

Automatic Feature Extraction in Accelerated Plethysmography

A Dissertation

Submitted in partial fulfilment of the requirements for the award of degree of

**Master of Engineering
in
Electronic Instrumentation and Control**



Submitted By

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Declaration

I hereby certify that the work is being presented in this thesis work entitled “**Automatic Feature Extraction in Accelerated Plethysmography**” in partial fulfillment of award of degree of **Master of Engineering in Electronic Instrumentation & Control** submitted in Electrical & Instrumentation Engineering Department, Thapar University, Patiala is an authentic record of my own work carried under the supervision of **Dr. Mandeep Singh**, Associate Professor, Department Of Electrical & Instrumentation Engineering, Thapar University, Patiala, Punjab.

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The heart works as a pumping machine which circulates blood in whole body and nourishes every cell of the body. The pulse generated by heart is sensed with the help of Photo plethysmography technique. Plethysmography is a test which is used to measure the blood clots in arms and legs and how much air one can store in the lungs. The changes in finger blood flow is given by the pulse wave amplitude derived from Finger plethysmography and is analyzed for its diagnostic abilities. The motive of this study is to analyze the features extracted from the second derivative of the pulse waveform. Further, the parameters are to be found which are directly link to the increase level of pitta. Pitta is one of the Ayurvedic dosha which may be the disease causing agent in the human body. It has been analyzed that the pitta level increases due to sunlight and after having mid-day meals.

In this dissertation work the second derivative of the finger PPG waveform has been studied and some important features have been extracted from it. The data has been recorded with the help of BIOPAC MP System and Acknowledge software. For this study data of 36 subjects has been acquired. Finger PPG's of three fingers namely index, middle and ring of both left and right hands has acquired after breakfast, before and after lunch. Eight parameters from each finger has extracted using computer algorithm. From a total of 36 subjects best 25 subjects are being taken. For comparison, two groups have been made, named as group 1(after breakfast and before lunch) and group 2(after breakfast and after lunch).

Further analysis is done by applying Fisher discriminant ratio and t-Test on these two groups. Out of these 48 parameters, 13 and 16 such parameters from group 1 and 2 respectively are found that having high Fisher discriminant ratio. After this analysis, the correlation matrices are formed for these 13 and 16 parameters. Parameters having correlation more than '0.6' are further selected, the lower Fisher discriminate ratio parameter is eliminated. These correlation matrices yield 6 and 10 parameters from each group respectively for further investigation. After these 6 and 10 parameters of group 1 and 2 respectively, 4 parameters were found to be common. Those parameters are recommended for further studies on detection of high level of pitta.

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APG	Acceleration Plethysmography
PPG	Photo Plethysmography
SDPTG	Second Derivative of Finger photo Plethysmography

1.1.An Introduction to Ayurveda

Ayurveda is an alternative system of medicine. It is a combination of specialized diets, herbal medicines and massage to deal the source cause of a disease and re-establish balance inside the body. The word Ayurveda is obtained from two Sanskrit terms ‘ayur’ means life and ‘veda’ means science as shown in Figure 1.1. Hence, Ayurveda means ‘the science of life’. Ayurveda, called the “Mother of all healing” is traditional health system which is more than 5,000 years old [1].

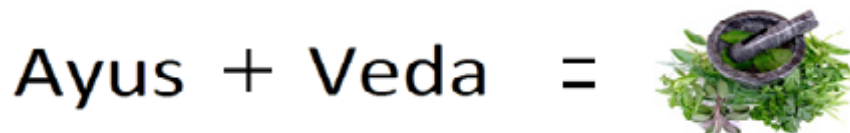


Figure 1.1: Meaning of Arurveda

1.2 Key Insights into Ayurveda

Ayurveda has a great importance on prevention. It motivates the maintenance of health by balancing one’s lifestyle, right thinking, diet and the use of herbs. Ayurvedic knowledge helps an individual in knowing how to create this balance of mind, body and consciousness according to the one’s own individual physique. It also helps in making changes in lifestyle to bring about and maintain this balance [2].

Each person has an individual fingerprint likewise everyone has its own pattern of energy. Energy, which is individual’s combination of mental, physical and emotional characteristics.

This balance is disturbed by many factors that includes both internal and external. This change is reflected as change in one’s physique which is different from the balanced state. Individual’s emotional state, seasons and weather, diet and food choices, work and family relationships, physical trauma are some examples of these emotional and physical stresses. After understanding these factors one can easily minimize or nullify their effects or remove the cause of imbalance by taking appropriate actions and gain its original state [3].

1.3 Balancing the Three Principal Energies of Body

Ayurveda classify three basic types of energies which are present in every individual but in different proportions. These three principal energies are related to the basic biology of the body. These three energies are named as vatta, pitta and kapha [4]. The Figure 1.2 shows these three types of energies.

In ayurveda, the balance is formed when mind, body and consciousness work together. In order to learn how the mind, body and consciousness is balanced one must need to know that how vata. Pitta and kapha work together.



Figure 1.2: Different types of energies in Ayurveda

1.3.1 Vata Type

Vata is the precise energy which is associated with movement. It is composed of space and air. It includes blinking, breathing, and muscle and tissue movement, all movements in the cell membranes and cytoplasm and pulsation of heart. If vata is in balanced state, it promotes flexibility and creativity and if becomes out of balance it promotes anxiety and fear. The type of physique vata type people exhibits is shown in Figure 1.3.

1.3.2 Pitta Type

Pitta indicates the body's metabolic system. It is made up of water and fire. It includes absorption, digestion, nutrition, metabolism, assimilation and body temperature. If vata is in balanced state, it promotes intelligence and understanding. If it is in out of balanced state, it awakens hatred, anger and jealousy. The type of physique pitta type people exhibits is shown in Figure 1.3.

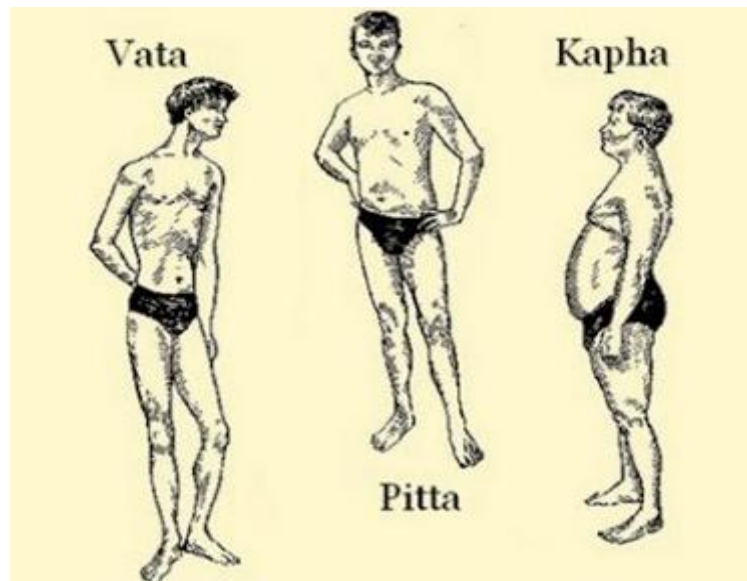


Figure 1.3: Consequences of different types of energies in Ayurveda

1.3.3.Kapha Type

Kapha forms the body's structure like bones, muscles, tendons etc. The type of physique kapha type people exhibits is shown in Figure 1.3. It also provides the “glue” which holds the cells together that are formed from water and earth. The water in all body parts and systems is supplied by kapha. It moisturizes the skin, lubricates joints and maintains immunity. If kapha is in balanced state it is expressed as calmness, love and forgiveness and if becomes unbalance it leads to greed, attachment and envy [5].

1.4 Ayurveda as a Complementary System of Healing

Ayurveda and Western allopathic medicine are very much different from one another. Western allopathic medicine basically works on symptomatology and disease. It mainly uses drugs and surgery to clear the diseased tissue and pathogens from the body. This approach has saved many lives [6]. Surgery, in fact is encompassed by ayurveda. On the other hand, the body repeatedly weakens because of the toxicity of drugs. Ayurveda does not focus on disease. Ayurveda mainly based on the proper balance of energy inside the body [7]. The condition when the person is suffering from minimal stress but at the same time the energy inside the body is balanced then it shows that the natural defence system of the body is strong and it can easily fight against disease [8]. When any of these energies get out of balance then the disease caused by them is shown in Figure 1.4.

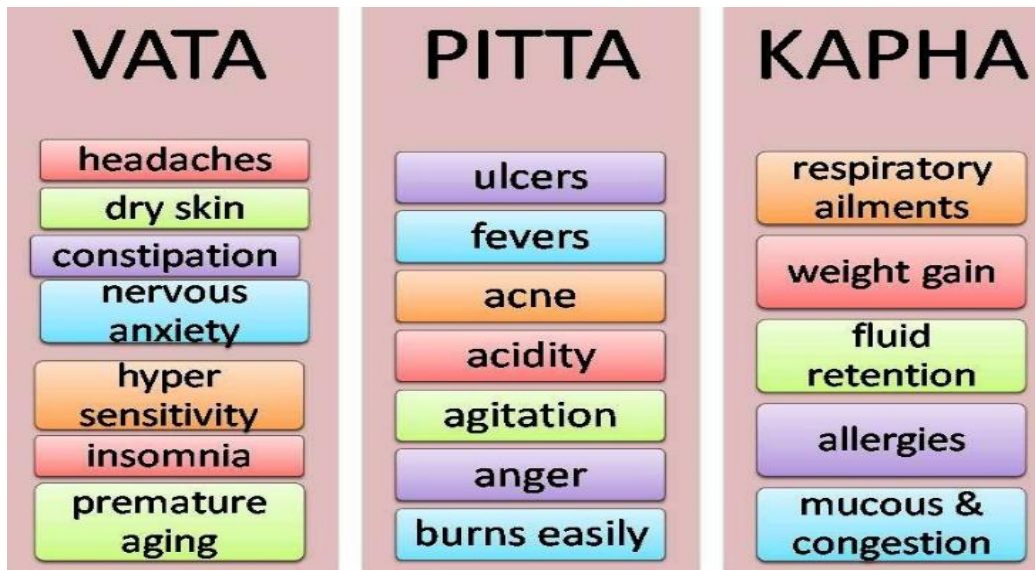


Figure 1.4: Diseases caused due to imbalance Doshas

Ayurveda plays vital role in maintaining this defence system inside the body. It is concluded that Ayurveda is not a substitute for Western allopathic medicine. Western allopathic medicine in conjunction with ayurveda can be used to make a person strong and less prone to disease. It also rebuilds the body an individual after being treated with surgery or drugs [9].

CHAPTER 2

PLETHYSMOGRAPHY AND SDPTG

2.1 Plethysmography

Plethysmography is a non-invasive indicative technique which is used for screening and victim follow ups with several arterial in conjunction with venous pathologies[10]. The principle of plethysmography is based on the graphical recording of any kind of elemental change in body with respect to each heartbeat. In contrast to this is the photo plethysmography (PPG), which is used for recording any change in reflection of light from the shift in number of red blood cells in the coetaneous microcirculation [11].

2.1.1 Types of Plethysmography

Earlier, Oscillometer was the most commonly used plethysmography device as it was inexpensive, simple and portable. It is no longer used because it is a non-standardized instrument with poor sensitivity and not provides pulse contour information or permanent record [12]. There are several types of plethysmography that have been used in the past. All of them contains a different transducer principle with the help of which any change in the body dimension have been recorded.

There are mainly four types of plethysmography exist which are listed below:

- Strain gauge
- Photoelectric
- Air displacement
- Impedance

Strain gauge plethysmography consist a transducer which is filled with indium gallium metal alloy conductor or mercury. The diameter of strain gauge decreases when it is stretched and this decrease in diameter will cause an increase in voltage. When this strain gauge is wrapped around a limb segment, it provides a circumferential measurement that can be used to calculate area. The limb segment has a “Slice Volume” which changes itself as the limb volume contracts and expands.

Photoelectric plethysmography which is also known as photoplethysmography deals with the skin related blood volume. In this plethysmography, an electrode that consist infrared LED and photo sensor is attached to the skin. Because of the electrode, the light is transmitted into

the skin as shown in the Figure 2.1. This light is scattered into the skin and is absorbed by the tissue in the illuminated area. Blood weakened the reflected light and the intensity of reflected light changes with density of blood tissue. The photo sensor generates the voltage signal which is amplified by a DC circuit. Low frequencies are passed that produces comparatively steady tracing. This correlates with the blood density in the fundamental tissue [13].

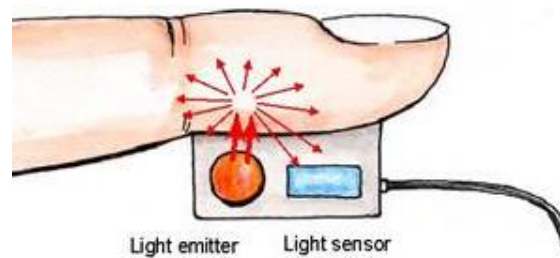


Figure 2.1: Method of photoelectric plethysmography

In Air- Displacement plethysmography the volume of an object is measured. This volume is measured by indirectly measuring the air volume which the object displaces inside a closed chamber. The body volume of human is measured when a victim sits in an confined chamber as shown in Figure 2.2. After that the victim displaces a volume of air equal to his or her own body volume in that respective chamber. The difference of the residual volume of air within the chamber when the victim is inside and the volume of air in the empty chamber will give the body volume.

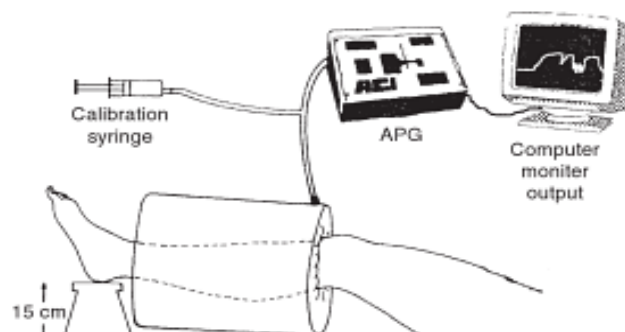


Figure 2.2: Method of Air- Displacement plethysmography

Last but not the least is Impedance plethysmography. In this plethysmography, a weak current is passed through a limb and the electrical resistance to the current flow is measured. The four conductive bands are used here which are taped around the limb. Out of these four, two electrodes are called inner electrodes and rest two is called outer electrodes. This inner pair of electrodes is then used to measure the electrical resistance.

2.2 Photoplethysmography Instrumentation

Recent PPG sensors generally consume low cost semiconductor technology by means of LED and coordinated photo detector device. These LED and photo detector devices worked at the red and/or close to infrared wavelengths. LEDs renovate electrical energy into light energy in addition to have a contracted single bandwidth (typically 50 nm). The major benefit of using LEDs as light source is that, they are condensed with a lengthy operating life typically greater than 105 hours. They operate over a broad temperature range with little shifts in the peak-emitted wavelength. They are mechanically reliable and robust [14].

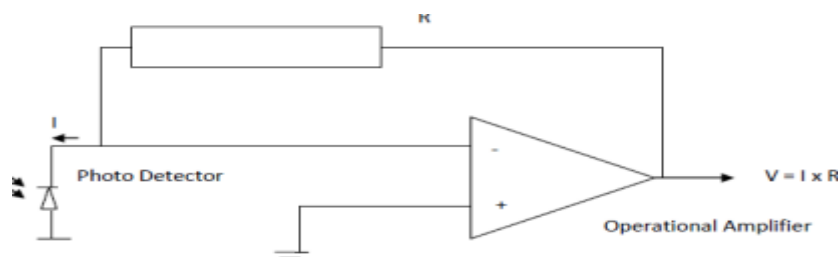


Figure 2.3: Transimpedance Amplifier stage of a PPG Sensor

Conversely, it should be taken concern that the standard intensity of the LED is stable and rather satisfactorily low to reduce unnecessary local tissue heating. Also, to decrease the danger of a non-ionizing emission hazard. The substitute of photo detector lying on its spectral individuality which are selected to go with that of the light source. The light energy is converted into an electrical current with the help of this photo detector as shown in Figure 2.3. They have low cost and fast response time. Also, they are compact and sensitive. The photo detector connects to tiny noise electronic circuitry which includes a filtering circuitry and a transimpedance amplifier as shown in Figure 2.4.

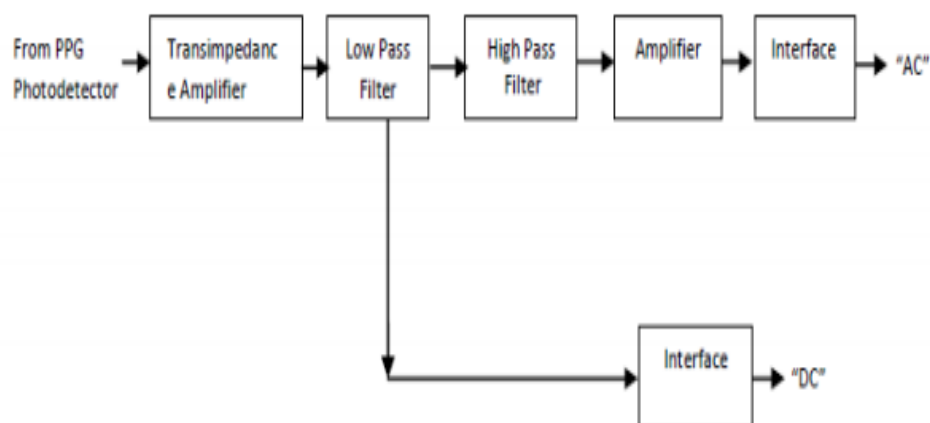


Figure 2.4: Block Diagram of Signal Conditioning Stages of a Standard PPG Sensor

2.3 Accelerated Plethysmography

This is a dimension tool for the evaluation of vascular retrogradation by differentiating “Volume capacity plethysmography” two times. This is also known as Second Derivative of finger photoplethysmography (SDPTG).

2.3.1 Origin of Accelerated Plethysmography

Classification of Photo plethysmography on the basis of signal processing method for velocity is shown in Figure 2.5.

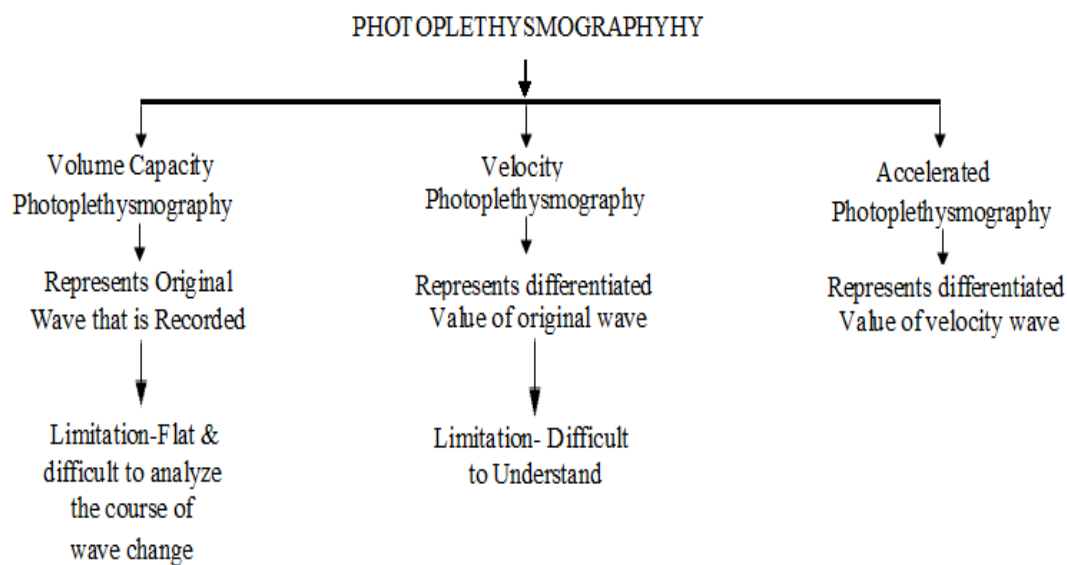


Figure 2.5: PPG classification by velocity method

Photoplethysmography is classified into three categories on the basis of signal processing method for velocity. These are named as simple plethysmography also called as “velocity capacity plethysmography”, “velocity plethysmography” and “accelerated plethysmography”. Specifically, the original wave that is recorded represents original wave. It simply means that photo plethysmography has its original characteristics as itself and this will help in recognizing its specificity [15].

Conversely, original plethysmography has a limitation that it cannot evaluate the route of wave changes immediately because the original wave is smooth. For nullifying this weak point the differentiated value of original wave is used. This differentiated value specifies “velocity photo plethysmography”. This value is helpful to figure out and examine the process of pulse wave transform which is tricky to be understood in the ordinary photo

plethysmography. However, there are restrictions to recognize the course of pulse energy throughout “velocity photo plethysmography” is helpful to understand the method of pulse wave change. Thus, the differentiated value of “velocity photo plethysmography” is used to more exclusively realize the route of pulse energy. This eventual value is called as “accelerated plethysmography”[16].

The composition of Volume Capacity Photoplethysmography, Velocity Photoplethysmography and Accelerated Photoplethysmography is shown in Figure 2.5.

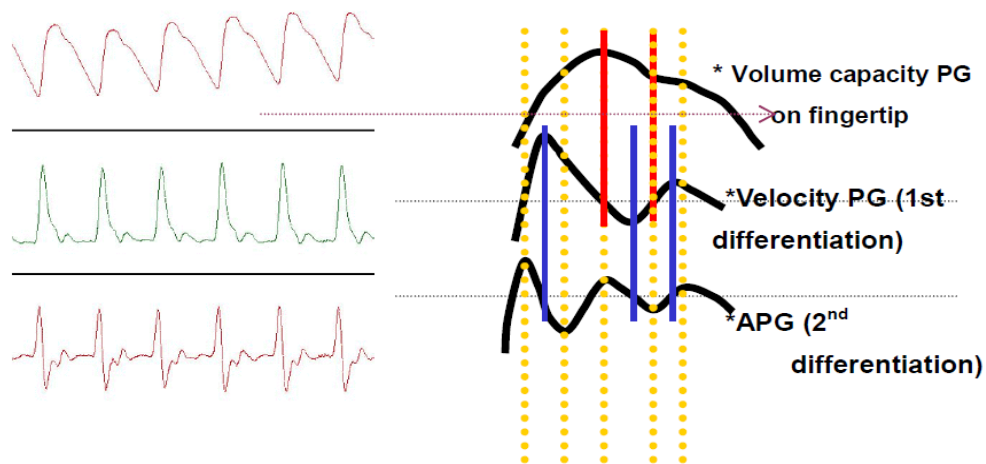


Figure 2.6: Comparisons of Volume Capacity Photoplethysmography, Velocity Photoplethysmography and Accelerated Photoplethysmography

2.3.2 Background of invention

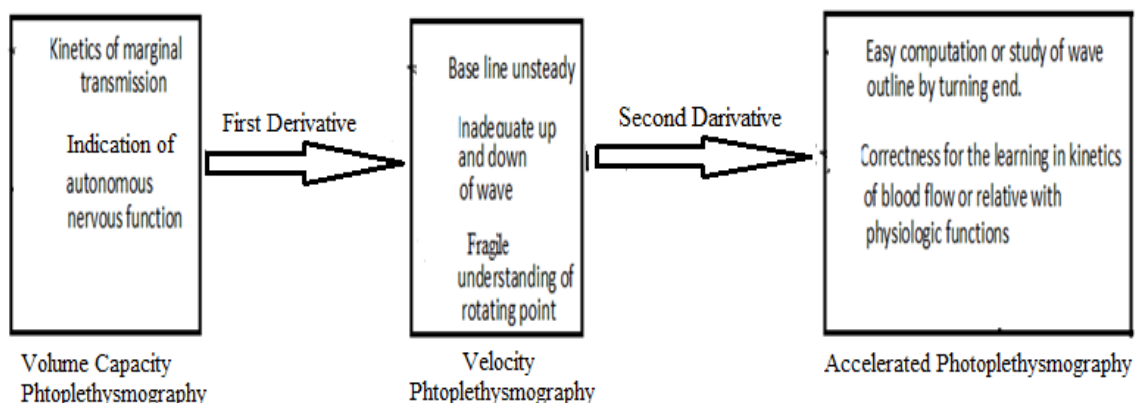
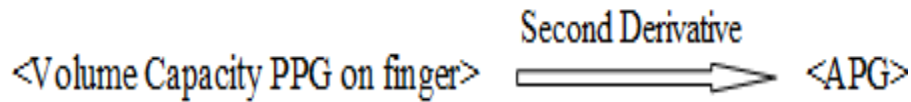


Figure 2.7: Classification of PPG on the basis of problems in Volume Capacity Photoplethysmography and Velocity Photoplethysmography

The background of invention of SDPTG (Second derivative of finger photoplethysmography/ APG (Accelerated photoplethysmography) is depicted in self explanatory diagram shown in Figure 2.7.



2.3.3 Analysis of SDPTG Waveform

The second derivative of the finger photo plethysmography is SDPTG. It consists five main parts as shown in Figure 2.7 from a to e: initial positive (a), early negative (b), re-increasing (c), late re-decreasing (d) and diastolic positive (e). From these determinants, the following parameters can be calculated: b/a ratio, c/a ratio, d/a ratio, e/a ratio and aging index $AGI = (b - c - d - e)/a$ [16].

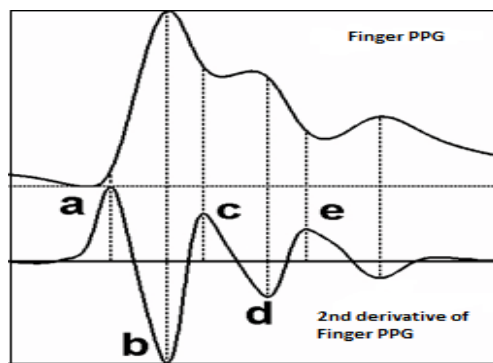
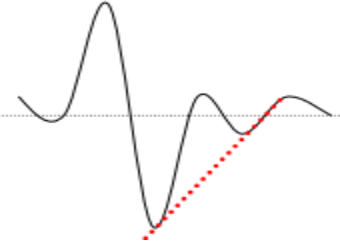
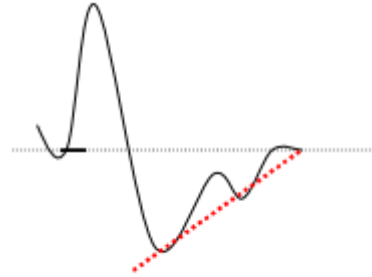
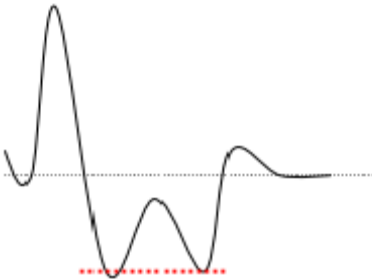
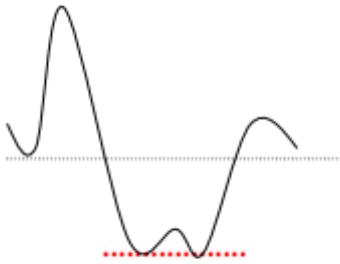
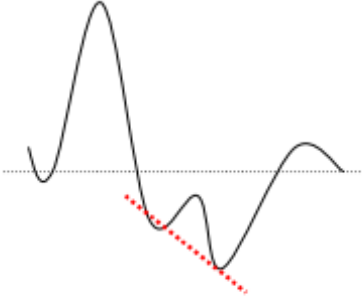
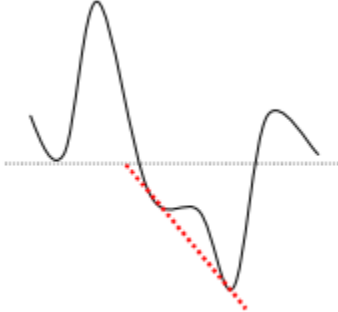


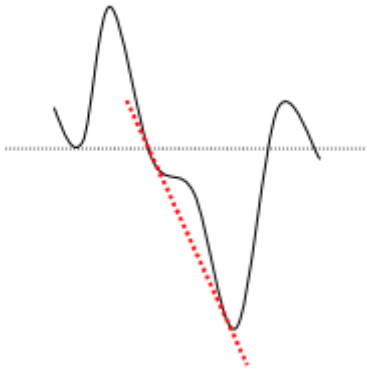
Figure 2.8: SDPTG (Second Derivative of finger photoplethysmography)

The features of APG are also identifying by studying the PPG waveform and their derivatives [17-24]. PPG studies also find applications in Biometrics [25]. The shape of the pulse waveform is classified into 7 classes according to reliability of circulation which is shown in table 2.1.

Table 2.1: Analysis of wave

Grade	Wave Patterns	Symptoms
<p>Normal</p>		<p>This kind of wave is frequently appeared not merely in a young and healthy human being as well in a individual having a good blood flow. Yet in a middle age, this typical wave is showed in individual in training.</p>
<p>Abnormal-1</p>		<p>This type of wave is showed in a human being having a a little bad blood circulation, however in a better state. A unique feature of this wave is that ‘c’ is below the base line but above ‘b’ and ‘d’ is above ‘b’. As ‘c’ and ‘d’ are downward, it means that a blood circulation is fetching in the bad state.</p>
<p>Abnormal-2</p>		<p>This wave shows that circulation of blood is in the Moderately bad state. A noticeable point is that ‘d’ is decreasing into the similar level as ‘b’ in Comparison to normal and abnormal-1 wave.</p> <p>•Symptoms: Foot & hand are getting chilled or Cold. A person belongs in this type is endangered to get overfull as with blood.</p>

<p>Abnormal-3</p>		<p>This wave reveals that blood flow is in the noticeably bad state. A marked characteristic is that 'c' is in the equal level as 'b', 'd' in compare to abnormal-2 wave, and becomes indefinite state.</p> <p>•Symptoms : Hand and foot are getting chilled or cold. Swelling from excessive accumulation of watery fluid in cells and tissues. Feeling weighty in the head or feeling like getting a cap on.</p>
<p>Abnormal-4</p>		<p>This type of wave is come out in a individual having a extensively bad blood circulation. A special feature is that 'd' is below 'b', and if variation is getting broad, it represents that the blood circulation is steadily becoming in the bad state.</p> <p>•Symptoms: Sudden common weakness and pain, skin color irregularity and thermo anesthesia.</p>
<p>Abnormal-5</p>		<p>This wave shows that blood flow is in the extraordinarily bad state. A marked distinctive is that 'b' and 'c' is almost in the equal level, and 'd' is in the far worse location than 'b' and 'c'.</p> <p>•Symptoms: Foot and hand could be blue from problem.</p>

<p>Abnormal- 6</p>	 <p>The image shows a single ECG wave on a grid. The wave starts with a small P wave, followed by a tall, narrow QRS complex. The ST segment is significantly depressed, and the T wave is inverted. A red dotted line is drawn from the end of the QRS complex down to the T wave, highlighting the abnormality. A horizontal dotted line represents the baseline.</p>	<p>This wave shows that blood circulation is in the worst condition. In this case, ECG repeatedly detects the irregularity.</p> <p>•Symptoms: This state is likely to infection even a minor injury (or trauma). Risks of hit Due to vascular deformity. This condition Does not recover although the medical healing is being done.</p>
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3.1 The blood supply of various skin areas as estimated by the photoelectric plethysmography

A. B. Hertzman was the first to propose a photoelectric plethysmography in (1938). Photo plethysmography is a noninvasive mechanism for sensing blood volume alterations in living tissue by visual means. The device consists of photo detector, a light source, and alternating amplifier. It can be used to detect flow deviation in the periphery throughout the cardiac cycle. It was further expressed as a device that takes benefit of the fact that the absorption of light by a trans-illuminated tissue differs with its blood content. This is an outcome of the Lambert–Beer law, which communicates light absorption to optical density. Hertzman’s device light up the skin and calculated back-scattered light with a photocell [26].

3.2 Reflection plethysmography of arterial-blood volume pulses

In [1977], J. Weinman, A. Hayat, and G. Raviv deliberated the visual indicator of the photoplethysmograph in the insightful mode by means of a in vitro form. Reflection photoplethysmography permits non-invasive registering of arterial-blood-volume pulsation. The technique is based on screening backscattered infrared light and it has promising diagnostic importance: volume pulse shapes depends on cardiac presentation and arterial elasticity. Two optical methods were observed: (a) Attenuation by the liner of backscattered and back-reflected light, here vessel expansion leads to less light at the sensor;(b) Light indication by the vessel barrier proximal to the sensor, and vessel expansion gives increment to more light at the sensor, this cancels out the attenuation. The mutual effects of (a) and (b) make the testimony pulse shape dependent on the transducer/artery position relationship. Volume-pulse transducers that observe the disarticulation of arterial walls mechanically (e.g. piezoelectric crystals) are responsible to produce similar artifacts. They completed that reflection, absorption scattering and association of the vessel wall all participate a role in creating the signal and the projection of minimizing these artifacts, by using enhanced transducer designs are capable [27].

3.3 Parameters Describing the Pulse Wave

In July[2008], D. Korpas, J. Hálek, L. Doležal from the Department of Medical Biophysics, Faculty of Medicine, Palacký University Olomouc, Czech Republic respectively offered a review article which explains the pulse wave measurement factors and main results achieved. The values of pulse wave measurement and current knowledge in clinical practice are also conferred in brief. It shows the potential consumption and incorrectness of clinical measurements. It creates that the Pulse waveform is a genuine physiological signal. The measurement is susceptible to body motion as predisposed by other physiological beats. In spite of restrictions, this technology characterizes a promising noninvasive tool for reflecting the grade of cardiovascular system together experimental and in a clinical setting [28].

3.4 On the Analysis of Fingertip Photoplethysmogram Signals

In 2012, Mohamed Elgendi in his research thrash out different types of artifact added to PPG signal, typical features of PPG waveform and obtainable indexes to estimate for diagnoses. The benefit of Photoplethysmography being simple, low cost and moveable technology which can be used in principal health care and distant clinics is also discussed. This review also explains a number of features of the photoplethysmogram and their possible applications. It was accomplished that a common structure of any PPG diagnostic scheme consists of three stages preprocessing, feature extraction and diagnosis where the chief focus of this review was the preprocessing and feature extraction period [29].

3.5 Contour analysis of the photoplethysmographic pulse measured at the finger

In 2006, Sandrine C. Millasseau, James M. Rittera, Kenji Takazawab and Philip J. Chowienczyka elaborate the backdrop to digital volume pulse contour study and how these technique relates to curve analysis of the pressure pulse. It was concluded that Optical resolution of the digital volume pulse (DVP) is a mainly simple method for performing pulse contour analysis. Similar to the pressure pulse, the DVP is inclined by huge artery stiffness 24 and by pressure wave reflection in the universal vasculature. Contour analysis of the DVP offer a rapid means of assessing vascular tone and arterial rigidity. Applications contain the assessment of arterial stiffness, endothelial function, and characterization of arterial ageing [30].

3.6 Frequency Analysis of the Peripheral Pulse Wave Detected in the Finger with a Photoplethysmograph

In 1990, M. H. Sherebrin and R. Z. Sherebrin, presented a frequency analysis of the tangential pulse wave discovered in finger PPG achieved with photoelectric plethysmography using a moveable computer and studied how the pulse shape modify as a function of age and qualitative control of heart rate and blood pressure. The experiment was executed using 54 subjects in three age groups, 10-29, 30-59, and 60-89 years. The youngest group had a superior power in the second harmonic, (normalized to the fundamental), with $p < 0.05$ than the elder two groups. The reduced power in the harmonics of the secondary pulse wave with age may be a helpful noninvasive measure of aging and vascular disease [31].

3.7 Analysis and Characterization of Photo-Plethysmographic Signal

In 2001, Joydeep Bhattacharya and Partha Pratim Kanjilal worked on the qualitative estimation of the largely clinical status of the subject and categorization of complex cardiovascular dynamics from digital blood volume pulsations which was calculated non-invasively using a photo-plethysmographic device. They engaged a novel concept to notice the dominant non sinusoidal periodicity entrenched in the data series and to take out the associated periodic component. They also offered the characterization of the fundamental system in the light of nonlinear dynamical study. It was accomplished that the stable subjects are shown to perform as a low-dimensional system whereas the diseased subjects reveal comparatively high dimensional activity [32].

3.8 Waveform Analysis of Peripheral Pulse Wave Detected in the Fingertip

In 2003, Irina Hlimonenko, Kalju Meigas and Rein Vahisalu studied the expandable properties of vascular tree in human being as subjects as a function of aging by using the shape of peripheral pulse wave and recognized that the pulse wave must be investigated as a superposition of two separate waves i.e. the incident traveling wave that travels from heart to periphery, and the reflected wave which travels from the periphery and the site of wave indication to the heart. The incident wave depends on the left ventricular expulsion and the arterial stiffness, whereas the reflected wave is connected to arterial stiffness and the possible sites of wave reflection [33].

3.9 Correlation studies of finger pulse profiles for detecting Ayurvedic Doshas

In 2011, Dr. Mandeep Singh and Spiti Gupta discovered the detection of tridoshas using new PhotoPlethysmoGraphy (PPG). As per the ancient science of Ayurveda human beings undergo primarily in relation of imbalance in the three basic human element (vatta, pitta, kapha) called doshas. These doshas are usually detected by the trained masters simply by imperative the radial artery in the wrist with their three fingers. In this study the pulse contour of all 10 fingers in 7 healthy subjects is recorded using Biopac MP150 data acquisition system. In all 70 cases without exclusion the autocorrelation for a specified finger of subject is always advanced than correlation with equivalent finger of any other subject [34].

3.10 Frequency Domain Analysis of Radial Pulse in Abnormal Health Conditions

In 2010, Bhaskar Thakker and Anoop Lal Vyas execute the frequency domain analysis of the radial pulse. The radial pulse signal in anomalous health conditions show discrepancy in its morphology in contrast to that of the healthy subjects that results in modifications in the pulse power spectrum. They made a relationship between the power spectrum of pulsation signal for the subject's affliction from gastrointestinal disorders and healthy subjects. A frequency domain characteristic "Band Energy Ratio (BER)" was distinct to recognize the band of frequencies consisting important dissimilarity between the two groups. The unusual bands showing significant enhance of energies was recognized as 4Hz to 10Hz band. Based on Receiver Operating individuality (ROC) analysis, 8 Hz to 10 Hz band was known carrying added significance giving 89.7% sensitivity, 90.5% specificity and 90% accuracy as best possible parameters to isolate the two groups[35].

3.11 Determinants of the second derivative of the finger

Photoplethysmogram and brachial-ankle pulse-wave velocity. In 2005, J Hashimoto et al. examined different individuality of the second derivative of the finger Photoplethysmogram (SDPTG) along with (BAPWV) brachial-ankle pulse wave velocity for evaluating arterial function in a big universal population, along with the modification of SDPTG in hypertension. They used the multivariate and univariate analyses method to evaluate the features of SDPTG indices and BAPWV along with the differences between hypertensive and normotensive subjects. They initiate that BAPWV was separately and positively correlated with blood pressure (BP), age, hemoglobin A1C and heart rate (HR). The AGI and d/a ratio explain a positive and the b/a ratio a negative autonomous correlation with BP and age. On the other hand, AGI and the d/a ratio and showed a negative and the b/a ratio a encouraging

correlation with HR. The SDPTG indices, but not BAPWV, were separately connected with gender. It was completed that the SDPTG depends on diverse factors in a manner unlike BAPWV; it may be helpful for noticing vascular aging accelerated by hypertension [36].

3.12 Second Derivative of the Finger Arterial Pressure Waveform:

An Insight into Dynamics of the Peripheral Arterial Pressure Pulse J. Simek et al. second derivative of the (SDFAP) i.e. finger arterial pressure waveform in 120 fit middle-aged subjects and in 24 subjects with necessary hypertension. In multivariate regression analysis, b/a and c/a correlated with age. d/a separately correlated with mean blood pressure (MBP), age, body height, heart period and gender. e/a separately correlated with age and MBP. d/a and e/a were advanced and while b/a and c/a were lesser in hypertensives compared to age and sex matched controls. After the adjustment for body mass index, MBP, heart period and independent discriminative power was conserved only for indices b/a and c/a ($p = 0.001$ and 0.021 , respectively). Consequently, they concluded b/a and c/a present extra information about easy clinical uniqueness and might reproduce the structural alteration of the arterial wall in hypertensive subjects [37].

3.13 Independent Determinants of Second Derivative of the Finger

Photoplethysmogram along with Various Cardiovascular Risk feature in Middle-Aged Men In 2007, Toshiaki OTSUKA et al. used the second derivative of the finger photoplethysmogram (SDPTG) as a non-invasive assessment for arterial stiffness. They wanted to make clear independent determinants of the SDPTG amongst a variety of cardiovascular risk factors in middle-aged Japanese men. The SDPTG was acquired from the cuticle of the left-hand index finger in 973 male workers during a medical checkup at a company. The SDPTG parameters (b/a and d/a) were calculated from the height of the wave components. Multiple logistic regression analyses revealed that the independent determinants of an increased b/a were age, hypertension, dyslipidemia, impaired fasting glucose/diabetes mellitus, and a lack of regular exercise. Similarly, independent determinants of a decreased d/a were age, hypertension, and alcohol intake 6 or 7 days per week. It was concluded the SDPTG indices reflect arterial properties affected by several cardiovascular risk factors in middle-aged Japanese men [38].

3.14 Noninvasive assessment of arterial distensibility in adolescents using the second derivative of photoplethysmogram waveform

In 2001, Miyai N et al. In order to explain the clinical utility of SDPTG waveform examined the connection among the prototype of the SDPTG waveform and danger factors connected to atherosclerosis in 1,495 subjects aged 9-17 years. They originate that subjects with lower d/a ratios had appreciably higher systolic (SBP) and diastolic blood pressures (DBP), atherogenic index (AI) and immunoreactive insulin concentrations (IRI) values compared to those with higher d/a ratios. Their findings recommended that differences in the length of the vascular system, which are associated to increases in body height, may change the SDPTG waveform prototype through adolescence. It was accomplished that when the body height as well as age and sex is adequately allowed for, the d/a ratio may be useful for the assessment of arterial distensibility and for recognition of individuals at an increased risk of rising atherosclerosis [39].

3.15 Second Derivative of Photoplethysmography for estimating vascular Aging

In 2007, Hyun Jae Baek, Jung Soo Kim, Yun Sung Kim, Haet Bit Lee and Kwang Suk Park introduced second derivative of photoplethysmography (SDPTG) for monitoring arterial state as an application of PPG method. SDPTG consists of a, b, c and d wave in systole and an e wave in diastole. The SDPTG wave model is determined by the extent of the b, c, d, and e waves to the a wave. In their study, they established that the b/a ratio and SDPTG-AI increased with age, and the c/a, d/a, and e/a ratios decreased with age. An informal method which substitutes formal SDPTG-AI was also suggested [40].

3.16 Measurement of a-a Intervals at Rest in the Second Derivative Plethysmogram

In 2009, Mohamed Elgendi, Mirjam Jonkman and Friso De Boer worked on the SDPTG waveform to find a new technique to discover the heart rate using an algorithm for a wave detection. It was completed that the precise detection of a waves in the SDPTG gives a non-invasive technique of evaluating cardiac rhythms. The usage of aa variability examination in SDPTG can be helpful for the cardiovascular functionality assessment [41].

3.17 Applying the APG to measure Heart Rate Variability

In 2010, Mohamed Elgendi, Mirjam Jonkman and Friso De Boer, used the Accelartion Plethysmograph(APG) to locate Heart Rate(HR) and heart Rate Variability(HRV). It was accomplished that HRV indices that are usually used with ECG signals can also be used with

APG signals. There was a strong positive connection linking the two HRV indices, SDNN(standard deviation of duration of heart beats) and R_{MSSD} (root mean square of the distinction of following heart beats) representing that the APG recordings were enough to measure the HRV [42].

3.18 Peripheral Hemodynamics Evaluated by Acceleration Plethysmography in Workers Exposed to Lead

Aiba Y, Ohshiba S, Horiguchi S, Morioka I, Miyashit K, Kiyota I, et al. with the intention of illuminate the effects of lead disclosure on peripheral hemodynamics performed increase of rate plethysmography (APG) for 48 male subjects occupationally out in the open to lead (exposure group) and 43 male subjects with no history of professional disclosure to lead (control group). In the exposure group, the blood lead concentration (Pb-B) was also calculated. Each APG parameter was assessed by comparing calculated data with the standard aging curves. A important negative connection was obtained connecting the parameter - b/a and Pb-B. The exposure group showed considerably lower values of parameters - b/a ($p < 0.01$) and d/a ($p < 0.05$) than the control group. It was completed that lead exposure affects peripheral hemodynamics as evaluated by APG [43].

3.19 Construction of a General Physical Condition Judgment System Using Acceleration Plethysmogram Pulse-Wave Analysis

In 2009, Heizo Tokutaka, Yoshio Maniwa, Eikou Gonda, Masashi Yamamoto, Toshiyuki Kakihara, Masahumi Kurata, Kikuo Fujimura, Li Shigang and Masaaki Ohkita used the function of rushing plethysmography to expand a analytic software that shows the state of the blood vessels using a Basic SOM (self organizing map) model, and performs artificial plethysmogram study of 4 components using the map position (the state of the blood vessel, vascularity), carelessness, pulse/minute, and pulse steadiness [44].

3.20 Evaluating the surgeon's stress when using surgical assistant robots

In 2007, Kazuhiro Taniguchi et al. projected a method for using surgeon's biological in order to estimate the surgeon's stress using a surgical supporter scheme. They analyzed the rushing plethysmogram unevenness as the indexes of autonomic anxious activity. It was completed that the technique had an aptitude to exactly estimate the surgeon's strain during surgery [45].

3.21 Finger Pulse Plethysmograph Feature Selection for Pitta Detection in Human Body

In 2012, Dr. Mandeep Singh and Tanushree Sharma have extracted and analyzed the facial appearance of finger pulse plethysmogram to uncover a family member among bigger pitta and the peripheral finger pulse. They acquired data from three subjects and extracted three parameters from both hands, before and straight away after lunch, namely, A2/A1, TP2/TPT, and TP1/TPT. It was established that the difference of A2/A1 in middle finger, and TP2/TPT in ring finger, decreased constantly for all the three subjects in both left and right hand [46].

3.22 Implantable accelerometer system for the determination of blood pressure using reflected wave transit time

M. Theodol et al (2014), has proposed a system in which a sensor system for nonstop monitoring of blood pressure using an acceleration sensor fixed on an artery using simply invasive techniques is described. The sensor relies on dimension of the reflected wave transfer time (RWTT). This implantable organization is fictitious on a stretchy substrate using 2 mm × 2 mm acceleration sensors and a telemetric unit for communication of the data. *In vivo* experiments show that the RWTT can be dependably strong-minded from arterial acceleration signals. RWTT and systolic blood pressure are shown to be powerfully coupled, with a correlation coefficient of 0.96, as strong-minded from dimension of 1800 pulses with a mean deviation of the blood pressure of only 4.3%. The system was fixed in an animal and was able to telemetrically convey acceleration plethysmographs with high worth out of the awake animal[47].

3.23 Photoplethysmography: Analysis of the Pulse Oximeter Waveform

Aymen A. et al, (2014) has established a system. A pulse oximeter is a noninvasive, accurate, unbroken indicator of arterial oxygen diffusion. It is measured one of the American Society of Anesthesia (ASA) standard monitors. The basic skill at the back the pulse oximeter is photoelectric plethysmography, as reported by Hertzman. There are two workings of the waveforms: the pulsatile section or AC portion and the static section or DC. Time and frequency domain are two different methods obtainable for plethysmographic waveform study. Inconsistency of the plethysmographic waveforms with ventilation provides an insight about purposeful volume position of the subjects. Plethysmographic waveform study provides more clinical information[48].

3.24 Evaluation of Arterial Properties through Acceleration

Photoplethysmogram

R. Gonzalez et al, (2014) have aimed to present, that acceleration photoplethysmogram produces practical information in assessing arterial properties. The growth and sequence of arterial vascular disease is a multi factorial development. Risk factors for cardiovascular disease intercede their things by changing the structure, properties and function of wall and endothelial components of the arterial blood vessels that vary between different vascular beds. Monitoring arterial vascular walls as well as danger factors for example hypertension, hypercholesterolemia and other blood biochemical profiles can potentially help to recognize individuals having an improved risk of mounting cardiovascular disease in adulthood. Pulse wave study has been shown to present precious information on aortic stiffness and elasticity, and it has been broadly used to weigh up the vascular effects of aging, hypertension and atherosclerosis. The second derivative of the PPG or acceleration photoplethysmogram (APG) was developed as a technique allowing more precise recognition of the modulation points and easier details of the unique plethysmogram wave. Even though obtained from the periphery of the movement, APG provides information about both central and peripheral arterial properties. A computer based PPG analyzer was developed. With the APG signal, four separate systole waves (named a-d) and a diastole wave (named e) were obtained. A study with 40 people, 20 healthy volunteers and 20 subjects with formerly diagnosed cardiovascular disease (diabetes mellitus, atherosclerosis, hypertension) was carried out. A t-Tested allocation between healthy volunteers and patients showed a important differences in considered parameters: b/a (-0.742 vs -0.361, $p < 0.0001$), d/a (-0.083 vs -0.482, $p < 0.0001$), e/a (0.182 vs 0.061, $p < 0.0001$), and for c/a (-0.039 vs -0.148, $p < 0.005$). In conclusion, APG signal has shown to be a noninvasive indicator for vascular assessments [49].

CHAPTER 4

PROBLEM DEFINITION

In the non-invasive Indian conventional system of Ayurveda, it is supposed that the function of entire human body is governed by three humors: vata, pitta, and kapha, called as Tridosha. The tridoshas control all the psychological, biological and physiopathological functions of the body, mind and consciousness. They act as essential constituents and defensive barriers for the body in its normal and balanced state. But when out of balance, they contribute to disease. Pitta, one of the tridoshas, which is a mixture of fire and water, is responsible for digestion and alteration in our bodies. Further it is also stated in Ayurveda that the level of pitta in human body increases after having meals [50].

Ayurveda has used the palpation of the pulse at the wrist under the thumb to examine physical health. In the nineteenth century, analysis of the contour of the peripheral pulse to evaluate arterial properties was first described. Also the peripheral artery is the expansion of radial artery. Therefore, the non-invasive evaluation of arterial indices can be done by analyzing the Finger Pulse wave, attained using the technique of Photo Plethysmography(PPG). Measurements taken directly from this finger PPG or from its second derivative can be used to assess these properties.

The aim of this dissertation is to evaluate the features extracted from the second derivative of the pulse waveform and find such parameters that may directly link to the increased level of pitta.

CHAPTER 5

PROPOSED SOLUTION

In this dissertation work, the finger pulse waveform of both left and right hands for the three fingers (index, middle and ring) of 36 subjects have been acquired for 30 seconds with the help of BIOPAC MP System and Acknowledge software. This data has been acquired one and a half hour after breakfast (but before 10:30 am), immediately before and after 15 minutes of lunch but the lunch should be taken in between 1-2 for all the 36 subjects. Filtering operation has been performed over the acquired waveform with the help of the digital IIR band stop filter with a quality factor of 7. Afterward twice the derivative of the filtered waveform at a sampling rate of 25 samples/sec has been taken to get the second derivative of the plethysmography or the acceleration plethysmography.

From the selected waveform five features which are the amplitude of the peaks (a,b,c,d,e) as shown in Figure 7.1. Set of parameters given by these features namely b/a , c/a , d/a , e/a followed by their average and standard deviation have been extracted using computer algorithm. These parameters are compared for the set of data collected after breakfast, before and after lunch by arranging them into data sheets. The process illustrated above has been executed and the results have been discussed in the proceeding chapters.

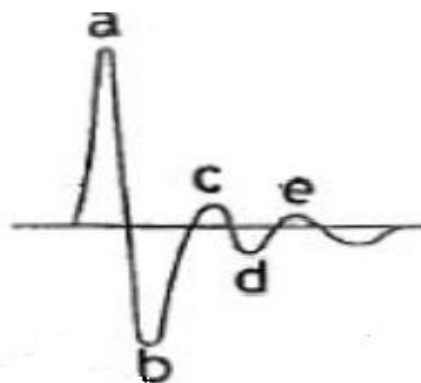


Figure 5.1: Significance of APG

CHAPTER 6

METHODOLOGY

6.1 MP System

The MP system hardware offers an adjustable means for the research and training needs. The modular, commanding interface structure can be used by means of BIOPAC simplifiers and accessories and with equipment.

MP starter system comprises all software, hardware and documentation that is needed to get started. Amplifier modules, transducers and electrodes can also be added to match the research design which is shown in Figure 6.1. New module for Electrogastrogram, Noninvasive blood pressure measurement, Microelectrode Recording and electrical bio-impedance (cardiac output) are also available here. Each MP system offers changeable sample rates for analog and digital channels, good resolution(16 bit), digital I/O lines,16 analog inputs and 2 analog outputs and 16 online calculation channels. With MP 150 system the high-sped acquisition (400 KHz aggregate), the ability to view and control systems across a network and Ethernet connectivity can be obtained[51].



Figure 6.1: BIOPAC MP150 System and its Probes

6.2 MP100 Starter System

The MP system consists of four panels which are shown in Figure 6.2-6.5. The MP100 system provides USB-ready data acquisition and analysis. It records various channels at several sampling rates. The data is recorded at speed up to 70 kHz or 16 kHz (aggregate to disk).

MP100 System includes: (1) Transformer: AC100A (2) Data acquisition unit: MP100A-CE (3) Universal interface module: UIM100C (4) USB adapter: USB1W (PC) or USB1M (Macintosh) (5) Cables: CBLSERA cable, CBL100 cable set (6) AcqKnowledge® software CD.

Recommended configuration: MP100 System connected to the computer's USB port by means of the USB1W (PC) or USB1M (Macintosh) Adapter. If the computer has no USB port, an adapter or industry standard USB card is required [52].

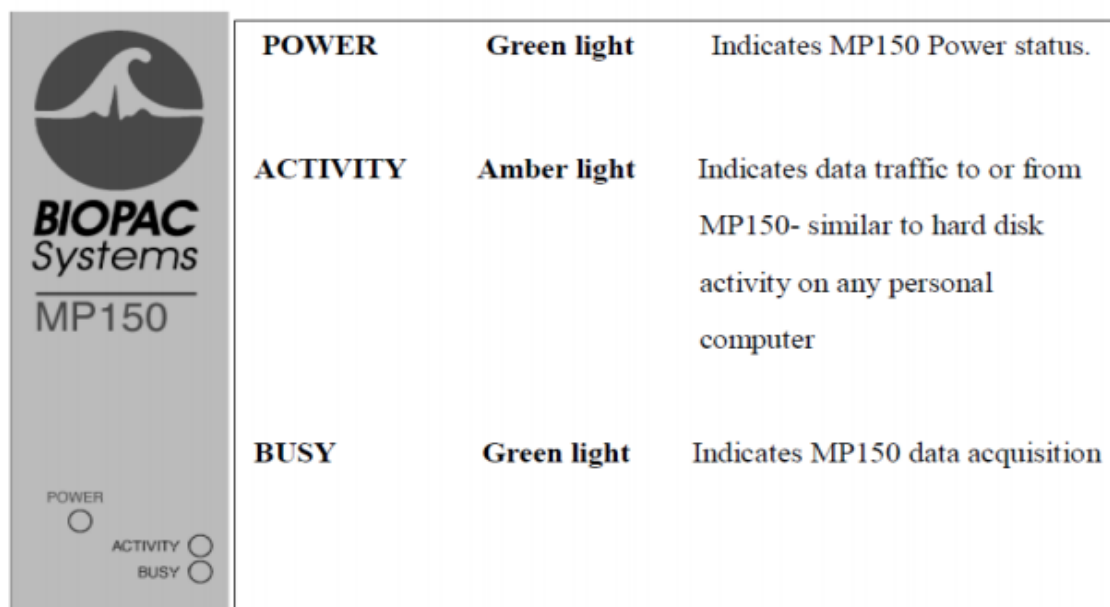


Figure 6.2: Front Panel

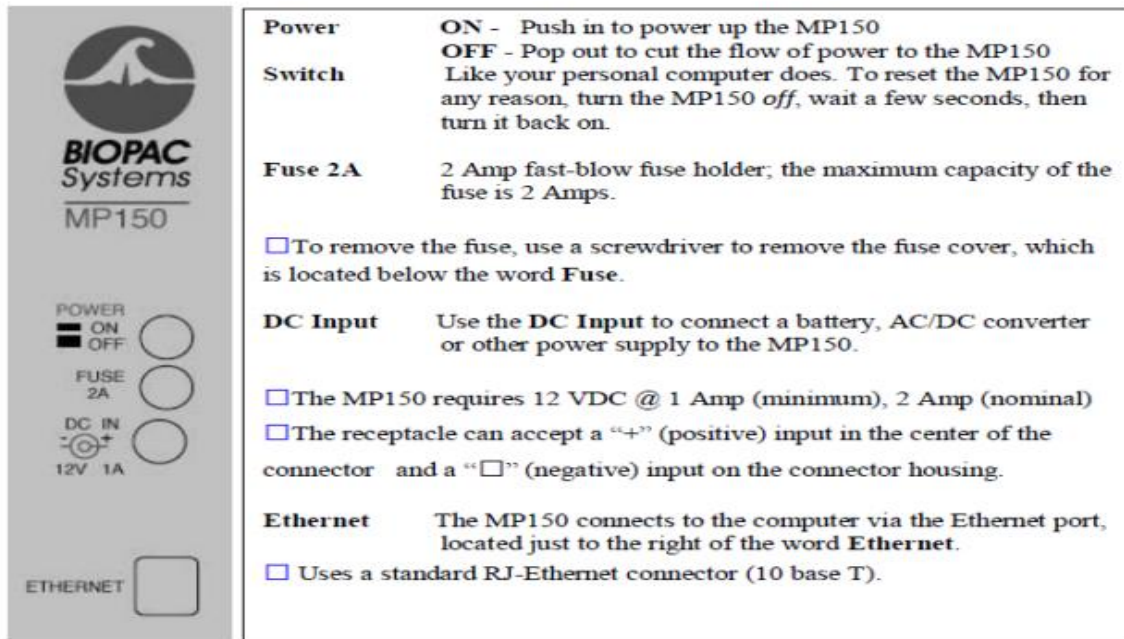


Figure 6.3: Back Panel

Module connections: The two connector inputs are designed to connect directly to the UIM100C.

Analog signals are transmitted through the 37-pin connector (upper right side)

Digital signals are transmitted through the 25-pin connector (lower-right side)

Figure 6.4: Side Panel

Firmware Rollback Switch

The Firmware Rollback Switch is located on the bottom of the MP150 unit and is recessed to prevent accidental activation—it is NOT A RESET for the MP150 unit.

Figure 6.5: Bottom

6.3 IPS100C Isolated Power Supply Module

The IPS100C is used to run 100-series amplifier modules without using MP data Acquisition unit. The IPS100C module shown in Figure 6.6 connects the 100-series amplifier outputs right away to one of the 36 other data acquisition system, oscilloscope or chart recorder. Amplifier modules break onto the region of the IPS100C to collect the necessary remote power and to express the modules output to the front panel of the IPS100C. The IPS100C

permits users to control up to 16 amplifiers on a separate basis. The analog channel outputs are given by 3.5mm phone jacks on the front panel. When recording data from electrodes attached to humans, make use of the HLT100C module with OUTISO and INISO adapters to join signals to outer equipment.



Figure 6.6: Isolated Power Supply Module

6.4 TSD200 Photoplethysmogram Transducer

The TSD200 shown in Figure 6.7 contains a photo diode and a matched infrared emitter. Photo diode conveys alterations in blood density (because by changing blood pressure), in definite body locations. When the TSD200 is connected to the skin, the infrared light is altered by blood pulsing with the help of the tissue below. The modulated reflected light outcome in little variations in the resistance of the photo resistor. This yields a relative change in voltage output.



Figure 6.7: Plethysmogram Transducer

The TSD200 contains a shielded 2-meter wire and a stretchable Velcro® strap for simple Connection to the fingers. The TSD200 can also be placed on other body position by utilizing

ADD208 adhesive disks to grasp the TSD200 in place. The transducer is placed around the finger and the Velcro® is adjusted to provide simply minor pressure.

Blood density readings can differ significantly depending on transducer position and pressure changes. The TSD200 connects to the PPG100C as shown in Table 6.1:

Table 6.1: Connections between TDS200 Lead and PPG100C

TSD200 Lead	PPG100C
Red Lead	+VSUP
Black Lead	GND
Blue Lead	Input

6.5 PPG100C – Photoplethysmogram Amplifier Module

The photoplethysmogram amplifier module (PPG100C) shown in Figure 6.8 is a one channel amplifier which is designed for indirect measurement of blood pressure or density. The PPG100C is designed for utilize in the purpose like blood pressure analysis, general pulse rate determination, psycho physiological investigations and exercise physiology studies.



Figure 6.8: Photoplethysmogram Amplifier Module

6.6 Acknowledge Overview

Acknowledge software shown in Figure 6.9 is incorporated with all MP systems. It is an instinctive, interactive program that gives the instantly outlook, measure, convert and analyse data. It helps in Performing complex data acquisition, triggering, stimulation and automated analysis using simple pull-down menus and dialogs. There is no need to learn a programming

language and new protocol for working on this software. It has online analysis settings, filters and transformations that provide real-time feedback. The wide variety of off-line analysis tools can also be chosen in this software. Multiple display options are existing during and after acquisition. Just a click on an icon gives the flip between chart, Scope, X/Y, overlapped segments, histogram or FFT. The software also provides excellence presentation capabilities [53].

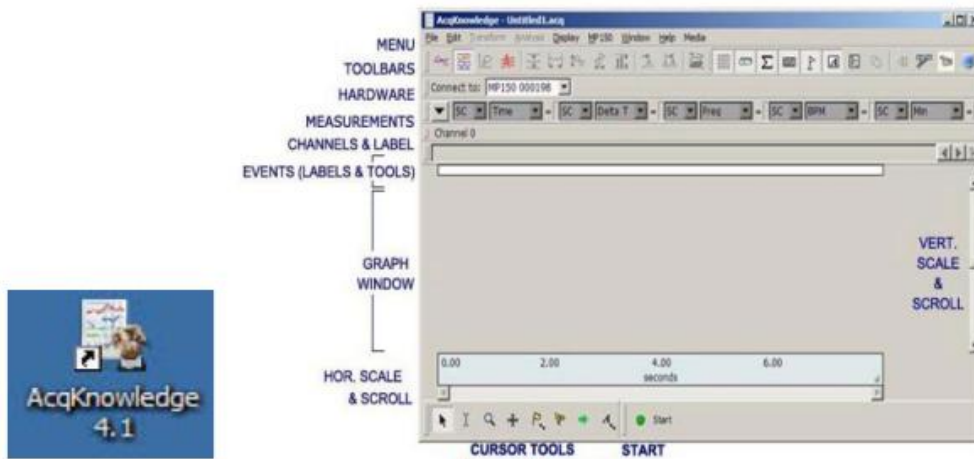


Figure 6.9: On the Left Software Launch Icon on the right Drag and Drop Menu

AcqKnowledge also has an “electronic notepad” or journal, which is used to record notes and data related with a graph file as shown in Figure 6.10.



Figure 6.10: Electronic Notepad or Journal

6.7 Data Acquisition

For acquiring the data we need to set up the channels first. In our study we have selected 3 modules of PPG100C and PPG100C-MRI with label Index, Middle and Ring respectively. From these 3 modules we get 3 channels namely A1, A2 and A3 for acquire, plot and value with sampling rate set at 250.00 KHz. The channels are selected through set up channel option that comes under the drop down menu of MP150 as shown in Figure 6.11.

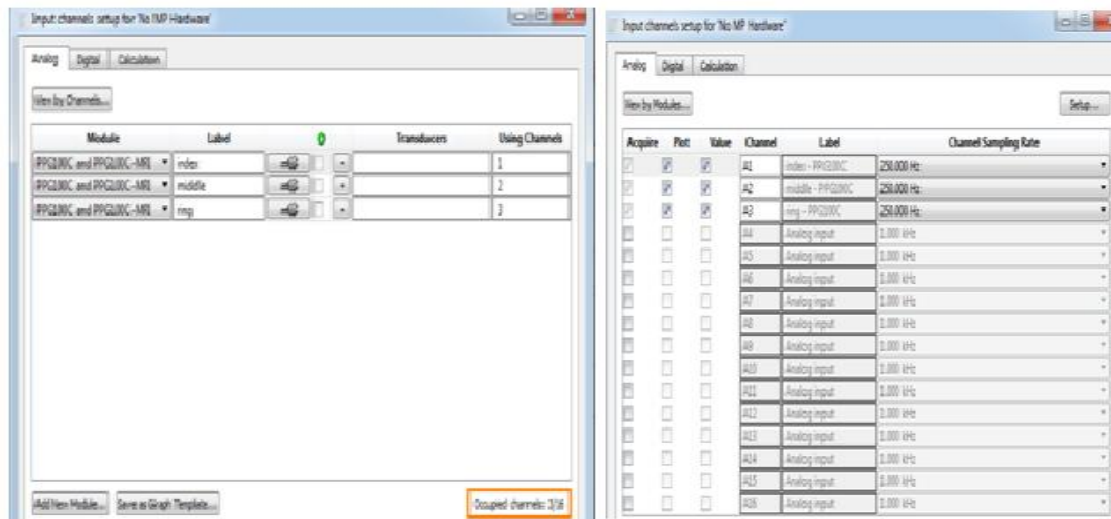


Figure 6.11: Channels of Acknowledge Software

For recording the data, the 3 PPG sensors are simultaneously wrapped around the subject's finger that is Index, Middle and Ring finger respectively while the other end of all the 3 sensors are connected to the transducer amplifier module of the MP system. The start button becomes active only when the circular light placed before the start button turns green. The green status of light shows that the MP data acquisition unit is properly connected to the computer. The data is then recorded by clicking on the start button. In our study the finger pulse waveform of 36 subjects is recorded after 1 hour 30 minutes of breakfast but before 10.30 am of index, middle and ring finger for both the hands respectively. Similarly the data of all the 36 subjects is recorded immediate before and after 15 min of lunch but the lunch should be taken in between 1 to 2 pm. The data is recorded for 30 seconds and is processed for feature extraction. Sample of such a recording is shown in Figure 6.12.

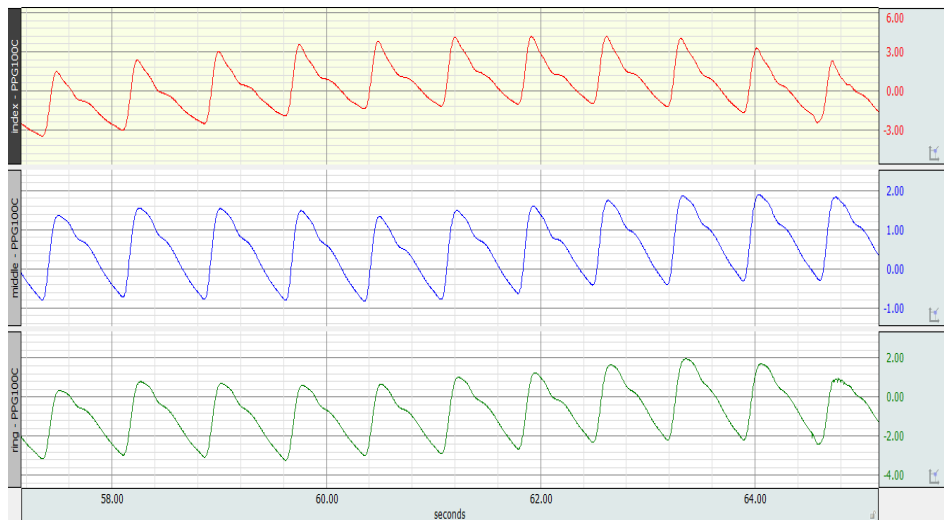


Figure 6.12: Recorded Pulse Wave

6.8 Processing of Data

Before feature extraction the noise is removed from the recorded data by using digital IIR band stop filter at default line frequency 50 Hz and quality factor 7. The IIR digital filter is available in the transform menu as shown in the Figure. The filter is applied separately to the each waveform. After the removal of noise the derivate of this data is taken twice at a sampling rate of 25 samples/second.

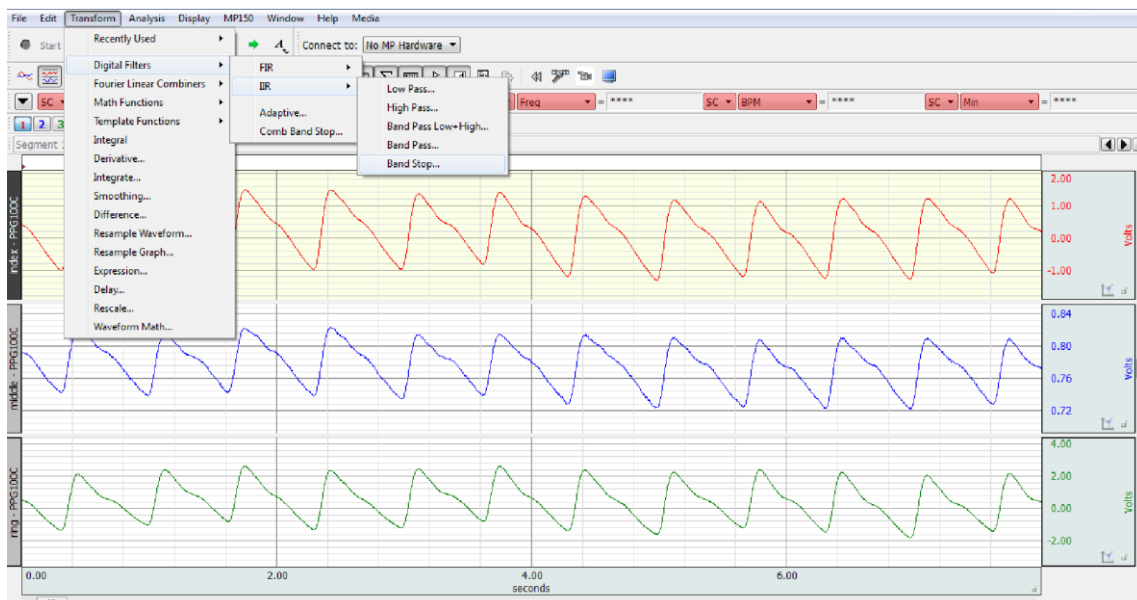


Figure 6.13: Filtration method on recorded pulse waveform

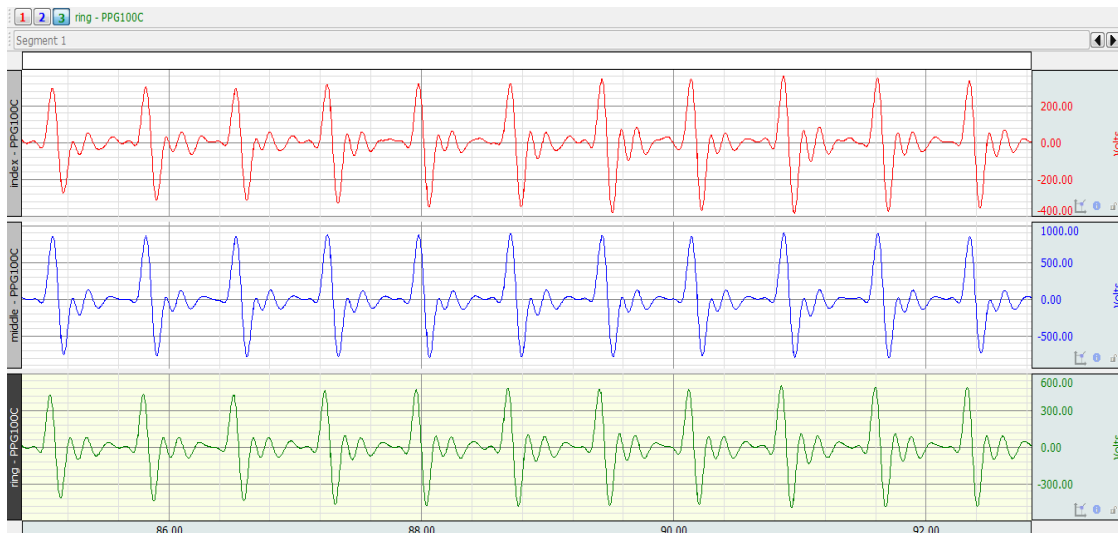


Figure 6.14: Second Derivative of PPG

The second derivative of waveform gives the 5 main features labeled from a to e: Initial positive(a), Initial negative(b), Re-increasing(c), late re-decreasing(d) and diastolic positive(e) as shown in Figure 6.15. From these features the 4 ratios are to be calculated i.e b/a ratio, c/a ratio, d/a ratio and e/a ratio. Further the mean and standard deviation of these ratios are to be calculated for the set of data collected after breakfast, before and after lunch.

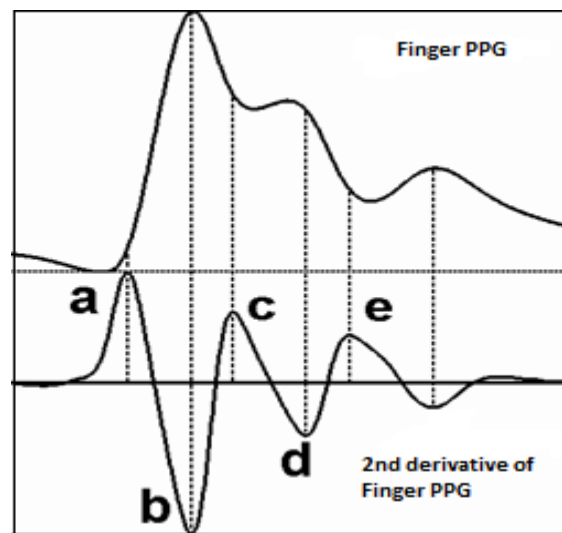


Figure 6.15: Features of APG

6.9 Computer Algorithm

Earlier the features were extracted manually by simply selecting the data. These features are the amplitude of the peaks. In this study in order to make the work faster and easier, the features are extracted now by the computer algorithm using Matlab programming.

The algorithm is described below:

1. Initially, record the pulses of three fingers simultaneously of both the hands using Biopac MP 150 system.
2. Apply digital IIR Band Stop Filter and took derivative twice.
3. Recorded data is saved in an Excel sheet.
4. Call the excel sheet in Matlab Script File.
5. Find out all the positive and negative peak values.
6. The peak values are stored in two different arrays:
Array A for all positive peak values
Array b for all negative peak values
7. Find out range of the highest positive and negative peaks in the entire waveform.
8. Make an Array of these highest positive and negative peaks.
9. If a negative peak occurs after every positive peak then discard the second positive peak and repeat the step for entire waveform.
10. If a positive peak occurs after every negative peak then discard the second negative peak and repeat the step for entire waveform.
11. Plot these highest positive and negative peak values for each cycle.
12. Find out 2 consecutive positive peak values after first highest positive peak from array A.
13. If this process is applied to the entire waveform then go ahead else go to step 12.
14. Find out early next negative peak value after first highest negative peak from array B.
15. If this process is applied to the entire waveform then go ahead else go to step 14.
16. Further, make a matrix of these five (positive and negative) peak values for the entire waveform.
17. Plot these five values.
18. Let these five values are called a_i , b_i , c_i , d_i and e_i respectively for each cycle.
19. Now, calculate b/a , c/a , d/a and e/a for each cycle also calculate mean and standard deviation of these ratios.
20. Finally make a matrix having columns as a , b , c , d , e , b/a , c/a , d/a , e/a of each cycle and another matrix having three rows which contains the values of mean, Standard deviation and variance.
21. Stop the program.

The images that appears after running the program which are shown in Figure [6.16-6.20].

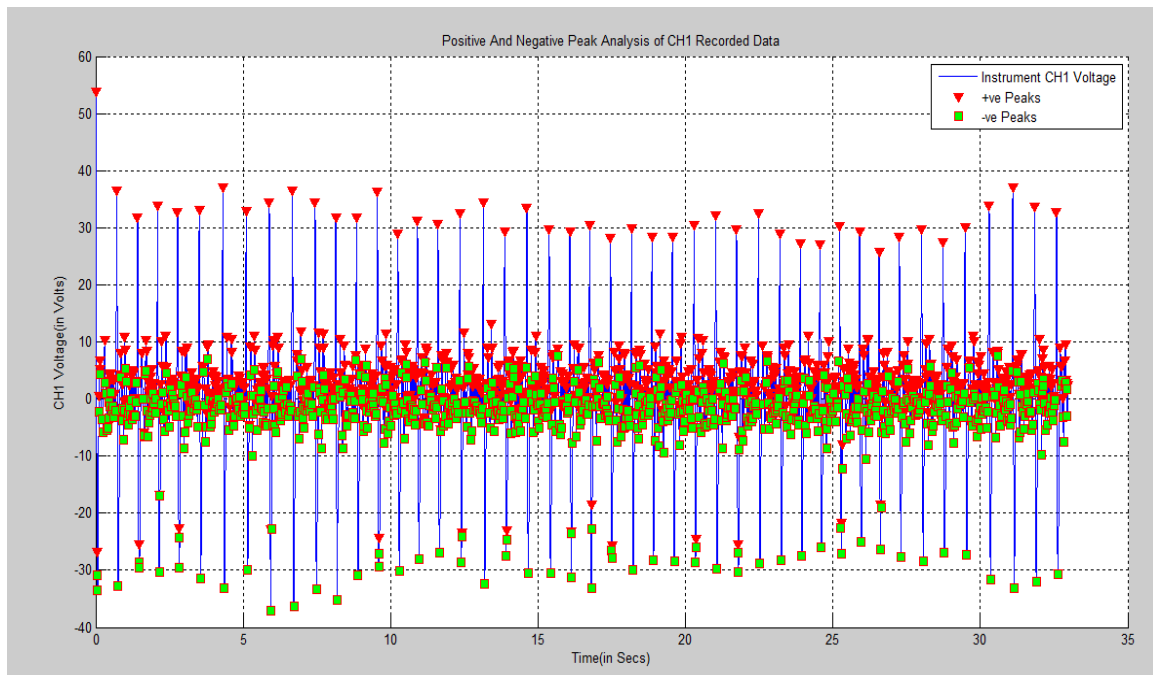


Figure 6.16: All positive and negative peaks of the waveform

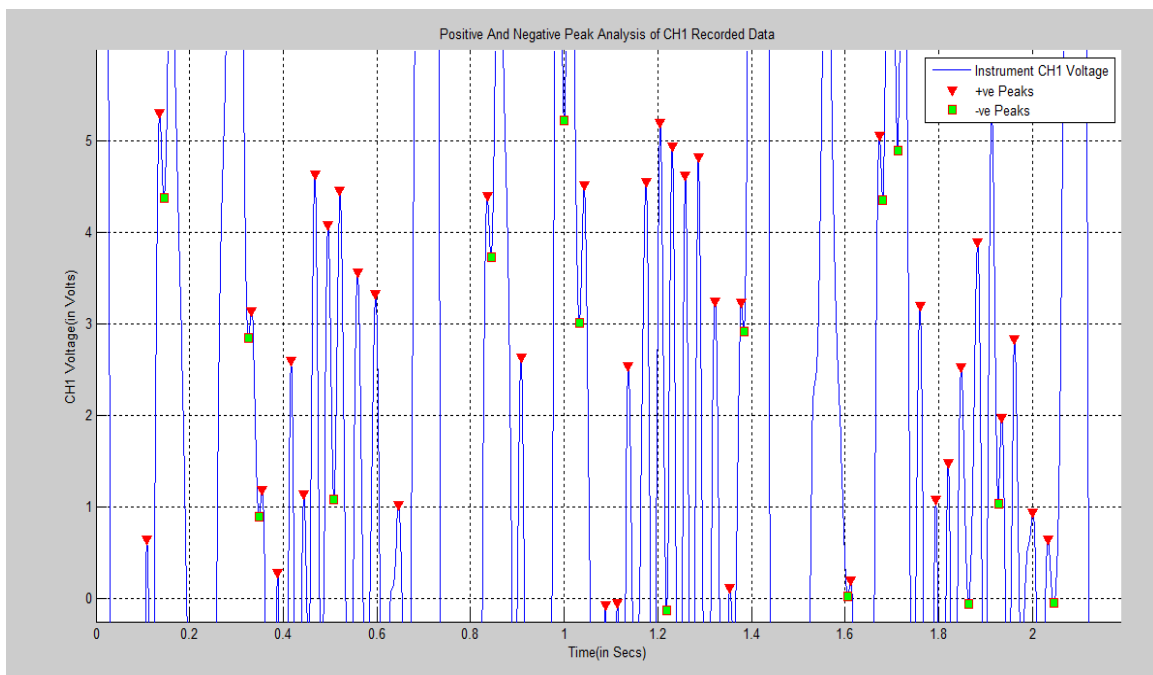


Figure 6.17: Zoomed View of all positive and negative peaks of the waveform

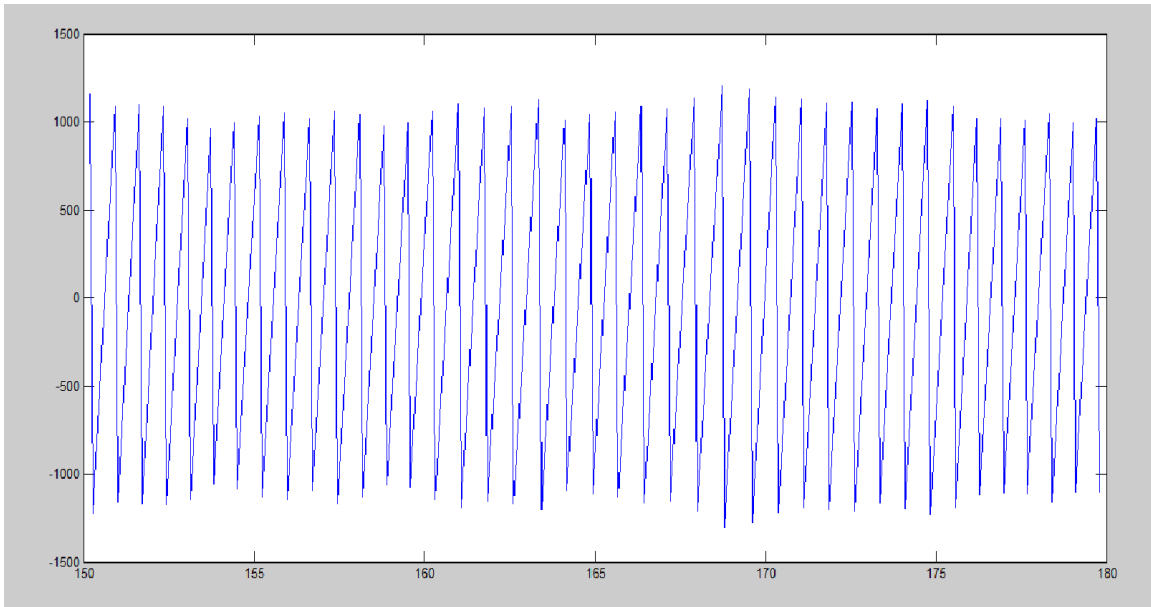


Figure 6.18: Matrix of highest positive and negative peaks from each cycle

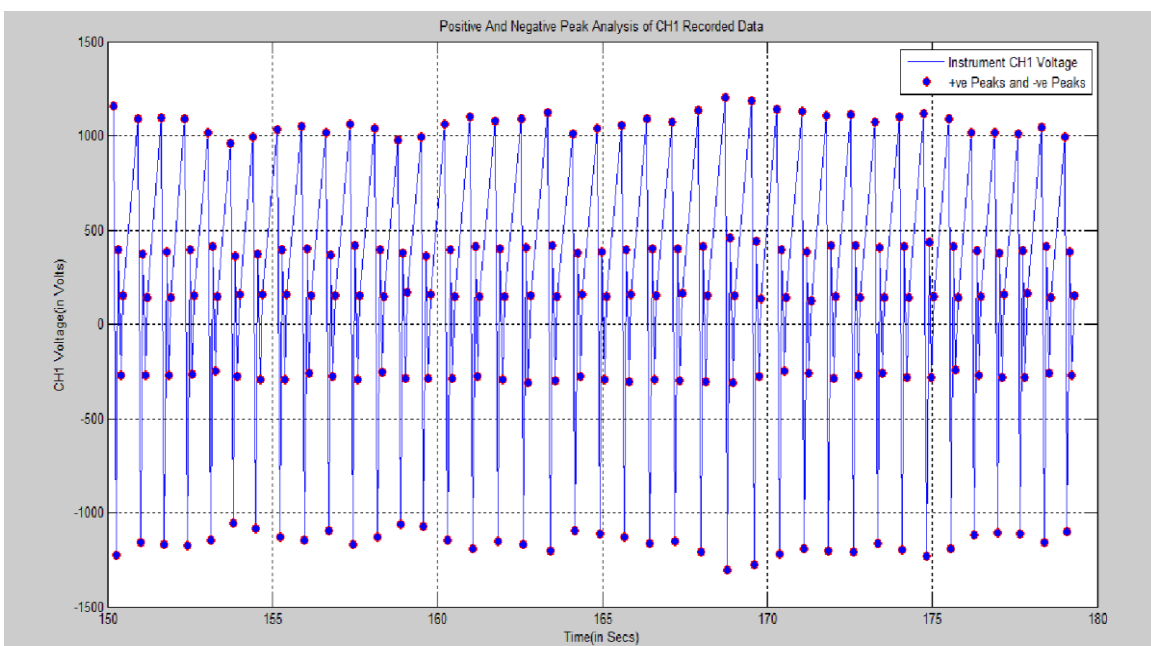


Figure 6.19: Features of complete waveform

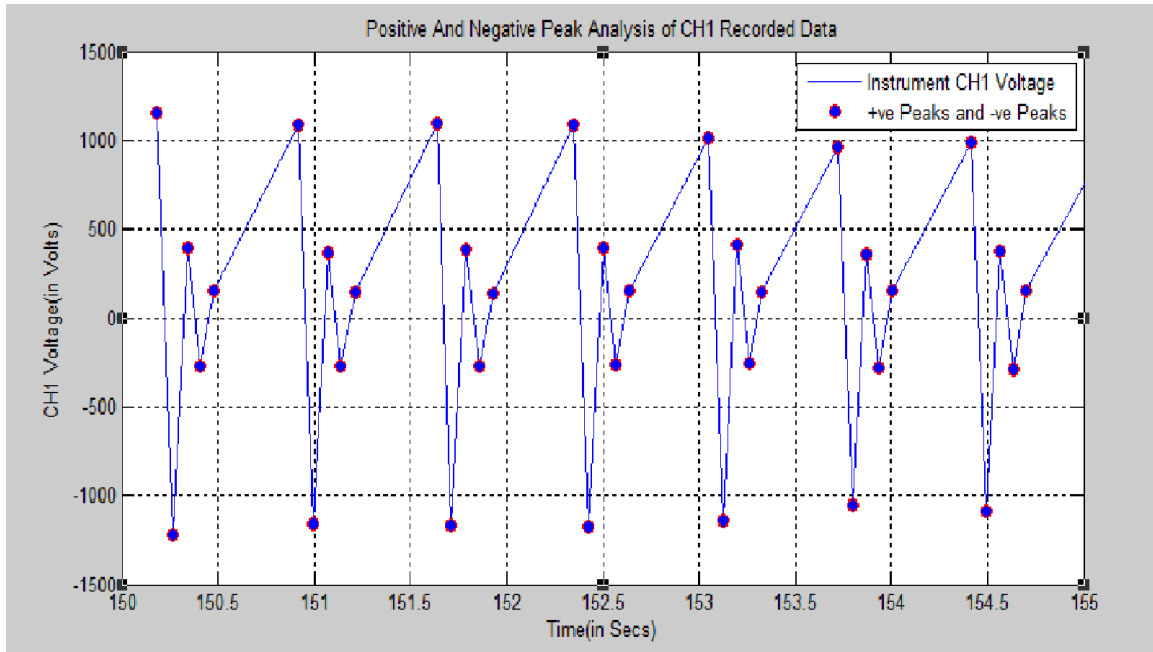


Figure 6.20: Zoomed view of features

7.1 Features Extracted from the SDPTG Wave

The finger pulse waveform is first recorded using MP150 system and Acknowledge software. After getting the filtered waveform, the second derivative of the PPG has been taken. The features a, b, c, d, e and all the four ratios taking ‘a’ as reference of the SDPTG are calculated using computer algorithm. The mean and standard deviation of these ratios are also extracted using the same computer algorithm as already discussed. This is done for 36 subjects. Out of these 36 subjects, best 25 subjects are selected. Data of 3 slots (i.e after breakfast, before lunch and after lunch) is arranged in the form of excel spreadsheets and is given in Appendix A.

7.2 Check for Fisher Discriminant Ratio and t-Test

7.2.1 Fisher Discriminant Ratio

Fisher Discriminant method are used in pattern recognition, statistics and machine learning on the way to find a linear grouping of features which distinguishes or divides the two or more classes of items or events. The resulting arrangement may be used as a linear classifier or more frequently for dimensionality reduction before later categorization.

$$J(w) = \frac{|m_1 - m_2|^2}{s_1^2 + s_2^2}$$

Where m represents a mean, s^2 represents the standard deviation. The subscripts denote the two classes [54, 55].

7.2.2 t-Test

A t-Test is statistical significance to point out whether or not the difference among the two group’s averages most expectedly reflects a “real” distinction in the population from which the groups were sampled. In order to determine whether the difference is statistically significant, the t-Test computes a t-value. The p-value is achieved directly from this t-value. The t-value is the basis for determining that the difference of values that we have taken is

enough to conclude which method is more effective, or if the result is something that could have happened by chance [56, 57].

7.2.3 Check for higher Fisher Discriminant Ratio

After extracting the features, the two group has been made named as:

- Group 1 symbolizes the features of after breakfast and before lunch
- Group 2 symbolizes the features of after breakfast and after lunch

The Fisher discriminant ratio is calculated for both the groups. Each group gives 48 parameters. After Fisher Discriminant Ratio, the t-Test of one trail is applied on the data of these two groups to check whether the data obtained is statistical or marginal. The results of fisher discriminant ratio and t-Test for each group is summarized in the excel sheets separately and is shown in table 7.1 and 7.2 repectively. Further, the data is sorted in decreasing order. After analyzing the data properly a threshold '2' has been set. From this set of 48 parameters, those parameters are taken in considerations whose fisher discriminant Ratio value is greater than 2.

The selected parameters from group 1 are:

1. c/a standard deviation of Middle finger of right hand (x_1)
2. b/a standard deviation of Middle finger of right hand (x_2)
3. d/a standard deviation of Index finger of right hand (x_3)
4. e/a standard deviation of Index finger of left hand (x_4)
5. d/a standard deviation of Middle finger of right hand (x_5)
6. b/a standard deviation of Ring finger of right hand (x_6)
7. c/a standard deviation of Ring finger of right hand (x_7)
8. c/a standard deviation of Index finger of right hand (x_8)
9. e/a standard deviation of Ring finger of right hand (x_9)
10. e/a standard deviation of Middle finger of right hand (x_{10})
11. d/a standard deviation of Index finger of left hand (x_{11})
12. b/a standard deviation of Index finger of right hand (x_{12})
13. e/a standard deviation of Index finger of right hand (x_{13})

The selected parameters from group 2 are:

1. e/a standard deviation of Middle finger of left hand (y_1)

2. b/a standard deviation of Middle finger of left hand (y_2)
3. d/a standard deviation of Middle finger of left hand (y_3)
4. c/a standard deviation of Ring finger of left hand (y_4)
5. e/a standard deviation of Ring finger of left hand (y_5)
6. c/a standard deviation of Middle finger of left hand (y_6)
7. c/a standard deviation of Index finger of left hand (y_7)
8. d/a standard deviation of Index finger of left hand (y_8)
9. b/a standard deviation of Ring finger of left hand (y_9)
10. b/a standard deviation of Index finger of left hand (y_{10})
11. b/a standard deviation of Middle finger of right hand (y_{11})
12. b/a standard deviation of Ring finger of right hand (y_{12})
13. e/a standard deviation of Index finger of right hand (y_{13})
14. e/a standard deviation of Ring finger of right hand (y_{14})
15. e/a standard deviation of Middle finger of right hand (y_{15})
16. b/a standard deviation of Index finger of right hand (y_{16})

Table 7.1 and 7.2 shows the result of fisher discriminant ratio and t-Test for both the groups separately.

Table 7.1: Result of fisher discriminant ratio and t-Test for group 1

Group 1					
Sr. No.	Hand	Finger	Parameter	Fisher discriminant ratio's value	t-Test value
1	Left Hand	Middle	e/a standard deviation	1.846380058	0.129319789
2	Left Hand	Index	c/a standard deviation	1.716289713	0.185220697
3	Left Hand	Middle	c/a standard deviation	1.706250558	0.190284802
4	Left Hand	Middle	d/a standard deviation	1.401766773	0.234832452
5	Left Hand	Ring	b/a standard deviation	1.194509471	0.326215858
6	Left Hand	Ring	c/a standard deviation	1.127216529	0.335274179
7	Left Hand	Index	b/a standard deviation	0.765818016	0.33590725
8	Left Hand	Ring	e/a standard deviation	0.59118025	0.425381085
9	Left Hand	Ring	e/a mean	0.256933617	0.306881638
10	Left Hand	Middle	b/a standard deviation	0.175550589	0.451730496
11	Left Hand	Index	c/a mean	0.164813901	0.368786456
12	Left Hand	Ring	b/a mean	0.075405763	0.024846839
13	Right Hand	Index	b/a mean	0.030072844	0.098730505
14	Right Hand	Middle	b/a mean	0.026836874	0.233538001
15	Right Hand	Ring	c/a mean	0.025332007	0.478661231
16	Left Hand	Middle	b/a mean	-0.017317672	0.284363438
17	Left Hand	Index	b/a mean	-0.019581469	0.294431851
18	Left Hand	Middle	e/a mean	-0.025474348	0.480539111
19	Right Hand	Ring	b/a mean	-0.028718607	0.211216671
20	Right Hand	Middle	c/a mean	-0.245726215	0.288960214
21	Right Hand	Ring	e/a mean	-0.254783221	0.312148347
22	Left Hand	Ring	c/a mean	-0.270930546	0.284111874
23	Right Hand	Index	c/a mean	-0.466782681	0.099474295
24	Right Hand	Index	e/a mean	-0.551437195	0.154564134
25	Left Hand	Ring	d/a mean	-0.573269895	0.073705928
26	Right Hand	Ring	d/a mean	-0.584091785	0.116004316
27	Left Hand	Middle	d/a mean	-0.709179759	0.050682225
28	Right Hand	Middle	d/a mean	-0.771386372	0.02010121
29	Left Hand	Index	d/a mean	-0.806992264	0.064211997
30	Left Hand	Middle	c/a mean	-0.854116028	0.040657081
31	Right Hand	Index	d/a mean	-0.955174792	0.015032208
32	Right Hand	Middle	e/a mean	-1.074822573	0.01798985
33	Left Hand	Index	e/a mean	-1.231031346	0.011910867
34	Left Hand	Ring	d/a standard deviation	-1.598433411	0.258109515
35	Right Hand	Ring	d/a standard deviation	-1.615384773	0.237186148
36	Right Hand	Middle	c/a standard deviation	-2.293592458	0.094801144
37	Right Hand	Middle	b/a standard deviation	-2.471171696	0.135095071
38	Right Hand	Index	d/a standard deviation	-2.480401716	0.105163291
39	Left Hand	Index	e/a standard deviation	-2.600547362	0.182291926
40	Right Hand	Middle	d/a standard deviation	-2.882522695	0.077382046
41	Right Hand	Ring	b/a standard deviation	-3.418793528	0.039761913
42	Right Hand	Ring	c/a standard deviation	-3.459703987	0.05265209
43	Right Hand	Index	c/a standard deviation	-3.517241521	0.075871065
44	Right Hand	Ring	e/a standard deviation	-4.119777677	0.046815802
45	Right Hand	Middle	e/a standard deviation	-4.617576129	0.040052193
46	Left Hand	Index	d/a standard deviation	-4.666196626	0.089212023
47	Right Hand	Index	b/a standard deviation	-4.943178197	0.057584169
48	Right Hand	Index	e/a standard deviation	-5.206158499	0.086206166

Table 7.2: Result of fisher discriminant ratio and t-Test for group 2

Group 2					
Sr. No.	Hand	Finger	Parameter	Fisher discriminant ratio's value	t-Test value
1	Left Hand	Middle	e/a standard deviation	5.403752129	0.036968305
2	Left Hand	Middle	b/a standard deviation	5.299325112	0.029950889
3	Left Hand	Middle	d/a standard deviation	5.083541163	0.032847502
4	Left Hand	Ring	c/a standard deviation	4.455568548	0.058354644
5	Left Hand	Ring	e/a standard deviation	4.211206825	0.106945171
6	Left Hand	Middle	c/a standard deviation	4.044419746	0.075658738
7	Left Hand	Index	c/a standard deviation	3.608828903	0.074121264
8	Left Hand	Index	d/a standard deviation	3.530107581	0.106927062
9	Left Hand	Ring	b/a standard deviation	3.301568786	0.162188712
10	Left Hand	Index	b/a standard deviation	2.132160228	0.0122156
11	Left Hand	Index	d/a mean	1.124543455	0.0154246
12	Left Hand	Ring	d/a standard deviation	1.086334147	0.36398737
13	Left Hand	Ring	e/a mean	1.063704439	0.025153918
14	Left Hand	Ring	d/a mean	1.017647868	0.009324507
15	Right Hand	Ring	d/a mean	0.968004275	0.06063956
16	Left Hand	Middle	d/a mean	0.93265832	0.073611538
17	Right Hand	Middle	c/a standard deviation	0.776084116	0.347665565
18	Right Hand	Index	d/a standard deviation	0.690781123	0.331188873
19	Left Hand	Middle	e/a mean	0.664450921	0.149661912
20	Right Hand	Middle	d/a mean	0.630818322	0.071998961
21	Right Hand	Ring	c/a mean	0.269564079	0.309279951
22	Left Hand	Index	c/a mean	0.267695746	0.0776234
23	Right Hand	Index	d/a mean	0.22491721	0.314749863
24	Left Hand	Index	e/a mean	0.218871868	0.0182495
25	Right Hand	Index	e/a mean	0.042776866	0.479470451
26	Left Hand	Ring	b/a mean	0.038166633	0.104795775
27	Right Hand	Ring	e/a mean	0.002151974	0.498818032
28	Left Hand	Index	b/a mean	-0.005149013	0.00438657
29	Left Hand	Middle	b/a mean	-0.029006086	0.151749169
30	Right Hand	Ring	b/a mean	-0.046489351	0.061124954
31	Right Hand	Middle	b/a mean	-0.057820867	0.079037243
32	Right Hand	Index	b/a mean	-0.060827409	0.076952735
33	Right Hand	Index	c/a standard deviation	-0.093671163	0.478975868
34	Left Hand	Middle	c/a mean	-0.131337209	0.414874543
35	Left Hand	Ring	c/a mean	-0.326803787	0.284955706
36	Right Hand	Middle	c/a mean	-0.394601028	0.107692923
37	Right Hand	Middle	e/a mean	-0.532952632	0.219542702
38	Right Hand	Index	c/a mean	-0.626108071	0.012304421
39	Right Hand	Ring	d/a standard deviation	-0.745240836	0.378997244
40	Right Hand	Ring	c/a standard deviation	-0.929818522	0.366957362
41	Right Hand	Middle	d/a standard deviation	-1.086100559	0.238629795
42	Left Hand	Index	e/a standard deviation	-1.45537164	0.325042723
43	Right Hand	Middle	b/a standard deviation	-2.388305796	0.136763523
44	Right Hand	Ring	b/a standard deviation	-2.631144304	0.167600828
45	Right Hand	Index	e/a standard deviation	-3.345444656	0.07003652
46	Right Hand	Ring	e/a standard deviation	-3.735736341	0.032469332
47	Right Hand	Middle	e/a standard deviation	-4.125740466	0.036598208
48	Right Hand	Index	b/a standard deviation	-4.512996434	0.052204249

7.3 Correlation Calculation

Correlation is used to find the more precise results. Correlation is made with two words i.e. ‘Co’ that means ‘together’ and ‘relation’. It is a statistical technique that describes degree of relationship between two variables. Correlation is positive when the values increase together and negative when one value decreases as the other increases [58-60]. The parameters of each group which are found above are now correlated with one another separately. Further, a threshold ‘0.6’ has been set. The parameters that are above this threshold are further selected. The highlighted part of the table 7.3 and 7.4 is showing the same.

The Table 7.3 and 7.4 shows the results of correlation matrix for each group separately.

Table 7.3: Correlation matrix for group 1

Group 1													
Sr. No.	1	2	3	4	5	6	7	8	9	10	11	12	13
1	1												
2	0.505294	1											
3	0.442198	0.071419	1										
4	0.265964	0.317649	0.557586	1									
5	0.59724	0.392201	0.602677	0.29235	1								
6	0.280155	0.274325	-0.05724	-0.14995	-0.09159	1							
7	0.192269	-0.11338	0.427609	0.098503	0.215758	0.084789	1						
8	0.69498	-0.01213	0.625435	0.427665	0.260258	0.182688	0.254967	1					
9	0.373711	0.417315	0.239635	0.198533	0.344221	0.377195	0.634626	0.141848	1				
10	0.685416	0.648118	0.483725	0.435634	0.813873	0.110348	0.257553	0.217954	0.594269	1			
11	0.145121	0.1508	0.413268	0.607236	0.384846	-0.27631	0.103108	0.255567	0.10584	0.359154	1		
12	0.346991	0.664392	0.03045	0.343433	0.238146	-0.01887	-0.10732	0.023953	0.120103	0.396819	0.286793	1	
13	0.180114	-0.0559	0.81052	0.716047	0.259217	-0.09057	0.366271	0.576538	0.204614	0.242534	0.429033	0.021406	1

Table 7.4: Correlation matrix for group 2

Group 2																
Sr.No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	1															
2	0.588871	1														
3	0.946451	0.527474	1													
4	-0.04784	-0.21243	-0.00246	1												
5	0.160756	-0.13326	0.166783	0.766494	1											
6	0.851435	0.563206	0.826277	0.039907	0.231801	1										
7	-0.13393	0.19757	-0.09504	-0.1314	-0.129	-0.08931	1									
8	0.055143	0.077233	0.105335	0.099593	-0.04664	0.120991	0.131567	1								
9	-0.01652	0.097401	-0.04839	0.685015	0.510465	0.034605	0.035337	-0.06448	1							
10	-0.18097	0.182002	-0.13348	-0.14933	-0.12244	-0.11439	0.961661	0.030237	0.107986	1						
11	0.094967	0.302294	0.056526	-0.02259	0.10648	0.046718	0.173795	0.1508	0.156518	0.167221	1					
12	-0.2575	-0.22795	-0.23195	0.148084	0.181419	-0.37469	-0.28642	-0.27631	0.00502	-0.30345	0.274325	1				
13	0.193316	-0.11845	0.152358	0.072329	-0.00479	0.021466	0.008015	0.429033	-0.1411	-0.19675	-0.0559	-0.09057	1			
14	0.297237	-0.02878	0.310076	0.080063	0.441054	0.161919	-0.12962	0.10584	-0.03755	-0.17248	0.417315	0.377195	0.204614	1		
15	0.102192	-0.00024	0.158818	0.08813	0.214683	0.134238	0.053312	0.359154	-0.13279	2.76E-05	0.648118	0.110348	0.242534	0.594269	1	
16	0.047313	0.339028	-0.04852	-0.07027	-0.06068	0.091699	0.070564	0.286793	0.181854	0.115677	0.664392	-0.01887	0.021406	0.120103	0.396819	1

The fisher discriminant ratios of the parameters given by the correlation matrices are now be compared for each group separately. The parameters are compared in pairs.

Pairs of parameters picked up for comparison from correlation matrix 1 are (x_1, x_8) , (x_1, x_{10}) , (x_2, x_{10}) , (x_2, x_{12}) , (x_3, x_5) , (x_3, x_8) , (x_3, x_{13}) , (x_4, x_{11}) , (x_4, x_{13}) , (x_5, x_{10}) , (x_7, x_9) . Similarly pairs of parameters picked up for comparison from correlation matrix 2 are (y_1, y_3) , (y_1, y_6) , (y_3, y_6) , (y_4, y_5) , (y_4, y_9) , (y_7, y_{10}) , (y_{11}, y_{15}) , (y_{11}, y_{16}) .

Afterwards if Group 1 is considered, the value of fisher discriminant ratio of x_1 (i.e. c/a standard deviation of Middle finger of right hand) is compared with x_8 (i.e. c/a standard deviation of Index finger of right hand). The parameter whose fisher discriminant Ratio value is less is being discriminated. Same procedure is repeated for all selected parameters of group 1 and group 2 as well.

This process sorts the selected and discarded parameters of each group which are listed in Table 7.5.:

Table 7.5: Result of the comparison of Correlation Matrices

Group 1	Group 1	Group 2	Group 2
Selected Parameters (S1)	Discarded Parameters (D1)	Selected Parameters (S2)	Discarded Parameters (D2)
x ₆	x ₁	y ₁	y ₃
x ₈	x ₂	y ₄	y ₅
x ₉	x ₃	y ₇	y ₆
x ₁₀	x ₄	y ₁₅	y ₉
x ₁₂	x ₅	y ₁₆	y ₁₀
x ₁₃	x ₇		y ₁₁
	x ₁₁		

From table 7.5 it is observed that 6 parameters out of 13 parameters of group 1 are selected for further comparison, leaving behind remaining 7 parameters that got discarded after the process of correlation. Similarly, out of 16 parameters of group 2, a total of 10 parameters are selected (5 parameters are selected from the correlation process as shown in Table 7.5 and rest 5 parameters are already selected without passing through this correlation process) for further comparison. Except these 10 parameters, other 6 parameters got discarded after the process of correlation in group 2.

Additionally, S1 is compared with S2. The comparison of S1 and S2 yields four common parameters that are present in both S1 and S2 which are- (1) b/a standard deviation of Ring finger of right hand, (2) e/a standard deviation of Ring finger of right hand, (3) e/a standard deviation of Middle finger of right hand and (4) b/a standard deviation of Index finger of right hand.

Finally, from these 6 and 10 parameters of group 1 and 2 respectively, four parameters are found to be common. These parameters are recommended for further studies in detection of high level of pitta.

CHAPTER 8

CONCLUSION AND FUTURE SCOPE

In this dissertation work thirteen parameters from Group 1 and sixteen parameters from Group 2 are found in best 25 subjects out of 36 subjects. These parameters have high value of Fisher Discriminant ratio above the set threshold. The shortlisted parameters of Group 1 are x_1-x_{13} and of Group 2 is y_1-y_{16} . These shortlisted parameters are then correlated group wise. Two correlation matrices have been formed for Group 1 and Group 2 which strengthened the result. The correlation matrix 1 results in eleven such parameters whose values are above the set threshold. In the same manner the correlation matrix 2 offers eight such parameters whose values are above the set threshold.

Further, the parameters of correlation matrices are compared with one another, the parameters are compared in pairs on the basis of their fisher discriminate Ratio value. For Group 1, eleven such pairs are formed which are (x_1, x_8) , (x_1, x_{10}) , (x_2, x_{10}) , (x_2, x_{12}) , (x_3, x_5) , (x_3, x_8) , (x_3, x_{13}) , (x_4, x_{11}) , (x_4, x_{13}) , (x_5, x_{10}) , (x_7, x_9) . After the comparison, those parameters whose fisher discriminant Ratio value is less as compared to the other are discarded else are selected. Similarly, For Group 2, eight such pairs are formed which are (y_1, y_3) , (y_1, y_6) , (y_3, y_6) , (y_4, y_5) , (y_4, y_9) , (y_7, y_{10}) , (y_{11}, y_{15}) , (y_{11}, y_{16}) . They are compared and selected in the same manner as of Group 1.

After the comparison six parameters which are $x_6, x_8, x_9, x_{10}, x_{12}$ and x_{13} are selected from group 1 and ten parameters which are $y_1, y_2, y_4, y_7, y_8, y_{12}, y_{13}, y_{14}, y_{15}$ and y_{16} are selected from group 2. Respectively discriminating the rest of the parameters from each group. At last the selected parameters of both groups are compared with each other. The common parameters of comparison are the matter of concern for this dissertation work. As common parameters directly links to the increase level of pitta.

Therefore, the four common parameters obtained which can be taken as indicative of pitta level i.e. (1) b/a standard deviation of Ring finger of right hand, (2) e/a standard deviation of Ring finger of right hand, (3) e/a standard deviation of Middle finger of right hand and (4) b/a standard deviation of Index finger of right hand. There are still certain limitations in this work that can be worked ahead in future.

No research work is completed in itself and it always has a scope for further improvements. The data obtained in this work can be used to built a classifier for high PITTA detection. The classifier so obtained may be tuned to obtain high level of accuracy. The algorithm developed for auto mated feature extraction of APG parameters b/a , c/a , d/a and e/a are for normal subjects. This algorithm may be enhanced to include abnormal cases as well.

Chapter-9

Check for Originality

The dissertation report presented here has been checked for its originality using online plagiarism checker “Paper Rater”, available at “http://www.paperrater.com/plagiarism_checker”.

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1. Mandeep Singh and Sakshi Bansal, “Automatic feature extraction in Accelerated Plethysmography”, International Journal of Computer Science and Communication, Vol. 5, No. 2, pp. 1-9, September 2014.
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Table A.1: Features of Subject 1

Sr. No.	Parameters	Session 1	Session 2	Session 3
1	Left Index b/a average	0.629265494	1.22531332	0.6352356
2	Left Index c/a average	0.195016274	0.38438181	0.2922063
3	Left Index d/a average	0.16313657	0.3357115	0.1771479
4	Left Index e/a average	0.060860322	0.12848038	0.0767978
5	Left Index b/a Standard Deviation	0.030370924	0.15656972	0.0501407
6	Left Index c/a Standard Deviation	0.028035783	0.15543709	0.0460721
7	Left Index d/a Standard Deviation	0.025618013	0.32866351	0.039888
8	Left Index e/a Standard Deviation	0.020977523	0.08723455	0.0345571
9	Left Middle b/a average	0.735384683	0.83556128	0.7794905
10	Left Middle c/a average	0.201831031	0.06837034	0.1442174
11	Left Middle d/a average	0.179106905	0.33030189	0.4180781
12	Left Middle e/a average	0.064243434	0.26149069	0.263346
13	Left Middle b/a Standard Deviation	0.050580092	0.01635186	0.0538125
14	Left Middle c/a Standard Deviation	0.055656065	0.04722439	0.0566513
15	Left Middle d/a Standard Deviation	0.059621562	0.04690785	0.0704412
16	Left Middle e/a Standard Deviation	0.042689997	0.03269623	0.0611006
17	Left Ring b/a average	0.875839903	0.83620987	0.6081687
18	Left Ring c/a average	0.091937776	0.18127834	0.1330984
19	Left Ring d/a average	0.21791843	0.13995003	0.2535849
20	Left Ring e/a average	0.205913046	0.02957501	0.0925885
21	Left Ring b/a Standard Deviation	0.036688641	0.02075571	0.0647467
22	Left Ring c/a Standard Deviation	0.065545854	0.01970306	0.0811125
23	Left Ring d/a Standard Deviation	0.047622819	0.01297248	0.1894039
24	Left Ring e/a Standard Deviation	0.042093127	0.00857842	0.0797064
25	Right Index b/a average	0.91780607	0.64061685	0.7534517
26	Right Index c/a average	0.074020853	0.19504209	0.1437943
27	Right Index d/a average	0.14879013	0.19201633	0.1780923
28	Right Index e/a average	0.198070813	0.08997028	0.0634796
29	Right Index b/a Standard Deviation	0.041512495	0.10588041	0.0448605
30	Right Index c/a Standard Deviation	0.033928364	0.11113725	0.0487993
31	Right Index d/a Standard Deviation	0.072272739	0.10156531	0.0569158
32	Right Index e/a Standard Deviation	0.027958036	0.12074861	0.039199
33	Right Middle b/a average	0.043533541	0.8155264	0.7375791
34	Right Middle c/a average	0.079996664	0.11401421	0.1319088
35	Right Middle d/a average	0.06868787	0.20890518	0.1997352
36	Right Middle e/a average	0.068015865	0.1214405	0.0658557
37	Right Middle b/a Standard Deviation	0.043533541	0.02790168	0.0546002
38	Right Middle c/a Standard Deviation	0.079996664	0.09312734	0.0525361
39	Right Middle d/a Standard Deviation	0.06868787	0.04096817	0.0734133
40	Right Middle e/a Standard Deviation	0.068015865	0.08114252	0.0684173
41	Right Ring b/a average	0.90612827	0.79346264	0.8395579
42	Right Ring c/a average	0.084326014	0.17980431	0.0933952
43	Right Ring d/a average	0.156681699	0.14301971	0.2370179
44	Right Ring e/a average	0.163974152	0.04684994	0.1412334
45	Right Ring b/a Standard Deviation	0.031749662	0.03052812	0.0344518
46	Right Ring c/a Standard Deviation	0.057715206	0.02712975	0.0719762
47	Right Ring d/a Standard Deviation	0.052814455	0.01644128	0.0599352
48	Right Ring e/a Standard Deviation	0.03926377	0.01621772	0.0621967

Table A.2: Features of Subject 2

Sr. No.	Parameters	Session 1	Session 2	Session 3
1	Left Index b/a average	0.807289074	1.04004614	1.0123796
2	Left Index c/a average	0.074018837	0.2777289	0.1593818
3	Left Index d/a average	0.140642846	0.29046986	0.2048935
4	Left Index e/a average	0.120683437	0.22579845	0.1130041
5	Left Index b/a Standard Deviation	0.029173691	0.03127774	0.0579431
6	Left Index c/a Standard Deviation	0.055788184	0.01875178	0.0270554
7	Left Index d/a Standard Deviation	0.018051487	0.0325014	0.0210947
8	Left Index e/a Standard Deviation	0.023635551	0.01561192	0.0205172
9	Left Middle b/a average	1.040245182	0.89806896	0.9641999
10	Left Middle c/a average	0.245020258	0.20574469	0.1151257
11	Left Middle d/a average	0.161399031	0.41199943	0.1975479
12	Left Middle e/a average	0.158937436	0.14104223	0.1270414
13	Left Middle b/a Standard Deviation	0.029918042	0.89806896	0.0205174
14	Left Middle c/a Standard Deviation	0.022603781	0.20574469	0.0239849
15	Left Middle d/a Standard Deviation	0.041537132	0.41199943	0.0430833
16	Left Middle e/a Standard Deviation	0.017222466	0.14104223	0.0235569
17	Left Ring b/a average	1.152947328	0.80258041	1.0656409
18	Left Ring c/a average	0.310416823	0.1333827	0.2018889
19	Left Ring d/a average	0.157071404	0.30478515	0.1730189
20	Left Ring e/a average	0.155675454	0.13727284	0.1834851
21	Left Ring b/a Standard Deviation	0.028841578	0.04124261	0.0111051
22	Left Ring c/a Standard Deviation	0.024095285	0.03127358	0.0094349
23	Left Ring d/a Standard Deviation	0.056024044	0.04019873	0.0338605
24	Left Ring e/a Standard Deviation	0.031492667	0.01354872	0.0186482
25	Right Index b/a average	0.947459687	0.92176392	1.0594081
26	Right Index c/a average	0.138616778	0.16913636	0.2943367
27	Right Index d/a average	0.155195304	0.26710889	0.2137076
28	Right Index e/a average	0.122350139	0.19357621	0.1644226
29	Right Index b/a Standard Deviation	0.024440498	0.04453905	0.0181796
30	Right Index c/a Standard Deviation	0.020691242	0.03115023	0.0152985
31	Right Index d/a Standard Deviation	0.04007814	0.02927955	0.0498245
32	Right Index e/a Standard Deviation	0.016425393	0.01927899	0.0274452
33	Right Middle b/a average	1.01846415	1.00809401	0.9396218
34	Right Middle c/a average	0.205176261	0.2606466	0.2415948
35	Right Middle d/a average	0.138402799	0.29631632	0.2460492
36	Right Middle e/a average	0.120033045	0.22026447	0.1358471
37	Right Middle b/a Standard Deviation	0.018284609	0.0543134	0.0451097
38	Right Middle c/a Standard Deviation	0.131360585	0.047263	0.0265682
39	Right Middle d/a Standard Deviation	0.057413734	0.04369655	0.0631023
40	Right Middle e/a Standard Deviation	0.100840551	0.03175011	0.0285311
41	Right Ring b/a average	0.947459687	1.22836013	1.0350709
42	Right Ring c/a average	0.138616778	0.09918094	0.2103445
43	Right Ring d/a average	0.155195304	0.35773784	0.1990484
44	Right Ring e/a average	0.122350139	0.17610448	0.1509343
45	Right Ring b/a Standard Deviation	0.024440498	0.046401	0.0289595
46	Right Ring c/a Standard Deviation	0.020691242	0.02015251	0.0168552
47	Right Ring d/a Standard Deviation	0.04007814	0.04873769	0.0479545
48	Right Ring e/a Standard Deviation	0.016425393	0.02009707	0.0247696

Table A.3: Features of Subject 3

Sr. No.	Parameters	Session 1	Session 2	Session 3
1	Left Index b/a average	1.01846415	0.83739265	0.9003454
2	Left Index c/a average	0.205176261	0.10517279	0.3062451
3	Left Index d/a average	0.138402799	0.10958665	0.1962511
4	Left Index e/a average	0.120033045	0.1452759	0.0310825
5	Left Index b/a Standard Deviation	0.018284609	0.06524143	0.0408809
6	Left Index c/a Standard Deviation	0.131360585	0.09782046	0.0279842
7	Left Index d/a Standard Deviation	0.057413734	0.07089002	0.0118165
8	Left Index e/a Standard Deviation	0.100840551	0.12642614	0.0113976
9	Left Middle b/a average	0.94838906	1.0631628	0.9003454
10	Left Middle c/a average	0.156509003	0.32849417	0.3062451
11	Left Middle d/a average	0.166804728	0.1976856	0.1962511
12	Left Middle e/a average	0.14193894	0.04752071	0.0310825
13	Left Middle b/a Standard Deviation	0.090003472	0.05275231	0.0408809
14	Left Middle c/a Standard Deviation	0.074932546	0.02716946	0.0279842
15	Left Middle d/a Standard Deviation	0.116151164	0.01708384	0.0118165
16	Left Middle e/a Standard Deviation	0.119796497	0.01180675	0.0113976
17	Left Ring b/a average	1.348673511	0.75375586	1.0597776
18	Left Ring c/a average	0.158771863	0.12688038	0.3979324
19	Left Ring d/a average	0.18648445	0.15547133	0.266095
20	Left Ring e/a average	0.095603482	0.10237634	0.0814193
21	Left Ring b/a Standard Deviation	0.018397437	0.03640534	0.0168637
22	Left Ring c/a Standard Deviation	0.022267013	0.12384891	0.1056195
23	Left Ring d/a Standard Deviation	0.016249769	0.05421329	0.051693
24	Left Ring e/a Standard Deviation	0.008463696	0.0846779	0.0782597
25	Right Index b/a average	1.129495708	0.97146745	0.9465508
26	Right Index c/a average	0.102442493	0.32332393	0.2905936
27	Right Index d/a average	0.155047914	0.17385143	0.187891
28	Right Index e/a average	0.164840266	0.04363399	0.0561882
29	Right Index b/a Standard Deviation	0.036992753	0.02971731	0.1481004
30	Right Index c/a Standard Deviation	0.081919698	0.02537842	0.0951861
31	Right Index d/a Standard Deviation	0.099878538	0.0181143	0.0523372
32	Right Index e/a Standard Deviation	0.131283277	0.01693953	0.0518067
33	Right Middle b/a average	0.777764046	1.00428395	0.9394219
34	Right Middle c/a average	0.238458172	0.28652928	0.1387457
35	Right Middle d/a average	0.156746155	0.15680775	0.2065525
36	Right Middle e/a average	0.070705964	0.0397901	0.3118805
37	Right Middle b/a Standard Deviation	0.044063555	0.02931473	0.0893988
38	Right Middle c/a Standard Deviation	0.03702355	0.02211745	0.0792292
39	Right Middle d/a Standard Deviation	0.045569563	0.01531356	0.0669068
40	Right Middle e/a Standard Deviation	0.035644907	0.00952961	0.0826743
41	Right Ring b/a average	0.817713757	1.16496594	0.9751064
42	Right Ring c/a average	0.154120331	0.06034769	0.0973289
43	Right Ring d/a average	0.068579603	0.07547828	0.1751441
44	Right Ring e/a average	0.246760543	0.3356874	0.2868612
45	Right Ring b/a Standard Deviation	0.048991334	0.02728245	0.0285453
46	Right Ring c/a Standard Deviation	0.023554503	0.0257914	0.1247148
47	Right Ring d/a Standard Deviation	0.07895527	0.07779517	0.0601918
48	Right Ring e/a Standard Deviation	0.072912706	0.09447029	0.1111784

Table A.4: Features of Subject 4

Sr. No.	Parameters	Session 1	Session 2	Session 3
1	Left Index b/a average	1.046234445	0.94047369	1.1064445
2	Left Index c/a average	0.101266866	0.12024351	0.1005326
3	Left Index d/a average	0.082253563	0.16382006	0.0751165
4	Left Index e/a average	0.072534494	0.14663116	0.1158769
5	Left Index b/a Standard Deviation	0.019128317	0.05042622	0.0314776
6	Left Index c/a Standard Deviation	0.062804337	0.03560835	0.0372521
7	Left Index d/a Standard Deviation	0.040784054	0.03518967	0.0408681
8	Left Index e/a Standard Deviation	0.048780803	0.02514036	0.0633679
9	Left Middle b/a average	0.93020743	1.1190127	0.875337
10	Left Middle c/a average	0.114166993	0.25751175	0.0542868
11	Left Middle d/a average	0.073370168	0.1483652	0.0614582
12	Left Middle e/a average	0.094350315	0.13587079	0.118369
13	Left Middle b/a Standard Deviation	0.010931618	0.04020912	0.01856
14	Left Middle c/a Standard Deviation	0.089291886	0.02590702	0.0494306
15	Left Middle d/a Standard Deviation	0.048360114	0.03887431	0.0400509
16	Left Middle e/a Standard Deviation	0.060916063	0.02216069	0.0395093
17	Left Ring b/a average	0.995845765	0.99189807	1.0576776
18	Left Ring c/a average	0.088790291	0.12477384	0.1206832
19	Left Ring d/a average	0.067874205	0.13668007	0.056653
20	Left Ring e/a average	0.090247361	0.18374118	0.1041842
21	Left Ring b/a Standard Deviation	0.011734768	0.02200245	0.015653
22	Left Ring c/a Standard Deviation	0.069547624	0.01757562	0.0199667
23	Left Ring d/a Standard Deviation	0.050383527	0.03063449	0.0391734
24	Left Ring e/a Standard Deviation	0.057071545	0.01475293	0.0454148
25	Right Index b/a average	1.132583792	1.07168811	0.926432
26	Right Index c/a average	0.200746733	0.20930303	0.0898408
27	Right Index d/a average	0.101783512	0.08935722	0.0957032
28	Right Index e/a average	0.080476489	0.11837225	0.1082598
29	Right Index b/a Standard Deviation	0.029661824	0.01879992	0.0335498
30	Right Index c/a Standard Deviation	0.048132973	0.0173245	0.0617824
31	Right Index d/a Standard Deviation	0.05361195	0.03629239	0.0636933
32	Right Index e/a Standard Deviation	0.039131922	0.02937701	0.0617493
33	Right Middle b/a average	1.08008296	0.90830378	0.8215196
34	Right Middle c/a average	0.160497829	0.12450421	0.0474385
35	Right Middle d/a average	0.098643361	0.105342	0.0708593
36	Right Middle e/a average	0.064578667	0.10100452	0.0937809
37	Right Middle b/a Standard Deviation	0.016801088	0.03576678	0.0236761
38	Right Middle c/a Standard Deviation	0.033035649	0.02189209	0.055014
39	Right Middle d/a Standard Deviation	0.046210831	0.04092406	0.0551869
40	Right Middle e/a Standard Deviation	0.034547358	0.0103571	0.0443797
41	Right Ring b/a average	0.925289638	1.05916582	0.9720637
42	Right Ring c/a average	0.130419876	0.16191333	0.1138712
43	Right Ring d/a average	0.106699562	0.11692252	0.0928198
44	Right Ring e/a average	0.073539742	0.11848121	0.0754159
45	Right Ring b/a Standard Deviation	0.033976563	0.04214499	0.0483428
46	Right Ring c/a Standard Deviation	0.058915203	0.01091448	0.0116658
47	Right Ring d/a Standard Deviation	0.043391278	0.04327135	0.0536735
48	Right Ring e/a Standard Deviation	0.029865995	0.0104007	0.0382481

Table A.5: Features of Subject 5

Sr. No.	Parameters	Session 1	Session 2	Session 3
1	Left Index b/a average	0.902042025	0.86978105	0.7681302
2	Left Index c/a average	0.061168706	0.08425209	0.0835798
3	Left Index d/a average	0.057425488	0.15538011	0.12626
4	Left Index e/a average	0.141773396	0.11959303	0.0755816
5	Left Index b/a Standard Deviation	0.023667759	0.04154288	0.0498568
6	Left Index c/a Standard Deviation	0.031961595	0.06917259	0.0560344
7	Left Index d/a Standard Deviation	0.03813209	0.05368547	0.0717688
8	Left Index e/a Standard Deviation	0.049734831	0.04096847	0.0528876
9	Left Middle b/a average	0.855686775	0.90442007	0.8970431
10	Left Middle c/a average	0.095520978	0.13836902	0.0802417
11	Left Middle d/a average	0.115191818	0.11885856	0.0978281
12	Left Middle e/a average	0.110729443	0.13004845	0.1051578
13	Left Middle b/a Standard Deviation	0.036673522	0.03296709	0.0355559
14	Left Middle c/a Standard Deviation	0.090708703	0.04265796	0.0326948
15	Left Middle d/a Standard Deviation	0.067473413	0.05678648	0.0591902
16	Left Middle e/a Standard Deviation	0.056659985	0.0436777	0.0440951
17	Left Ring b/a average	0.894466849	1.02401568	1.0142438
18	Left Ring c/a average	0.075112444	0.18901395	0.1782312
19	Left Ring d/a average	0.068935755	0.10457299	0.0580361
20	Left Ring e/a average	0.148176622	0.16045321	0.1097029
21	Left Ring b/a Standard Deviation	0.031337767	0.02787201	0.0351789
22	Left Ring c/a Standard Deviation	0.028271365	0.03218476	0.0215569
23	Left Ring d/a Standard Deviation	0.02864646	0.05377289	0.0405702
24	Left Ring e/a Standard Deviation	0.051166898	0.04446517	0.0324036
25	Right Index b/a average	0.965183169	0.96579431	0.9390051
26	Right Index c/a average	0.1644481	0.2806428	0.1082085
27	Right Index d/a average	0.135047874	0.22665766	0.1027779
28	Right Index e/a average	0.157392402	0.17105438	0.1392163
29	Right Index b/a Standard Deviation	0.036305207	0.06326513	0.033008
30	Right Index c/a Standard Deviation	0.025523009	0.06001461	0.0292215
31	Right Index d/a Standard Deviation	0.05424174	0.07446074	0.0469032
32	Right Index e/a Standard Deviation	0.039195441	0.04623643	0.0292031
33	Right Middle b/a average	0.959096236	0.799306	0.8815168
34	Right Middle c/a average	0.118660776	0.11874168	0.0664053
35	Right Middle d/a average	0.12358515	0.2104377	0.1020982
36	Right Middle e/a average	0.148837121	0.13328945	0.1298363
37	Right Middle b/a Standard Deviation	0.044231665	0.0574324	0.0356092
38	Right Middle c/a Standard Deviation	0.050520613	0.06339631	0.0268411
39	Right Middle d/a Standard Deviation	0.066110832	0.07718154	0.0483053
40	Right Middle e/a Standard Deviation	0.040534668	0.05375747	0.0221845
41	Right Ring b/a average	1.045975614	0.87599844	0.8892167
42	Right Ring c/a average	0.238135408	0.096264	0.082173
43	Right Ring d/a average	0.117468629	0.19004118	0.0967762
44	Right Ring e/a average	0.155988276	0.13579754	0.1327065
45	Right Ring b/a Standard Deviation	0.024230497	0.02005121	0.022284
46	Right Ring c/a Standard Deviation	0.026190994	0.03850843	0.0204184
47	Right Ring d/a Standard Deviation	0.053161505	0.0547758	0.0440763
48	Right Ring e/a Standard Deviation	0.032917007	0.03264836	0.0177809

Table A.6: Features of Subject 6

Sr. No.	Parameters	Session 1	Session 2	Session 3
1	Left Index b/a average	0.787102367	0.88058029	0.8736252
2	Left Index c/a average	0.046806992	0.05614418	0.039338
3	Left Index d/a average	0.144812982	0.14854244	0.0451163
4	Left Index e/a average	0.147528132	0.11953195	0.1109275
5	Left Index b/a Standard Deviation	0.039317525	0.07322805	0.0198505
6	Left Index c/a Standard Deviation	0.048340724	0.03022152	0.0523753
7	Left Index d/a Standard Deviation	0.032652114	0.03206741	0.0274403
8	Left Index e/a Standard Deviation	0.039568886	0.02998939	0.0354717
9	Left Middle b/a average	1.037064693	0.67559522	0.9192088
10	Left Middle c/a average	0.180199573	0.09179177	0.0940053
11	Left Middle d/a average	0.103320574	0.14562729	0.0764318
12	Left Middle e/a average	0.172080649	0.08603222	0.1202245
13	Left Middle b/a Standard Deviation	0.047870312	0.07081326	0.052809
14	Left Middle c/a Standard Deviation	0.036485707	0.04781444	0.0774744
15	Left Middle d/a Standard Deviation	0.052668449	0.07501737	0.0703769
16	Left Middle e/a Standard Deviation	0.041711489	0.05315989	0.0481518
17	Left Ring b/a average	1.06688137	0.77451537	1.0394285
18	Left Ring c/a average	0.122954436	0.07758335	0.0912834
19	Left Ring d/a average	0.094313657	0.14393735	0.0537199
20	Left Ring e/a average	0.187211008	0.06639235	0.0823028
21	Left Ring b/a Standard Deviation	0.047365897	0.03779998	0.015888
22	Left Ring c/a Standard Deviation	0.045057113	0.04985221	0.0172035
23	Left Ring d/a Standard Deviation	0.052721942	0.06007059	0.0353709
24	Left Ring e/a Standard Deviation	0.054729944	0.03190576	0.0465499
25	Right Index b/a average	0.921347993	1.17432549	1.0301633
26	Right Index c/a average	0.09773546	0.36169032	0.1426045
27	Right Index d/a average	0.141658203	0.16098361	0.0630883
28	Right Index e/a average	0.148370399	0.17791125	0.1141474
29	Right Index b/a Standard Deviation	0.011922759	0.01740474	0.0472821
30	Right Index c/a Standard Deviation	0.010185199	0.02798624	0.0192894
31	Right Index d/a Standard Deviation	0.017873508	0.0504644	0.0313584
32	Right Index e/a Standard Deviation	0.020704861	0.0330492	0.0224776
33	Right Middle b/a average	0.955915028	1.159504	0.9764994
34	Right Middle c/a average	0.168137811	0.33891626	0.1561049
35	Right Middle d/a average	0.159763988	0.171633	0.0736407
36	Right Middle e/a average	0.175654912	0.1843312	0.1336843
37	Right Middle b/a Standard Deviation	0.01987913	0.03197558	0.1076679
38	Right Middle c/a Standard Deviation	0.011142354	0.0398493	0.0317738
39	Right Middle d/a Standard Deviation	0.017810134	0.06362326	0.0691573
40	Right Middle e/a Standard Deviation	0.022690664	0.05501295	0.0611068
41	Right Ring b/a average	1.063533555	0.91447125	0.9968195
42	Right Ring c/a average	0.177658112	0.12871039	0.1580141
43	Right Ring d/a average	0.170148487	0.13556269	0.0760669
44	Right Ring e/a average	0.196028278	0.1448085	0.1263375
45	Right Ring b/a Standard Deviation	0.051277054	0.03910911	0.0763479
46	Right Ring c/a Standard Deviation	0.049258073	0.02224918	0.0150555
47	Right Ring d/a Standard Deviation	0.053593863	0.04418048	0.0303077
48	Right Ring e/a Standard Deviation	0.047046069	0.03324302	0.0213129

Table A.7: Features of Subject 7

Sr. No.	Parameters	Session 1	Session 2	Session 3
1	Left Index b/a average	0.968319316	0.93648434	0.9809795
2	Left Index c/a average	0.163437179	0.22357042	0.1428036
3	Left Index d/a average	0.241726867	0.26467904	0.1563571
4	Left Index e/a average	0.254007466	0.20027806	0.1760858
5	Left Index b/a Standard Deviation	0.02714381	0.04301595	0.0638639
6	Left Index c/a Standard Deviation	0.018058066	0.03930195	0.0602733
7	Left Index d/a Standard Deviation	0.034426972	0.04257898	0.0381602
8	Left Index e/a Standard Deviation	0.017047052	0.0414086	0.0312879
9	Left Middle b/a average	0.874340431	0.95993696	1.0201319
10	Left Middle c/a average	0.059653112	0.28249508	0.1437762
11	Left Middle d/a average	0.270878802	0.29898533	0.1433986
12	Left Middle e/a average	0.233976668	0.2351822	0.165614
13	Left Middle b/a Standard Deviation	0.036972419	0.09576517	0.086802
14	Left Middle c/a Standard Deviation	0.048365369	0.08646776	0.1896465
15	Left Middle d/a Standard Deviation	0.054704882	0.07554874	0.1418744
16	Left Middle e/a Standard Deviation	0.051020726	0.08098692	0.1479079
17	Left Ring b/a average	0.980834931	0.87113009	1.0276866
18	Left Ring c/a average	0.146144644	0.16316115	0.2049265
19	Left Ring d/a average	0.246634681	0.27344801	0.1624476
20	Left Ring e/a average	0.254014361	0.18174959	0.1843185
21	Left Ring b/a Standard Deviation	0.030211454	0.06433861	0.0529423
22	Left Ring c/a Standard Deviation	0.018686417	0.05872773	0.0688038
23	Left Ring d/a Standard Deviation	0.032653025	0.04403004	0.0309696
24	Left Ring e/a Standard Deviation	0.018363789	0.05328385	0.020402
25	Right Index b/a average	0.955029172	0.93958416	0.9985997
26	Right Index c/a average	0.16340996	0.12804497	0.1931441
27	Right Index d/a average	0.23978507	0.24988998	0.1666382
28	Right Index e/a average	0.21330709	0.23106427	0.1841904
29	Right Index b/a Standard Deviation	0.030833403	0.02142436	0.0174221
30	Right Index c/a Standard Deviation	0.025524293	0.01875214	0.0103207
31	Right Index d/a Standard Deviation	0.051834144	0.03076973	0.0359922
32	Right Index e/a Standard Deviation	0.020639023	0.01960019	0.0163921
33	Right Middle b/a average	0.991911036	0.94497701	1.011274
34	Right Middle c/a average	0.190844863	0.16961607	0.1661576
35	Right Middle d/a average	0.215338797	0.26034418	0.1787867
36	Right Middle e/a average	0.218153165	0.24033106	0.201884
37	Right Middle b/a Standard Deviation	0.059340391	0.03621926	0.0267985
38	Right Middle c/a Standard Deviation	0.054255086	0.03566972	0.0283775
39	Right Middle d/a Standard Deviation	0.06062451	0.04870345	0.0485917
40	Right Middle e/a Standard Deviation	0.033632177	0.03725154	0.0234257
41	Right Ring b/a average	0.993393981	0.93517786	1.0244293
42	Right Ring c/a average	0.189216935	0.12044992	0.2144667
43	Right Ring d/a average	0.227674524	0.24060081	0.1757918
44	Right Ring e/a average	0.20590321	0.23499168	0.1923793
45	Right Ring b/a Standard Deviation	0.03626646	0.02478077	0.0192255
46	Right Ring c/a Standard Deviation	0.028824669	0.01770752	0.0150639
47	Right Ring d/a Standard Deviation	0.046918014	0.03418181	0.038148
48	Right Ring e/a Standard Deviation	0.016338932	0.02387587	0.0168343

Table A.8: Features of Subject 8

Sr. No.	Parameters	Session 1	Session 2	Session 3
1	Left Index b/a average	1.022708892	0.98852074	1.12649
2	Left Index c/a average	0.113044512	0.04638507	0.1748214
3	Left Index d/a average	0.171947877	0.19404297	0.1670315
4	Left Index e/a average	0.19528004	0.20673457	0.2119175
5	Left Index b/a Standard Deviation	0.032358042	0.02829431	0.0191676
6	Left Index c/a Standard Deviation	0.015487894	0.03135511	0.0219074
7	Left Index d/a Standard Deviation	0.025290987	0.02561691	0.0185641
8	Left Index e/a Standard Deviation	0.014814071	0.02873794	0.0159339
9	Left Middle b/a average	0.932800806	0.77990918	0.9152883
10	Left Middle c/a average	0.102069203	0.1457241	0.0561695
11	Left Middle d/a average	0.130252968	0.1844959	0.1961622
12	Left Middle e/a average	0.114851903	0.08852677	0.1935731
13	Left Middle b/a Standard Deviation	0.103202574	0.0791685	0.0110343
14	Left Middle c/a Standard Deviation	0.043198608	0.07386866	0.0171881
15	Left Middle d/a Standard Deviation	0.035791363	0.09633237	0.0159516
16	Left Middle e/a Standard Deviation	0.055844861	0.0821277	0.0127689
17	Left Ring b/a average	0.948085052	0.73400793	0.8308703
18	Left Ring c/a average	0.108185588	0.15119365	0.197636
19	Left Ring d/a average	0.16693372	0.13950645	0.085654
20	Left Ring e/a average	0.188639493	0.04290189	0.0333153
21	Left Ring b/a Standard Deviation	0.019074665	0.03555052	0.0701047
22	Left Ring c/a Standard Deviation	0.012311856	0.0406633	0.0168115
23	Left Ring d/a Standard Deviation	0.019852737	0.05688204	0.0098544
24	Left Ring e/a Standard Deviation	0.017000006	0.04164835	0.0123857
25	Right Index b/a average	0.936184279	0.79481169	1.3127966
26	Right Index c/a average	0.16836325	0.16637923	0.1383855
27	Right Index d/a average	0.130027657	0.28126788	0.3435193
28	Right Index e/a average	0.18118632	0.1489911	0.0833274
29	Right Index b/a Standard Deviation	0.040525635	0.07535808	0.0801331
30	Right Index c/a Standard Deviation	0.014563124	0.05686962	0.0290666
31	Right Index d/a Standard Deviation	0.024145278	0.05833801	0.0513006
32	Right Index e/a Standard Deviation	0.014074429	0.06399453	0.0336558
33	Right Middle b/a average	0.979946266	0.69719025	1.4663316
34	Right Middle c/a average	0.166375708	0.16070195	0.1319901
35	Right Middle d/a average	0.153776519	0.29011251	0.0942419
36	Right Middle e/a average	0.182769954	0.15367593	0.164223
37	Right Middle b/a Standard Deviation	0.052139969	0.08646529	0.1557255
38	Right Middle c/a Standard Deviation	0.022888973	0.08745044	0.0168285
39	Right Middle d/a Standard Deviation	0.028818339	0.0816638	0.034277
40	Right Middle e/a Standard Deviation	0.015456303	0.08175176	0.0281391
41	Right Ring b/a average	0.930578258	0.72843353	0.9681893
42	Right Ring c/a average	0.125679832	0.05666468	0.1342386
43	Right Ring d/a average	0.097294117	0.23858383	0.1001293
44	Right Ring e/a average	0.133758569	0.09005502	0.1377637
45	Right Ring b/a Standard Deviation	0.194856063	0.039348	0.0287623
46	Right Ring c/a Standard Deviation	0.086203201	0.04665032	0.0094004
47	Right Ring d/a Standard Deviation	0.05552242	0.07669193	0.0132254
48	Right Ring e/a Standard Deviation	0.049479647	0.04573047	0.0119754

Table A.9: Features of Subject 9

Sr. No.	Parameters	Session 1	Session 2	Session 3
1	Left Index b/a average	0.94270795	0.91288816	1.1163138
2	Left Index c/a average	0.216990009	0.09485868	0.1633054
3	Left Index d/a average	0.184480545	0.17461337	0.054502
4	Left Index e/a average	0.03214121	0.18759303	0.1931329
5	Left Index b/a Standard Deviation	0.025929885	0.04809651	0.0491665
6	Left Index c/a Standard Deviation	0.02561488	0.06479014	0.0517077
7	Left Index d/a Standard Deviation	0.020482469	0.04433865	0.0406816
8	Left Index e/a Standard Deviation	0.026140231	0.0237484	0.0453849
9	Left Middle b/a average	0.90413128	0.96191976	0.8900445
10	Left Middle c/a average	0.04720946	0.19952123	0.0468306
11	Left Middle d/a average	0.090065682	0.15940618	0.0963242
12	Left Middle e/a average	0.184587823	0.19716644	0.1827822
13	Left Middle b/a Standard Deviation	0.014949398	0.07736588	0.0333309
14	Left Middle c/a Standard Deviation	0.060853766	0.07727087	0.0353542
15	Left Middle d/a Standard Deviation	0.087191365	0.07243462	0.0372289
16	Left Middle e/a Standard Deviation	0.069197473	0.05657815	0.0399129
17	Left Ring b/a average	0.910107715	0.93648775	1.0066369
18	Left Ring c/a average	0.088839666	0.16374125	0.1608975
19	Left Ring d/a average	0.115670312	0.11909934	0.0968177
20	Left Ring e/a average	0.170881328	0.16923776	0.2091416
21	Left Ring b/a Standard Deviation	0.040105143	0.02850889	0.0233744
22	Left Ring c/a Standard Deviation	0.093712483	0.02214488	0.0142065
23	Left Ring d/a Standard Deviation	0.092358349	0.02870634	0.0298844
24	Left Ring e/a Standard Deviation	0.083472926	0.0241642	0.0107082
25	Right Index b/a average	0.931101873	0.97068631	1.0910137
26	Right Index c/a average	0.151448354	0.18650824	0.1969129
27	Right Index d/a average	0.17070622	0.12192931	0.0870133
28	Right Index e/a average	0.084428853	0.18051821	0.1545591
29	Right Index b/a Standard Deviation	0.035907184	0.08514149	0.0706168
30	Right Index c/a Standard Deviation	0.093547287	0.10961963	0.0443077
31	Right Index d/a Standard Deviation	0.072618521	0.06763317	0.0722237
32	Right Index e/a Standard Deviation	0.049475766	0.06337149	0.0715592
33	Right Middle b/a average	0.958017361	1.03489085	1.1317354
34	Right Middle c/a average	0.157704604	0.25146019	0.2034151
35	Right Middle d/a average	0.184486194	0.15813385	0.0983097
36	Right Middle e/a average	0.073831424	0.21723926	0.117923
37	Right Middle b/a Standard Deviation	0.020347212	0.13255494	0.0484822
38	Right Middle c/a Standard Deviation	0.086917139	0.15120904	0.0549816
39	Right Middle d/a Standard Deviation	0.052646988	0.13157495	0.0640387
40	Right Middle e/a Standard Deviation	0.037278337	0.2001041	0.0907737
41	Right Ring b/a average	0.941611307	1.26604788	1.0952141
42	Right Ring c/a average	0.138910505	0.31773722	0.1776962
43	Right Ring d/a average	0.169616701	0.08755764	0.0948585
44	Right Ring e/a average	0.107249903	0.13523764	0.1423638
45	Right Ring b/a Standard Deviation	0.048435068	0.05939926	0.024766
46	Right Ring c/a Standard Deviation	0.080689353	0.04999073	0.0294652
47	Right Ring d/a Standard Deviation	0.092802821	0.06093295	0.06194
48	Right Ring e/a Standard Deviation	0.055006333	0.06845566	0.0755113

Table A.10: Features of Subject 10

Sr. No.	Parameters	Session 1	Session 2	Session 3
1	Left Index b/a average	0.970705979	0.9459584	0.9310053
2	Left Index c/a average	0.144244549	0.24107784	0.1195517
3	Left Index d/a average	0.078777273	0.16567824	0.0695403
4	Left Index e/a average	0.185521271	0.18370178	0.1381424
5	Left Index b/a Standard Deviation	0.023748355	0.10090432	0.0235428
6	Left Index c/a Standard Deviation	0.033526156	0.08603706	0.0256915
7	Left Index d/a Standard Deviation	0.038287273	0.08671877	0.0558849
8	Left Index e/a Standard Deviation	0.031682178	0.07590804	0.0535173
9	Left Middle b/a average	0.998893336	0.96535937	0.9194179
10	Left Middle c/a average	0.179129528	0.27171251	0.09077
11	Left Middle d/a average	0.074755995	0.13526443	0.0638293
12	Left Middle e/a average	0.172689371	0.15419535	0.1304034
13	Left Middle b/a Standard Deviation	0.015866932	0.05353397	0.0287416
14	Left Middle c/a Standard Deviation	0.020875775	0.04355648	0.0356492
15	Left Middle d/a Standard Deviation	0.032344352	0.03859611	0.0492519
16	Left Middle e/a Standard Deviation	0.036027813	0.04395286	0.0501436
17	Left Ring b/a average	1.069219717	1.02481631	0.7945242
18	Left Ring c/a average	0.214671179	0.32534118	0.0904276
19	Left Ring d/a average	0.091770471	0.24595599	0.108826
20	Left Ring e/a average	0.174285781	0.25137314	0.1641507
21	Left Ring b/a Standard Deviation	0.049904133	0.14057203	0.0582082
22	Left Ring c/a Standard Deviation	0.04623572	0.14290749	0.0620689
23	Left Ring d/a Standard Deviation	0.051628863	0.1364112	0.0541088
24	Left Ring e/a Standard Deviation	0.0641545	0.11792351	0.0535905
25	Right Index b/a average	0.948686686	0.90775155	0.926466
26	Right Index c/a average	0.129259877	0.19944174	0.1196914
27	Right Index d/a average	0.096249992	0.12206792	0.0836697
28	Right Index e/a average	0.113483789	0.15214232	0.0828953
29	Right Index b/a Standard Deviation	0.019787865	0.27018589	0.0342281
30	Right Index c/a Standard Deviation	0.030040756	0.15502747	0.0453458
31	Right Index d/a Standard Deviation	0.077081834	0.17663657	0.0610142
32	Right Index e/a Standard Deviation	0.049763689	0.06241153	0.0442915
33	Right Middle b/a average	0.950491747	1.03048743	0.9194808
34	Right Middle c/a average	0.157042968	0.23740535	0.115761
35	Right Middle d/a average	0.095117192	0.10345508	0.0706611
36	Right Middle e/a average	0.114679096	0.10678504	0.0768376
37	Right Middle b/a Standard Deviation	0.022504586	0.06935788	0.031376
38	Right Middle c/a Standard Deviation	0.035144968	0.05563424	0.0300171
39	Right Middle d/a Standard Deviation	0.073562947	0.06946991	0.0579908
40	Right Middle e/a Standard Deviation	0.044756977	0.05381686	0.0398718
41	Right Ring b/a average	0.910553441	1.00063935	0.8771863
42	Right Ring c/a average	0.20111508	0.29111884	0.1755597
43	Right Ring d/a average	0.138865664	0.23284664	0.1537117
44	Right Ring e/a average	0.14263593	0.2963735	0.1669098
45	Right Ring b/a Standard Deviation	0.050286839	0.25874286	0.0989824
46	Right Ring c/a Standard Deviation	0.076019986	0.17566301	0.1137226
47	Right Ring d/a Standard Deviation	0.083727687	0.31862499	0.107525
48	Right Ring e/a Standard Deviation	0.05990332	0.21219131	0.1113269

Table A.11: Features of Subject 11

Sr. No.	Parameters	Session 1	Session 2	Session 3
1	Left Index b/a average	0.853010467	0.615654408	0.8103294
2	Left Index c/a average	0.119733326	0.156123266	0.0751715
3	Left Index d/a average	0.269684426	0.068113957	0.2445609
4	Left Index e/a average	0.18897051	0.040269584	0.1281544
5	Left Index b/a Standard Deviation	0.05001719	0.05119204	0.0421198
6	Left Index c/a Standard Deviation	0.025872022	0.031800193	0.053784
7	Left Index d/a Standard Deviation	0.040695799	0.016303671	0.0344559
8	Left Index e/a Standard Deviation	0.031519553	0.023868428	0.022595
9	Left Middle b/a average	0.768949605	0.807471528	0.933139
10	Left Middle c/a average	0.100479738	0.094801203	0.1814279
11	Left Middle d/a average	0.310621068	0.355337512	0.2111391
12	Left Middle e/a average	0.210995606	0.163571104	0.1523558
13	Left Middle b/a Standard Deviation	0.052369617	0.070942583	0.0758279
14	Left Middle c/a Standard Deviation	0.047731432	0.076878169	0.0634194
15	Left Middle d/a Standard Deviation	0.070846953	0.159079883	0.0523218
16	Left Middle e/a Standard Deviation	0.069094834	0.08926661	0.0757083
17	Left Ring b/a average	1.018556018	0.679052442	1.037649
18	Left Ring c/a average	0.207899029	0.064907578	0.2542529
19	Left Ring d/a average	0.199586439	0.256874146	0.2026423
20	Left Ring e/a average	0.13495125	0.153078679	0.1547297
21	Left Ring b/a Standard Deviation	0.030915055	0.025721928	0.0440999
22	Left Ring c/a Standard Deviation	0.024467563	0.077343176	0.0358743
23	Left Ring d/a Standard Deviation	0.014103165	0.0988244	0.0214798
24	Left Ring e/a Standard Deviation	0.017554637	0.064356137	0.0227361
25	Right Index b/a average	1.047871603	0.864073794	0.9609798
26	Right Index c/a average	0.223745087	0.233592312	0.3091919
27	Right Index d/a average	0.294661247	0.395483073	0.2935007
28	Right Index e/a average	0.24150069	0.214290395	0.1685769
29	Right Index b/a Standard Deviation	0.066005721	0.03175023	0.0806656
30	Right Index c/a Standard Deviation	0.014721802	0.026112738	0.0599477
31	Right Index d/a Standard Deviation	0.034797615	0.029858564	0.041092
32	Right Index e/a Standard Deviation	0.025315448	0.032807831	0.0341518
33	Right Middle b/a average	1.211022144	0.832559446	0.9588321
34	Right Middle c/a average	0.136476742	0.281850712	0.2992674
35	Right Middle d/a average	0.410311437	0.411045359	0.2945843
36	Right Middle e/a average	0.275210466	0.263097316	0.2376092
37	Right Middle b/a Standard Deviation	0.073486191	0.101780287	0.1148463
38	Right Middle c/a Standard Deviation	0.04842233	0.100579069	0.1335462
39	Right Middle d/a Standard Deviation	0.067382182	0.102746733	0.128876
40	Right Middle e/a Standard Deviation	0.054803725	0.115408185	0.096757
41	Right Ring b/a average	1.089127991	0.949901409	1.0610701
42	Right Ring c/a average	0.178348451	0.279269951	0.3721337
43	Right Ring d/a average	0.307857856	0.291648815	0.2974221
44	Right Ring e/a average	0.272175877	0.213498962	0.1921112
45	Right Ring b/a Standard Deviation	0.060820686	0.03162379	0.0811214
46	Right Ring c/a Standard Deviation	0.010953735	0.032104152	0.0751477
47	Right Ring d/a Standard Deviation	0.026669801	0.035433819	0.0407886
48	Right Ring e/a Standard Deviation	0.024059282	0.033541265	0.0410942

Table A.12: Features of Subject 12

Sr. No.	Parameters	Session 1	Session 2	Session 3
1	Left Index b/a average	0.809926212	0.982935953	1.0729661
2	Left Index c/a average	0.072842938	0.077596419	0.1208281
3	Left Index d/a average	0.174431961	0.215107901	0.0772536
4	Left Index e/a average	0.140881631	0.222665833	0.1964827
5	Left Index b/a Standard Deviation	0.028922466	0.021419321	0.0209182
6	Left Index c/a Standard Deviation	0.069963351	0.057989021	0.019073
7	Left Index d/a Standard Deviation	0.048351953	0.043330332	0.0229357
8	Left Index e/a Standard Deviation	0.068320062	0.051395035	0.0227644
9	Left Middle b/a average	0.957677724	0.899606618	1.05276
10	Left Middle c/a average	0.077504827	0.223867199	0.0621531
11	Left Middle d/a average	0.111375042	0.126969756	0.0448197
12	Left Middle e/a average	0.20634176	0.078213171	0.1680882
13	Left Middle b/a Standard Deviation	0.053598357	0.040847454	0.0195789
14	Left Middle c/a Standard Deviation	0.03061052	0.093741847	0.0203438
15	Left Middle d/a Standard Deviation	0.051998337	0.078869204	0.0241366
16	Left Middle e/a Standard Deviation	0.039156247	0.084111065	0.0144535
17	Left Ring b/a average	0.884904324	0.762202237	1.05276
18	Left Ring c/a average	0.181062665	0.227216005	0.0621531
19	Left Ring d/a average	0.091380487	0.086748223	0.0448197
20	Left Ring e/a average	0.033199022	0.039570618	0.1680882
21	Left Ring b/a Standard Deviation	0.02240011	0.015685474	0.0195789
22	Left Ring c/a Standard Deviation	0.050506689	0.022560894	0.0203438
23	Left Ring d/a Standard Deviation	0.033717561	0.011915931	0.0241366
24	Left Ring e/a Standard Deviation	0.054755121	0.013185482	0.0144535
25	Right Index b/a average	1.049534503	0.92712168	0.9433302
26	Right Index c/a average	0.134568106	0.101566869	0.1040478
27	Right Index d/a average	0.146111582	0.199219426	0.0553307
28	Right Index e/a average	0.220951682	0.151040369	0.3979744
29	Right Index b/a Standard Deviation	0.072409897	0.064967201	0.0677696
30	Right Index c/a Standard Deviation	0.054596507	0.07781706	0.0477653
31	Right Index d/a Standard Deviation	0.070553334	0.058532149	0.0282359
32	Right Index e/a Standard Deviation	0.035527741	0.08098887	0.3732116
33	Right Middle b/a average	1.03527293	0.941808667	0.9238412
34	Right Middle c/a average	0.137196483	0.121236716	0.1219542
35	Right Middle d/a average	0.149831269	0.246511818	0.069765
36	Right Middle e/a average	0.182703146	0.185090983	0.4211156
37	Right Middle b/a Standard Deviation	0.188068547	0.065224057	0.0845241
38	Right Middle c/a Standard Deviation	0.112594992	0.077876961	0.0624242
39	Right Middle d/a Standard Deviation	0.077373302	0.075703993	0.042102
40	Right Middle e/a Standard Deviation	0.098746409	0.06889292	0.3814785
41	Right Ring b/a average	0.988259417	1.127844903	1.0373647
42	Right Ring c/a average	0.10768622	0.125799881	0.0901411
43	Right Ring d/a average	0.11364637	0.129676021	0.0649945
44	Right Ring e/a average	0.160932295	0.152398341	0.5184069
45	Right Ring b/a Standard Deviation	0.093034016	0.487503751	0.093941
46	Right Ring c/a Standard Deviation	0.067615902	0.139697298	0.074652
47	Right Ring d/a Standard Deviation	0.049603218	0.17741099	0.0280982
48	Right Ring e/a Standard Deviation	0.08150809	0.38838832	0.4738017

Table A.13: Features of Subject 13

Sr. No.	Parameters	Session 1	Session 2	Session 3
1	Left Index b/a average	0.914921526	0.92879739	0.9351552
2	Left Index c/a average	0.438603714	0.24758478	0.0789095
3	Left Index d/a average	0.082385682	0.31534849	0.1684582
4	Left Index e/a average	0.0716529	0.21669183	0.108885
5	Left Index b/a Standard Deviation	0.720067288	0.15788658	0.0690148
6	Left Index c/a Standard Deviation	0.546363227	0.13712738	0.04538
7	Left Index d/a Standard Deviation	0.035202929	0.13961309	0.0453268
8	Left Index e/a Standard Deviation	0.035886891	0.16351994	0.0496848
9	Left Middle b/a average	0.922777646	0.97499647	1.2067371
10	Left Middle c/a average	0.229854645	0.30607141	0.3458114
11	Left Middle d/a average	0.158517002	0.28141183	0.1806672
12	Left Middle e/a average	0.146667047	0.14659129	0.2159028
13	Left Middle b/a Standard Deviation	0.079824453	0.02932284	0.0535248
14	Left Middle c/a Standard Deviation	0.035881738	0.03422703	0.0313561
15	Left Middle d/a Standard Deviation	0.035624399	0.0523045	0.0440428
16	Left Middle e/a Standard Deviation	0.021912845	0.02819051	0.0220451
17	Left Ring b/a average	0.943527354	1.04925129	1.0075586
18	Left Ring c/a average	0.282472271	0.35338659	0.2048479
19	Left Ring d/a average	0.181862018	0.27553629	0.1717372
20	Left Ring e/a average	0.169781682	0.16507297	0.1862133
21	Left Ring b/a Standard Deviation	0.046333639	0.02528608	0.0275077
22	Left Ring c/a Standard Deviation	0.011601141	0.03231676	0.0177005
23	Left Ring d/a Standard Deviation	0.037806362	0.05224346	0.0528405
24	Left Ring e/a Standard Deviation	0.020327782	0.02608605	0.0272324
25	Right Index b/a average	0.947786446	1.02285298	0.9768504
26	Right Index c/a average	0.123479994	0.29809249	0.1866244
27	Right Index d/a average	0.084049166	0.2063514	0.1133538
28	Right Index e/a average	0.068267383	0.09906271	0.1160843
29	Right Index b/a Standard Deviation	0.040262755	0.04184938	0.0376785
30	Right Index c/a Standard Deviation	0.021593687	0.03166605	0.0308115
31	Right Index d/a Standard Deviation	0.043261784	0.0465958	0.0727114
32	Right Index e/a Standard Deviation	0.011270154	0.02472406	0.0348573
33	Right Middle b/a average	0.899715783	1.13411536	0.9997288
34	Right Middle c/a average	0.10278556	0.44350531	0.2717908
35	Right Middle d/a average	0.108746933	0.20740717	0.1251503
36	Right Middle e/a average	0.062495138	0.13076954	0.1145497
37	Right Middle b/a Standard Deviation	0.071636295	0.01977699	0.0241536
38	Right Middle c/a Standard Deviation	0.047792997	0.01742814	0.0286074
39	Right Middle d/a Standard Deviation	0.067657726	0.03143053	0.0740724
40	Right Middle e/a Standard Deviation	0.039244663	0.02188614	0.0398471
41	Right Ring b/a average	1.15761374	1.05992994	1.0001535
42	Right Ring c/a average	0.349179448	0.32501445	0.1868166
43	Right Ring d/a average	0.075318459	0.19622415	0.1061726
44	Right Ring e/a average	0.091439977	0.10077933	0.1057147
45	Right Ring b/a Standard Deviation	0.01473104	0.04399553	0.0384681
46	Right Ring c/a Standard Deviation	0.010159414	0.02705408	0.019587
47	Right Ring d/a Standard Deviation	0.034786359	0.04283121	0.0664128
48	Right Ring e/a Standard Deviation	0.018559447	0.01786476	0.0218192

Table A.14: Features of Subject 14

Sr. No.	Parameters	Session 1	Session 2	Session 3
1	Left Index b/a average	1.020390563	0.991904554	1.0501648
2	Left Index c/a average	0.185816014	0.175238325	0.244015
3	Left Index d/a average	0.216535282	0.206814372	0.1502701
4	Left Index e/a average	0.227968559	0.201365038	0.1570459
5	Left Index b/a Standard Deviation	0.085827343	0.036133879	0.0580343
6	Left Index c/a Standard Deviation	0.064718244	0.03298939	0.0313403
7	Left Index d/a Standard Deviation	0.028203738	0.026868096	0.0427782
8	Left Index e/a Standard Deviation	0.027423569	0.032027469	0.0309715
9	Left Middle b/a average	0.953768575	1.012179424	1.126039
10	Left Middle c/a average	0.217852917	0.195013168	0.3090785
11	Left Middle d/a average	0.215700044	0.20507868	0.1506746
12	Left Middle e/a average	0.19083066	0.197617324	0.1761643
13	Left Middle b/a Standard Deviation	0.040323754	0.026862518	0.0375359
14	Left Middle c/a Standard Deviation	0.040855251	0.021472997	0.0186772
15	Left Middle d/a Standard Deviation	0.020831594	0.019675814	0.0457066
16	Left Middle e/a Standard Deviation	0.031338368	0.028936253	0.0279557
17	Left Ring b/a average	0.973781919	0.844962291	0.9301805
18	Left Ring c/a average	0.216910803	0.111525352	0.1126137
19	Left Ring d/a average	0.252690068	0.241385892	0.1669784
20	Left Ring e/a average	0.221510928	0.180114337	0.1485035
21	Left Ring b/a Standard Deviation	0.28059399	0.079441662	0.0673899
22	Left Ring c/a Standard Deviation	0.172408856	0.067714005	0.0817596
23	Left Ring d/a Standard Deviation	0.094893897	0.07020377	0.0681578
24	Left Ring e/a Standard Deviation	0.087489044	0.077035873	0.0736502
25	Right Index b/a average	0.998691951	0.920944992	1.0238336
26	Right Index c/a average	0.298172889	0.176503392	0.3195713
27	Right Index d/a average	0.253550136	0.223832541	0.1743647
28	Right Index e/a average	0.175124048	0.148468326	0.1261867
29	Right Index b/a Standard Deviation	0.047360053	0.056956975	0.070594
30	Right Index c/a Standard Deviation	0.059782533	0.029267182	0.0838172
31	Right Index d/a Standard Deviation	0.040055781	0.028891613	0.0442099
32	Right Index e/a Standard Deviation	0.025861211	0.025375307	0.0212475
33	Right Middle b/a average	0.925905623	0.902900231	1.0738252
34	Right Middle c/a average	0.297486028	0.153706225	0.3408647
35	Right Middle d/a average	0.249782167	0.225841903	0.1601005
36	Right Middle e/a average	0.142925079	0.161614391	0.1177437
37	Right Middle b/a Standard Deviation	0.076477786	0.031768817	0.0385493
38	Right Middle c/a Standard Deviation	0.083154743	0.028985375	0.0517496
39	Right Middle d/a Standard Deviation	0.040112614	0.0270227	0.0454411
40	Right Middle e/a Standard Deviation	0.026835604	0.029507763	0.0272741
41	Right Ring b/a average	0.970607112	1.09001476	0.8817855
42	Right Ring c/a average	0.317005059	0.251554505	0.140456
43	Right Ring d/a average	0.295093518	0.295642297	0.0613607
44	Right Ring e/a average	0.170242741	0.19519386	0.0625904
45	Right Ring b/a Standard Deviation	0.150733465	0.424275485	0.3399517
46	Right Ring c/a Standard Deviation	0.12126728	0.102266553	0.2358646
47	Right Ring d/a Standard Deviation	0.067476165	0.077578503	0.1623066
48	Right Ring e/a Standard Deviation	0.066485827	0.028138473	0.131017

Table A.15: Features of Subject 15

Sr. No.	Parameters	Session 1	Session 2	Session 3
1	Left Index b/a average	1.020390563	0.99190455	1.0501648
2	Left Index c/a average	0.185816014	0.17523833	0.244015
3	Left Index d/a average	0.216535282	0.20681437	0.1502701
4	Left Index e/a average	0.227968559	0.20136504	0.1570459
5	Left Index b/a Standard Deviation	0.085827343	0.0361339	0.0580343
6	Left Index c/a Standard Deviation	0.064718244	0.0329894	0.0313403
7	Left Index d/a Standard Deviation	0.028203738	0.0268681	0.0427782
8	Left Index e/a Standard Deviation	0.027423569	0.0320275	0.0309715
9	Left Middle b/a average	0.953768575	1.01217942	1.126039
10	Left Middle c/a average	0.217852917	0.19501317	0.3090785
11	Left Middle d/a average	0.215700044	0.20507868	0.1506746
12	Left Middle e/a average	0.19083066	0.19761732	0.1761643
13	Left Middle b/a Standard Deviation	0.040323754	0.02686252	0.0375359
14	Left Middle c/a Standard Deviation	0.040855251	0.021473	0.0186772
15	Left Middle d/a Standard Deviation	0.020831594	0.01967581	0.0457066
16	Left Middle e/a Standard Deviation	0.031338368	0.02893625	0.0279557
17	Left Ring b/a average	0.973781919	0.84496229	0.9301805
18	Left Ring c/a average	0.216910803	0.11152535	0.1126137
19	Left Ring d/a average	0.252690068	0.24138589	0.1669784
20	Left Ring e/a average	0.221510928	0.18011434	0.1485035
21	Left Ring b/a Standard Deviation	0.28059399	0.07944166	0.0673899
22	Left Ring c/a Standard Deviation	0.172408856	0.06771401	0.0817596
23	Left Ring d/a Standard Deviation	0.094893897	0.07020377	0.0681578
24	Left Ring e/a Standard Deviation	0.087489044	0.07703587	0.0736502
25	Right Index b/a average	0.998691951	0.92094499	1.0238336
26	Right Index c/a average	0.298172889	0.17650339	0.3195713
27	Right Index d/a average	0.253550136	0.22383254	0.1743647
28	Right Index e/a average	0.175124048	0.14846833	0.1261867
29	Right Index b/a Standard Deviation	0.047360053	0.05695698	0.070594
30	Right Index c/a Standard Deviation	0.059782533	0.02926718	0.0838172
31	Right Index d/a Standard Deviation	0.040055781	0.02889161	0.0442099
32	Right Index e/a Standard Deviation	0.025861211	0.02537531	0.0212475
33	Right Middle b/a average	0.925905623	0.90290023	1.0738252
34	Right Middle c/a average	0.297486028	0.15370622	0.3408647
35	Right Middle d/a average	0.249782167	0.2258419	0.1601005
36	Right Middle e/a average	0.142925079	0.16161439	0.1177437
37	Right Middle b/a Standard Deviation	0.076477786	0.03176882	0.0385493
38	Right Middle c/a Standard Deviation	0.083154743	0.02898537	0.0517496
39	Right Middle d/a Standard Deviation	0.040112614	0.0270227	0.0454411
40	Right Middle e/a Standard Deviation	0.026835604	0.02950776	0.0272741
41	Right Ring b/a average	0.970607112	1.09001476	0.8817855
42	Right Ring c/a average	0.317005059	0.2515545	0.140456
43	Right Ring d/a average	0.295093518	0.2956423	0.0613607
44	Right Ring e/a average	0.170242741	0.19519386	0.0625904
45	Right Ring b/a Standard Deviation	0.150733465	0.42427548	0.3399517
46	Right Ring c/a Standard Deviation	0.12126728	0.10226655	0.2358646
47	Right Ring d/a Standard Deviation	0.067476165	0.0775785	0.1623066
48	Right Ring e/a Standard Deviation	0.066485827	0.02813847	0.131017

Table A.16: Features of Subject 16

Sr. No.	Parameters	Session 1	Session 2	Session 3
1	Left Index b/a average	0.822182809	1.02456272	0.9454224
2	Left Index c/a average	0.249752768	0.08017115	0.111061
3	Left Index d/a average	0.09740604	0.10066339	0.0872818
4	Left Index e/a average	0.191767012	0.18690279	0.2015041
5	Left Index b/a Standard Deviation	0.028112282	0.01054329	0.0216008
6	Left Index c/a Standard Deviation	0.020522851	0.01758352	0.0246788
7	Left Index d/a Standard Deviation	0.020326987	0.02524239	0.0242514
8	Left Index e/a Standard Deviation	0.008254644	0.01030256	0.0092307
9	Left Middle b/a average	1.110900979	1.05726852	0.9343512
10	Left Middle c/a average	0.105554942	0.12281567	0.112036
11	Left Middle d/a average	0.119431282	0.05820153	0.1051542
12	Left Middle e/a average	0.205920694	0.10717519	0.2035098
13	Left Middle b/a Standard Deviation	0.042474899	0.03687374	0.0206258
14	Left Middle c/a Standard Deviation	0.087901391	0.09877725	0.0262436
15	Left Middle d/a Standard Deviation	0.139583127	0.02380462	0.0240824
16	Left Middle e/a Standard Deviation	0.114241383	0.09338243	0.0114878
17	Left Ring b/a average	1.047204355	0.93099329	0.8965644
18	Left Ring c/a average	0.134390587	0.05019402	0.1239811
19	Left Ring d/a average	0.141377061	0.16929949	0.1125088
20	Left Ring e/a average	0.208332951	0.18815895	0.2151579
21	Left Ring b/a Standard Deviation	0.021828067	0.010488	0.0256539
22	Left Ring c/a Standard Deviation	0.023418149	0.02757633	0.0222707
23	Left Ring d/a Standard Deviation	0.027347211	0.02491157	0.0283844
24	Left Ring e/a Standard Deviation	0.010080676	0.03059447	0.0111607
25	Right Index b/a average	1.256617505	1.2561803	1.292031
26	Right Index c/a average	0.425399711	0.36128121	0.4003101
27	Right Index d/a average	0.216855601	0.07453146	0.1119032
28	Right Index e/a average	0.228667281	0.16849839	0.0907471
29	Right Index b/a Standard Deviation	0.020030358	0.02198158	0.0121499
30	Right Index c/a Standard Deviation	0.024845477	0.03873944	0.0228151
31	Right Index d/a Standard Deviation	0.034797035	0.04312311	0.062585
32	Right Index e/a Standard Deviation	0.023159105	0.04199814	0.0629431
33	Right Middle b/a average	1.130863053	1.22120313	1.3273955
34	Right Middle c/a average	0.268637241	0.30099647	0.4374113
35	Right Middle d/a average	0.194870601	0.0650536	0.1161342
36	Right Middle e/a average	0.193646476	0.14722598	0.1030438
37	Right Middle b/a Standard Deviation	0.024287752	0.02710097	0.0146827
38	Right Middle c/a Standard Deviation	0.030528661	0.043174	0.029088
39	Right Middle d/a Standard Deviation	0.034072599	0.03861385	0.0673495
40	Right Middle e/a Standard Deviation	0.024641107	0.03793561	0.0587019
41	Right Ring b/a average	1.219701959	1.19546904	1.2867046
42	Right Ring c/a average	0.371307521	0.25993643	0.347705
43	Right Ring d/a average	0.20913444	0.06444067	0.1319657
44	Right Ring e/a average	0.228611061	0.15724824	0.0662034
45	Right Ring b/a Standard Deviation	0.020298593	0.04264444	0.0155914
46	Right Ring c/a Standard Deviation	0.024978481	0.05161665	0.0214839
47	Right Ring d/a Standard Deviation	0.037625015	0.03799382	0.0423745
48	Right Ring e/a Standard Deviation	0.023732946	0.04693392	0.0521826

Table A.17: Features of Subject 17

Sr. No.	Parameters	Session 1	Session 2	Session 3
1	Left Index b/a average	0.808221326	0.84079401	1.0234247
2	Left Index c/a average	0.177558445	0.08862754	0.1722963
3	Left Index d/a average	0.163579518	0.22640471	0.0628277
4	Left Index e/a average	0.035220392	0.18406386	0.3192388
5	Left Index b/a Standard Deviation	0.045764972	0.05016502	0.0436283
6	Left Index c/a Standard Deviation	0.047171881	0.0555873	0.0518918
7	Left Index d/a Standard Deviation	0.038231907	0.05584101	0.0279979
8	Left Index e/a Standard Deviation	0.027731005	0.06065587	0.4511427
9	Left Middle b/a average	0.850155392	0.8644078	0.8501607
10	Left Middle c/a average	0.201246185	0.14441599	0.2189533
11	Left Middle d/a average	0.256585071	0.2149767	0.1090614
12	Left Middle e/a average	0.255906782	0.24878752	0.0308618
13	Left Middle b/a Standard Deviation	0.14588903	0.17314615	0.0243289
14	Left Middle c/a Standard Deviation	0.181208621	0.09755467	0.0137888
15	Left Middle d/a Standard Deviation	0.220882222	0.07978578	0.0153046
16	Left Middle e/a Standard Deviation	0.20254042	0.12937983	0.0138007
17	Left Ring b/a average	0.87751902	0.94764031	0.8501607
18	Left Ring c/a average	0.117604159	0.13715801	0.2189533
19	Left Ring d/a average	0.142780794	0.21648456	0.1090614
20	Left Ring e/a average	0.129888865	0.23116041	0.0308618
21	Left Ring b/a Standard Deviation	0.078959647	0.05143013	0.0243289
22	Left Ring c/a Standard Deviation	0.072272103	0.04677275	0.0137888
23	Left Ring d/a Standard Deviation	0.056649709	0.03996858	0.015234
24	Left Ring e/a Standard Deviation	0.085161605	0.03072795	0.0125
25	Right Index b/a average	0.698839705	0.7789323	1.52376
26	Right Index c/a average	0.150665767	0.16403371	0.2585152
27	Right Index d/a average	0.151454939	0.15253144	0.155254
28	Right Index e/a average	0.022256933	0.06160823	0.3719445
29	Right Index b/a Standard Deviation	0.035905706	0.03367101	0.0877251
30	Right Index c/a Standard Deviation	0.039223743	0.06205405	0.0249784
31	Right Index d/a Standard Deviation	0.030153654	0.04267292	0.0251333
32	Right Index e/a Standard Deviation	0.01438184	0.05248677	0.613903
33	Right Middle b/a average	0.707749464	0.9682326	0.9434738
34	Right Middle c/a average	0.16976339	0.24319832	0.1193785
35	Right Middle d/a average	0.164866045	0.31592691	0.1521832
36	Right Middle e/a average	0.078762691	0.25555616	0.2080447
37	Right Middle b/a Standard Deviation	0.084349772	0.26377327	0.0987009
38	Right Middle c/a Standard Deviation	0.077256052	0.18898129	0.1003654
39	Right Middle d/a Standard Deviation	0.074901529	0.30795085	0.08513
40	Right Middle e/a Standard Deviation	0.062037957	0.20412152	0.1362847
41	Right Ring b/a average	0.798052064	0.73279377	1.3075191
42	Right Ring c/a average	0.115201407	0.12954559	0.1696901
43	Right Ring d/a average	0.175836589	0.20897998	0.2072967
44	Right Ring e/a average	0.113070995	0.08123154	0.2881397
45	Right Ring b/a Standard Deviation	0.039270148	0.03432902	0.0587167
46	Right Ring c/a Standard Deviation	0.090267449	0.0766247	0.1029931
47	Right Ring d/a Standard Deviation	0.041972732	0.0776151	0.0749804
48	Right Ring e/a Standard Deviation	0.085389742	0.07357228	0.4406374

Table A.18: Features of Subject 18

Sr. No.	Parameters	Session 1	Session 2	Session 3
1	Left Index b/a average	0.983533683	1.02367099	1.1014197
2	Left Index c/a average	0.112739907	0.19896271	0.2804509
3	Left Index d/a average	0.149661714	0.11485166	0.1434984
4	Left Index e/a average	0.064730876	0.13840859	0.0181747
5	Left Index b/a Standard Deviation	0.060185562	0.07605193	0.0242442
6	Left Index c/a Standard Deviation	0.050073882	0.0193048	0.0429864
7	Left Index d/a Standard Deviation	0.031529817	0.03815236	0.0174148
8	Left Index e/a Standard Deviation	0.020952455	0.01755841	0.0132092
9	Left Middle b/a average	1.107392903	1.17489987	1.2036115
10	Left Middle c/a average	0.124388053	0.18836488	0.3511071
11	Left Middle d/a average	0.165341107	0.1493866	0.1426217
12	Left Middle e/a average	0.08890872	0.16094449	0.0190604
13	Left Middle b/a Standard Deviation	0.124260825	0.11066142	0.0206169
14	Left Middle c/a Standard Deviation	0.075528701	0.06474634	0.0484269
15	Left Middle d/a Standard Deviation	0.088916232	0.06804915	0.0214693
16	Left Middle e/a Standard Deviation	0.066161397	0.04385588	0.0172848
17	Left Ring b/a average	1.147720129	1.28833191	1.0709442
18	Left Ring c/a average	0.078436615	0.15169088	0.2682564
19	Left Ring d/a average	0.15629445	0.19541616	0.1317301
20	Left Ring e/a average	0.062028562	0.14364802	0.0178685
21	Left Ring b/a Standard Deviation	0.097443063	0.09323137	0.0142881
22	Left Ring c/a Standard Deviation	0.05277785	0.04531646	0.0426358
23	Left Ring d/a Standard Deviation	0.062088858	0.06797	0.0156693
24	Left Ring e/a Standard Deviation	0.031739245	0.02513468	0.0147047
25	Right Index b/a average	0.951023127	1.01085031	1.1655335
26	Right Index c/a average	0.191895928	0.10058939	0.3868044
27	Right Index d/a average	0.172611899	0.16016348	0.223058
28	Right Index e/a average	0.072725334	0.12091943	0.0661367
29	Right Index b/a Standard Deviation	0.056268031	0.0470109	0.016496
30	Right Index c/a Standard Deviation	0.043635893	0.07304578	0.0375096
31	Right Index d/a Standard Deviation	0.018275522	0.09357779	0.0189676
32	Right Index e/a Standard Deviation	0.01344419	0.04723639	0.015421
33	Right Middle b/a average	1.295629541	1.01927242	1.1571225
34	Right Middle c/a average	0.34842569	0.11058662	0.3493871
35	Right Middle d/a average	0.190062899	0.17322064	0.2171014
36	Right Middle e/a average	0.084299174	0.11786471	0.0671204
37	Right Middle b/a Standard Deviation	0.033390067	0.04965029	0.0208817
38	Right Middle c/a Standard Deviation	0.047587434	0.07784559	0.0375818
39	Right Middle d/a Standard Deviation	0.021602742	0.09636614	0.0261455
40	Right Middle e/a Standard Deviation	0.010444299	0.0399931	0.0174165
41	Right Ring b/a average	0.940240619	0.87747579	1.1311545
42	Right Ring c/a average	0.245070089	0.13551133	0.4006893
43	Right Ring d/a average	0.203713567	0.19194029	0.2430664
44	Right Ring e/a average	0.09598667	0.08235062	0.0806879
45	Right Ring b/a Standard Deviation	0.050370884	0.04536143	0.0124086
46	Right Ring c/a Standard Deviation	0.047941296	0.07223132	0.0408344
47	Right Ring d/a Standard Deviation	0.021946638	0.0406554	0.0215293
48	Right Ring e/a Standard Deviation	0.009295931	0.02737565	0.0116718

Table A.19: Features of Subject 19

Sr. No.	Parameters	Session 1	Session 2	Session 3
1	Left Index b/a average	0.995861951	0.94201496	1.0202853
2	Left Index c/a average	0.126779478	0.05641556	0.1144462
3	Left Index d/a average	0.209472813	0.17851761	0.1695448
4	Left Index e/a average	0.153682052	0.15947849	0.1567329
5	Left Index b/a Standard Deviation	0.090190015	0.03725443	0.0368953
6	Left Index c/a Standard Deviation	0.081448002	0.0178126	0.031197
7	Left Index d/a Standard Deviation	0.098223141	0.04921064	0.0483875
8	Left Index e/a Standard Deviation	0.04289634	0.01480575	0.0202942
9	Left Middle b/a average	0.842027251	0.99139978	0.7955324
10	Left Middle c/a average	0.081074495	0.06865752	0.1177952
11	Left Middle d/a average	0.204944866	0.16413018	0.1260442
12	Left Middle e/a average	0.086751248	0.16787294	0.071057
13	Left Middle b/a Standard Deviation	0.053178709	0.0576839	0.0611441
14	Left Middle c/a Standard Deviation	0.067947704	0.04913382	0.0425377
15	Left Middle d/a Standard Deviation	0.075450449	0.04098739	0.0213113
16	Left Middle e/a Standard Deviation	0.05300648	0.04133607	0.021629
17	Left Ring b/a average	0.991454184	0.99909352	1.0309176
18	Left Ring c/a average	0.20007207	0.12687491	0.1697596
19	Left Ring d/a average	0.219608043	0.18938483	0.1714606
20	Left Ring e/a average	0.163835088	0.18449004	0.1613135
21	Left Ring b/a Standard Deviation	0.059214388	0.04285639	0.0204635
22	Left Ring c/a Standard Deviation	0.076983741	0.03075831	0.0229867
23	Left Ring d/a Standard Deviation	0.075816636	0.04489078	0.0454673
24	Left Ring e/a Standard Deviation	0.038859068	0.01768588	0.0198046
25	Right Index b/a average	1.097416169	1.00437368	1.1450094
26	Right Index c/a average	0.260311482	0.24847239	0.2998158
27	Right Index d/a average	0.117807492	0.17091391	0.1420959
28	Right Index e/a average	0.147350153	0.12297521	0.1285438
29	Right Index b/a Standard Deviation	0.04480694	0.018045	0.0133064
30	Right Index c/a Standard Deviation	0.036836263	0.01576107	0.0119082
31	Right Index d/a Standard Deviation	0.058888163	0.05955539	0.0591916
32	Right Index e/a Standard Deviation	0.032391165	0.02596984	0.0310253
33	Right Middle b/a average	1.048773674	1.15884994	1.195391
34	Right Middle c/a average	0.254517056	0.27454283	0.3604604
35	Right Middle d/a average	0.116440045	0.13062661	0.1501252
36	Right Middle e/a average	0.125393396	0.13676039	0.1291456
37	Right Middle b/a Standard Deviation	0.031430276	0.05634376	0.0198737
38	Right Middle c/a Standard Deviation	0.016622606	0.04496586	0.0150376
39	Right Middle d/a Standard Deviation	0.047952114	0.06520609	0.0563173
40	Right Middle e/a Standard Deviation	0.018743365	0.03872638	0.0331047
41	Right Ring b/a average	1.159994821	1.07482104	1.140437
42	Right Ring c/a average	0.303438896	0.33199591	0.2259844
43	Right Ring d/a average	0.098127338	0.17359359	0.0987511
44	Right Ring e/a average	0.145193194	0.15246354	0.1088561
45	Right Ring b/a Standard Deviation	0.032677344	0.01535596	0.0245661
46	Right Ring c/a Standard Deviation	0.019409472	0.01356494	0.0290848
47	Right Ring d/a Standard Deviation	0.048993434	0.05340783	0.0541816
48	Right Ring e/a Standard Deviation	0.023310267	0.03248225	0.0313448

Table A.20: Features of Subject 20

Sr. No.	Parameters	Session 1	Session 2	Session 3
1	Left Index b/a average	0.938185828	0.87365395	1.0096995
2	Left Index c/a average	0.052661346	0.17768513	0.1631429
3	Left Index d/a average	0.220392806	0.11611563	0.0891177
4	Left Index e/a average	0.193058593	0.22154842	0.046329
5	Left Index b/a Standard Deviation	0.019256263	0.06057804	0.0232416
6	Left Index c/a Standard Deviation	0.062721183	0.0285403	0.0450684
7	Left Index d/a Standard Deviation	0.043877121	0.05832682	0.0216598
8	Left Index e/a Standard Deviation	0.050345584	0.03368408	0.032756
9	Left Middle b/a average	1.122707161	0.89891537	1.097925
10	Left Middle c/a average	0.227450122	0.17027511	0.1261187
11	Left Middle d/a average	0.201672428	0.13038721	0.047129
12	Left Middle e/a average	0.254770284	0.23773062	0.2042615
13	Left Middle b/a Standard Deviation	0.08937288	0.0497968	0.0163789
14	Left Middle c/a Standard Deviation	0.080126302	0.02196897	0.0186764
15	Left Middle d/a Standard Deviation	0.08090737	0.05403147	0.0364873
16	Left Middle e/a Standard Deviation	0.072339575	0.02376844	0.0615462
17	Left Ring b/a average	0.931527747	0.96242144	1.0378522
18	Left Ring c/a average	0.105228663	0.100207	0.0961787
19	Left Ring d/a average	0.250433834	0.13705516	0.0666284
20	Left Ring e/a average	0.236418138	0.200213	0.2298191
21	Left Ring b/a Standard Deviation	0.014090906	0.07696347	0.0099182
22	Left Ring c/a Standard Deviation	0.013218895	0.03709812	0.0104912
23	Left Ring d/a Standard Deviation	0.037752919	0.05417948	0.0221774
24	Left Ring e/a Standard Deviation	0.017003424	0.02593332	0.0115366
25	Right Index b/a average	0.898848183	0.82343283	1.2157516
26	Right Index c/a average	0.193512326	0.29806908	0.298103
27	Right Index d/a average	0.09242653	0.16477472	0.0768416
28	Right Index e/a average	0.17046013	0.21633684	0.1810172
29	Right Index b/a Standard Deviation	0.019581054	0.0474272	0.0157723
30	Right Index c/a Standard Deviation	0.011703796	0.02468373	0.0189795
31	Right Index d/a Standard Deviation	0.030632512	0.06268342	0.0525195
32	Right Index e/a Standard Deviation	0.016346183	0.03680551	0.0647394
33	Right Middle b/a average	0.819897369	0.91302306	1.1837348
34	Right Middle c/a average	0.231445468	0.22841207	0.2977271
35	Right Middle d/a average	0.065462722	0.19568113	0.0925848
36	Right Middle e/a average	0.157082113	0.22865283	0.1990624
37	Right Middle b/a Standard Deviation	0.041780555	0.05000852	0.0143443
38	Right Middle c/a Standard Deviation	0.022547694	0.028222	0.0139568
39	Right Middle d/a Standard Deviation	0.034448784	0.07062577	0.046775
40	Right Middle e/a Standard Deviation	0.035749199	0.03265477	0.041747
41	Right Ring b/a average	0.90409094	0.77443768	1.0688989
42	Right Ring c/a average	0.177788074	0.37377183	0.159635
43	Right Ring d/a average	0.086387375	0.21098726	0.0841423
44	Right Ring e/a average	0.172495827	0.24580118	0.1772782
45	Right Ring b/a Standard Deviation	0.024158925	0.05711889	0.0125024
46	Right Ring c/a Standard Deviation	0.013291433	0.02602006	0.0116687
47	Right Ring d/a Standard Deviation	0.030501542	0.06667575	0.0415052
48	Right Ring e/a Standard Deviation	0.017099274	0.03329874	0.0431961

Table A.21: Features of Subject 21

Sr. No.	Parameters	Session 1	Session 2	Session 3
1	Left Index b/a average	1.083271031	1.06957559	1.1866431
2	Left Index c/a average	0.372809738	0.34411886	0.3783026
3	Left Index d/a average	0.261752886	0.38400075	0.1976591
4	Left Index e/a average	0.14003753	0.22765579	0.1390132
5	Left Index b/a Standard Deviation	0.015037939	0.01975575	0.0177971
6	Left Index c/a Standard Deviation	0.013927001	0.02092916	0.0266784
7	Left Index d/a Standard Deviation	0.020075864	0.04070115	0.04356
8	Left Index e/a Standard Deviation	0.013720518	0.03126179	0.0316152
9	Left Middle b/a average	1.087869729	0.91262657	0.8484541
10	Left Middle c/a average	0.376491302	0.28793191	0.0901161
11	Left Middle d/a average	0.261426835	0.28296407	0.169688
12	Left Middle e/a average	0.145444881	0.09773806	0.1220974
13	Left Middle b/a Standard Deviation	0.028565776	0.05777639	0.0452593
14	Left Middle c/a Standard Deviation	0.02917652	0.02407567	0.0415023
15	Left Middle d/a Standard Deviation	0.035308535	0.03120484	0.0351841
16	Left Middle e/a Standard Deviation	0.023252049	0.01562739	0.0259149
17	Left Ring b/a average	1.195748055	1.07383052	1.014736
18	Left Ring c/a average	0.287652663	0.15662238	0.2308262
19	Left Ring d/a average	0.237753613	0.32505801	0.1788419
20	Left Ring e/a average	0.164690098	0.18488801	0.1152652
21	Left Ring b/a Standard Deviation	0.014313892	0.0190292	0.0226926
22	Left Ring c/a Standard Deviation	0.014672676	0.01533388	0.0239095
23	Left Ring d/a Standard Deviation	0.02803301	0.04326699	0.038356
24	Left Ring e/a Standard Deviation	0.018505098	0.02149404	0.0213184
25	Right Index b/a average	1.099437141	1.17664939	0.9444368
26	Right Index c/a average	0.368141309	0.47592288	0.2906664
27	Right Index d/a average	0.222296143	0.3427044	0.2049857
28	Right Index e/a average	0.122994768	0.17232445	0.1045521
29	Right Index b/a Standard Deviation	0.021617682	0.04948191	0.0335448
30	Right Index c/a Standard Deviation	0.028745449	0.06250631	0.0229566
31	Right Index d/a Standard Deviation	0.048499194	0.05564431	0.0522145
32	Right Index e/a Standard Deviation	0.025907764	0.02946507	0.0298469
33	Right Middle b/a average	1.076158091	0.95568769	0.8150966
34	Right Middle c/a average	0.328674266	0.3015541	0.3750308
35	Right Middle d/a average	0.244278479	0.26643187	0.1907685
36	Right Middle e/a average	0.097883622	0.10849639	0.1303033
37	Right Middle b/a Standard Deviation	0.025993635	0.01742545	0.0227992
38	Right Middle c/a Standard Deviation	0.029217862	0.01965803	0.0105207
39	Right Middle d/a Standard Deviation	0.058393894	0.02800824	0.0350941
40	Right Middle e/a Standard Deviation	0.024002513	0.01253997	0.0186828
41	Right Ring b/a average	1.146924537	1.1310022	0.9955056
42	Right Ring c/a average	0.343020771	0.27652428	0.2754943
43	Right Ring d/a average	0.232373356	0.2949836	0.1764918
44	Right Ring e/a average	0.122808474	0.12677594	0.1198974
45	Right Ring b/a Standard Deviation	0.01967028	0.04001531	0.0717272
46	Right Ring c/a Standard Deviation	0.017233129	0.02539226	0.0184392
47	Right Ring d/a Standard Deviation	0.045728113	0.04139077	0.0365625
48	Right Ring e/a Standard Deviation	0.022827475	0.03212869	0.0190948

Table A.22: Features of Subject 22

Sr. No.	Parameters	Session 1	Session 2	Session 3
1	Left Index b/a average	1.083271031	1.06957559	1.1866431
2	Left Index c/a average	0.372809738	0.34411886	0.3783026
3	Left Index d/a average	0.261752886	0.38400075	0.1976591
4	Left Index e/a average	0.14003753	0.22765579	0.1390132
5	Left Index b/a Standard Deviation	0.015037939	0.01975575	0.0177971
6	Left Index c/a Standard Deviation	0.013927001	0.02092916	0.0266784
7	Left Index d/a Standard Deviation	0.020075864	0.04070115	0.04356
8	Left Index e/a Standard Deviation	0.013720518	0.03126179	0.0316152
9	Left Middle b/a average	1.087869729	0.91262657	0.8484541
10	Left Middle c/a average	0.376491302	0.28793191	0.0901161
11	Left Middle d/a average	0.261426835	0.28296407	0.169688
12	Left Middle e/a average	0.145444881	0.09773806	0.1220974
13	Left Middle b/a Standard Deviation	0.028565776	0.05777639	0.0452593
14	Left Middle c/a Standard Deviation	0.02917652	0.02407567	0.0415023
15	Left Middle d/a Standard Deviation	0.035308535	0.03120484	0.0351841
16	Left Middle e/a Standard Deviation	0.023252049	0.01562739	0.0259149
17	Left Ring b/a average	1.195748055	1.07383052	1.014736
18	Left Ring c/a average	0.287652663	0.15662238	0.2308262
19	Left Ring d/a average	0.237753613	0.32505801	0.1788419
20	Left Ring e/a average	0.164690098	0.18488801	0.1152652
21	Left Ring b/a Standard Deviation	0.014313892	0.0190292	0.0226926
22	Left Ring c/a Standard Deviation	0.014672676	0.01533388	0.0239095
23	Left Ring d/a Standard Deviation	0.02803301	0.04326699	0.038356
24	Left Ring e/a Standard Deviation	0.018505098	0.02149404	0.0213184
25	Right Index b/a average	1.099437141	1.17664939	0.9444368
26	Right Index c/a average	0.368141309	0.47592288	0.2906664
27	Right Index d/a average	0.222296143	0.3427044	0.2049857
28	Right Index e/a average	0.122994768	0.17232445	0.1045521
29	Right Index b/a Standard Deviation	0.021617682	0.04948191	0.0335448
30	Right Index c/a Standard Deviation	0.028745449	0.06250631	0.0229566
31	Right Index d/a Standard Deviation	0.048499194	0.05564431	0.0522145
32	Right Index e/a Standard Deviation	0.025907764	0.02946507	0.0298469
33	Right Middle b/a average	1.076158091	0.95568769	0.8150966
34	Right Middle c/a average	0.328674266	0.3015541	0.3750308
35	Right Middle d/a average	0.244278479	0.26643187	0.1907685
36	Right Middle e/a average	0.097883622	0.10849639	0.1303033
37	Right Middle b/a Standard Deviation	0.025993635	0.01742545	0.0227992
38	Right Middle c/a Standard Deviation	0.029217862	0.01965803	0.0105207
39	Right Middle d/a Standard Deviation	0.058393894	0.02800824	0.0350941
40	Right Middle e/a Standard Deviation	0.024002513	0.01253997	0.0186828
41	Right Ring b/a average	1.146924537	1.1310022	0.9955056
42	Right Ring c/a average	0.343020771	0.27652428	0.2754943
43	Right Ring d/a average	0.232373356	0.2949836	0.1764918
44	Right Ring e/a average	0.122808474	0.12677594	0.1198974
45	Right Ring b/a Standard Deviation	0.01967028	0.04001531	0.0717272
46	Right Ring c/a Standard Deviation	0.017233129	0.02539226	0.0184392
47	Right Ring d/a Standard Deviation	0.045728113	0.04139077	0.0365625
48	Right Ring e/a Standard Deviation	0.022827475	0.03212869	0.0190948

Table A.23: Features of Subject 23

Sr. No.	Parameters	Session 1	Session 2	Session 3
1	Left Index b/a average	1.012990593	0.89668327	0.8585332
2	Left Index c/a average	0.114515991	0.10922656	0.0841213
3	Left Index d/a average	0.142243383	0.11917991	0.2215163
4	Left Index e/a average	0.099686116	0.12510514	0.1355327
5	Left Index b/a Standard Deviation	0.020398829	0.02446563	0.0641202
6	Left Index c/a Standard Deviation	0.082479863	0.10797505	0.0471921
7	Left Index d/a Standard Deviation	0.066997097	0.04952752	0.0636471
8	Left Index e/a Standard Deviation	0.064007054	0.062673	0.0309564
9	Left Middle b/a average	0.911474368	1.12864445	0.7933454
10	Left Middle c/a average	0.15209043	0.14828762	0.0602883
11	Left Middle d/a average	0.156906128	0.11724567	0.175175
12	Left Middle e/a average	0.071302253	0.1520826	0.0899284
13	Left Middle b/a Standard Deviation	0.046150454	0.02549038	0.0800208
14	Left Middle c/a Standard Deviation	0.069552831	0.03141153	0.043716
15	Left Middle d/a Standard Deviation	0.061551216	0.07251228	0.0807661
16	Left Middle e/a Standard Deviation	0.035691646	0.07774916	0.0483819
17	Left Ring b/a average	1.03406309	0.851859	0.7924726
18	Left Ring c/a average	0.180772993	0.13427932	0.0743444
19	Left Ring d/a average	0.147798151	0.14109698	0.2124496
20	Left Ring e/a average	0.090631102	0.09950885	0.1114254
21	Left Ring b/a Standard Deviation	0.020416665	0.02187805	0.0983708
22	Left Ring c/a Standard Deviation	0.114348792	0.09787995	0.0488213
23	Left Ring d/a Standard Deviation	0.069264821	0.03575917	0.0707097
24	Left Ring e/a Standard Deviation	0.050352898	0.05526043	0.0517915
25	Right Index b/a average	0.996952353	1.04752172	1.1976924
26	Right Index c/a average	0.128835765	0.12009689	0.1445546
27	Right Index d/a average	0.15780837	0.1011569	0.1549941
28	Right Index e/a average	0.089349146	0.17986975	0.109015
29	Right Index b/a Standard Deviation	0.0175278	0.04426732	0.1448486
30	Right Index c/a Standard Deviation	0.114914087	0.14006703	0.107996
31	Right Index d/a Standard Deviation	0.079432927	0.09641505	0.0769621
32	Right Index e/a Standard Deviation	0.055399063	0.09536163	0.0669045
33	Right Middle b/a average	0.987468011	0.97823402	1.3624307
34	Right Middle c/a average	0.133801634	0.2033791	0.1574946
35	Right Middle d/a average	0.138119781	0.1378415	0.2233749
36	Right Middle e/a average	0.111467952	0.09695877	0.067978
37	Right Middle b/a Standard Deviation	0.029192684	0.0968183	0.1640795
38	Right Middle c/a Standard Deviation	0.122871098	0.11715991	0.0552443
39	Right Middle d/a Standard Deviation	0.088154736	0.07231141	0.0516965
40	Right Middle e/a Standard Deviation	0.06933385	0.0693368	0.0392302
41	Right Ring b/a average	0.91056703	1.0982215	0.9419417
42	Right Ring c/a average	0.105353207	0.23194546	0.1151335
43	Right Ring d/a average	0.092744723	0.17985259	0.03837
44	Right Ring e/a average	0.16800566	0.13123522	0.1992631
45	Right Ring b/a Standard Deviation	0.018094892	0.06716998	0.0515732
46	Right Ring c/a Standard Deviation	0.124547211	0.1398682	0.0317707
47	Right Ring d/a Standard Deviation	0.09653133	0.08639147	0.040402
48	Right Ring e/a Standard Deviation	0.068673599	0.08140675	0.0628197

Table A.24: Features of Subject 24

Sr. No.	Parameters	Session 1	Session 2	Session 3
1	Left Index b/a average	1.043905345	1.05801065	1.0411658
2	Left Index c/a average	0.430000374	0.43126983	0.3430557
3	Left Index d/a average	0.222002918	0.21190733	0.1587198
4	Left Index e/a average	0.083435931	0.08103996	0.0693774
5	Left Index b/a Standard Deviation	0.013767336	0.03040948	0.0176311
6	Left Index c/a Standard Deviation	0.028142974	0.0248316	0.0299897
7	Left Index d/a Standard Deviation	0.016603897	0.01377293	0.0156691
8	Left Index e/a Standard Deviation	0.009980565	0.0096608	0.0108548
9	Left Middle b/a average	1.148888947	1.09757528	1.1184597
10	Left Middle c/a average	0.45502322	0.41641652	0.392215
11	Left Middle d/a average	0.225305594	0.21776651	0.1876564
12	Left Middle e/a average	0.089957252	0.08007538	0.0828753
13	Left Middle b/a Standard Deviation	0.026999839	0.02323593	0.0355339
14	Left Middle c/a Standard Deviation	0.02822911	0.02692873	0.03825
15	Left Middle d/a Standard Deviation	0.018459676	0.01933577	0.0233586
16	Left Middle e/a Standard Deviation	0.013081174	0.01540482	0.0175548
17	Left Ring b/a average	1.125899282	1.00136166	1.0242413
18	Left Ring c/a average	0.426711561	0.40301707	0.3468759
19	Left Ring d/a average	0.233059719	0.19106019	0.1670371
20	Left Ring e/a average	0.085517446	0.07416158	0.0693459
21	Left Ring b/a Standard Deviation	0.022320507	0.02538541	0.0163506
22	Left Ring c/a Standard Deviation	0.027448357	0.02501667	0.0340192
23	Left Ring d/a Standard Deviation	0.022623437	0.01182911	0.0163921
24	Left Ring e/a Standard Deviation	0.01341448	0.01170177	0.0161448
25	Right Index b/a average	1.211824166	1.14056344	0.9588259
26	Right Index c/a average	0.457381319	0.3726146	0.4811517
27	Right Index d/a average	0.306992582	0.24959664	0.2561783
28	Right Index e/a average	0.095455289	0.08367626	0.0987834
29	Right Index b/a Standard Deviation	0.021411835	0.06567022	0.0332766
30	Right Index c/a Standard Deviation	0.025735866	0.06576716	0.0660409
31	Right Index d/a Standard Deviation	0.019810039	0.03498172	0.0421954
32	Right Index e/a Standard Deviation	0.007629635	0.02411422	0.0152114
33	Right Middle b/a average	1.149129929	0.81807009	1.2103723
34	Right Middle c/a average	0.420532845	0.25636064	0.3449088
35	Right Middle d/a average	0.253955417	0.20323816	0.2226142
36	Right Middle e/a average	0.08709833	0.05745522	0.0786459
37	Right Middle b/a Standard Deviation	0.026130034	0.04717924	0.0281319
38	Right Middle c/a Standard Deviation	0.030650506	0.0887268	0.0651214
39	Right Middle d/a Standard Deviation	0.015520553	0.01548393	0.0305749
40	Right Middle e/a Standard Deviation	0.014026038	0.01424674	0.017124
41	Right Ring b/a average	0.897526271	0.96202342	1.116073
42	Right Ring c/a average	0.610050053	0.35964966	0.3714244
43	Right Ring d/a average	0.273395365	0.19047616	0.2026012
44	Right Ring e/a average	0.104382131	0.0796362	0.0725534
45	Right Ring b/a Standard Deviation	0.05241111	0.02760037	0.0192619
46	Right Ring c/a Standard Deviation	0.043930289	0.05155024	0.0388143
47	Right Ring d/a Standard Deviation	0.030092137	0.01354496	0.0249486
48	Right Ring e/a Standard Deviation	0.019804344	0.02430826	0.0108694

Table A.25: Features of Subject 25

Sr. No.	Parameters	Session 1	Session 2	Session 3
1	Left Index b/a average	0.974659557	1.02164949	0.9323493
2	Left Index c/a average	0.140445436	0.07902208	0.1485197
3	Left Index d/a average	0.122461408	0.09081666	0.0891738
4	Left Index e/a average	0.07813267	0.15911925	0.0505147
5	Left Index b/a Standard Deviation	0.025299533	0.03622013	0.034749
6	Left Index c/a Standard Deviation	0.069748128	0.05843182	0.0225857
7	Left Index d/a Standard Deviation	0.041293188	0.06321512	0.01187
8	Left Index e/a Standard Deviation	0.028235988	0.04405561	0.0087229
9	Left Middle b/a average	0.938617932	0.92963417	1.1448254
10	Left Middle c/a average	0.104022376	0.08212004	0.1353482
11	Left Middle d/a average	0.12010417	0.11168582	0.0846662
12	Left Middle e/a average	0.121207228	0.12130039	0.0906874
13	Left Middle b/a Standard Deviation	0.020496864	0.03526437	0.0242477
14	Left Middle c/a Standard Deviation	0.107665976	0.0760508	0.040245
15	Left Middle d/a Standard Deviation	0.064605073	0.05769681	0.0373935
16	Left Middle e/a Standard Deviation	0.037556441	0.04857131	0.0572489
17	Left Ring b/a average	1.064808433	1.16222992	1.0063725
18	Left Ring c/a average	0.116840009	0.24095194	0.0877613
19	Left Ring d/a average	0.108123055	0.107982	0.0858633
20	Left Ring e/a average	0.108847056	0.16929947	0.098072
21	Left Ring b/a Standard Deviation	0.021695971	0.01697668	0.0300147
22	Left Ring c/a Standard Deviation	0.081375768	0.04370961	0.0778397
23	Left Ring d/a Standard Deviation	0.057752658	0.08069556	0.0324879
24	Left Ring e/a Standard Deviation	0.05045657	0.04652726	0.0593695
25	Right Index b/a average	0.954887562	0.98311665	1.0954069
26	Right Index c/a average	0.119008469	0.07967247	0.1434875
27	Right Index d/a average	0.106914298	0.1493358	0.1010529
28	Right Index e/a average	0.078492008	0.18993668	0.0716359
29	Right Index b/a Standard Deviation	0.01614182	0.01571676	0.0109387
30	Right Index c/a Standard Deviation	0.09285671	0.01774432	0.0521062
31	Right Index d/a Standard Deviation	0.060142786	0.04747025	0.0334291
32	Right Index e/a Standard Deviation	0.039386172	0.01228845	0.0340098
33	Right Middle b/a average	0.943464265	0.92261825	1.2332018
34	Right Middle c/a average	0.171084394	0.14856923	0.2207368
35	Right Middle d/a average	0.137124404	0.09781172	0.1230688
36	Right Middle e/a average	0.064562045	0.19603377	0.0831212
37	Right Middle b/a Standard Deviation	0.02456077	0.04450587	0.0372133
38	Right Middle c/a Standard Deviation	0.076146325	0.02849986	0.0447629
39	Right Middle d/a Standard Deviation	0.046873606	0.0513355	0.0516672
40	Right Middle e/a Standard Deviation	0.023138037	0.02973741	0.0435153
41	Right Ring b/a average	0.828121994	0.96827388	1.0390803
42	Right Ring c/a average	0.182781692	0.04544742	1.60E-01
43	Right Ring d/a average	0.132918325	0.09107125	0.0929419
44	Right Ring e/a average	0.093247163	0.18779151	6.79E-02
45	Right Ring b/a Standard Deviation	0.094580955	0.04336501	0.0162398
46	Right Ring c/a Standard Deviation	0.061288576	0.03497996	0.0867716
47	Right Ring d/a Standard Deviation	0.058933521	0.04740872	0.0265274
48	Right Ring e/a Standard Deviation	0.052659953	0.02547549	0.0287353

Table A.26: Features of Subject 26

Sr. No.	Parameters	Session 1	Session 2	Session 3
1	Left Index b/a average	0.021492153	0.92879739	0.9351552
2	Left Index c/a average	0.033860371	0.24758478	0.0789095
3	Left Index d/a average	0.002385682	0.31534849	0.1684582
4	Left Index e/a average	0.0216529	0.21669183	0.108885
5	Left Index b/a Standard Deviation	0.020067288	0.15788658	0.0690148
6	Left Index c/a Standard Deviation	0.046363227	0.13712738	0.04538
7	Left Index d/a Standard Deviation	0.015202929	0.13961309	0.0453268
8	Left Index e/a Standard Deviation	0.033886891	0.16351994	0.0496848
9	Left Middle b/a average	0.921177765	0.97499647	1.2067371
10	Left Middle c/a average	0.029854645	0.30607141	0.3458114
11	Left Middle d/a average	0.0258517	0.28141183	0.1806672
12	Left Middle e/a average	0.021666705	0.14659129	0.2159028
13	Left Middle b/a Standard Deviation	0.029824453	0.02932284	0.0535248
14	Left Middle c/a Standard Deviation	0.002588174	0.03422703	0.0313561
15	Left Middle d/a Standard Deviation	0.015624399	0.0523045	0.0440428
16	Left Middle e/a Standard Deviation	0.025391284	0.02819051	0.0220451
17	Left Ring b/a average	0.014352735	1.04925129	1.0075586
18	Left Ring c/a average	0.001247227	0.35338659	0.2048479
19	Left Ring d/a average	0.238186202	0.27553629	0.1717372
20	Left Ring e/a average	0.459781682	0.16507297	0.1862133
21	Left Ring b/a Standard Deviation	0.012333639	0.02528608	0.0275077
22	Left Ring c/a Standard Deviation	0.076011405	0.03231676	0.0177005
23	Left Ring d/a Standard Deviation	0.048063617	0.05224346	0.0528405
24	Left Ring e/a Standard Deviation	0.023632778	0.01360861	0.0397232
25	Right Index b/a average	0.012786446	1.0482853	0.024385
26	Right Index c/a average	0.022347999	0.02980925	0.2686624
27	Right Index d/a average	0.024049166	0.20133514	0.0113354
28	Right Index e/a average	0.001826738	0.04690627	0.4676084
29	Right Index b/a Standard Deviation	0.040262755	0.05984938	0.0187678
30	Right Index c/a Standard Deviation	0.001159369	0.0471666	0.0680812
31	Right Index d/a Standard Deviation	0.012326178	0.03965958	0.0352711
32	Right Index e/a Standard Deviation	0.023127015	0.02367241	0.0748573
33	Right Middle b/a average	0.002971578	1.02341154	0.0099729
34	Right Middle c/a average	0.01278556	0.40435053	0.0371791
35	Right Middle d/a average	0.028746933	0.00274072	0.022515
36	Right Middle e/a average	0.056495138	0.04907695	0.031455
37	Right Middle b/a Standard Deviation	0.04616363	0.04877699	0.0354154
38	Right Middle c/a Standard Deviation	0.087929975	0.01724281	0.0158607
39	Right Middle d/a Standard Deviation	0.054657726	0.05914305	0.0276407
40	Right Middle e/a Standard Deviation	0.035924466	0.04018861	0.0379847
41	Right Ring b/a average	1.465761374	1.03899299	1.0001535
42	Right Ring c/a average	0.389179448	0.03501445	0.0286817
43	Right Ring d/a average	0.068318459	0.11062242	0.0256173
44	Right Ring e/a average	0.591439977	0.13007793	0.0350571
45	Right Ring b/a Standard Deviation	0.01473104	0.04609553	0.0404681
46	Right Ring c/a Standard Deviation	0.037015941	0.05905408	0.0259587
47	Right Ring d/a Standard Deviation	0.049786359	0.02983121	0.0366413
48	Right Ring e/a Standard Deviation	0.018855945	0.29786476	0.0171819

Table A.27: Features of Subject 27

Sr. No.	Parameters	Session 1	Session 2	Session 3
1	Left Index b/a average	0.729265494	1.42531332	0.3352356
2	Left Index c/a average	0.795016274	0.58438181	0.1922063
3	Left Index d/a average	0.36313657	0.4357115	0.4771479
4	Left Index e/a average	0.160860322	0.42848038	0.9767978
5	Left Index b/a Standard Deviation	0.130370924	0.75656972	0.8501407
6	Left Index c/a Standard Deviation	0.528035783	0.45543709	0.3460721
7	Left Index d/a Standard Deviation	0.225618013	0.12866351	0.939888
8	Left Index e/a Standard Deviation	0.920977523	0.88723455	0.7345571
9	Left Middle b/a average	0.635384683	0.53556128	0.4794905
10	Left Middle c/a average	0.301831031	0.26837034	0.9442174
11	Left Middle d/a average	0.879106905	0.73030189	0.6180781
12	Left Middle e/a average	0.564243434	0.46149069	0.363346
13	Left Middle b/a Standard Deviation	0.250580092	0.11635186	0.9538125
14	Left Middle c/a Standard Deviation	0.855656065	0.74722439	0.6566513
15	Left Middle d/a Standard Deviation	0.559621562	0.44690785	0.3704412
16	Left Middle e/a Standard Deviation	0.242689997	0.13269623	0.9611006
17	Left Ring b/a average	0.775839903	0.63620987	0.5081687
18	Left Ring c/a average	0.991937776	0.88127834	0.7330984
19	Left Ring d/a average	0.979184303	0.83995003	0.7535849
20	Left Ring e/a average	0.605913046	0.62957501	0.5925885
21	Left Ring b/a Standard Deviation	0.936688641	0.82075571	0.7647467
22	Left Ring c/a Standard Deviation	0.665545854	0.51970306	0.4811125
23	Left Ring d/a Standard Deviation	0.347622819	0.21297248	0.9894039
24	Left Ring e/a Standard Deviation	0.842093127	0.70857842	0.6797064
25	Right Index b/a average	0.51780607	0.44061685	0.3534517
26	Right Index c/a average	0.274020853	0.99504209	0.8437943
27	Right Index d/a average	0.94879013	0.89201633	0.7780923
28	Right Index e/a average	0.698070813	0.58997028	0.4634796
29	Right Index b/a Standard Deviation	0.341512495	0.20588041	0.1448605
30	Right Index c/a Standard Deviation	0.933928364	0.81113725	0.7487993
31	Right Index d/a Standard Deviation	0.672272739	0.50156531	0.4569158
32	Right Index e/a Standard Deviation	0.327958036	0.22074861	0.139199
33	Right Middle b/a average	0.943533541	0.7155264	0.6375791
34	Right Middle c/a average	0.579996664	0.41401421	0.3319088
35	Right Middle d/a average	0.26868787	0.10890518	0.9997352
36	Right Middle e/a average	0.868015865	0.7214405	0.6658557
37	Right Middle b/a Standard Deviation	0.543533541	0.42790168	0.3546002
38	Right Middle c/a Standard Deviation	0.279996664	0.19312734	0.9525361
39	Right Middle d/a Standard Deviation	0.86868787	0.74096817	0.6734133
40	Right Middle e/a Standard Deviation	0.568015865	0.48114252	0.3684173
41	Right Ring b/a average	0.20612827	0.19346264	0.9395579
42	Right Ring c/a average	0.884326014	0.77980431	0.6933952
43	Right Ring d/a average	0.956681699	0.84301971	0.7370179
44	Right Ring e/a average	0.663974152	0.54684994	0.5412334
45	Right Ring b/a Standard Deviation	0.431749662	0.33052812	0.2344518
46	Right Ring c/a Standard Deviation	0.957715206	0.82712975	0.7719762
47	Right Ring d/a Standard Deviation	0.635281446	0.51644128	0.4599352
48	Right Ring e/a Standard Deviation	0.33926377	0.21621772	0.1621967

Table A.28: Features of Subject 28

Sr. No.	Parameters	Session 1	Session 2	Session 3
1	Left Index b/a average	0.022182809	0.02456272	0.0645422
2	Left Index c/a average	0.049752768	0.09017115	0.0021061
3	Left Index d/a average	0.023740604	0.15676634	0.0542818
4	Left Index e/a average	0.909176701	0.01869028	0.0301504
5	Left Index b/a Standard Deviation	0.034811228	0.03405433	0.0161601
6	Left Index c/a Standard Deviation	0.023522851	0.12758352	0.0646788
7	Left Index d/a Standard Deviation	0.012032699	0.03452424	0.0174251
8	Left Index e/a Standard Deviation	0.028254644	0.02303026	0.8592307
9	Left Middle b/a average	1.151090098	1.02172685	0.0434351
10	Left Middle c/a average	0.136555494	0.10222816	0.0211204
11	Left Middle d/a average	0.137431282	0.00082015	0.0305154
12	Left Middle e/a average	0.204792069	0.01071752	0.030351
13	Left Middle b/a Standard Deviation	0.02824749	0.02287374	0.3006258
14	Left Middle c/a Standard Deviation	0.028790139	0.01577725	0.5626244
15	Left Middle d/a Standard Deviation	0.159958313	0.09238046	0.5724082
16	Left Middle e/a Standard Deviation	0.021424138	0.07438243	0.9811488
17	Left Ring b/a average	1.028720436	0.02309933	0.0265644
18	Left Ring c/a average	0.024390587	0.0100194	0.0123981
19	Left Ring d/a average	0.041377061	0.01169299	0.0212509
20	Left Ring e/a average	0.030833295	0.01881589	0.0115158
21	Left Ring b/a Standard Deviation	0.012182807	0.030488	0.0165654
22	Left Ring c/a Standard Deviation	0.024841815	0.06057633	0.0219271
23	Left Ring d/a Standard Deviation	0.001734721	0.00102912	0.0123437
24	Left Ring e/a Standard Deviation	0.028080676	0.02805945	0.0231161
25	Right Index b/a average	1.025661751	1.02561803	1.0232031
26	Right Index c/a average	0.022539971	0.01612812	0.0240031
27	Right Index d/a average	0.04168556	0.01753146	0.0211903
28	Right Index e/a average	0.012866728	0.19284984	0.0230747
29	Right Index b/a Standard Deviation	0.058003036	0.04921982	0.9121499
30	Right Index c/a Standard Deviation	0.023484845	0.02387394	0.0428151
31	Right Index d/a Standard Deviation	0.045970354	0.14312311	0.0762585
32	Right Index e/a Standard Deviation	0.04831591	0.03819981	0.0369431
33	Right Middle b/a average	1.193086305	1.02212031	1.023274
34	Right Middle c/a average	0.027863724	0.34899647	0.0437411
35	Right Middle d/a average	0.019448706	0.02750536	0.0911613
36	Right Middle e/a average	0.038936465	0.1047226	0.1383044
37	Right Middle b/a Standard Deviation	0.392428775	0.2927101	0.0386827
38	Right Middle c/a Standard Deviation	0.010052866	0.0183174	0.1229088
39	Right Middle d/a Standard Deviation	0.03190726	0.02638614	0.6073495
40	Right Middle e/a Standard Deviation	0.021164111	0.09927936	0.0388702
41	Right Ring b/a average	1.021970196	1.0295469	1.452867
42	Right Ring c/a average	0.037130752	0.01599364	1.347705
43	Right Ring d/a average	0.020913444	0.06384067	0.0319657
44	Right Ring e/a average	0.022861106	0.10172482	0.0262034
45	Right Ring b/a Standard Deviation	0.048029859	0.02726444	0.0155814
46	Right Ring c/a Standard Deviation	0.124978481	0.02061665	0.0206747
47	Right Ring d/a Standard Deviation	0.237625015	0.03879938	0.0932375
48	Right Ring e/a Standard Deviation	0.049373295	0.05869339	0.0023183

Table A.29: Features of Subject 29

Sr. No.	Parameters	Session 1	Session 2	Session 3
1	Left Index b/a average	0.023010467	0.611065441	0.0310329
2	Left Index c/a average	0.011973333	0.025612327	0.0015171
3	Left Index d/a average	0.036968443	0.003811396	0.0214561
4	Left Index e/a average	0.048897051	0.050269584	0.1013254
5	Left Index b/a Standard Deviation	0.064001719	0.08119204	0.0420978
6	Left Index c/a Standard Deviation	0.063587202	0.071800193	0.053925
7	Left Index d/a Standard Deviation	0.430695799	0.036303671	0.0823456
8	Left Index e/a Standard Deviation	0.017519553	0.029237484	0.0291595
9	Left Middle b/a average	0.032689496	0.809283153	0.0933139
10	Left Middle c/a average	0.165479738	0.094801203	0.1004279
11	Left Middle d/a average	0.031062107	0.355217512	0.2001391
12	Left Middle e/a average	0.021099561	0.01635711	0.1500558
13	Left Middle b/a Standard Deviation	0.087536962	0.023494258	0.0702279
14	Left Middle c/a Standard Deviation	0.047563143	0.076078101	0.0024194
15	Left Middle d/a Standard Deviation	0.032084695	0.150079883	0.0593248
16	Left Middle e/a Standard Deviation	0.067909483	0.080212666	0.0012708
17	Left Ring b/a average	1.023855602	0.601725244	1.0027649
18	Left Ring c/a average	0.200899029	0.064918758	0.0214253
19	Left Ring d/a average	0.100586439	0.251887415	0.2001264
20	Left Ring e/a average	0.102495125	0.153197893	0.1227297
21	Left Ring b/a Standard Deviation	0.021091506	0.019219282	0.0930999
22	Left Ring c/a Standard Deviation	0.021467563	0.029633176	0.0928743
23	Left Ring d/a Standard Deviation	0.001410317	0.0980242	0.0934798
24	Left Ring e/a Standard Deviation	0.022755464	0.064013214	0.0272361
25	Right Index b/a average	1.02178716	0.016407379	0.096098
26	Right Index c/a average	0.023745087	0.013359231	0.0309192
27	Right Index d/a average	0.019466125	0.019548307	0.012935
28	Right Index e/a average	0.014150069	0.011429039	0.0236858
29	Right Index b/a Standard Deviation	0.042005721	0.001175023	0.0944567
30	Right Index c/a Standard Deviation	0.01327218	0.025431127	0.0869477
31	Right Index d/a Standard Deviation	0.012479761	0.003215856	0.0341092
32	Right Index e/a Standard Deviation	0.022215448	0.083207831	0.0398518
33	Right Middle b/a average	1.210022144	0.803215945	0.9589221
34	Right Middle c/a average	0.012364767	0.028185071	0.2902674
35	Right Middle d/a average	0.010311437	0.011104536	0.2926297
36	Right Middle e/a average	0.017521047	0.043630973	0.2302092
37	Right Middle b/a Standard Deviation	0.056348619	0.102317803	0.0114846
38	Right Middle c/a Standard Deviation	0.043342233	0.198057907	0.1392462
39	Right Middle d/a Standard Deviation	0.012738218	0.103214673	0.128062
40	Right Middle e/a Standard Deviation	0.012480372	0.091540818	0.0969364
41	Right Ring b/a average	1.080112799	0.949902764	1.0610794
42	Right Ring c/a average	0.027834845	0.279826495	0.0272134
43	Right Ring d/a average	0.007857856	0.291683642	0.0369937
44	Right Ring e/a average	0.272298877	0.213498387	0.1928371
45	Right Ring b/a Standard Deviation	0.015408207	0.07362379	0.0893514
46	Right Ring c/a Standard Deviation	0.010934373	0.097354152	0.0759375
47	Right Ring d/a Standard Deviation	0.026268015	0.092333819	0.0407883
48	Right Ring e/a Standard Deviation	0.019405928	0.030132126	0.0410994

Table A.30: Features of Subject 30

Sr. No.	Parameters	Session 1	Session 2	Session 3
1	Left Index b/a average	1.91846415	0.73739265	0.8003454
2	Left Index c/a average	0.705176261	0.60517279	0.5062451
3	Left Index d/a average	0.438402799	0.30958665	0.2962511
4	Left Index e/a average	0.920033045	0.8452759	0.7310825
5	Left Index b/a Standard Deviation	0.618284609	0.56524143	0.4408809
6	Left Index c/a Standard Deviation	0.331360585	0.29782046	0.1279842
7	Left Index d/a Standard Deviation	0.957413734	0.87089002	0.7118165
8	Left Index e/a Standard Deviation	0.600840551	0.52642614	0.4113976
9	Left Middle b/a average	0.34838906	1.2631628	0.1003454
10	Left Middle c/a average	0.956509003	0.82849417	0.3062451
11	Left Middle d/a average	0.266804728	0.9976856	0.7962511
12	Left Middle e/a average	0.64193894	0.54752071	0.4310825
13	Left Middle b/a Standard Deviation	0.390003472	0.25275231	0.1408809
14	Left Middle c/a Standard Deviation	0.974932546	0.82716946	0.7279842
15	Left Middle d/a Standard Deviation	0.616151164	0.51708384	0.4118165
16	Left Middle e/a Standard Deviation	0.319796497	0.21180675	0.1113976
17	Left Ring b/a average	1.948673511	0.85375586	1.7597776
18	Left Ring c/a average	0.658771863	0.52688038	0.4979324
19	Left Ring d/a average	0.38648445	0.25547133	0.166095
20	Left Ring e/a average	0.995603482	0.80237634	0.7814193
21	Left Ring b/a Standard Deviation	0.618397437	0.55364053	0.4168637
22	Left Ring c/a Standard Deviation	0.322267013	0.22384891	0.9056195
23	Left Ring d/a Standard Deviation	0.816249769	0.75421329	0.651693
24	Left Ring e/a Standard Deviation	0.608463696	0.5846779	0.4782597
25	Right Index b/a average	1.329495708	0.27146745	0.1465508
26	Right Index c/a average	0.902442493	0.82332393	0.7905936
27	Right Index d/a average	0.655047914	0.57385143	0.487891
28	Right Index e/a average	0.364840266	0.24363399	0.1561882
29	Right Index b/a Standard Deviation	0.936992753	0.82971731	0.7481004
30	Right Index c/a Standard Deviation	0.681919698	0.52537842	0.4951861
31	Right Index d/a Standard Deviation	0.399878538	0.2181143	0.1523372
32	Right Index e/a Standard Deviation	0.931283277	0.81693953	0.7518067
33	Right Middle b/a average	0.677764046	1.50428395	0.4394219
34	Right Middle c/a average	0.338458172	0.28652928	0.9387457
35	Right Middle d/a average	0.856746155	0.85680775	0.7065525
36	Right Middle e/a average	0.670705964	0.5397901	0.4118805
37	Right Middle b/a Standard Deviation	0.044063555	0.02931473	0.0893988
38	Right Middle c/a Standard Deviation	0.33702355	0.22211745	0.1792292
39	Right Middle d/a Standard Deviation	0.945569563	0.81531356	0.7669068
40	Right Middle e/a Standard Deviation	0.635644907	0.50952961	0.4826743
41	Right Ring b/a average	0.317713757	1.26496594	0.1751064
42	Right Ring c/a average	0.941203309	0.86034769	0.7973289
43	Right Ring d/a average	0.668579603	0.57547828	0.4751441
44	Right Ring e/a average	0.346760543	0.2356874	0.1868612
45	Right Ring b/a Standard Deviation	0.948991334	0.82728245	0.7285453
46	Right Ring c/a Standard Deviation	0.623554503	0.5257914	0.4247148
47	Right Ring d/a Standard Deviation	0.37895527	0.27779517	0.1601918
48	Right Ring e/a Standard Deviation	0.972912706	0.89447029	0.7111784

Table A.31: Features of Subject 31

Sr. No.	Parameters	Session 1	Session 2	Session 3
1	Left Index b/a average	0.868319316	0.73648434	0.6809795
2	Left Index c/a average	0.563437179	0.42357042	0.3428036
3	Left Index d/a average	0.941726867	0.86467904	0.7563571
4	Left Index e/a average	0.654007466	0.50027806	0.4760858
5	Left Index b/a Standard Deviation	0.32714381	0.24301595	0.1638639
6	Left Index c/a Standard Deviation	0.918058066	0.83930195	0.7602733
7	Left Index d/a Standard Deviation	0.634426972	0.54257898	0.4381602
8	Left Index e/a Standard Deviation	0.317047052	0.2414086	0.1312879
9	Left Middle b/a average	0.874340431	0.75993696	1.6201319
10	Left Middle c/a average	0.559653112	0.48249508	0.3437762
11	Left Middle d/a average	0.970878802	0.89898533	0.7433986
12	Left Middle e/a average	0.633976668	0.5351822	0.465614
13	Left Middle b/a Standard Deviation	0.336972419	0.29576517	0.186802
14	Left Middle c/a Standard Deviation	0.948365369	0.88646776	0.7896465
15	Left Middle d/a Standard Deviation	0.654704882	0.57554874	0.4418744
16	Left Middle e/a Standard Deviation	0.351020726	0.28098692	0.9479079
17	Left Ring b/a average	0.880834931	0.77113009	1.6276866
18	Left Ring c/a average	0.546144644	0.46316115	0.3049265
19	Left Ring d/a average	0.946634681	0.87344801	0.7624476
20	Left Ring e/a average	0.654014361	0.58174959	0.4843185
21	Left Ring b/a Standard Deviation	0.330211454	0.26433861	0.1529423
22	Left Ring c/a Standard Deviation	0.918686417	0.85872773	0.7688038
23	Left Ring d/a Standard Deviation	0.632653025	0.54403004	0.4309696
24	Left Ring e/a Standard Deviation	0.318363789	0.25328385	0.120402
25	Right Index b/a average	0.955029172	0.83958416	0.7985997
26	Right Index c/a average	0.66340996	0.52804497	0.4931441
27	Right Index d/a average	0.33978507	0.94988998	0.8666382
28	Right Index e/a average	0.71330709	0.63106427	0.5841904
29	Right Index b/a Standard Deviation	0.430833403	0.32142436	0.2174221
30	Right Index c/a Standard Deviation	0.125524293	0.91875214	0.8103207
31	Right Index d/a Standard Deviation	0.751834144	0.63076973	0.5359922
32	Right Index e/a Standard Deviation	0.420639023	0.31960019	0.2163921
33	Right Middle b/a average	0.191911036	0.84497701	1.7111274
34	Right Middle c/a average	0.908448626	0.86961607	0.7661576
35	Right Middle d/a average	0.615338797	0.60344185	0.5787867
36	Right Middle e/a average	0.418153165	0.34033106	0.901884
37	Right Middle b/a Standard Deviation	0.859340391	0.73621926	0.6267985
38	Right Middle c/a Standard Deviation	0.554255086	0.43566972	0.3283775
39	Right Middle d/a Standard Deviation	0.26062451	0.14870345	0.9485917
40	Right Middle e/a Standard Deviation	0.833632177	0.73725154	0.6234257
41	Right Ring b/a average	0.593393981	0.43517786	1.3244293
42	Right Ring c/a average	0.289216935	0.92044992	0.8144667
43	Right Ring d/a average	0.727674524	0.64060081	0.5757918
44	Right Ring e/a average	0.40590321	0.33499168	0.1292379
45	Right Ring b/a Standard Deviation	0.93626646	0.82478077	0.7192255
46	Right Ring c/a Standard Deviation	0.628824669	0.51770752	0.4150639
47	Right Ring d/a Standard Deviation	0.346918014	0.23418181	0.138148
48	Right Ring e/a Standard Deviation	0.916338932	0.82387587	0.7168343

Table A.32: Features of Subject 32

Sr. No.	Parameters	Session 1	Session 2	Session 3
1	Left Index b/a average	0.84270795	0.71288816	1.9163138
2	Left Index c/a average	0.816990009	0.79485868	0.6633054
3	Left Index d/a average	0.584480545	0.47461337	0.354502
4	Left Index e/a average	0.23214121	0.98759303	0.8931329
5	Left Index b/a Standard Deviation	0.725929885	0.64809651	0.5491665
6	Left Index c/a Standard Deviation	0.42561488	0.36479014	0.2517077
7	Left Index d/a Standard Deviation	0.120482469	0.94433865	0.8406816
8	Left Index e/a Standard Deviation	0.726140231	0.6237484	0.5453849
9	Left Middle b/a average	0.40413128	0.36191976	0.2900445
10	Left Middle c/a average	0.14720946	0.99952123	0.8468306
11	Left Middle d/a average	0.990065682	0.85940618	0.7963242
12	Left Middle e/a average	0.684587823	0.59716644	0.4827822
13	Left Middle b/a Standard Deviation	0.314949398	0.27736588	0.1333309
14	Left Middle c/a Standard Deviation	0.960853766	0.87727087	0.7353542
15	Left Middle d/a Standard Deviation	0.887191365	0.77243462	0.6372289
16	Left Middle e/a Standard Deviation	0.569197473	0.45657815	0.3399129
17	Left Ring b/a average	0.210107715	0.13648775	1.9066369
18	Left Ring c/a average	0.888839666	0.76374125	0.6608975
19	Left Ring d/a average	0.515670312	0.41909934	0.3968177
20	Left Ring e/a average	0.270881328	0.96923776	0.8091416
21	Left Ring b/a Standard Deviation	0.740105143	0.62850889	0.5233744
22	Left Ring c/a Standard Deviation	0.493712483	0.32214488	0.2142065
23	Left Ring d/a Standard Deviation	0.992358349	0.82870634	0.7298844
24	Left Ring e/a Standard Deviation	0.683472926	0.5241642	0.4107082
25	Right Index b/a average	0.331101873	0.27068631	1.1910137
26	Right Index c/a average	0.951448354	0.88650824	0.7969129
27	Right Index d/a average	0.97070622	0.82192931	0.7870133
28	Right Index e/a average	0.984428853	0.88051821	0.7545591
29	Right Index b/a Standard Deviation	0.635907184	0.58514149	0.4706168
30	Right Index c/a Standard Deviation	0.493547287	0.30961963	0.2443077
31	Right Index d/a Standard Deviation	0.172618521	0.96763317	0.8722237
32	Right Index e/a Standard Deviation	0.949475766	0.86337149	0.7715592
33	Right Middle b/a average	0.658017361	1.53489085	1.4317354
34	Right Middle c/a average	0.357704604	0.95146019	0.8034151
35	Right Middle d/a average	0.984486194	0.85813385	0.7983097
36	Right Middle e/a average	0.673831424	0.51723926	0.417923
37	Right Middle b/a Standard Deviation	0.320347212	0.23255494	0.1484822
38	Right Middle c/a Standard Deviation	0.986917139	0.85120904	0.7549816
39	Right Middle d/a Standard Deviation	0.652646988	0.53157495	0.4640387
40	Right Middle e/a Standard Deviation	0.337278337	0.9001041	0.8907737
41	Right Ring b/a average	0.741611307	1.66604788	1.5952141
42	Right Ring c/a average	0.438910505	0.91773722	0.8776962
43	Right Ring d/a average	0.969616701	0.88755764	0.7948585
44	Right Ring e/a average	0.607249903	0.63523764	0.5423638
45	Right Ring b/a Standard Deviation	0.548435068	0.75939926	0.924766
46	Right Ring c/a Standard Deviation	0.980689353	0.84999073	0.7294652
47	Right Ring d/a Standard Deviation	0.692802821	0.56093295	0.46194
48	Right Ring e/a Standard Deviation	0.355006333	0.26845566	0.1755113

Table A.33: Features of Subject 33

Sr. No.	Parameters	Session 1	Session 2	Session 3
1	Left Index b/a average	0.807645431	1.04324614	1.981238
2	Left Index c/a average	0.086501884	0.27547289	0.1232382
3	Left Index d/a average	0.186706428	0.02104699	0.2032935
4	Left Index e/a average	0.129783437	0.0123258	0.1130041
5	Left Index b/a Standard Deviation	0.058917369	0.04212777	0.0654794
6	Left Index c/a Standard Deviation	0.059267882	0.01855452	0.0560554
7	Left Index d/a Standard Deviation	0.018264871	0.0565014	0.0761095
8	Left Index e/a Standard Deviation	0.023637251	0.03156119	0.0204372
9	Left Middle b/a average	1.048264182	0.0898069	0.0041999
10	Left Middle c/a average	0.032502026	0.02057447	0.1151257
11	Left Middle d/a average	0.17554399	0.01119994	0.1954435
12	Left Middle e/a average	0.159997374	0.04141042	0.0327041
13	Left Middle b/a Standard Deviation	0.029032804	0.8432199	0.0826317
14	Left Middle c/a Standard Deviation	0.092160378	0.02520574	0.0298263
15	Left Middle d/a Standard Deviation	0.04826132	0.01411999	0.0430927
16	Left Middle e/a Standard Deviation	0.092522466	0.83641042	0.0235573
17	Left Ring b/a average	1.152937369	0.0210258	1.0682663
18	Left Ring c/a average	0.310416827	0.13637827	0.201889
19	Left Ring d/a average	0.157752136	0.03047852	0.1641089
20	Left Ring e/a average	0.836155675	0.01372728	0.0183485
21	Left Ring b/a Standard Deviation	0.072532884	0.04864261	0.0132411
22	Left Ring c/a Standard Deviation	0.024574095	0.03129374	0.1094349
23	Left Ring d/a Standard Deviation	0.05735546	0.04082635	0.0372505
24	Left Ring e/a Standard Deviation	0.036473149	0.01376555	0.0182524
25	Right Index b/a average	0.962559687	0.02137639	1.0575343
26	Right Index c/a average	0.024233862	0.16763636	0.0294337
27	Right Index d/a average	0.86645953	0.26764589	0.1021371
28	Right Index e/a average	0.012235014	0.19364521	0.1026442
29	Right Index b/a Standard Deviation	0.024532498	0.43044539	0.0101818
30	Right Index c/a Standard Deviation	0.023069124	0.32311502	0.0275299
31	Right Index d/a Standard Deviation	0.048667478	0.0754628	0.0865635
32	Right Index e/a Standard Deviation	0.015325393	0.0529279	0.0275339
33	Right Middle b/a average	1.01326415	1.20809401	0.9372652
34	Right Middle c/a average	0.100517626	0.20030647	0.2415728
35	Right Middle d/a average	0.10384028	0.01963163	0.0124605
36	Right Middle e/a average	0.12340033	0.02202645	0.0113585
37	Right Middle b/a Standard Deviation	0.018275461	0.04743134	0.0451097
38	Right Middle c/a Standard Deviation	0.136140585	0.09826463	0.0226657
39	Right Middle d/a Standard Deviation	0.058263763	0.04539655	0.1263102
40	Right Middle e/a Standard Deviation	0.105134055	0.06545301	0.1728531
41	Right Ring b/a average	0.947483697	1.22656013	1.0350709
42	Right Ring c/a average	0.137253486	0.09745339	0.1921034
43	Right Ring d/a average	0.173555195	0.00357738	0.1639048
44	Right Ring e/a average	0.19872235	0.10076104	0.1560934
45	Right Ring b/a Standard Deviation	0.02342444	0.04765401	0.0744596
46	Right Ring c/a Standard Deviation	0.043206912	0.02754251	0.0533292
47	Right Ring d/a Standard Deviation	0.012340078	0.04003769	0.8530048
48	Right Ring e/a Standard Deviation	0.098541643	0.02330971	0.1020248

Table A.34: Features of Subject 34

Sr. No.	Parameters	Session 1	Session 2	Session 3
1	Left Index b/a average	0.273533683	1.62367099	1.4614197
2	Left Index c/a average	0.312739907	0.89896271	0.7804509
3	Left Index d/a average	0.369661714	0.41485166	0.5234984
4	Left Index e/a average	0.764730876	0.83840859	0.1381747
5	Left Index b/a Standard Deviation	0.060185562	0.17605193	0.5442442
6	Left Index c/a Standard Deviation	0.750073882	0.4193048	0.9929864
7	Left Index d/a Standard Deviation	0.131529817	0.82815236	0.8874148
8	Left Index e/a Standard Deviation	0.820952455	0.56755841	0.4532092
9	Left Middle b/a average	1.607392903	1.62489987	1.7636115
10	Left Middle c/a average	0.124388053	0.12836488	0.6511071
11	Left Middle d/a average	0.765341107	0.3393866	0.4426217
12	Left Middle e/a average	0.48890872	0.87094449	0.2190604
13	Left Middle b/a Standard Deviation	0.624260825	0.19066142	0.5206169
14	Left Middle c/a Standard Deviation	0.525528701	0.16474634	0.8484269
15	Left Middle d/a Standard Deviation	0.988916232	0.36804915	0.2214693
16	Left Middle e/a Standard Deviation	0.766161397	0.54385588	0.5672848
17	Left Ring b/a average	1.447720129	1.88833191	1.7009442
18	Left Ring c/a average	0.878436615	0.58169088	0.7882564
19	Left Ring d/a average	0.45629445	0.25541616	0.4317301
20	Left Ring e/a average	0.662028562	0.64364802	0.2178685
21	Left Ring b/a Standard Deviation	0.697443063	0.99323137	0.8242881
22	Left Ring c/a Standard Deviation	0.45277785	0.14531646	0.8726358
23	Left Ring d/a Standard Deviation	0.162088858	0.36797	0.5456693
24	Left Ring e/a Standard Deviation	0.331739245	0.52513468	0.2347047
25	Right Index b/a average	0.851023127	1.31085031	1.9655335
26	Right Index c/a average	0.491895928	0.10058939	0.5868044
27	Right Index d/a average	0.972611899	0.86016348	0.743058
28	Right Index e/a average	0.172725334	0.52091943	0.6661367
29	Right Index b/a Standard Deviation	0.456268031	0.8470109	0.986496
30	Right Index c/a Standard Deviation	0.143635893	0.27304578	0.5475096
31	Right Index d/a Standard Deviation	0.318275522	0.49357779	0.8189676
32	Right Index e/a Standard Deviation	0.81344419	0.64723639	0.615421
33	Right Middle b/a average	1.355629541	1.41927242	1.9171225
34	Right Middle c/a average	0.84842569	0.21058662	0.7493871
35	Right Middle d/a average	0.390062899	0.65322064	0.8371014
36	Right Middle e/a average	0.484299174	0.41786471	0.2671204
37	Right Middle b/a Standard Deviation	0.233390067	0.84965029	0.4208817
38	Right Middle c/a Standard Deviation	0.947587434	0.97784559	0.7675818
39	Right Middle d/a Standard Deviation	0.621602742	0.29636614	0.5261455
40	Right Middle e/a Standard Deviation	0.140444299	0.4399931	0.8274165
41	Right Ring b/a average	0.430240619	0.33747579	1.3411545
42	Right Ring c/a average	0.655070089	0.95551133	0.4806893
43	Right Ring d/a average	0.703713567	0.59194029	0.4430664
44	Right Ring e/a average	0.29598667	0.80235062	0.6806879
45	Right Ring b/a Standard Deviation	0.850370884	0.14536143	0.9124086
46	Right Ring c/a Standard Deviation	0.147941296	0.37223132	0.8408344
47	Right Ring d/a Standard Deviation	0.721946638	0.2406554	0.4215293
48	Right Ring e/a Standard Deviation	0.529295931	0.52737565	0.2116718

Table A.35: Features of Subject 35

Sr. No.	Parameters	Session 1	Session 2	Session 3
1	Left Index b/a average	0.338185828	0.67365395	1.1296995
2	Left Index c/a average	0.652661346	0.87768513	0.3631429
3	Left Index d/a average	0.530392806	0.91611563	0.8891177
4	Left Index e/a average	0.293058593	0.52154842	0.446329
5	Left Index b/a Standard Deviation	0.219256263	0.56057804	0.7232416
6	Left Index c/a Standard Deviation	0.362721183	0.5285403	0.1450684
7	Left Index d/a Standard Deviation	0.438771214	0.35832682	0.2216598
8	Left Index e/a Standard Deviation	0.050345584	0.03368408	0.032756
9	Left Middle b/a average	1.422707161	0.29891537	1.897925
10	Left Middle c/a average	0.427450122	0.57027511	0.7261187
11	Left Middle d/a average	0.241672428	0.72038721	0.897129
12	Left Middle e/a average	0.554770284	0.73773062	0.2042615
13	Left Middle b/a Standard Deviation	0.38937288	0.8497968	0.2163789
14	Left Middle c/a Standard Deviation	0.980126302	0.52196897	0.2186764
15	Left Middle d/a Standard Deviation	0.72090737	0.55403147	0.2364873
16	Left Middle e/a Standard Deviation	0.272339575	0.52376844	0.4615462
17	Left Ring b/a average	0.131527747	0.36242144	1.6378522
18	Left Ring c/a average	0.505228663	0.700207	0.9961787
19	Left Ring d/a average	0.430433834	0.67055163	0.8666284
20	Left Ring e/a average	0.736418138	0.210213	0.5298191
21	Left Ring b/a Standard Deviation	0.854090906	0.47696347	0.1199182
22	Left Ring c/a Standard Deviation	0.563218895	0.78709812	0.5104912
23	Left Ring d/a Standard Deviation	0.637752919	0.25417948	0.8221774
24	Left Ring e/a Standard Deviation	0.437003424	0.63593332	0.7115366
25	Right Index b/a average	0.998848183	0.42343283	1.5157516
26	Right Index c/a average	0.193512326	0.29806908	0.798103
27	Right Index d/a average	0.29242653	0.56477472	0.7658416
28	Right Index e/a average	0.57046013	0.65633684	0.8710172
29	Right Index b/a Standard Deviation	0.239581054	0.4574272	0.7757723
30	Right Index c/a Standard Deviation	0.441703796	0.66468373	0.9189795
31	Right Index d/a Standard Deviation	0.670632512	0.46268342	0.7625195
32	Right Index e/a Standard Deviation	0.236346183	0.53680551	0.7647394
33	Right Middle b/a average	0.619897369	0.34302306	1.8937348
34	Right Middle c/a average	0.721445468	0.63841207	0.9277271
35	Right Middle d/a average	0.435462722	0.67568113	0.7625848
36	Right Middle e/a average	0.357082113	0.29865283	0.4990624
37	Right Middle b/a Standard Deviation	0.121780555	0.56000852	0.9643443
38	Right Middle c/a Standard Deviation	0.232547694	0.548222	0.6739568
39	Right Middle d/a Standard Deviation	0.554448784	0.45062577	0.886775
40	Right Middle e/a Standard Deviation	0.545749199	0.83265477	0.931747
41	Right Ring b/a average	0.63409094	0.37443768	1.4688989
42	Right Ring c/a average	0.777788074	0.67377183	0.259635
43	Right Ring d/a average	0.486387375	0.61098726	0.7841423
44	Right Ring e/a average	0.572495827	0.32580118	0.9272782
45	Right Ring b/a Standard Deviation	0.324158925	0.45711889	0.7525024
46	Right Ring c/a Standard Deviation	0.613291433	0.82602006	0.9916687
47	Right Ring d/a Standard Deviation	0.330501542	0.26667575	0.9415052
48	Right Ring e/a Standard Deviation	0.417099274	0.53329874	0.8431961

Table A.36: Features of Subject 36

Sr. No.	Parameters	Session 1	Session 2	Session 3
1	Left Index b/a average	0.338185828	0.67365395	1.1296995
2	Left Index c/a average	0.652661346	0.87768513	0.3631429
3	Left Index d/a average	0.530392806	0.91611563	0.8891177
4	Left Index e/a average	0.293058593	0.52154842	0.446329
5	Left Index b/a Standard Deviation	0.219256263	0.56057804	0.7232416
6	Left Index c/a Standard Deviation	0.362721183	0.5285403	0.1450684
7	Left Index d/a Standard Deviation	0.438771214	0.35832682	0.2216598
8	Left Index e/a Standard Deviation	0.050345584	0.03368408	0.032756
9	Left Middle b/a average	1.422707161	0.29891537	1.897925
10	Left Middle c/a average	0.427450122	0.57027511	0.7261187
11	Left Middle d/a average	0.241672428	0.72038721	0.897129
12	Left Middle e/a average	0.554770284	0.73773062	0.2042615
13	Left Middle b/a Standard Deviation	0.38937288	0.8497968	0.2163789
14	Left Middle c/a Standard Deviation	0.980126302	0.52196897	0.2186764
15	Left Middle d/a Standard Deviation	0.72090737	0.55403147	0.2364873
16	Left Middle e/a Standard Deviation	0.272339575	0.52376844	0.4615462
17	Left Ring b/a average	0.131527747	0.36242144	1.6378522
18	Left Ring c/a average	0.505228663	0.700207	0.9961787
19	Left Ring d/a average	0.430433834	0.67055163	0.8666284
20	Left Ring e/a average	0.736418138	0.210213	0.5298191
21	Left Ring b/a Standard Deviation	0.854090906	0.47696347	0.1199182
22	Left Ring c/a Standard Deviation	0.563218895	0.78709812	0.5104912
23	Left Ring d/a Standard Deviation	0.637752919	0.25417948	0.8221774
24	Left Ring e/a Standard Deviation	0.437003424	0.63593332	0.7115366
25	Right Index b/a average	0.998848183	0.42343283	1.5157516
26	Right Index c/a average	0.193512326	0.29806908	0.798103
27	Right Index d/a average	0.29242653	0.56477472	0.7658416
28	Right Index e/a average	0.57046013	0.65633684	0.8710172
29	Right Index b/a Standard Deviation	0.239581054	0.4574272	0.7757723
30	Right Index c/a Standard Deviation	0.441703796	0.66468373	0.9189795
31	Right Index d/a Standard Deviation	0.670632512	0.46268342	0.7625195
32	Right Index e/a Standard Deviation	0.236346183	0.53680551	0.7647394
33	Right Middle b/a average	0.619897369	0.34302306	1.8937348
34	Right Middle c/a average	0.721445468	0.63841207	0.9277271
35	Right Middle d/a average	0.435462722	0.67568113	0.7625848
36	Right Middle e/a average	0.357082113	0.29865283	0.4990624
37	Right Middle b/a Standard Deviation	0.121780555	0.56000852	0.9643443
38	Right Middle c/a Standard Deviation	0.232547694	0.548222	0.6739568
39	Right Middle d/a Standard Deviation	0.554448784	0.45062577	0.886775
40	Right Middle e/a Standard Deviation	0.545749199	0.83265477	0.931747
41	Right Ring b/a average	0.63409094	0.37443768	1.4688989
42	Right Ring c/a average	0.777788074	0.67377183	0.259635
43	Right Ring d/a average	0.486387375	0.61098726	0.7841423
44	Right Ring e/a average	0.572495827	0.32580118	0.9272782
45	Right Ring b/a Standard Deviation	0.324158925	0.45711889	0.7525024
46	Right Ring c/a Standard Deviation	0.613291433	0.82602006	0.9916687
47	Right Ring d/a Standard Deviation	0.330501542	0.26667575	0.9415052
48	Right Ring e/a Standard Deviation	0.417099274	0.53329874	0.8431961