AYURVEDIC DOSHA DETECTION AND CORRECTIVE MEASURES THROUGH LABVIEW

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DECLARATION

I hereby certify that the work which is presented in dissertation entitled, "**Ayurvedic Dosha Detection And Corrective Measures Through Labview**" in partial fulfillment of the requirements for the award of the degree of **Master of Engineering in Electronic Instrumentation and Control** submitted to Electrical & Instrumentation Engineering Department of Thapar University, Patiala is as authentic record of my own work carried under the supervision of **Dr. Gagandeep Kaur**, Assistant Professor, EIED. It refers others researcher's work which are duly listed in the reference section. The matter contained in this dissertation has not been submitted, neither in part nor in full to any other degree to any other university or institute except as reported in text and references.

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It is certified that above statement made by student is correct to the best of my knowledge and belief.

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ABBREVIATIONS

LabVIEW	Laboratory Virtual Instrument Engineering Workbench
BMI	Body Mass Index

ABSTRACT

Prevention is always better than cure. A proper ayurvedic diet itself can be used to balance tridosha and prevents occurrence of any disease beforehand. This work is an ayurveda based healthcare management system. This system embodies the traditional expertise of ayurveda acharyas into a scientific form with the help of LabVIEW. It can be used by anyone without any pre-qualification. It works on questions related to various features of the body which can be judged by individual itself as per his/ her own observation. This method is highly apt as no one can judge anyone better than their own self. Therefore approximately 320 questions have been selected to identify a person's prakriti. All daily used food items have been researched upon well in order to design diet according to the subject so as to rectify the imbalance of dosha specific to that subject. This highly precise LabVIEW application balances the dosha and manages the daily calorie intake in accordance with the persisting season through 84 different ayurvedic diets. This system is user friendly, very accurate and has low latency time.

CHAPTER 1

INTRODUCTION

1.1 AYURVEDA

Ayurveda is an ancient indian system of natural and holistic medicine. Ayurveda has been formed from two small words which are ‘Ayur’ and ‘Veda’. The former means life while the latter means science. Therefore Ayurveda as a whole can be understood as the science of life. The origin of Ayurveda dates back to nearly 5000 years ago. The origin of ayurveda was found in Arthva Veda i.e. the divine book of knowledge. Two most famous early texts on ayurveda are the Charaka Samhita and the Sushruta Samhita. [1] Some special features of ayurveda, which makes this system of medicine unique, are

i. Ayurveda is a highly technical medicine system which was understood by the ancient people.
ii. It provides the knowledge of how to prevent disease or how to eliminate the root cause of the disease unlike allopathic medicine which tends to focus on management of disease.
iii. It focusses on preserving the union of mind, body as well as the spirit.
iv. It focusses on maintaining balance of energies within us.
v. It recognizes the unique difference in the constitution of individuals and therefore suggests different remedies to each of them even when the outward symptoms appear same.
vi. Ayurveda detects imbalance in energies much before that imbalance takes the shape of a disease.
vii. Most of the diseases can be detected just by examining the pulse by traditional ayurvedic practioners; making it a low cost and non-invasive detection technique.

1.2 PANCH MAHABHUTAS

Entire universe is made up of panchmahabhutas, a sanskrit word meaning five great elements. The figure 1.1 shows all five elements which are the building blocks of human beings. Everything is made from these elements whether living or non-living including human beings. These five elements are

i. Aakash i.e. Space or ether
ii. Vayu i.e. Air
iii. Agni i.e. Fire
iv. Jal i.e. Water
v. Prithvi i.e. Earth

Figure 1.1: Panchmahabhutas [2]

Every animate being and inanimate object is made up of atoms, the panchmahabhutas can be understood with the help of an atom as an example. Aakash is the space which the protons and neutrons occupy as well as the space in which the electrons revolve. Vayu represents the force of

movement of the electrons around the nucleus. Agni represents the latent energy in an atom and also the released energy when an atom is broken down. Jala gives the force of cohesion that allow the protons, neutrons and electrons to remain attracted towards each other. Prithvi contributes the solid portion of the atom (i.e. the electrons, protons, and neutrons). [3]

There are various qualities of each of these mahabhutas and one sensory organ related to each of them. This would enable the understanding of presence of these elements in our body. Qualities of aakash mahabhuta are clear, subtle, light and immeasurable. It is related with various actions like vibration, expansion and non-resistance. Sensory organ related to space element is ear as it is hollow and transmits the sound waves. Qualities of vayu mahabhuta are light, mobile, cold, dry and subtle in nature. Its main action is any kind of movement. The sensory organ related to air element is skin as skin is very sensitive for detecting any movement, vibration or change in pressure. Qualities of agni mahabhuta are sharp, hot, dry, light and subtle. Functions performed by this element are digestion of food, penetration and transformation of thoughts, perception of light and intelligence. Sensory organ related to agni element is eye. Qualities of jala mahabhuta are dull, cool, soft, liquid and sliminess. Its main actions are cohesiveness and adhesiveness i.e. to bind cells together. Tongue is the sensory organ related to water element. Qualities of prithvi mahabhuta are dull, heavy, hard, dense and gross. The earth element is responsible for giving shape, structure and strength to the body. The sensory organ related to earth element is nose because it is the hardest sensory organ out of all. [4]

1.3 DOSHAS

According to Ayurveda, doshas are functional projections of panchmahabhutas. These doshas are bodily humors which are present throughout human mind and body as biological energies. The entire concept of ayurvedic medicine theory is based on these doshas. Balance of doshas is considered as complete health and wellness. Three main doshas which are present in human body are

i. Vata
ii. Pitta
iii. Kapha

Figure 1.2 shows how these doshas are related to the panchmahabhutas. Predominant vata dosha individual possesses qualities of space and air as vata is formed by the combination of space and air. Similarly pitta dosha individual possesses qualities of fire and water as pitta dosha is formed by the combination of fire and water. Kapha dosha predominant individual possesses qualities of water and earth as kapha is formed by the combination of water and earth. There are three main doshas and hence this theory is also known as tridosha theory.

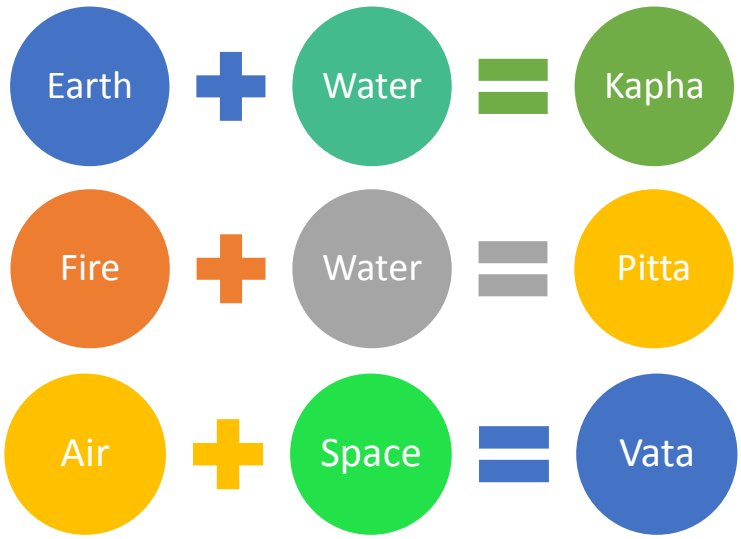


Figure 1.2: Ayurvedic Doshas

There are three states possible for these doshas which are

i. Increased: One or two doshas are in aggravated states i.e. present in more proportion to others. It represents increased or excess state of dosha.
ii. Decreased: One or two doshas are in reduced or depleted states i.e. present in less proportion to others or normal value.
iii. Balanced: All the doshas are in normal proportion and are in equilibrium. This signifies the perfect healthy state of an individual. [5]

Out of these three types of states, the aggravated state is the one which is major cause of imbalance. This type of imbalance is generally caused if a person takes excessive stress in life or if he/she consumes food which aggravates the predominant dosha even more. Best way to balance this

aggravated dosha is to consume food which has qualities opposite to that respective dosha. This is because only opposite doshas can create balance amongst tridoshas. If a person with high pitta dosha consumes spicy food, pitta percentage would increase even more as compared to the other two doshas. Whereas if the same person consumes cold foods, pitta percentage would get lowered leading to balance of doshas. [5]

1.3.1 VATA

Vata is the energy of movement and force that takes care of all biological activities taking place in the body. Balanced vata individual is creative, active and is gifted with a natural ability to communicate and express. Imbalance in vata leads to nervousness, anxiety and disorders related to dryness like gas, constipation and dry skin. Main locations of vata in the body are ears, skin, joints, brain, bones, nerve tissues, thighs and colon. Physiologically, as mentioned above, vata governs movement like talking, breathing, movement in tissues as well as muscles, circulation, assimilation of food, nerve impulses, menstruation, elimination and urination. Psychologically, vata governs quickness of thoughts, creativity, flexibility and communication. Some qualities of vata constitution are light, mobile, subtle, cold, rough and dry. Figure 1.3 shows a vata flower. It shows that ether and air which are constituents of vata dosha. Additionally, the flower shows some of the qualities of vata in the form of petals. [5]

Figure 1.3: Constituents and qualities of vata [6]

1.3.2 PITTA

Pitta is the energy of metabolism and digestion in the body. It governs all processes related to conversion and transformation throughout the mind and body. It functions through various carrier substances such as enzymes, bile, organic acids and hormones. Balanced pitta individual is sharp, joyful, has tremendous courage and dedication. Imbalanced pitta is egoistic, angry, faces ulcers, infection, heartburn, inflammation, fever and rashes. Main locations of pitta are eyes, sweat, blood, liver, stomach, pancreas, spleen and small intestine. Physiologically, pitta provides the body with heat and energy by the breakdown of complex food molecules. Psychologically, pitta governs intellect, power, courage, joy, anger, mental perception and jealousy. Qualities of pitta are sharp, hot, oily, acidic, liquid and moving. Figure 1.4 shows a pitta flower. It shows that fire and water which are constituents of pitta dosha. Additionally, flower shows some of the qualities of pitta in the form of petals. [5]

Figure 1.4: Constituents and qualities of pitta [6]

1.3.3 KAPHA

Kapha is the energy of lubrication and building that provides the body with structure, physical outlook and governs the smooth functioning of all its parts. Kapha can be thought of as the essential adhesive and lubricant in the body. Balanced kapha individual is calm, stable, forgiving and easy going. Imbalanced kapha is greedy, narrow minded, possessive, faces excessive fluid retention, respiratory disorders and obesity disorders. Main locations of kapha in the body are connective

tissues, tendons, ligaments, lymph, fatty tissue, head, chest, lungs and throat. Physiologically, kapha stores energy, moistens food, lubricates joints, gives bulk to our tissues and relates to cool bodily fluids such as lymph, mucous and water. Psychologically, kapha governs love, forgiveness, patience, mental inertia, attachment and greed. Qualities of kapha are cold, moist, soft, heavy, sticky, static and dull. Figure 1.5 shows a kapha flower. It shows that water and earth which are constituents of kapha dosha. Additionally, flower shows some of the qualities of kapha in the form of petals. [5]

Figure 1.5: Constituents and qualities of pitta [6]

1.4 CONSTITUTIONAL TYPES

There are three main doshas as mentioned vata, pitta and kapha. It is not necessary that there can be only one dominant dosha. Sometimes dominant dosha is highly influenced by another high proportioned dosha. This means a person can have a constitution of one dosha or two dominating doshas in combination. It is necessary to know the precise constitution so as to be able to take measures to balance the life energies in the body. Balance of the doshas is the best sign of health and proper well-being for any individual. Therefore there are seven types of constitutions possible which are

i. Vata
ii. Vata – Pitta
iii. Vata – Kapha

iv. Pitta
v. Pitta – Kapha
vi. Kapha
vii. Vata – Pitta – Kapha i.e. Tridoshic

Vata – pitta is highly similar to pitta – vata, in terms of characteristics. Similarly for vata – kapha, pitta – kapha and tridoshic constitutions.

1.5 DIET

Diet is the sum of all the food intake of a person or any other organism. Diet includes fruits, vegetables, legumes, cereals in any form, oil, spices and beverages. Diet does not at all mean to eat less food, this is a misconception. Diet is food that we eat and get energy to perform any work. Diet is the most important need of anyone's life. If diet is not appropriate, it leads to variety of problems, weakness and diseases. Diet is highly correlated with ayurvedic doshas. Some foods aggravate one dosha while the same food balances the other. Improper diet is one major reason of diseases. Some improper ways of diet consumption are

i. Eating food in inappropriate quantity i.e. eating a lot of food at one meal time and skip the next meal. Excessive food intake at one meal makes a person lazy leading to increase in kapha dosha.
ii. Eating food at irregular times. These days life is so busy that food timings are difficult to maintain. Therefore people tend to consume food whenever they wish to. Sometimes consuming lunch time at 5p.m while sometimes at 12 noon. Hunger either produces acid or gas in the stomach which leads to increase in pitta dosha or vata dosha in the body respectively.
iii. Eating food which is out of season. For example watermelon is a summer fruit but is consumed throughout the year. It is supposed to reduce pitta dosha in summers. But when it is consumed in other seasons, it tends to imbalance the doshas which is not good for health. In winters, kapha dosha is already present in body in more than normal proportion and watermelon consumption can increases it even more.

iv. Improper knowledge of qualities and calories of the food. Normally a kapha dosha individual likes to eat sweets and keeps eating sweets, therefore increases dosha imbalance as well as weight because sweets have high calories. Similarly a pitta dominant person likes to eat spicy food which further increases pitta leading to imbalance of tridosha.

1.6 CONCLUSION

Proper knowledge of ayurvedic doshas help to prevent diseases much before they are able to manifest themselves in the body. If the doshas are maintained in balanced form, every individual can lead a healthy life, both physically as well as mentally. Additional advantage of ayurveda is that just a proper diet can regularize the balance of dosha in an individual. Therefore precise diet itself can be considered as a medicine to cure any disease as well as to prevent any further occurrence of disease.

CHAPTER 2

LITERATURE REVIEW

2.1 ASTANGA HRIDAYA SUTRA STHAN

Arthva Veda, also known as divine book of knowledge, is the oldest known source of origin of ayurveda. The Charaka Samhita and the Sushruta Samhita are the two most famous known texts on ayurveda. These texts are in highly detailed form and are in sanskrit only, which is not understood by most of the people. Vagbhata has, therefore, collected the essence of all of these ayurvedic textbooks and presented it in the form of Astanga Hridaya. It is neither too short nor too elaborate and has translation of each sanskrit shloka in hindi as well as english. It deals with each aspect of life, whether it is the purpose of life, origin of ayurveda, all branches of ayurveda, body types and many more topics. [7]

2.2 AYURVEDA: A LIFE OF BALANCE

Tiwari, Maya has given a complete guide to ayurvedic nutrition and body types. She has worked on the concept of holistic health which says that a human being is not just a body but combination of mind, body and spirit. She has also explained how alternative healing helps curing in a better manner. She has implemented her entire work on many people, including herself, and cured the root cause of dangerous diseases like cancer. She has, therefore, clearly explained that just by removing the disease from the body of a person does not make the person healthy. Her work also includes recipes of some common as well as special vegetables and foods considering the constitution of the individual. [8]

2.3 DEVELOPMENT AND STANDARDIZATION OF MYSORE TRIDOSHA SCALE

Shilpa S *et al.* had developed a personality scale to assess the tridoshas present in human beings i.e. state of kapha, vata and pitta considering their psychological perspective. These tridoshas have been formed from the Pancha Mahabhutas which are the five great elements present in each human being. Usually one or the other dosha is dominant in each human being. It is not possible to survive

if any one of the panch mahabhuta or any one of the doshas is completely absent. All five elements are akasha, vayu, agni, jal and prithvi. Vata dosha is made from space and air mahabhuta. Pitta dosha is combination of tejas or fir and water mahabhuta. Kapha dosha is made up of ap or water and earth mahabhuta. The authors have tried to validate the ayurvedic tridosha theory from the domain of psychology as they are from the psychology domain and not aayurveda. Psychological dosha prakriti assessment had been used personality assessment test and psychometric properties of the scale were established. Thus the development of the Mysore Psychological Tridosha Scale has been explained. [9]

2.4 A SELF-RATING SCALE TO MEASURE TRIDOSHAS IN CHILDREN

Suchitra, S.P. *et al.* have developed self - rating inventories to assess the personality and prakṛiti (constitution) and got it validated for adults. Standardized scale is not available to assess the effect of personality development programs on prakṛti of the children. They have worked to standardize and develop Charaka Child Personality inventory (CCPI). It included 77- item based on vataja, pittaja and kaphaja which are three doshas present in human beings according to ayurveda. Opinion of 5 ayurveda experts and psychologists were taken. Children of 8-12 years of New Generation National public school, Bangalore were taken as subjects for the scale. [10]

2.5 CORRELATION BETWEEN A, B AND O BLOOD GROUPS AND TRIDOSHAS (AYURVEDIC BIOLOGICAL CONSTITUENTS)

Purandare, V R *et al.* worked on vata, pitta and kapha or tridoshas (ayurvedic biological constituents) and considered them as main determinants of human constitution. 800 healthy individuals were selected for their tridoshas analysis (Ayurvedic biological constituents) belonging to the age group 18 to 25 years. Correlation between blood groups (A, B and O) and tridoshic analysis was studied to be able to determine any relation between them. Out of 800, only 447 people had single dosha from the tridosha prakriti (ayurvedic constitution). Remaining 353 people had almost same percentage of either two or all three doshas. That means those 353 people either belonged to Dwandwaja Prakriti (combination of two doshas) or Tridoshatmaka Prakriti (combination of three doshas). After correlating predominant doshas with A, B, O blood groups, significant result was obtained. Kapha prakriti was found to be correlated with blood group A,

pitta prakriti was correlated with blood group B and vata prakriti correlated with blood group O. [11]

2.6 OPTIMIZING AYURVEDA BASED HUMAN CONSTITUENTS DIAGNOSIS BY PRINCIPAL COMPONENT ANALYSIS

Anand, Anil *et al.* proposed that there is no standardization for the questionnaire available for detection of ayurveda based doshas. They provided means to reduce the questionnaire in an optimal manner so that even with less number of questions being answered, dosha can be detected by the doctor with high accuracy. They had used Principal Component Analysis for reduction of questionnaire. Further devised four methods for dosha detection Gold Standard, Sub Group, Minimum Correlation and Quick Slot depending on the reliability required by the doctor. [12]

2.7 AYURVEDIC NUTRITION & COOKING

Ranade, Sunanda portrayed diet as an essential part of life. She has very minutely explained the effects and qualities present in various foods that are consumed in daily life by each individual. According to her, diet is the most important part of one's life. If food is prepared and consumed properly, then one can maintain heath easily. Improper diet, on the other hand, is a major reason behind many diseases. She has discussed some Ayurveda based diet plans and recipes of many foods which are tasty as well as highly beneficial to balance aggravated doshas according to ayurveda. [13]

2.8 THE AYURVEDIC COOKBOOK

Morningstar Amadea et al. put forward ayurveda as the oldest science of life, healing and a system of diet. Therefore they propose ayurveda as a science of complete health maintenance that too in accordance with deep spirituality. Ayurveda addresses prevention of diseases and maintainance of vitality; not only on healing. The power of food can be understood only when it is consumed in proper combinations and in complete coordination. Spices and aroma play a major role in bringing health and well-being of the deepest level. They also explain the careful selection of spices in accordance with the ayurvedic prakriti of each individual. [14]

2.9 AYURVEDIC COOKING FOR SELF-HEALING

Lad Usha at al. gave guidance about ayurvedic cooking. According to them, ayurveda encompasses healing of mind, body as well as soul through lifestyle, rejuvenation and diet. They explained the art of achieving continuous good health through food and diet. Ayurveda provides insight about each food that will suit each individual uniquely. These foods balance ayurvedic doshas of any individual and also allow them to stay in health and harmony. They have also focused on combinations of foods which according to ayurveda lead to creation of toxins in body, which in turn may become major diseases at later stages. [15]

CHAPTER 3
OBJECTIVE & METHODOLOGY

3.1 OBJECTIVE

Ayurvedic medicine system works on tridosha theory. There are two most widely used methods to identify these dosha which are through palpation or through questions. Therefore questionnaires are prepared, which can be filled by the subject and the dosha can be easily identified by doctor. Various online website and books have questionnaires to identify vata, pitta and kapha. But they all display very less number of questions, about 40-50 only. Out of these questions, subjects tend to answer about 10 of them accurately and dosha detected therefore has high probability of incorrect result. Therefore for this work, collection of largest set of questions available from almost all possibly practical sources has been prepared. This helps in achieving of the highest accuracy even if a couple of questions are marked incorrectly.

Task does not end by just identifying the dosha. Management of dosha by balancing the tridoshas is important. If the imbalance is not contained on time, it may take the shape of any disease. These doshas can be balanced simply by consuming good food combinations. Dosha specific diet is to be consumed with proper knowledge of seasonal fruits and vegetables as well as calories present in each food. If this is done then this diet serves as a complete healthcare system as it not only balances the dosha, but manages weight of the subject along with providing all essential foods for healthy life. 84 such diets have been prepared considering each aspect mentioned.

LabVIEW, a highly advanced software, is the tool used for all the programing. All the questions have been put into labview code and the subject can select as many answers as applicable to him. More the answers filled, better will be the accuracy. According all the answers, values of tridosha are calculated at the back end of the system, upto accuracy of 4 decimals. Then according to the season and weight of the person, a one week diet chart is generated with every minute detail mentioned in it. This entire work is therefore a merger of basics of Ayurveda, calorie based diet and engineering through LabVIEW.

3.2 METHODOLOGY

Work comprises of designing of an exhaustive ayurveda based questionnaire and coding it in LabVIEW. Identification of the dosha is followed by diet charts to balance the same. Figure 3.1 shows the flow chart of methodology.

Figure 3.1: Methodology flow chart

Initially work is to identify the aggravated dosha i.e. the dosha causing imbalance. The procedure begins with the understanding of the concepts of tridosha theory and its application in ayurveda field. Ayurveda is the knowledge of the most ancient system of medicine which works at the root cause of disease of any patient. It also guides how to prevent the occurance of any disease, simply by changing food habits. Then work proceeds with collection of all the features that can be used to classify between these doshas i.e. vata, pitta, kapha or any of their combinations. List of all personal, physical and physiological features is prepared in the form of an exhaustive questionnaire. Then the coding of the features is done in LabVIEW after understanding the features of the software itself. On entering all the features of any person, a calculated value of each of the dosha present in the body appears as a result. Three values come as results of features, then LabVIEW finds out which of them is responsible for causing imbalance. A comparison between results is necessary to understand if it is one dosha which is increased or two so that prakriti can be chosen. Once dosha has been identified, then the means to normalize it have to be given. Fruits and vegetables of each of the seasons are noted. This is done by considering all fruits and vegetable which are available in India during the seasons namely summer, winter, autumn and spring. Then according to each dosha, all fruits, vegetables, oils, spices, legumes, cereals and beverages which are beneficial for balancing of dosha are recorded. Calories present in each fruit, vegetable, legume is noted. Further weight management is an extra added advantage of this dosha balancing diet chart so that these diets could serve the purpose of overall healthcare management system. Diet charts are prepared considering the total calories that can be given to the person depending on dosha, season and calorie requirement. Calculation of each calorie for each of the seven days of a week are done for every diet chart to ensure high precision. PDF files of the diet charts have been designed and are coded in LabVIEW. Therefore a well-defined one week diet chart becomes the output according to all the feature inputs given to LabVIEW for balancing the aggravated dosha.

CHAPTER 4

QUESTIONNAIRE BASED DOSHA DETECTING FEATURES

4.1 FEATURES

Dosha detecting features have been short listed as per their scientific medical reasoning. These features inform about human body characteristics. These features are easily observable and therefore can be filled easily. Information about each aspect of human body has been taken as input for high precision and accuracy. Types of features considered are

i. Physical

ii. Physiological

iii. Personal

The system developed takes all the features as input. This is because each and every feature contribute to the detection of constitution.

4.2 PHYSICAL FEATURES

Physical features means information about skin, hair, nose, body hair, body temperature, teeth, eyes, fingers, nails, forehead, lips, chin, neck, body frame, stamina, chest, tongue, body odour, shoulders, pulse rate and menses have been considered. Each of these features are elaborated below.

4.2.1 SKIN

Just at the look of skin of any individual, it can be identified whether the characteristics of skin belong to vata, pitta or kapha. If the skin is dry, coarse, or rough, or skin is dark or it tans easily but burns rarely, is prone to premature wrinkles and has birthmarks, then this type of skin is vata dominated. If the skin is moderately oily and soft, is delicate and sensitive, tans moderately, is prone to rashes and pimples and has brown patches or moles, then it is pitta dominated. Last but

not the least, if the skin is soft and oily, is fair with gleam, is reddish and pale, burns when over exposed, is clear and smooth, then the skin is kapha dominated. [8]

4.2.2 HAIR

Features of hair can help us classify between three humours that are vata, pitta or kapha. For example, if hair are brown or black in colour, they are dry and wiry, they are thin, are tightly curled or frizzy (not smooth nor shiny), then they imply vata. Next, if hair are reddish blonde, soft, thin and fine, straight but prone to premature greying or baldness, then they imply pitta. Similarly, if hair are jet black or dark brown, oily, thick, wavy and shiny or glossy, then they imply kapha. [8, 16]

4.2.3 NOSE

The shape of the nose is different for people with vata, pitta and kapha. Vata dominated person generally has a very sharp nose. Pitta dominated person has an aquiline nose, i.e. he/she has proper bridge of the nose. And kapha dominated individual has a wide and large nose. [8]

4.2.4 BODY HAIR

Body hair quantity and quality are also significant to identify vata, pitta and kapha. If body hair are either very fine or very thick, then it means that they are vata type. If the body hair are moderate, then it means that they are pitta type. And if the body hair are thick and plentiful, then it means that they are kapha type. [16]

4.2.5 BODY TEMPERATURE

Based on the body temperature, anyone can differentiate between vata, pitta and kapha characteristics. People with vata characteristics dominating usually have cold hands and feet and therefore they prefer warm or moist weather as compared to cold or dry weather. People with pitta characteristics dominating are usually warm, regardless of the season therefore they prefer cool weather and get irritated in warm weather. People with kapha characteristics catch cold quite frequently and prefer warm environment over cold or wet weather. [8, 17]

4.2.6 TEETH

By just looking at the teeth of person, vata, pitta and kapha characteristics can be identified. If one has very small or uneven or protruding (tend to come out) or one's teeth are easily cracked or one has receding gums (gums which are gradually or slowly reducing), then the person's vata characteristics are more than the other two. If one has teeth that are moderate sized, or are generally yellow and have inflammated or bleeding gums, then the person's pitta characteristics are more than the other two. In the end, if a person has large teeth that are strong and white with thick gums, then the person's kapha characteristics are more than the other two. [16, 18]

4.2.7 EYES

Shape, size and colour of eyes reveal the vata, pitta and kapha dominance for an individual. Grey or brown eyes or dull eyes, narrow or small eyes, dry or itchy eyes with dark sclera and thin or scanty (less) eyelashes portray vata dominance. Light brown or hazel or green eyes, sharp eyes that are observant/ alert, almond shape, penetrating eyes (that can make anyone uncomfortable), sensitive eyes with yellow sclera and blonde or copper eyelashes portray pitta dominance. Unlike these, if the eyes are black or blue, bright, big, sensual and attractive, teary or wattery eyes with white sclera and thick eyelashes portray kapha dominance. [8]

4.2.8 FINGERS

Fingers means both fingers of hands as well as foot i.e. toes. They too contribute to detection of vata, pitta and kapha. Long and tapering fingers and toes contribute to vata. Medium length of fingers and toes contribute to pitta; whereas short and squarish fingers and toes contribute to kapha. [16]

4.2.9 NAILS

Though nails are very small part of the body, yet they help us in judging the prakriti. Like it can be said that grey, dry, brittle nails or ridged nails (yellow or white or opaque nail/ nail away from nail bed) and the tendency to bite nails are all the characteristics of vata type nails. In the same manner, clear or pink or reddish, well-formed and pliable (difficult to grow nails long) are all the

characteristics of pitta type nails. Lastly clear and pale, even, moist, square shaped, thick and strong nails are all the characteristics of kapha type nails. [8]

4.2.10 FOREHEAD

Size of forehead helps us to determine vata, pitta and kapha for an individual. Small forehead shows vata tendency. Medium forehead shows pitta tendency and large forehead shows kapha tendency. [16]

4.2.11 LIPS

Dark or dry or cracked lips point towards vata characteristics. Pink or copper colored and soft lips point towards pitta characteristics. Moist and oily and full lips point towards kapha characteristics. [16]

4.2.12 CHIN

By looking at the chin, also we can find out vata, pitta and kapha. If one has a delicate chin, then it is vata type. If one has a moderate chin, then it is pitta type. If one has a large jaw, then it is kapha type. [16]

4.2.13 NECK

Neck features help us to classify between vata, pitta and kapha. Small and unsteady neck corresponds to vata. Moderate neck corresponds to pitta. Large and steady neck corresponds to kapha. [16]

4.2.14 BODY FRAME

Body frame is one of the most important and easiest feature which helps us to distinguish between vata, pitta and kapha. Body frame features are maximum and most easily identifiable. If a person is either very short or very tall (as compared to the average), is thin or lean, has narrow body frame, is flat chested, has big or loose or rigid joints then all these features portray vata prakriti. Some other features of vata prakriti according to body frame are that the person has crack and pop type

joints (protruding or sharp), veins are prominent or close to the surface, weight is less than normal, it is very difficult to gain weight and shape of their face is thin and bony.

If a person is medium heighted, has well shaped body, is medium built, has a toned athletic body, have smooth joints, then all these portray pitta prakriti. Some other features of pitta prakriti according to body frame are that the person has flexible and well-knit joints, veins are neither hidden, nor prominent, weight is in normal range which is present evenly throughout the body, it is easy to loose or gain weight if idea is put in mind to it and shape of face is oval and angular.

If a person is heavy, has a wide or square framed body structure, is strong, is thick, large, fleshy or plum and has well lubricated and hidden joints, then they portray kapha prakriti. Some other features of kapha prakriti according to body frame are that the person gains weight in great moulds (buttocks, thighs, chest, arms), veins are deep and hidden, weight is more than normal, it is extremely difficult to lose weight even after putting large amount of exercise and shape of face is usually round. [8, 16]

4.2.15 STAMINA

In terms of stamina, less stamina is a characteristic feature of vata. Moderate stamina is a characteristic feature of pitta. Strong or large stamina is characteristic feature of kapha. [12, 17]

4.2.16 CHEST

Chest is another identifying feature for vata, pitta and kapha. If the individual's chest is long and thin so ribs are easily visible, then this feature belongs to vata. If the individual's chest in medium in length and thickness, and ribs are not so visible, then this feature belongs to pitta. If the individual's chest is broad and is strongly covered by flesh, then this feature belongs to kapha. [12]

4.2.17 TONGUE

Colour of tongue also participates in classification of prakriti between the three humors. If someone has a dark brownish tongue that is rough and very cracked on sides because of dryness then tongue shows vata characteristic. If someone has a pink or dark red tongue that is soft and long, then my tongue shows pitta characteristic. If someone has a light coloured tongue that is heavy and moist, then my tongue shows kapha characteristic. [16]

4.2.18 BODY ODOUR

Body odour is because of the smell of perspiration. This also characterises vata, pitta and kapha. If anybody has little smell of perspiration, it means vata is dominant. If anybody has strong smell of perspiration, it means pitta is dominant. If anybody does not have any smell of perspiration, it means kapha is dominant. [8]

4.2.19 SHOULDERS

Shape of the shoulders is taken as a feature to decide vata, pitta and kapha for any individual. Shoulders which are narrow and slope downwards display vata behavior. Medium sized shoulders display pitta behavior. On the contrary, firm, broad and well developed shoulders display kapha behavior. [18]

4.2.20 PULSE RATE

Pulse rate of any person varies with age and sex. But pulse rate also depends on vata, pitta or kapha dosha of any person. For males, a person with vata dosha has a pulse rate of 70-90 beats per minute. A male with pitta dosha has pulse rate of 60-70 and a male with kapha dosha has pulse rate of 50-60. For females, there is a little difference. A female with vata dosha has a pulse rate of 80-100. A female with pitta dosha has pulse rate of 70-80. And in the end, a female with kapha dosha has pulse rate of 60-70. [18, 19]

4.2.21 MENSTRUATION

In women, menses are a major part of life. Therefore, for women, menses are must to be studied. If menses are irregular or scanty with less flow accompanied by severe pain, then these characteristics point to vata prakriti. If menses are with heavy and long bleeding accompanied by loose stool, then these characteristics point to pitta prakriti. If in menses, one is prone to water weight gain i.e. experience gain in weight because of water retention and suffers from slight cramps sometimes, then these characteristics point to kapha prakriti. [16]

4.3 PHYSIOLOGICAL FEATURES

With respect to physiological characteristics, information about rate of performing activities, time taken motivate, excite and enthusiastic, rate of mood change, learning capability, quality of mind, memory, method of learning new material, foods desired, digestion, appetite, eating speed, taste preferences, thirst, frequency of bowel movement, consistency of faeces, perspiration, sexual desire, amount of sleep, quality of sleep, method of sleep, types of dreams, emotional temperament, mental tendencies, what is one most sensitive to, what does one love, one trait that describes a person, behavior when threatened, response to challenges, speech, gait, behavior under stress, money spending habit, illness or disease vulnerability, music preferences, preference of work, frequency of praying, sensitivity towards feelings, express affection by and stages of pride have all been considered.

4.3.1 RATE OF PERFORMING ACTIVITY

The speed at which an individual can perform an action or any activity can help to determine vata, pitta and kapha. If somebody performs all activities very rapidly, then that person shows vata characteristics. If somebody performs all activities with moderate speed, then that person shows pitta characteristics. If somebody performs all activities very slowly, then that person shows kapha characteristics. [18]

4.3.2 MOTIVATED, ENTHUSIASTIC AND EXCITABLE

Features such as motivation, enthusiasm and excitation are also used in observation of vata, pitta and kapha of any individual. If a person can be motivated very easily and is very enthusiastic and gets excited quickly, then the person portrays vata nature. If a person can be motivated or excited with a little effort and is moderately enthusiastic, then the person portrays pitta nature. If a person can be motivated or excited very slowly with lots of effort, then the person portrays kapha nature. [8]

4.3.3 MOOD

If a person's mood changes quickly, it shows that it is a vata based characteristic. If a person's mood is intense and changes slowly, it shows that it is pitta based characteristic. If a person's mood is steady and non-changing, it shows that it is kapha based characteristic. [8]

4.3.4 LEARNING CAPABILITY

If one can learn things very quickly and very easily, then this quality demonstrates vata prakriti. If one can learn things at a moderate rate with very less difficulty, then this quality demonstrates pitta prakriti. If one learns things slowly, then this quality demonstrates kapha prakriti. [8]

4.3.5 QUALITY OF MIND

Quality of mind means how somebody's mind thinks or works. This plays an important part in realization of vata, pitta and kapha for anybody. If a person's mind is quick, creative, imaginative but restless, then the person displays vata characteristics. If a person's mind is sharp, alert and intelligent i.e. have high intellect, then the person displays pitta characteristics. If a person's mind is stable, calm and focusses on good in the world, then that person displays kapha characteristics. [8]

4.3.6 MEMORY

Memory means the capability to remember things for some time. A vata prakriti individual has a good memory but it is short term memory. A pitta prakriti individual has a medium type of memory i.e. can remember things for a comparatively longer time than vata. A kapha prakriti individual has a good long termed memory. [8]

4.3.7 LEARN NEW MATERIAL BY

How does a person learn a new thing is also taken for studying features. Every person has a different way of learning a new material. If a person can learn new material easily by listening to a speaker, then the person corresponds to vata nature. If a person can learn new material easily by just reading or through any visual aid, then the person corresponds to pitta nature. If a person learns

by associating the new learning material with some other previous material in memory, then the person corresponds to kapha nature. [18]

4.3.8 FOODS DESIRED

Choice of foods is distinct for everybody. But people with similar characteristics appear to have matching food choices. All people who are vata dominated desire to have warm foods. All people who are pitta dominated desire to have cold foods. All people who are kapha dominated desire to have warm as well as dry foods. [12]

4.3.9 DIGESTION

Digestion of food is counted on a normal basis and not on the basis any particular day. Usually, if digestion is inconsistent, varies between weak and strong, then is vata dominated. If digestion is generally strong, then it is pitta dominated. If digestion is usually weak and slow, then it is kapha dominated. [8, 17]

4.3.10 APPETITE

Appetite varies from person to person. If one's appetite is variable and can skip meals sometimes, then it is portrayal of vata nature. If one's appetite is strong, consistent and cannot comfortably skip meals, then it is portrayal of pitta nature. If one's appetite is usually mild and can skip meals without discomfort, then it is portrayal of kapha nature. [18]

4.3.11 EATING SPEED

Some people eat slowly while some eat very quickly. It depends from person to person. If a person eats very fast, then that person has a probability of possessing vata nature. If a person eats with moderate speed, then that person has a probability of possessing pitta nature. If a person eats slowly i.e. speed of eating is very less, then that person has a probability of possessing kapha nature. [18, 19]

4.3.12 TASTE PREFERENCES

Vata dominated individual likes to eat foods which are bitter (like turmeric, aloe vera, neem leaves, lettuce), astringent (like tea, legumes or pulses, pomegranate) and pungent (like garlic, ginger, peppers). Pitta dominated individual likes to eat foods which are sour (like lemons, strawberries, grapefruit, pickles, soya sauce), salty (like cucumber, tomatoes) and pungent. Kapha dominated individual likes to eat foods which are sweet (like water, milk), sour and salty. [8]

4.3.13 THIRST

Drinking a lot of water is good for health. Everybody knows this fact but does not follow it. It is because people with dissimilar prakriti tend to respond to thirst in dissimilar manner. If a person has irregular thirst i.e. sometime gets thirsty very often and sometimes seldomly, then that person has vata prakriti. If a person usually gets thirsty quite often, then that person has pitta prakriti. If a person gets thirsty rarely or not very often, then that person has kapha prakriti. [12]

4.3.14 FREQUENCY OF BOWEL MOVEMENT

Bowel movement's frequency helps us to differentiate between vata, pitta and kapha behaviour. Irregular frequency of bowels points towards vata behaviour. Two or more bowels per day points towards pitta behaviour. Regular bowel throughout the day points towards kapha behaviour. [17]

4.3.15 CONSISTENCY OF FAECES

Faeces or stool can be used interchangeably. Hard and dry stool or constipated stool denotes vata nature. Loose and soft stool denotes pitta nature. Well-formed stool denotes kapha nature. [19]

4.3.16 PERSPIRATION

Sweating is also known as perspiration. Sweating parameter is also used to classify between vata, pitta and kapha. If perspiration is moderate, then this characteristic belongs to vata. If perspiration is profuse i.e a lot with body odour, then this characteristic belongs to pitta. If the perspiration is very slight or less, then this characteristic belongs to kapha. [8]

4.3.17 SEXUAL DESIRE

If sexual desire is small and interest is variable then this feature belongs to vata type. If sexual desire is small to moderate but interest can be aroused easily, then this feature belongs to pitta type. If sexual desire is abundant but interest is slow to arouse, then this feature belongs to kapha type. [16]

4.3.18 AMOUNT OF SLEEP

Amount of sleep is a characteristic feature used to distinguish between vata, pitta and kapha characteristics. If a person usually sleeps for 5-6 hours every day during their normal routine, then the person shows vata characteristics. If a person normally sleeps for 6-8 hours every day, then the person shows pitta characteristics. If a person sleeps for 8 hours or more, then the person shows kapha characteristics. [8]

4.3.19 QUALITY OF SLEEP

Vata prakriti individual has a light and easily interrupted sleep. Pitta prakriti has a deep and uninterrupted sleep. Whereas kapha prakriti individual has a deep and heavy sleep. [8]

4.3.20 METHOD OF SLEEP

How does one sleep also counts for dividing behaviours into vata, pitta and kapha. One who sleeps on left side normally shows vata nature. One who sleeps on back normally shows pitta nature. On the other hand, one who sleeps on stomach normally shows kapha nature. [8]

4.3.21 TYPES OF DREAMS

Some people have dreams related to fear, flying, jumping, running, climbing trees and mountains; such people have vata characteristics. Some people have dreams related to anger, violence, struggle, war, fir, lighting, sun, gold and light; such people have pitta characteristics. On the contrary, some people have dreams related to water, lakes, rivers, oceans, clouds, swans, flowers and romance; such people have kapha characteristics. [12, 18, 20]

4.3.22 EMOTIONAL TEMPERAMENT

Emotional temperament is the one of the most important deciding factor for identifying vata, pitta and kapha for an individual. An individual who has low tolerance to pain, noise, bright lights, can't take decisions easily, has difficulty in falling asleep, is fearful, anxious and has difficulty to have close relationships. All these are the characteristics of vata based emotional temperament. Unlike these, an individual who is hot, arrogant, irritable, self-centered, enjoys competition and has good sense of humor demonstrates characteristics of pitta based emotional temperament. Lastly, an individual who is narrow minded, lets negative emotions build up rather than addressing them, becomes sentimental very easily, is forgiving and nurturing (caring) demonstrate characteristics of kapha based emotional temperament. [8, 17]

4.3.23 MENTAL TENDENCIES

Vata dominated person always has questions in mind or keeps forming theories in mind. Pitta dominated person has judgmental or artistic tendency. Kapha dominated person has a stable and logical metal tendency. [18]

4.3.24 MOST SENSITIVE TO

There are certain things to which a person is very sensitive. This factor has also been considered. If a person is most sensitive to noise, then the person possess vata prakriti. If a person is most sensitive to bright light, then the person possess pitta prakriti. If a person is most sensitive to strong odour, then the person possess kapha prakriti. [8, 18]

4.3.25 LOVES WHAT

Interests of a person help us to define nature of an individual. If a person likes travelling or art or dancing, then the person displays vata nature. If a person likes politics or sports or luxury, then the person displays pitta nature. If a person likes business or good food or literature, then that person displays kapha nature. [18, 20]

4.3.26 ONE TRAIT THAT DESCRIBES ONE BEST

Vivacious (lively, active, spirited and full of life) trait is a major trait of vata. Determination is a major trait of pitta. Easy going is a major trait of kapha. [18]

4.3.27 WHEN THREATENED, ONE BECOMES

Behaviour of a person is different when he/she has been threatened. So, considering this feature is also important. If a subject becomes fearful and anxious, then the subject shows vata prakriti. If a subject becomes angry, irritable or fights, then the subject shows pitta prakriti. If a subject becomes indifferent or withdraws, then the subject shows kapha prakriti. [18]

4.3.28 RESPONSE TO CHALLENGE

How does one handle challenges that come across their way is one more parameter which is considered. Vata dominated people behave as they are uncertain, indecisive and worried when they confront a challenge. Pitta dominant people behave as they are angered, impatient, and irritable when they confront a challenge. Kapha dominant people behave as they are clear, stable and patient when they confront a challenge. [18]

4.3.29 SPEECH

If a person speaks very fast and omits a few words while speaking, then that individual points to vata behaviour. If a person speaks very fast but speaks with clarity and precision, then that individual points to pitta behaviour. If a person speaks slowly, clearly and sweetly, then that individual points to kapha behaviour. [12]

4.3.30 GAIT

Gait actually means walk. By this point, we want discuss the way of walking of anybody. Fast walk with light steps is an attribute of vata prakriti. Medium walking speed with precise and determined step size is an attribute of pitta prakriti. Slow, steady and fluid like walking is an attribute of kapha prakriti. [18]

4.3.31 UNDER STRESS

Behaviour of any individual is different under stress or tension. This is also necessary to study for any person. Some people lose weight, suffer from insomnia (lack of sleep), paranoia (jealously, exaggerated self-importance), get easily addicted to substances, are restless, have blurred mind, constipated and excess gas; such people belong to vata category. Some people get violent dreams, face insomnia, have excessive sweating, get addicted to intoxicants, face weight loss, become careless, casual and also suffer from diarrhea; such people belong to pitta category. Some people oversleep, overeat or face loss of appetite, they become greedy or lazy; such people belong to kapha category. [8, 18]

4.3.32 MONEY SPENDING

Vata dominating persons spend impulsively as they feel that money is to be used only. Pitta dominating persons spend money after proper planning. Kapha dominating persons spend money reluctantly and like to save money. [12]

4.3.33 ILLNESS OR DISEASE VULNERABILITY

People of varying prakritis face different types of diseases or can say are vulnerable to certain diseases frequently. People with increased vata tend to suffer from nervous disorders or sharp pain, neurological or stress disorders, gas in abdomen or pain. People with increased pitta tend to suffer from fever, skin rashes, inflammation, acid indigestion or infections. People with increased kapha tend to suffer from extensive fluid retention or mucus secretion, respiratory disorders, congestion and obesity disorders. [16]

4.3.34 PREFERENCES FOR MUSIC

Choice or preference for certain music can help to decide between vata, pitta and kapha personality. Vata personality prefers instrumental music, rhythmic tunes like group music. Pitta personality prefers exciting loud songs, like group songs and folk music. Kapha personality prefers soft romantic music, classical and devotional music (like bhajans). [12]

4.3.35 PREFER TO WORK

How does a person want to work is different for different natured people. Working under supervision is a trait of vata natured person. Working alone is a trait of pitta nature. Working in groups is a trait of kapha natured person. [12]

4.3.36 HOW OFTEN ONE PRAYS

Praying frequency is a habit that helps to distinguish between doshas. Praying occasionally is characteristic of vata. Praying daily is characteristic of pitta. Praying never is characteristic of kapha. [12]

4.3.37 MORE SENSITIVE TO (In terms of Feelings)

Sensitivity based on feelings can categorize between vata, pitta and kapha dominant individual. An individual who is sensitive to his or her own feelings has vata dominance. An individual who is not sensitive to anyone's feelings has pitta dominance. An individual who is sensitive to other's feelings has kapha dominance. [12]

4.3.38 EXPRESS AFFECTION BY

The way one express their affection is also a deciding factor for vata, pitta and kapha. Vata persons express their affection by words. Pitta persons express their affection by gifts. Kapha persons express their affection by touch. [12]

4.3.39 PRIDE

Vata person has moderate pride. Pitta person has ego. Kapha person has vain i.e. very high pride. [12]

4.4 PERSONAL FEATURES

Personal features include the age and blood group. They have also been considered to identify prakriti of any individual.

4.4.1 AGE

Usually prakriti of any person vary with age. Therefore age is also a factor to classify amongst various prakritis. If age of a person is below 14 years, then that person tends to be of kapha prakriti. If age is between 14 to 27 years, then the person tends to be of pitta - kapha prakriti. If age is between 27 to 42 years, then the person tends to be of pitta prakriti. If age is between 42 to 56 years, then the person tends to be of vata - pitta prakriti. If age is between 56 to 77 years, then the person tends to be of vata prakriti. If age is above 77 years, then the person tends to be of vata - kapha prakriti. [8]

4.4.2 BLOOD GROUP

Blood group also shows correlation with ayurvedic doshas of any person. Kapha prakriti is correlated with blood group A. Pitta prakriti is correlated with blood group B. Vata prakriti is correlated with blood group O. [11]

4.5 CONCLUSION

Needless to say that by carefully observing all the above features, we can easily identify any person's prakriti. A person can have one or two of vata, pitta and kapha increased simultaneously. Therefore there are vata-pitta, pitta-kapha and vata-kapha are also possible prakritis. A person who has balanced vata, pitta and kapha would have equal characteristics of each of these and would have least probability of catching any disease.

CHAPTER 5

ADVISORY AYURVEDIC DIET SPECIFICATIONS

5.1 BASIC

Ayurveda emphasis on preventive healthcare medicine system. Diet and food habits play an important role in well-being of any human being. Improper diet is one major cause of many disease in any person. It can also be understood that if a person takes proper food combinations in required quantity, then there are very low chances of development of a disease. This means that a well-designed ayurvedic diet is itself a prevention of any disease in a person. And if a person is suffering from any disease, then also proper diet itself can work as a cure to revive from the disease and also curb any further occurrence of the disease. Diet is to be prepared considering various parameters of the subject. In this work, diet is prepared based on the following factors

i. Ayurvedic dosha or prakriti
ii. Seasons
iii. Body Mass Index (BMI)

5.2 AYURVEDIC PRAKRITI

Ayurvedic prakriti or constitution of any person is the most important parameter for designing of ayurvedic diets. This prakriti is determined by the doctors through pulses or through questions. In this work, prakriti is determined by an exhaustive questionnaire which has been designed to consider all features of any human being. According to the results of the questionnaire, person can be of vata type, pitta type, kapha type, vata-pitta type, vata-kapha type, pitta-kapha type and vata-pitta-kapha type i.e. tridoshic. Imbalance in tridosha may be the root cause of any disease at later stage. Therefore to balance the imbalance of doshas, proper diet is the best method of balancing in initial stages. If a vata dominated person eats vata increasing food, the imbalance would get aggravated. On the contrary, if that vata dominated person eats pitta increasing food or kapha increasing food, balance can be attained. If a person has two dominant doshas, then eating the food

that increases the third dosha is the only way to balance. Prior knowledge of dosha is a necessary condition to decide the suitable diet.

For this work, initially list of all foods that are consumed in daily life is prepared. Then effect of each food on the dosha of any individual is identified. This work is done for fruits, vegetables, legumes, oils, spices, teas, cereals, dairy products, beverages and some other miscellaneous foods. If a particular food can be consumed by a specific dosha dominant individual, then it is shown by a tick (√) mark. Table 5.1 shows fruits that can be consumed by various dosha dominant person. Table 5.2 shows vegetables that can be consumed by various dosha dominant person. Table 5.3 shows legumes or pulses that can be consumed by various dosha dominant person. Table 5.4 shows spices or condiments that can be consumed by various dosha dominant person. Table 5.5 shows dairy products that can be consumed by various dosha dominant person. Table 5.6 shows cereals that can be consumed by various dosha dominant person. Table 5.7 shows oils that can be consumed by various dosha dominant person. Table 5.8 shows different teas that can be consumed by various dosha dominant person. Table 5.9 shows beverages that can be consumed by various dosha dominant person. Table 5.10 shows some miscellaneous foods that can be consumed by various dosha dominant person.

Table 5.1: Fruits beneficial for various prakriti. [8, 13-15, 21-35]

FRUITS	**VATA**	**PITTA**	**KAPHA**	**VATA - PITTA**	**VATA - KAPHA**	**PITTA - KAPHA**	**TRIDOSHA**
Mango	√	√		√	√	√	√
Apple		√	√		√	√	
Orange	√	√		√ (Sweet)			
Watermelon		√				√	
Muskmelon	√	√			√		
Sweet Lime (Mousambi)	√			√	√		√
Papaya	√				√		

Grapes		√		√			√ (Black)
Pomegranate (Anaar)		√	√	√	√	√	√
Banana	√						
Pineapple	√	√ (Sweet)		√			
Green Berry (Baer)		√		√		√	√
Fig (Anjeer)	√	√	√ (dry)	√	√		√
Black Plum (Jamun)			√			√	
Asian Pear (Nashpati / Babugosha)		√	√		√	√	
Peach (Aadu)	√				√	√	√
Lemon			√	√	√		√
Guava		√	√		√	√	
Dates (Khajoor)	√	√		√	√		
Coconut	√	√		√	√	√	√
Plum (Aalubukhara)	√	√		√ (Sweet)			
Custard Apple (Shareefa)	√	√	√ (Less)	√	√	√	√
Tangerines (Keenu)				√	√		
Faalsa		√	√				
Cherry			√		√	√	√
Lychee	√	√	√			√	

Apricot (Khubani)	√	√	√	√	√	√	√
Water Chestnut (Singarde)	√	√	√	√	√	√	√
Goose Berry (Amla)		√	√		√	√	√
Tamarind				√	√		√
Strawberries					√	√	√ (Sweet)
Indian Raspberry	√		√	√	√	√	√
Mulberry (Shehtoot)		√					
Sugarcane	√						
Kiwi	√						
Prunes				√		√	

Table 5.2: Vegetables beneficial for various prakriti. [8, 13-15, 21-25, 36-40]

VEGETABLES	**VATA**	**PITTA**	**KAPHA**	**VATA - PITTA**	**VATA - KAPHA**	**PITTA - KAPHA**	**TRIDOSHA**
Potato		√		√		√	√
Tomato	√						
Onion	√ (Cooked)		√		√ (Cooked)	√ (Cooked)	√ (Cooked)
Carrot			√	√	√	√	√
Raddish					√ (Cooked)		

Cucumber		√		√			
Armenian Cucumber (Kakdi)	√	√		√			
Ginger					√		
Garlic			√		√	√	
Coriander (Dhaniya)	√	√	√	√	√	√	√
Beet Root (Chakundar)			√		√		
Green Chilli			√				
Cabbage		√	√		√	√	
Cauliflower		√	√		√	√	√
Green Beans	√	√	√	√	√	√	√
Peas		√	√				
Bottle Gourd		√	√			√	
Bitter Gourd		√	√	√	√	√	
Plantain (Kacha Kela)						√	
Ash Gourd (Petha)	√	√	√	√	√	√	√
Eggplant (Brinjal / Begun)			√		√	√	
Bell Pepper (Capsicum / Shimlamirch)		√	√	√		√	
Broccoli		√	√	√	√	√	√

Sweet Corn			√		√	√	√ (Fresh)
Spinach (Palak)			√		√	√	√
Fenugreek (Meethi)	√						
Okra / Lady Finger (Bhindi)		√	√	√	√	√	√
Turnip (Shalgam)			√			√	
Sarson Saag			√	√	√	√	√
Taro Root (Arbi)				√			
Baby Corn			√		√	√	√ (Fresh)
Zucchini (Tori)	√			√			√
Tofu (Soya Paneer)	√						√
Soya Bean Nuggets		√		√		√	
Pumpkin	√			√		√	
Apple Gourd (Tinda)	√	√		√	√		√
Pointed Gourd (Permal)			√			√	
Sweet Potato (Shakarkandi)	√			√			√
Jackfruit (Kathal)	√	√	√	√	√	√	√

Lotus Stem (Bhen)					√	√	
Yam (Jimikand)		√					
Mushroom		√					
Kadhi	√	√		√	√		√
Sprouts		√	√		√	√	√

Table 5.3: Legumes beneficial for various prakriti. [8, 13-15]

LEGUMES	**VATA**	**PITTA**	**KAPHA**	**VATA - PITTA**	**VATA - KAPHA**	**PITTA - KAPHA**	**TRIDOSHA**
Split Peas (Chana Dal)		√	√		√	√	
Red Lentils (Masur Dal)			√		√		
Chick Pea (Kale Channe)		√	√		√	√	
Arhar Dal	√				√		
Black Lentils (Urad Dal)				√	√	√	√
Mung Dhuli Dal	√	√		√	√		
Mung Sabut Dal	√	√		√	√		√
Pinto beans (Chitra Rajma)		√	√		√	√	

Cow Peas (Safed Lobhia)		√			√	√	
Moth Dal		√	√		√	√	
Aduki Beans (Lal Lobhia)	√	√	√	√	√	√	√

Table 5.4: Condiments/ Spices beneficial for various prakriti. [8, 13-15, 25, 41]

SPICES	**VATA**	**PITTA**	**KAPHA**	**VATA - PITTA**	**VATA - KAPHA**	**PITTA - KAPHA**	**TRIDOSHA**
Dried Ginger (Sonth)	√		√		√		
Cumin (Jeera)	√	√	√	√	√	√	√
Garam Masala	√		√	√	√	√	√
Dry Coriander (Sookha Dhaniya)	√	√	√	√	√		√
Red Chilli	√		√				
Thyme (Ajwain)	√		√		√	√	
Cinnamon (dal-chini)	√		√		√	√	√
Cardamom (Elaichi)	√		√	√	√	√	√
Ginger					√		√ (Cooked)
Garlic			√		√	√	√ (Cooked)

Mint (Pudina)		√		√	√	√	√
Turmeric (Haldi)	√	√	√	√	√	√	√
Mustard Seeds (Sarson)	√		√	√	√	√	√
Saffron (Kesar)	√	√	√	√	√	√	√
Fenugreek Seeds (Methi Daana)					√		
Asafoetida (Hing)	√		√		√		
Inknut (Harhad)	√		√		√		
Pippali	√		√			√	
Rock Salt	√						
Oregano	√		√		√	√	
Dry Mango Powder (Amchoor)	√						
Fennel (Saunf)	√	√		√	√	√	√
Black Pepper (Kali Mirch)	√		√	√	√	√	√
Curry Leaf (Kadi Patta)	√	√			√	√	
Clove (Long)	√		√		√		
Basil (Tulsi)	√		√	√	√		
Olives	√						

Table 5.5: Dairy products beneficial for various prakriti. [8, 13-15, 25]

DAIRY PRODUCTS	VATA	PITTA	KAPHA	VATA - PITTA	VATA - KAPHA	PITTA - KAPHA	TRIDOSHA
Cow Milk	√	√		√		√	
Curd	√			√			
Ghee	√			√	√	√	
Cottage Cheese	√	√		√	√		
Sweet Lassi				√			
Salted Lassi						√	
Butter (Unsalted)		√		√			
Goat Milk				√	√	√ (Warmed)	
Soya Milk			√		√ (Warmed)		

Table 5.6: Cereals beneficial for various prakriti. [8, 13-15, 25]

CEREALS	VATA	PITTA	KAPHA	VATA - PITTA	VATA - KAPHA	PITTA - KAPHA	TRIDOSHA
Maize / Corn (Makkai)			√			√	
Basmati Rice	√	√		√	√	√	√
Wheat	√	√		√	√	√	√
Barley (Jaun)		√	√	√	√	√	√

Pearl Millet (Bajra)			√		√	√	√
Finger Millet (Ragi)			√		√	√	√
Oats (Vilayati Jaun)	√ (Cooked)	√		√ (Cooked)	√		√ (Cooked)

Table 5.7: Oils beneficial for various prakriti. [8, 13-15, 25]

OILS	**VATA**	**PITTA**	**KAPHA**	**VATA - PITTA**	**VATA - KAPHA**	**PITTA - KAPHA**	**TRIDOSHA**
Coconut Oil		√		√			
Olive Oil	√	√		√			
Seasame Oil	√			√			
Sunflower Oil	√	√		√	√	√	√

Table 5.8: Teas beneficial for various prakriti. [8, 13-15, 25]

TEAS	**VATA**	**PITTA**	**KAPHA**	**VATA - PITTA**	**VATA - KAPHA**	**PITTA - KAPHA**	**TRIDOSHA**
Ajwain Tea	√		√		√	√	
Fennel Tea	√			√	√	√	√
Ginger Tea	√		√ (dry)		√	√	
Basil Tea	√		√		√	√	

Cinnamon Tea	√		√		√	√	√
Clove Tea	√		√		√	√	√
Cardamom Tea				√		√	
Saffron Tea		√	√		√	√	√
Strawberry Tea						√	
Green Tea	√	√	√	√	√	√	√
Lemon Tea	√	√	√	√	√	√	√

Table 5.9: Beverages beneficial for various prakriti. [8, 13-15, 25, 42]

BEVERAGES	**VATA**	**PITTA**	**KAPHA**	**VATA - PITTA**	**VATA - KAPHA**	**PITTA - KAPHA**	**TRIDOSHA**
Coconut Water	√	√	√	√	√	√	√
Sugarcane Juice	√		√	√			
Hot Ginger Milk	√		√		√		
Hot Black Pepper Milk	√		√		√		
Hot Milk with Cardamom		√		√		√	
Carrot Juice	√		√		√	√	
Carrot – Ginger Juice					√	√	
Rose Water		√			√	√	

Aloe Vera Juice	√	√	√		√	√	√
Lemon Juice	√				√	√	
Orange Juice	√				√	√	
Almond Milk	√						
Mango Juice	√	√		√	√ (Unsweetened)		
Cherry Juice	√		√	√	√	√	
Grape Juice	√	√		√	√	√	
Apricot Juice	√	√	√	√	√	√	√
Apple Juice		√	√		√	√	

Table 5.10: Miscellaneous foods beneficial for various prakriti. [8, 13-15, 25]

MISCELLANEOUS FOODS	**VATA**	**PITTA**	**KAPHA**	**VATA - PITTA**	**VATA - KAPHA**	**PITTA - KAPHA**	**TRIDOSHA**
Poha	√	√ (Less Spicy)	√ (High Spices)	√	√	√	√
Upma (Cream of Wheat)	√	√ (Less Spicy)	√ (High Spices)	√	√	√	√
Honey (Raw & Uncooked)	√ (New Honey)	√ (New Honey)	√ (Old Honey)		√	√	√
Tomato Soup	√						
Mix Veg Soup	√	√	√	√	√	√	√

Jaggery (Gud)	√		√		√		√ (Old Jaggery)
Almonds	√						
Cashew	√		√		√		
Raisens		√	√	√	√	√	√
Peanuts	√						
Mint Chutney	√	√	√	√	√	√	√
Coconut Chutney	√	√		√		√	
Aam Ki Chutney	√	√		√			
Coriander Chutney	√	√	√	√	√	√	√
Mint Leaves					√	√	
Vegetable Pulao	√	√	√	√	√	√	√
Cauliflower & Green Peas Pulao	√	√	√	√	√	√	√
Carrot Raita	√	√		√			
Cucumber Raita	√	√		√			
Beet Root Raita	√	√	√	√	√	√	√
Pumpkin Raita	√	√	√	√	√	√	√
Cabbage Raita	√	√	√	√	√	√	√

Pineapple Raita		√					
Moong Dal Halwa	√	√	√	√	√	√	√
Mixed Vegetable Salad	√	√	√	√	√	√	√

5.3 SEASONS

A year is divided into four major seasons which are summer, autumn, winter and spring. Each of these seasons continues for approximately three months. Months of June, July and August belong to summer season. Months of September, October and November belong to autumn season. Months of December, January and February belongs to winter season. March, April and May belong to spring season. During each season, new crops are sown and ripped. The season in which a crop ripens and is sent to market, is the right season for consumption of that crop. In this work, it has been identified which fruits and vegetables are available during which season. These days, all fruits and vegetables are present round the year as they are kept in cold storages. This practice of consuming fruits and vegetables irrespective of seasons is not good for health.

Therefore after understanding the effect of food on each dosha, the work progresses towards season in which all fruits and vegetables are made available in market. In this way, any fruit is given in diet only if it is easily available for consumption during that season. Problems arising because of consuming out of season food is hence resolved. Table 5.11 shows seasons in which a given fruit can be consumed. Table 5.12 shows seasons in which a given vegetable can be consumed.

Table 5.11: Seasons of fruits [43-46]

FRUITS	**SUMMER**	**AUTUMN**	**WINTER**	**SPRING**
Mango	√			
Apple	√	√	√	√

Orange			√	
Watermelon	√			
Muskmelon	√			
Sweet Lime (Mousambi)	√	√	√	√
Papaya	√	√	√	√
Grapes				√
Pomegranate (Anaar)	√			
Banana	√	√	√	√
Pineapple		√		
Green Berry (Baer)			√	
Fig (Anjeer)			√	
Black Plum (Jamun)	√			
Asian Pear (Nashpati / Babugosha)	√			
Peach (Aadu)	√			
Lemon	√			
Guava			√	
Dates (Khajoor)			√	
Coconut	√	√	√	√
Plum (Aalubukhara)	√			
Custard Apple (Shareefa)			√	
Tangerines (Keenu)			√	
Faalsa	√			
Cherry	√			
Litchi	√			

Apricot (Khubani)			√	
Water Chestnut (Singarde)				√
Goose Berry (Amla)			√	
Tamarind	√			
Strawberries	√			
Indian Raspberry	√			
Mulberry (Shehtoot)	√			
Sugarcane			√	
Kiwi			√	
Prunes	√	√	√	√

Table 5.12: Seasons of vegetables [43-46]

VEGETABLES	**SUMMER**	**AUTUMN**	**WINTER**	**SPRING**
Potato	√	√	√	√
Tomato	√	√	√	√
Onion	√	√	√	√
Carrot			√	
Raddish			√	
Cucumber	√			
Armenian Cucumber (Kakdi)	√			
Ginger			√	
Garlic	√			
Coriander (Dhaniya)	√	√	√	√

Beet Root (Chakundar)			√	
Green Chilli			√	
Cabbage			√	
Cauliflower			√	
Green Beans				√
Peas			√	
Bottle Gourd	√			
Bitter Gourd	√			
Plantain (Kacha Kela)	√			
Ash Gourd (Petha)		√		
Eggplant (Brinjal / Begun)	√	√	√	√
Bell Pepper (Capsicum / Shimlamirch)			√	
Broccoli			√	
Sweet Corn	√			
Spinach (Palak)		√		
Fenugreek (Meethi)			√	
Okra / Lady Finger (Bhindi)				√
Turnip (Shalgam)			√	
Sarson Saag			√	
Taro Root (Arbi)	√			
Baby Corn		√		
Zucchini (Tori)	√			
Pumpkin				√
Apple Gourd (Tinda)	√			

Pointed Gourd (Permal)	√			
Sweet Potato (Shakarkandi)			√	
Jackfruit (Kathal)		√		
Lotus Stem (Bhen)	√			
Yam (Jimikand)	√			
Mushroom		√		

5.4 BODY MASS INDEX (BMI)

Weight measurement is not a method used to identify if a person is overweight or normal weight or underweight. Height of the person also needs to be considered. Therefore BMI is taken as measure for the same. BMI is defined as

$$BMI = \frac{mass_{(in\ kgs)}}{height^2_{(in\ meters)}}$$

BMI value is calculated with the help of above mentioned formula. The calculated value needs to be compared with some set standard values to classify between weight categories. Table 5.13 depicts the BMI ranges and respective category. [47]

Table 5.13: BMI ranges [47]

BMI ranges	**CATEGORY**
<18.5	Underweight
Between 18.5 & 25	Normal weight
>25	Overweight

This work targets on balancing of doshas for a healthy living. Along with tridosha, number of calorie intake is also taken care of. A calculated set of calorie intake can manage the weight of any

person easily. Therefore the system is a complete healthcare management system. To provide a calculated set of diet, the initial need is to identify the daily calorie requirements of a person. Table 5.14 shows the daily calorie requirements of a person according to weight category.

Table 5.14: Calorie requirements for various BMI ranges

BMI	**CALORIES / DAY**
Overweight	1500
Normal weight	2000
Under weight	2500

Total calorie needs have been identified. Now to provide these calories in diet chart, it is required to know the calories present in each food that is to be consumed. Calories are calculated for 100g solid foods and 100ml for liquids for each food which is available for consumption in daily life. Table 5.15 shows calorie count for different fruits. Table 5.16 shows calorie count for different vegetables. Table 5.17 shows calorie count for different sabzi combinations. Table 5.18 shows calorie count for different legumes. Table 5.19 shows calorie count for different dairy products. Table 5.20 shows calorie count for different cooking oils. Table 5.21 shows calorie count for different beverages. Table 5.22 shows calorie count for different miscellaneous food items.

Table 5.15: Calories present in fruits [48-57]

FRUITS (per 100g)	**CALORIES**
Mango	60
Apple	52
Orange	47
Watermelon	30
Muskmelon	34
Sweet Lime (Mousambi)	30

Papaya	39
Grapes	67
Pomegranate (Anaar)	83
Banana	89
Pineapple	50
Green Berry (Baer)	80
Fig (Anjeer)	74
Black Plum (Jamun)	62
Asian Pear (Nashpati / Babugosha)	42
Peach (Aadu)	39
Lemon	29
Guava	68
Dates (Khajoor)	277
Coconut	354
Plum (Aalubukhara)	46
Custard Apple (Shareefa)	101
Tangerines (Keenu)	53
Faalsa	72
Cherry	63
Lychee	66
Apricot (Khubani)	48
Water Chestnut (Singarde)	97
Goose Berry (Amla)	44
Tamarind	239

Strawberries	32
Indian Raspberry	52
Mulberry (Shehtoot)	43
Kiwi	61
Prunes	275

Table 5.16: Calories present in vegetables [48-55, 58-61]

VEGETABLES (per 100g)	**CALORIES**
Potato (Raw)	77
Potato (Cooked)	86
Tomato (Raw / Cooked)	18
Onion (Raw)	42
Onion (Cooked)	44
Carrot (Raw)	41
Carrot (Cooked)	35
Raddish (Cooked)	17
Cucumber (Raw)	12
Armenian Cucumber (Kakdi) (Raw)	12
Ginger (Raw)	80
Garlic (Raw)	149
Coriander (Dhaniya) (Raw)	23
Beet Root (Chakundar) (Raw)	43
Beet Root (Chakundar) (Cooked)	44

Green Chilli (Raw)	40
Cabbage (Cooked)	22
Cauliflower (Cooked)	23
Cauliflower (Raw)	25
Green Beans (Cooked)	35
Peas (Cooked)	84
Bottle Gourd (Cooked)	14
Bitter Gourd (Cooked)	19
Plantain (Kacha Kela) (Cooked)	116
Ash Gourd (Petha) (Cooked)	10
Eggplant (Brinjal / Begun) (Cooked)	35
Bell Pepper (Capsicum / Shimlamirch) (Cooked)	28
Broccoli (Cooked)	35
Sweet Corn (Cooked)	86
Spinach (Palak) (Cooked)	23
Okra / Lady Finger (Bhindi) (Cooked)	31
Turnip (Shalgam) (Cooked)	22
Sarson Saag (Cooked)	15
Taro Root (Arbi) (Cooked)	112
Baby Corn (Cooked)	26
Zucchini (Tori) (Cooked)	29
Tofu (Soya Paneer) (Raw)	76
Soya Bean Nuggets (Cooked)	333
Pumpkin (Cooked)	20

Apple Gourd (Tinda) (Cooked)	66
Pointed Gourd (Permal) (Cooked)	20
Sweet Potato (Shakarkandi) (Steamed)	34
Jackfruit (Kathal) (Cooked)	88
Lotus Stem (Bhen) (Cooked)	70
Yam (Jimikand) (Cooked)	116
Mushroom (Cooked)	22
Kadhi	88
Sprouts (Boiled)	21

Table 5.17: Calories present in sabzi combos. [48-55, 62-79]

SABZI COMBOS (100g)	**CALORIES**
Cauliflower-Potato	71
Beans-Potato	134
Peas-Cauliflower-Carrot	58
Peas-Paneer	147
Bittergourd-Potato	40
Brinjal-Potato	103
Capsicum-Potato	93
Capsicum-Paneer	63
Peas-Cauliflower-Carrot-Sweet Corn	95
Spinach-Paneer	139
Spinach-Chole	59

Spinach-Sweet Corn	70
Mushroom-Peas	88
Fenugreek-Potato	121
Lotus Stem-Peas	88
Tomato-Onion	37
Peas-Potato-Carrot	106
Soya chunks-Peas	413
Scrambled Tofu	71
Shahi Paneer	152
Stuffed Bitter Gourd	180
Lady Finger as Bhindi Masala	112
Lady Finger as Bhindi do pyaza	54
Mixed Vegetables	132

Table 5.18: Calories present in legumes [48-55, 80-82]

LEGUMES (per 100g)	**CALORIES**
Split Peas (Chana Dal) (Cooked)	118
Red Lentils (Masur Dal) (Cooked)	116
Chick Pea (Kale Channe) (Cooked)	164
Arhar Dal (Cooked)	144
Black Lentils (Urad Dal) (Cooked)	116
Mung Dhuli Dal (Cooked)	105
Mung Sabut Dal (Cooked)	105

Pinto beans (Chitra Rajma) (Cooked)	143
Cow Peas (Safed Lobhia) (Cooked)	116
Moth Dal (Cooked)	85
Aduki Beans (Lal Lobhia) (Cooked)	128

Table 5.19: Calories present in dairy products [48-55]

DAIRY PRODUCTS	**CALORIES**
Cow Milk (100ml)	62
Curd (100g)	61
Ghee (100g)	900
Cottage Cheese (100g)	103
Sweet Lassi (100ml)	68
Salted Lassi (100ml)	68
Butter (Unsalted) (100g)	717
Goat Milk (100ml)	71
Soya Milk (100ml)	46

Table 5.20: Calories present in oils [48-55]

OILS (per 10ml)	**CALORIES**
Coconut Oil	86
Olive Oil	81
Seasame Oil	88
Sunflower Oil	88

Table 5.21: Calories present in beverages [48-55, 83-88]

BEVERAGES (per 100ml)	**CALORIES**
Coconut Water	19
Tea	44
Sugarcane Juice	818
Hot Ginger Milk	62
Hot Black Pepper Milk	62
Hot Milk with Cardamom	62
Carrot Juice	21
Carrot – Ginger Juice	40
Rose Water	0
Aloe Vera Juice	53
Lemon Juice	26
Orange Juice	47
Almond Milk	25
Mango Juice	75
Cherry Juice	54
Grape Juice	60
Apricot Juice	40
Apple Juice	49

Table 5.22: Calories present in miscellaneous food items [48-55, 89-108]

MISCELLANEOUS FOODS	**CALORIES**
Medium Roti (9.5g)	68
Marie Biscuit (1 quantity)	28
Nutri Choice Biscuit (1 quantity)	30
White Bread (1 quantity)	24
Atta Bread (1 quantity)	78
Atta Bread (without crust) (1 quantity)	31
Milk Cornflakes (100g)	100
Museli (100g)	340
Idli (1 quantity) (8.25g)	39
Masala Dosa (1 quantity) (39g)	208
Sambhar (100ml)	120
Dhokla (100g)	160
Besan Pooda (1 quantity) (30g)	24
Poha (100g)	110
Upma (Cream of Wheat) (100g)	62
Daliya Kheer (Wheat flakes) (100g)	99
Honey (Raw & Uncooked) (100g)	304
Tomato Soup (100ml)	42
Mix Veg Soup (100ml)	290
Jaggery (Gud) (100g)	583
Almonds (100g)	578
Cashew (100g)	553

Raisens (100g)	299
Peanuts (100g)	567
Mint Chutney (10g)	9
Coconut Chutney (10g)	60
Aam Ki Chutney (10g)	10
Coriander Chutney (10g)	33
Mint Leaves (100g)	20
Vegetable Pulao (100g)	119
Cauliflower & Green Peas Pulao (100g)	137
Carrot Raita (100g)	68
Cucumber Raita (100g)	48
Beet Root Raita (100g)	54
Pumpkin Raita (100g)	58
Cabbage Raita (100g)	28
Pineapple Raita (100g)	53
Moong Dal Halwa (100g)	512
Mixed Vegetable Salad (100g)	16
Tomato Ketchup (10g)	10

5.5 MEAL TIME

Accurate timing of food is one important point to be kept in mind along with proper food. If a person does no eat food at approximately same time everyday, then also doshas might get disturbed.

Table 5.23: Meal Timings

Meals	Timings
Early morning tea	7-7:30 a.m
Breakfast	9-9:30 a.m
Afternoon snacks	11:30-12 noon
Lunch	2-2:30 p.m
Evening snacks	4:30-5 p.m
Dinner	7:30-8 p.m

The entire work on proper food would be of no advantage if the food is not taken according to proper timings. The best standard meal timings have been mentioned in table 5.23.

5.6 DIET CHARTS

Diet chart is a collection of diets to be given to a person for one complete week. Calories have been given according to BMI. Fruits and vegetables have been selected according to the ongoing season. Foods are selected according to dominant dosha to balance the same. Each combination is prepared according to the prakriti, BMI and season. Some of the diet charts prepared are shown in chapter 7, results and discussions.

CHAPTER 6

SYSTEM DESIGNING AND LABVIEW RESULTS

6.1 INTRODUCTION TO LABVIEW

LabVIEW stands for laboratory virtual instrument engineering workbench. It is a highly advanced software of instrumentation, by National Instruments. LabVIEW is a development environment for problem solving. It is ideal for any measurement or control system. It is a visual graphical dataflow programming language. Execution is determined by the structure of a graphical block diagram where the programmer connects different nodes by drawing wires. Variables are propagated through these wires and execution takes place as soon as all inputs are available. It also facilitates parallel execution hence making it multiprocessing software. [109]

There are three components in LabVIEW which are front panel, block diagram and connector pane. Front panel is the GUI interface for the communication of users. All inputs and outputs are present on front panel. Blocks corresponding to each input output appears on the block diagram respectively. Each of the blocks are connected through wires for execution. Front panel defines the inputs and outputs for the given node through the connector pane. The work has been done in the latest version 2013 which is 32 bit.

6.2 LABVIEW COMPONENTS

There are many functions and blocks in LabVIEW that can be used to design the desired application. Various inputs and outputs have been used to design this high end application. Some of the functions used in this work are explained in detail.

6.2.1 CASE STRUCTURE

Case structure is a set of conditional logic like switch case in sequential programming. There can be many cases. But when it is used with true false logic, there can be just two cases.

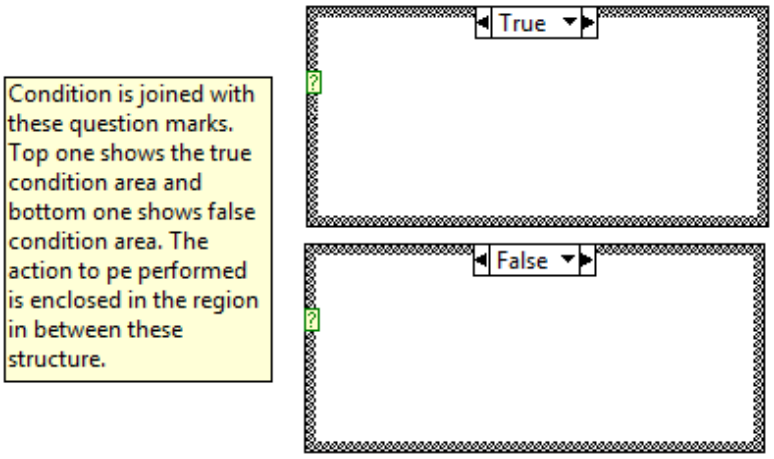


Figure 6.1: True/False conditions of case structure

Condition is to be provided to both cases otherwise the structure would not work. Figure 6.1 shows both cases of a true/false case structure.

6.2.2 BOOLEAN CONTROL & INDICATOR

Boolean means 0-1 logic i.e. just two logical states are possible. It can be either true or false. If it is true, then it appears in green colour in this work.

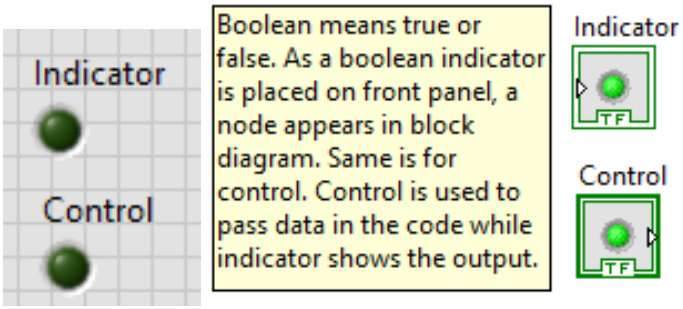


Figure 6.2: Boolean indicator & control

It has been used as an indicator as well as a control. Figure 6.2 shows boolean indicator and control on front panel as well as block diagram respectively.

6.2.3 IN RANGE & COERCE

In range and coerce is a block which is used to compare a given value with an upper as well as lower limit simultaneously. It takes two bounds for comparison.

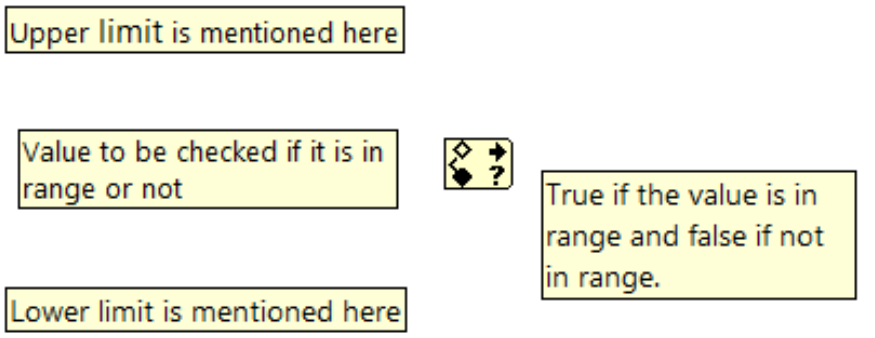


Figure 6.3: Working of in range & coerce block.

It compares the value with both of them and gives the output if it lies in the range. Figure 6.3 shows the working of block in range and coerce.

6.2.4 COMPARATORS

Comparators, as the name suggests, is used to compare a given value with a choosen value. Greater than, less than, equal to and their combinations can be used to compare according to the need.

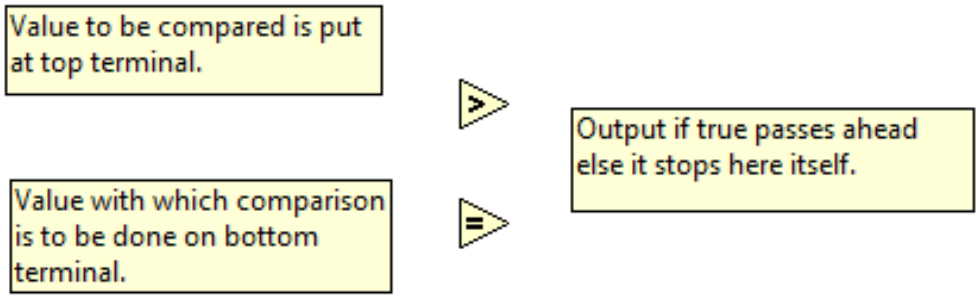


Figure 6.4: Greater than and equal to comparators

Almost all types of comparators have been used in this work. Figure 6.4 shows greater than and equal to comparators.

6.2.5 SUB VI

SubVI is similar to subroutine. It is used to for a small program which needs to be called again and again. Its code is not shown in the main application. The work performed can be seen by double clicking the subVI icon to see its front panel and block diagram.

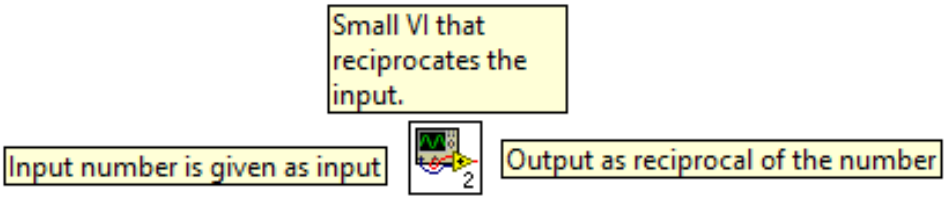


Fig. 6.5: Example of subVI to reciprocate a number.

SubVI can be for any purpose and can have multiple input and output. This subVI icon appears on the block diagram. Figure 6.5 shows an example of subVI used to reciprocate a number.

6.2.6 LOGIC GATES

Logic gates are the digital logic gates that work on 'on and off' logic. And, or, not, nand, nor, xor and xnor are various logic gates which are used according to the need of the code.

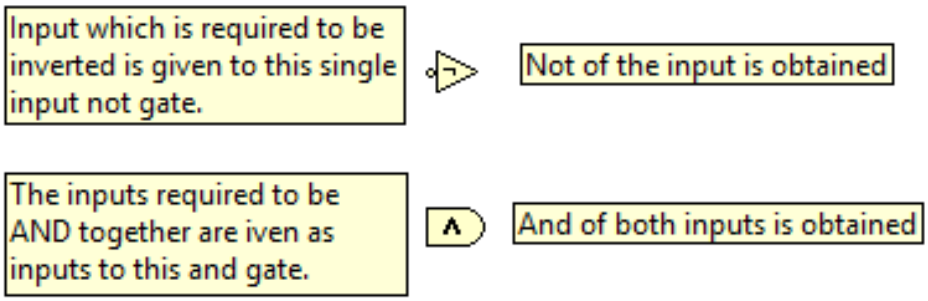


Figure 6.6: Not & and logic gates

Multiple gates are used to design complicated conditions used in this work. Block diagram view of the logic gates of not & and is shown in figure 6.6.

6.2.7 PATHS

Path means the address source of any file. Complete address is preferably mentioned. Path indicator, control or constant can be used.

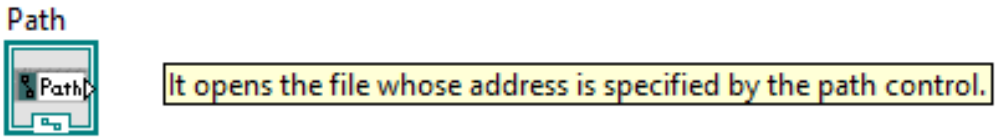


Figure 6.7: Path control to provide address input

Path can be written or chosen with 'open' icon present on the path control of the front panel. Figure 6.7 shows a path control where the address is given to the code for use.

6.2.8 MATHEMATICAL OPERATORS

Mathematical operators means the blocks which are used to perform small mathematical operations, like addition, subtraction, multiplication, division and some others, on the input numbers.

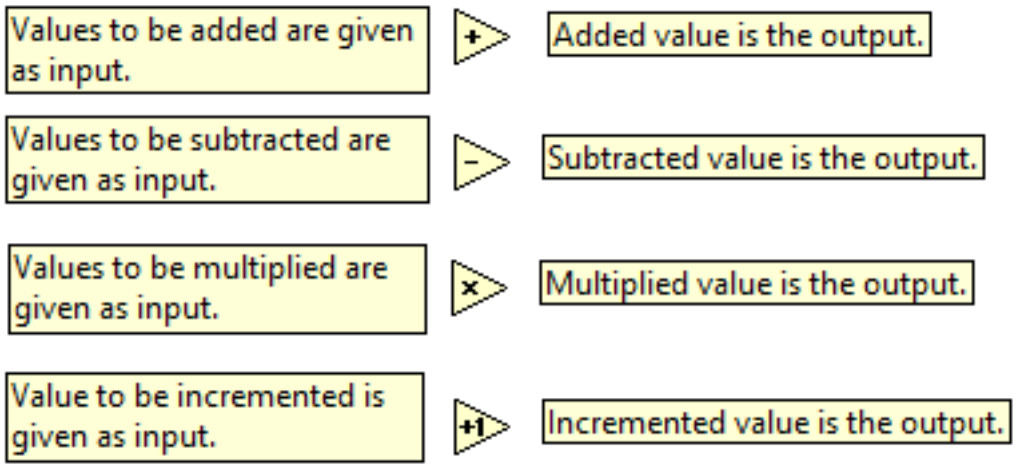


Figure 6.8: Some mathematical operators

All calculations require the use of these mathematical operators. Figure 6.8 shows some mathematical operators on the block diagram.

6.3 PROCEDURE TO DESIGN VI BASED SYSTEM:

1. Local variables are taken for three main variables used. The three local variables used are vata, pitta and kapha.
2. Initially they are assigned with value 0.
3. Then with selection of each input by user, their values get modified.
4. Numerical indicator is used for weight and height.
5. Weight is an important input and must be answered in kilograms.

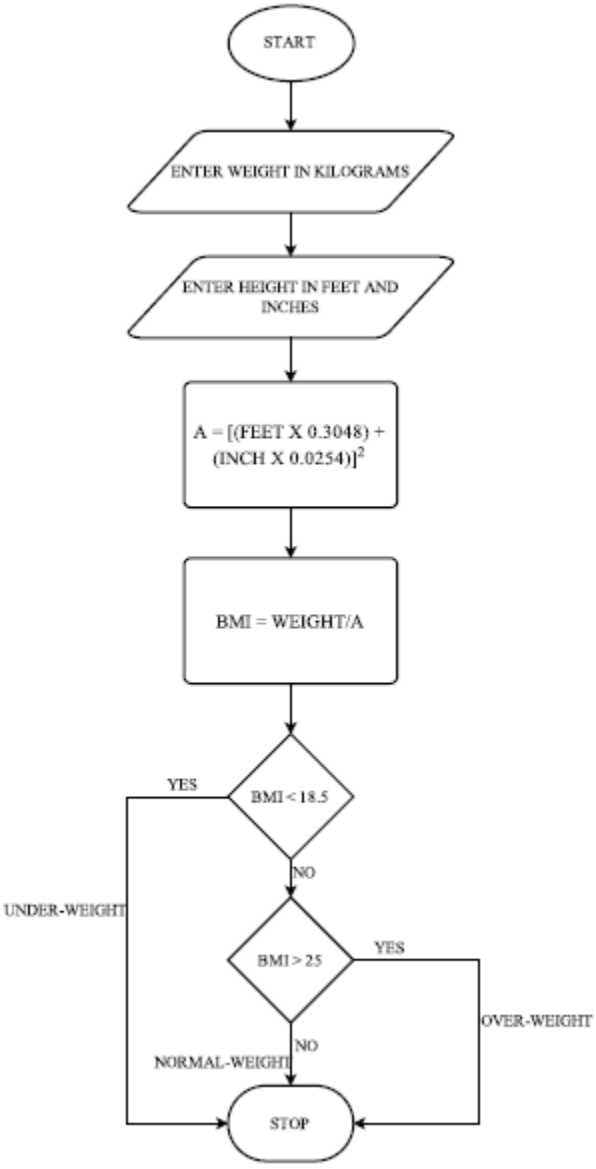


Figure 6.9: Flowchart for BMI calculation and weight classification

6. Height is to be answered in terms of feet and inches, as most of people do not know the exact height in centimeters.
7. With the help of weight and height, BMI is calculated.
8. Numerical indicator is present to show the calculated value of BMI.
9. Then according to the BMI obtained, boolean indicators of weight categories lighten up. Figure 6.9 shows the flow chart to calculate BMI and its classification.

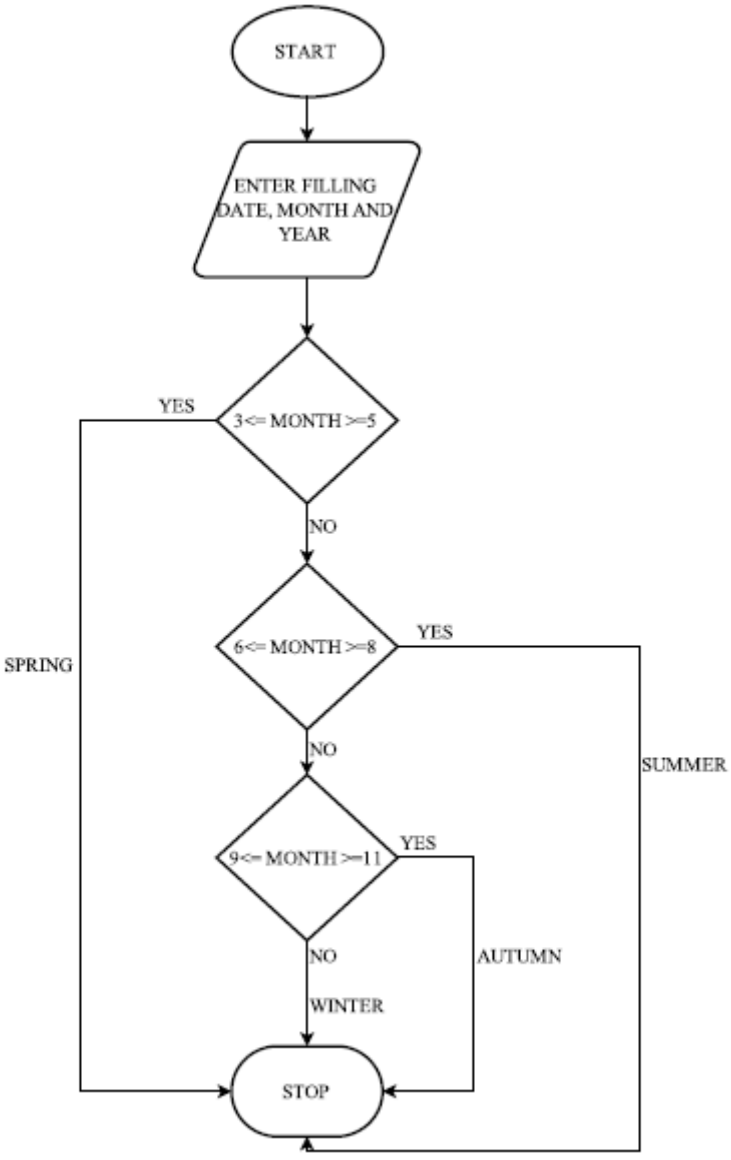


Figure 6.10: Flowchart to determine season from months

10. Date of filling this questionnaire is another input. This date is primarily used to determine the ongoing season. The diet which is to be provided must have foods according to the present season. Figure 6.10 shows the flow chart to calculate season from month.

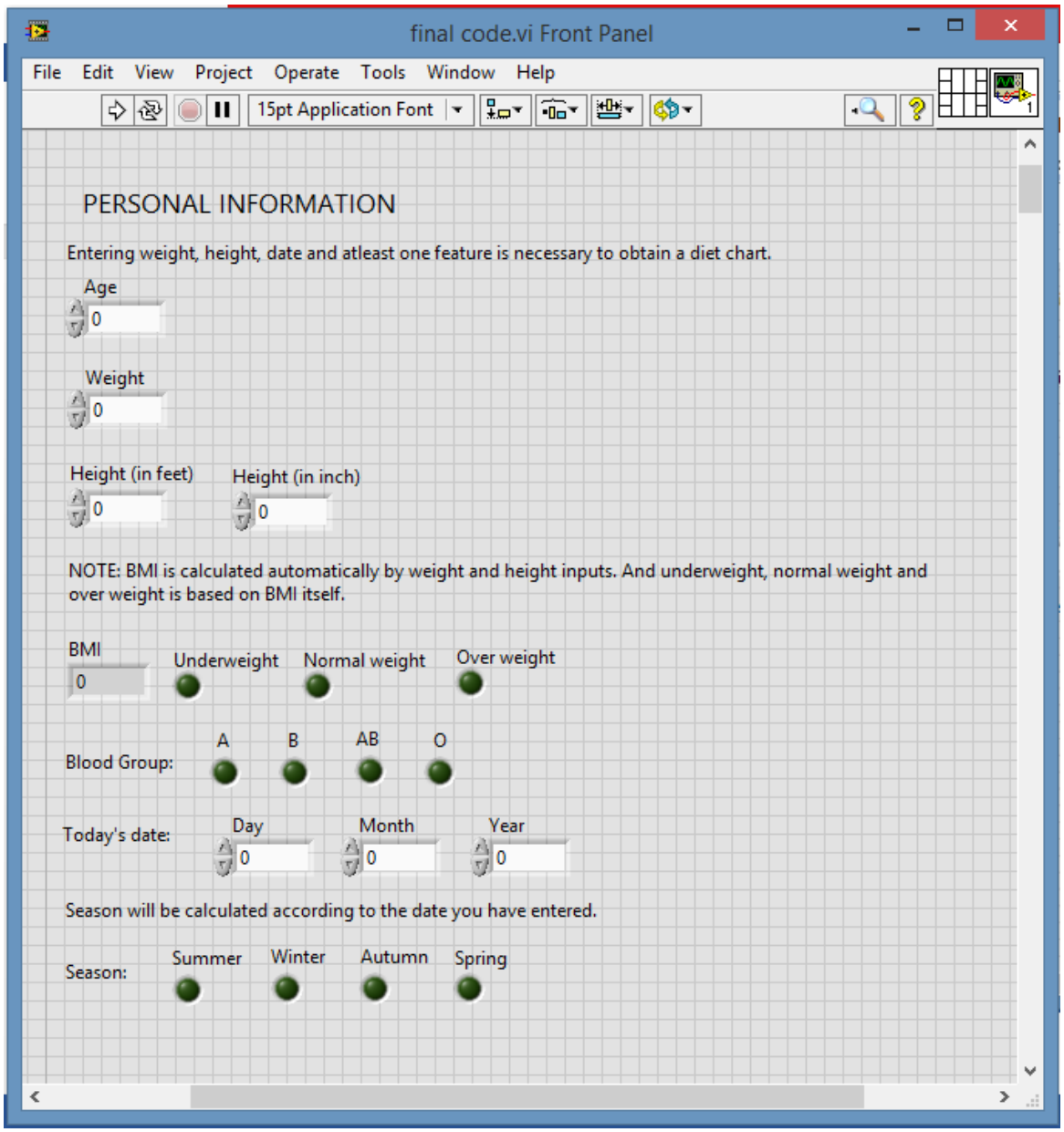


Figure 6.11: Blank questionnaire beginning

11. Height, weight and date of filling the questionnaire are minimum conditions to obtain any diet chart i.e. if any of these fields is left blank, results of vata, pitta and kapha would appear but no diet chart would be generated.

12. Figure 6.11 shows the beginning of a blank questionnaire on LabVIEW front panel and figure 6.12 shows the filled questionnaire of the beginning question set.

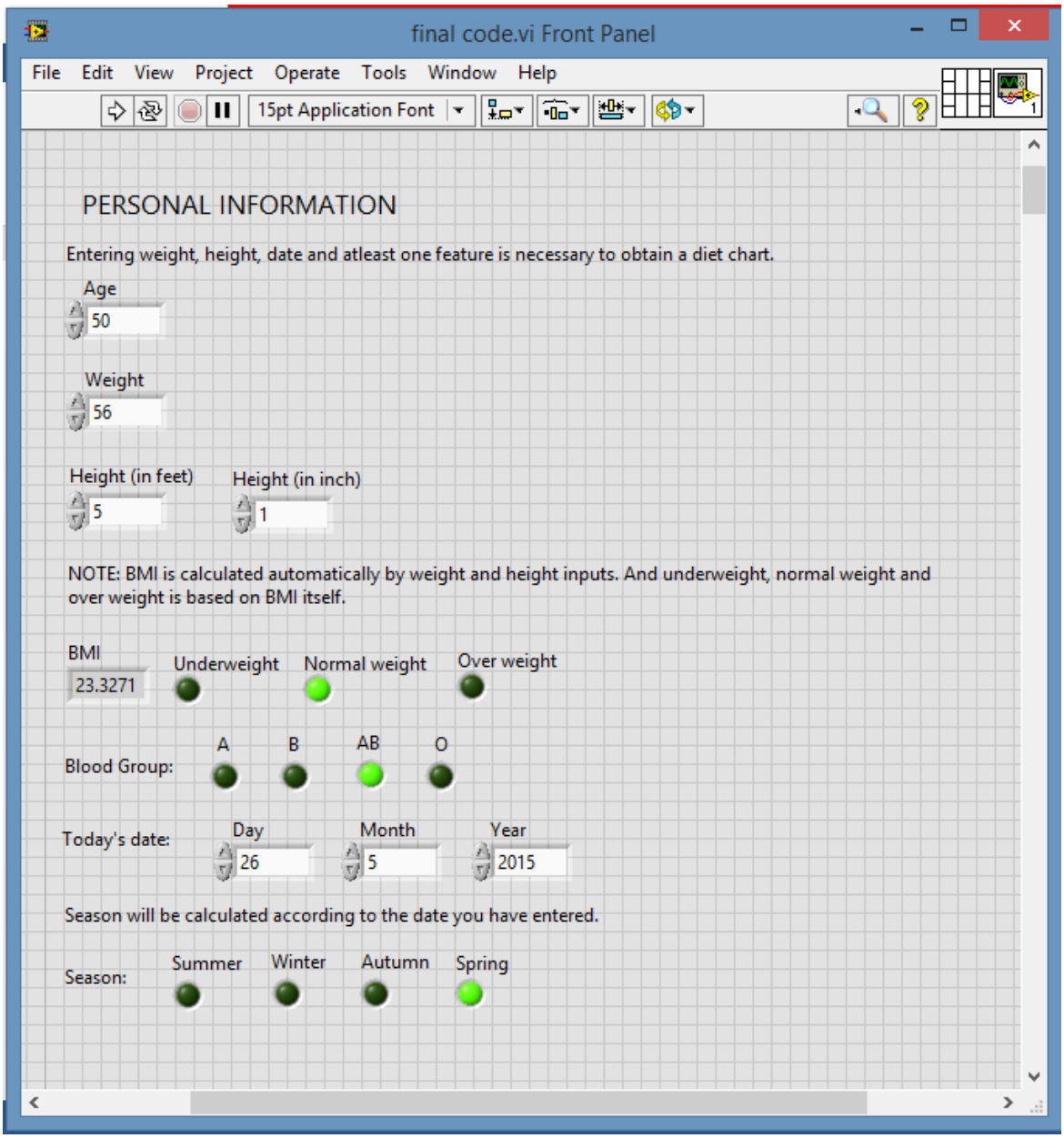


Figure 6.12: Filled questionnaire beginning

13. Various physical and physiological features have been mentioned in the form of a list. Figure 6.13 to 6.16 show various sections of filling the questionnaire. Figure 6.13 shows the filling of physical features. Figure 6.14 shows the filling of initial physiological

features. Figure 6.15 shows the continuation of filling of physiological features. Figure 6.16 shows a fully filled questionnaire.

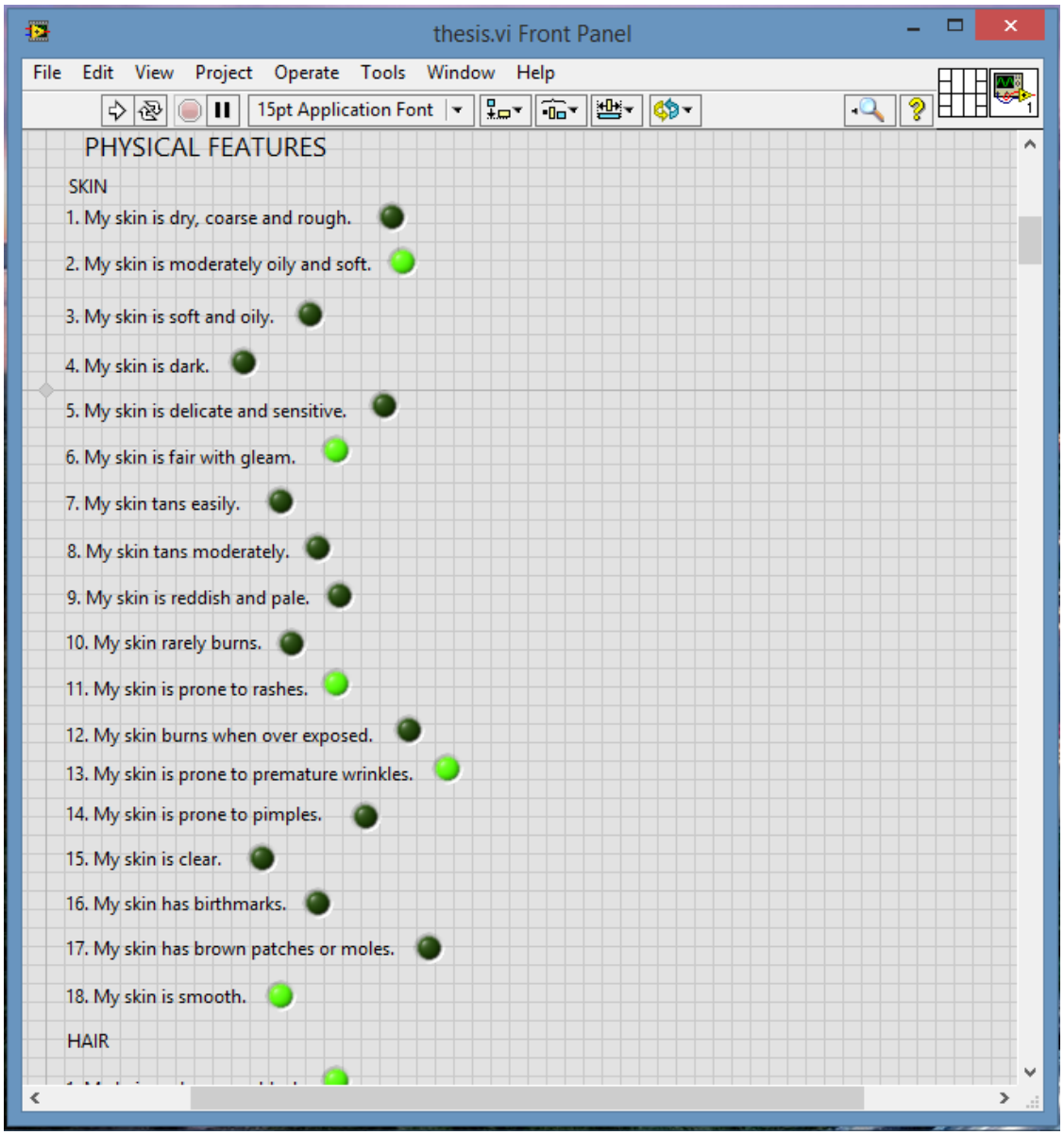


Figure 6.13: Filling of physical features

14. All the points which are the most closely applicable to the person are to be marked. Usually one out of every consecutive three options would be applicable.

15. There is a boolean control present in front of each option which is to be selected to indicate true value i.e. it must turn to green colour.

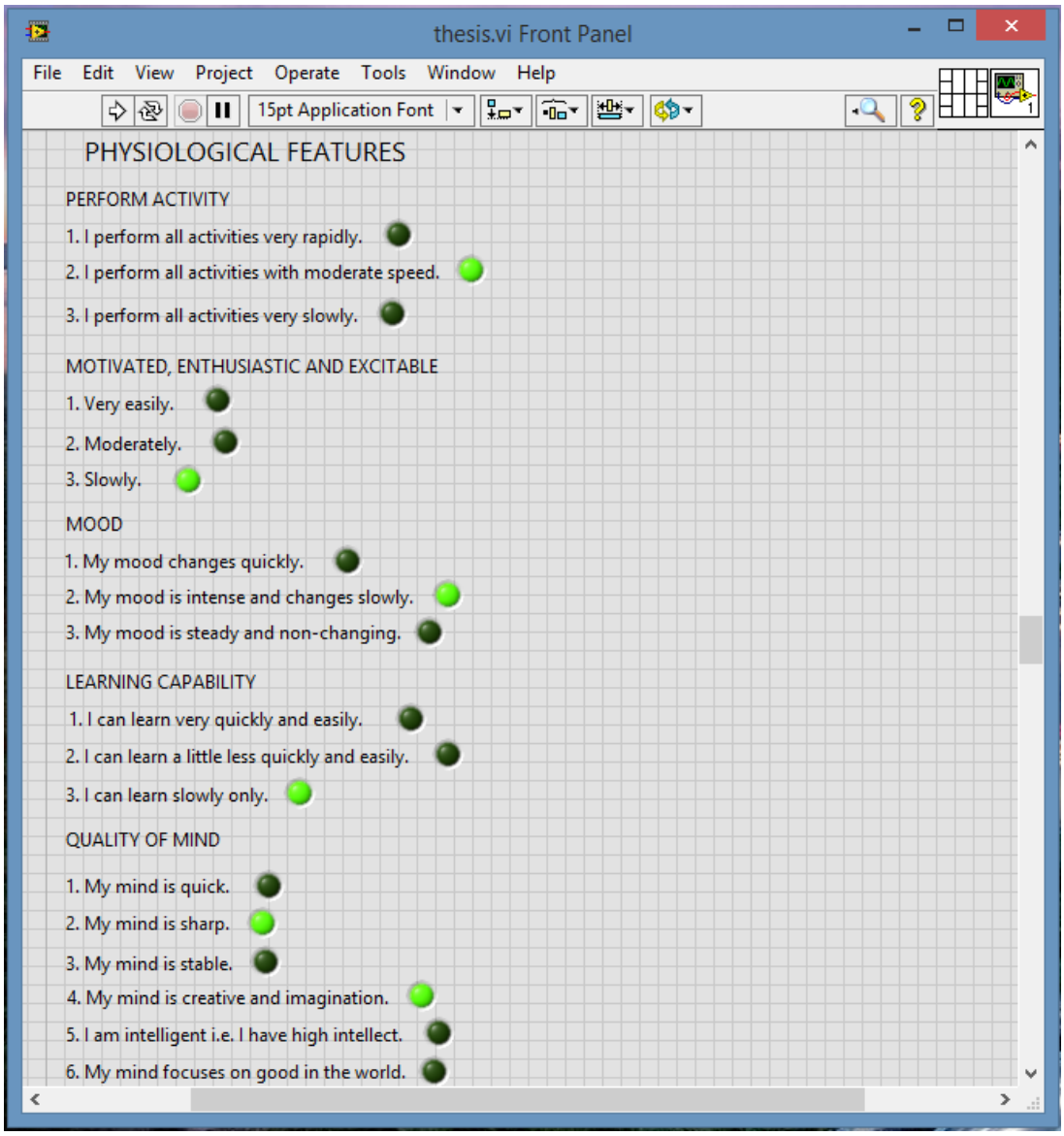


Figure 6.14: Filling of initial physiological features

16. More the questions answered, better is the accuracy. Though the system is designed in such a manner that it gives output diet chart even with one feature as input. But the prakriti must be judged by the maximum number of questions to get precise results.

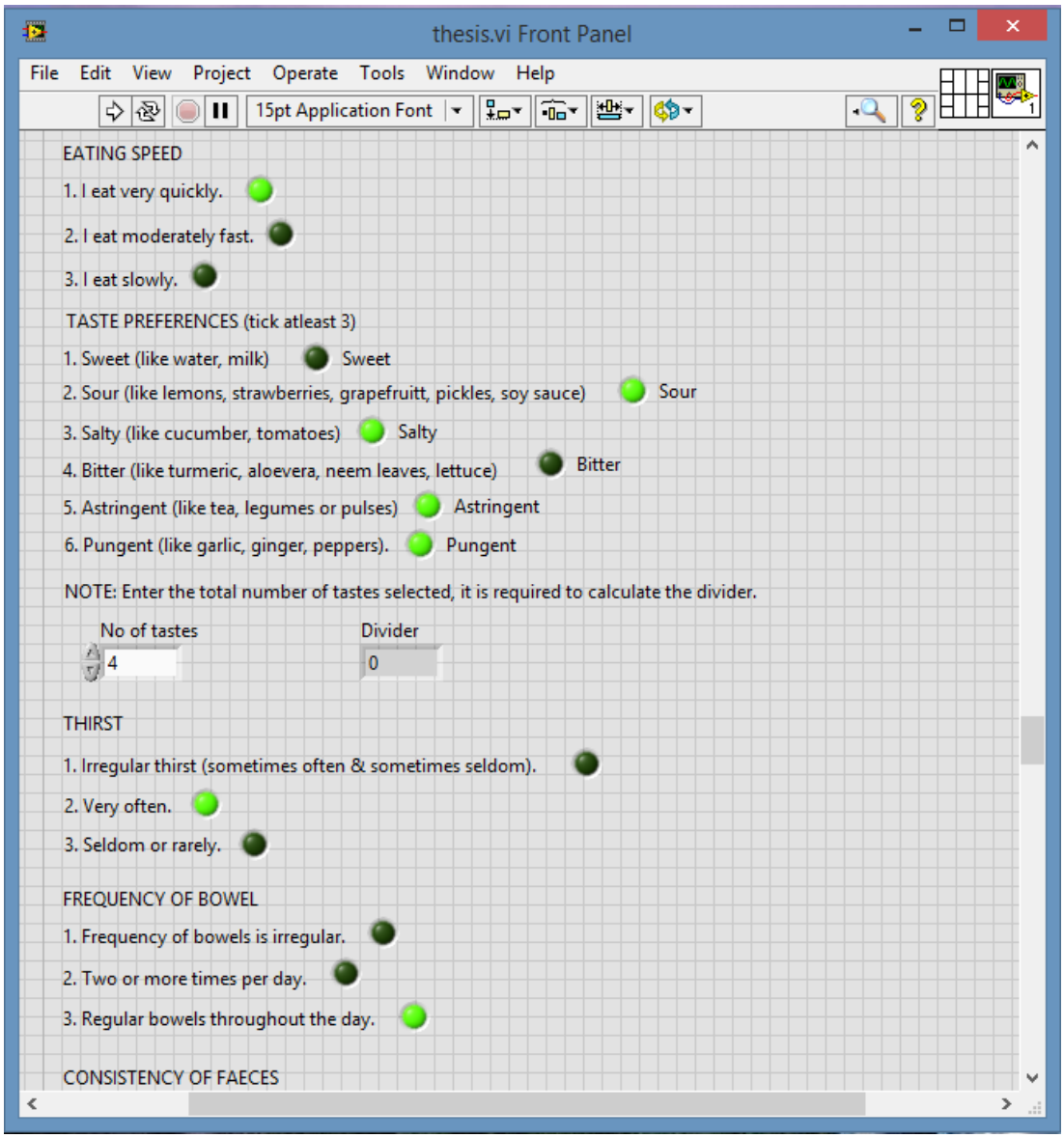


Figure 6.15: Continuation of filling of physiological features

17. All the applicable questions have been answered and values of vata, pitta and kapha are obtained.

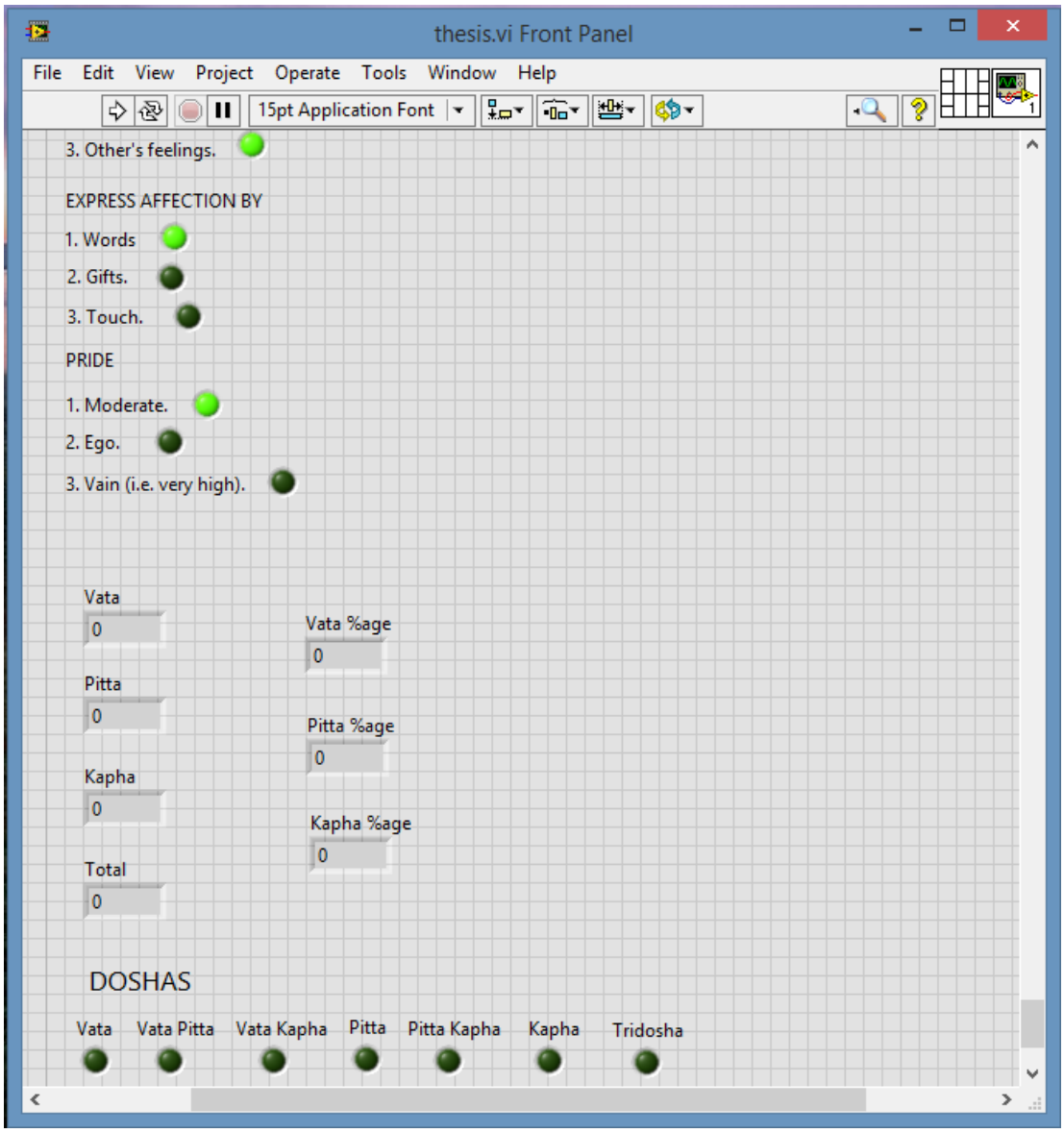


Figure 6.16: Questionnaire fully filled

18. Total number of questions answered or features marked are obtained.
19. Percentages of vata dosha, pitta dosha and kapha dosha is calculated respectively.
20. To identify the increase in any of this dosha, it is required to be compared with standard value.

21. If percentage of one dosha is more than the standard value and rest two have percentages less than standard value, then the person has that one dosha dominant prakriti.
22. If percentage of two doshas are more than the standard value and third one has percentage less than standard value, then the person has those two dosha dominant prakriti.

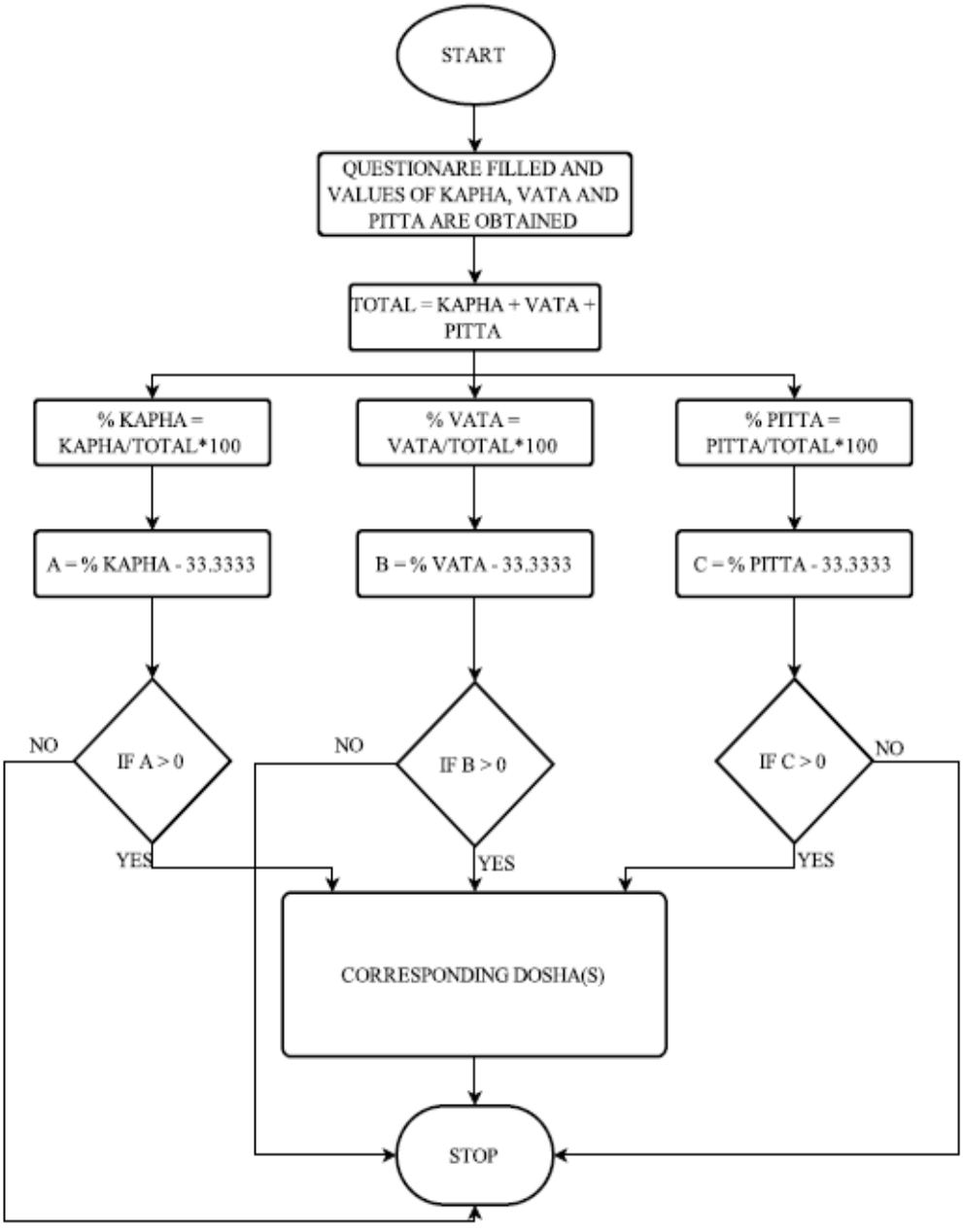


Figure 6.17: Flowchart of calculation of dosha

23. Figure 6.17 shows the flowchart of the method of calculation of dosha. Figure 6.18 shows the detection of dosha that takes place on execution as seen on LabVIEW front panel.

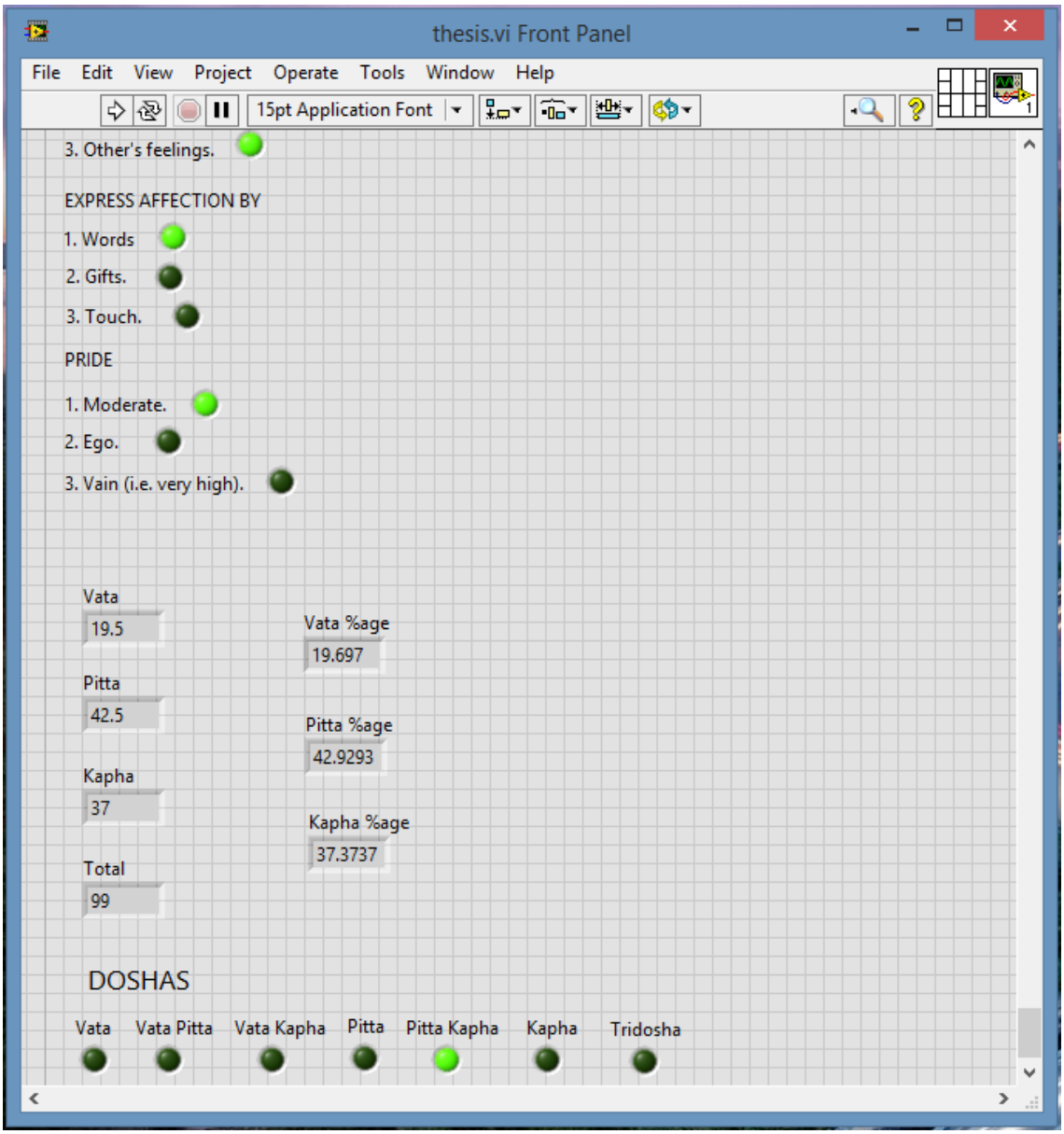
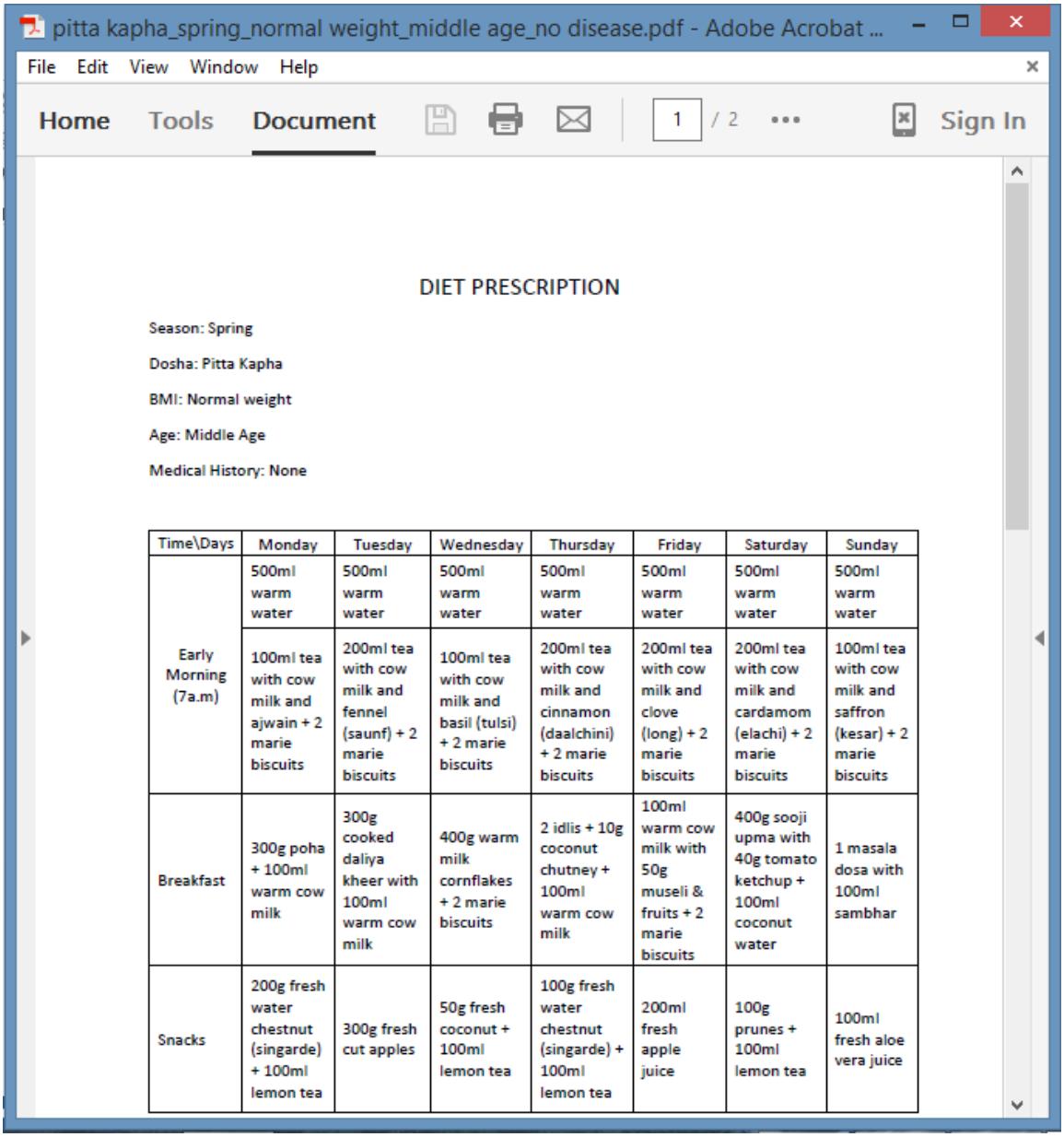


Figure 6.18: Dosha detected

24. If prakriti is identified along with season and BMI values, one of their combinations gets a true value.
25. Path of the desired diet chart is present in the code which holds true value.



Time\Days	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Early Morning (7a.m)	500ml warm water	500ml warm water	500ml warm water	500ml warm water	500ml warm water	500ml warm water	500ml warm water
	100ml tea with cow milk and ajwain + 2 marie biscuits	200ml tea with cow milk and fennel (saunf) + 2 marie biscuits	100ml tea with cow milk and basil (tulsi) + 2 marie biscuits	200ml tea with cow milk and cinnamon (daalchini) + 2 marie biscuits	200ml tea with cow milk and clove (long) + 2 marie biscuits	200ml tea with cow milk and cardamom (elachi) + 2 marie biscuits	100ml tea with cow milk and saffron (kesar) + 2 marie biscuits
Breakfast	300g poha + 100ml warm cow milk	300g cooked daliya kheer with 100ml warm cow milk	400g warm milk cornflakes + 2 marie biscuits	2 idlis + 10g coconut chutney + 100ml warm cow milk	100ml warm cow milk with 50g museli & fruits + 2 marie biscuits	400g sooji upma with 40g tomato ketchup + 100ml coconut water	1 masala dosa with 100ml sambhar
Snacks	200g fresh water chestnut (singarde) + 100ml lemon tea	300g fresh cut apples	50g fresh coconut + 100ml lemon tea	100g fresh water chestnut (singarde) + 100ml lemon tea	200ml fresh apple juice	100g prunes + 100ml lemon tea	100ml fresh aloe vera juice

Figure 6.19: Diet chart pdf on execution

26. Path is given to a subVI to open the pdf format of diet chart.

27. Figure 6.19 shows the diet chart pdf as it appears on execution.

CHAPTER 7

RESULTS AND DISCUSSIONS

7.1 DATA COLLECTION & EVALUATION

The hardcopy of questionnaire was used for the collection of data from people. The data in hardcopy is implemented on LabVIEW application. Results and calculations have been done by the system itself. Table 7.1 shows the dosha percentage values, season as well as BMI.

Table 7.1: Result sheet showing dosha percentage, season and BMI

S No.	BMI	Season	Vata	Pitta	Kapha	Total Ques	Vata %age	Pitta %age	Kapha %age	Dosha
1	19.3549	Spring	9.3333	45.6667	51	104	8.01282	43.9103	48.0769	Pitta Kapha
2	27.2461	Winter	26.5	37.5	38	102	25.9804	36.7647	37.2549	Pitta Kapha
3	18.1641	Winter	29	47.5	28.5	105	27.619	45.2381	27.1429	Pitta
4	20.5444	Spring	23	31	21	75	30.6667	41.3333	28	Pitta
5	28.4665	Winter	19.167	27.5	14.3333	61	31.4208	45.082	23.4973	Pitta
6	23.5996	Winter	32	29.5	24.5	86	37.2093	34.3023	28.4884	Vata Pitta
7	24.8	Winter	20	47.5	32.5	100	20	47.5	32.5	Pitta
8	25.6199	Winter	28.417	32.75	20.8333	82	34.6545	39.939	25.4065	Vata Pitta
9	28.7598	Winter	31	43.5	29.5	104	29.8077	41.8269	28.3654	Pitta

10	27.8368	Winter	28	46.5	25.5	100	28	46.5	25.5	Pitta
11	24.5972	Winter	33	43	25	101	32.6733	42.5743	24.7525	Pitta
12	22.9106	Winter	30	42.5	31.5	104	28.8462	40.8654	30.2885	Pitta
13	25.1158	Winter	21	41.5	36.5	99	21.2121	41.9192	36.8687	Pitta Kapha
14	28.0223	Winter	26	39.5	35.5	101	25.7426	39.1089	35.1485	Pitta Kapha
15	27.5148	Winter	29	45.5	29.5	104	27.8846	43.75	28.3654	Pitta
16	20.1613	Winter	27	37.5	24.5	89	30.3371	42.1348	27.5281	Pitta
17	19.3739	Winter	23	42.5	35.5	101	22.7723	42.0792	35.1485	Pitta Kapha
18	25.7748	Spring	21.5	54.5	23	99	21.7172	55.0505	23.2323	Pitta
19	27.6246	Spring	18.5	54.5	29	102	18.1373	53.4314	28.4314	Pitta
20	29.3492	Winter	18	27	23	68	26.4706	39.7059	33.8235	Pitta Kapha
21	23.4646	Winter	22	62	17	101	21.7822	61.3861	16.8317	Pitta
22	22.7894	Winter	16	30.5	20.5	67	23.8806	45.5224	30.597	Pitta
23	22.3889	Winter	29	38.5	36.5	104	27.8846	37.0192	35.0962	Pitta Kapha
24	27.2461	Winter	24	29.5	20.5	74	32.4324	39.8649	27.7027	Pitta
25	20.4346	Winter	14	35	11	60	23.3333	58.3333	18.3333	Pitta

26	28.2259	Winter	25	21.5	12.5	59	42.3729	36.4407	21.1864	Vata Pitta
27	23.3871	Winter	20	25	14	59	33.8983	42.3729	23.7288	Vata Pitta
28	26.1462	Winter	17	51.5	27.5	96	17.7083	53.6458	28.6458	Pitta
29	19.5264	Winter	22	56.5	23.5	102	21.5686	55.3922	23.0392	Pitta
30	21.1616	Winter	30	24.5	25.5	80	37.5	30.625	31.875	Vata
31	26.5559	Winter	27	42.5	31.5	101	26.7327	42.0792	31.1881	Pitta
32	21.5236	Winter	30	36.5	36.5	103	29.1262	35.4369	35.4369	Pitta Kapha
33	31.0303	Winter	26	44.5	27.5	98	26.5306	45.4082	28.0612	Pitta
34	17.398	Winter	37	44	23	104	35.5769	42.3077	22.1154	Pitta
35	20.5613	Winter	44	38	19	101	43.5644	37.6238	18.8119	Vata Pitta
36	21.0885	Winter	40	40	25	105	38.0952	38.0952	23.8095	Vata Pitta
37	27.5148	Winter	22	39	40	101	21.7822	38.6139	39.604	Pitta Kapha
38	22.0119	Winter	32	30.5	41.5	104	30.7692	29.3269	39.9038	Kapha
39	23.3271	Spring	19.5	42.5	37	99	19.697	42.9293	37.3737	Pitta Kapha

7.2 OUTPUT OBTAINED

Once the data is filled in the questionnaire, calculations are the first aspect of result generated. The calculations have been shown in previous section. The true output generated is a diet chart according to the imbalance causing dosha, ongoing season and BMI of the subject. Diet charts generated in respect to first four subjects have been shown. Table 7.2 shows diet chart generated as result of subject number 1. Table 7.3 shows diet chart generated as result of subject number 2. Table 7.4 shows diet chart generated as result of subject number 3. Table 7.5 shows diet chart generated as result of subject number 4.

Table 7.2: Diet chart for subject 1

Time\Days	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Early Morning (7a.m)	500ml warm water	500ml warm water	500ml warm water	500ml warm water	500ml warm water	500ml warm water	500ml warm water
	200ml tea with cow milk and ajwain + 2 marie biscuits	200ml tea with cow milk and fennel (saunf) + 2 marie biscuits	100ml tea with cow milk and basil (tulsi) + 2 marie biscuits	300ml tea with cow milk and cinnamon (daalchini) + 2 marie biscuits	100ml tea with cow milk and clove (long) + 2 marie biscuits	200ml tea with cow milk and cardamom (elachi) + 2 marie biscuits	100ml tea with cow milk and saffron (kesar) + 2 marie biscuits
Breakfast	200g poha + 200ml warm cow milk with 20g raisens	300g cooked daliya kheer with 200ml warm cow milk	250g warm milk cornflakes + 2 marie biscuits	4 idlis + 20g coconut chutney + 200ml warm cow milk with 20g raisens	200ml warm cow milk with 100g museli & fruits + 2 marie biscuits	400g sooji upma with 40g tomato ketchup + 100ml coconut water	1 masala dosa with 100ml sambhar

Snacks	200g fresh green berry (baer)	300g fresh cut apples	200g fresh cut apricot (khubani)	200g fresh cut guava	100g custard apple (shareefa) + 100ml green tea	100g coconut	100g fresh prunes + 100ml lemon tea
Lunch	400g cooked cabbage (band gobhi) + 2 medium chapatis with ghee + 200g boiled rice (with 50g peas)	300g cooked potato - cauliflower (phool gobhi) sabzi + 2 medium chapatis with ghee + 200g boiled rice	100g cooked soyabean - peas sabzi + 2 medium chapatis with ghee + 100g boiled rice	400g turnip (shalgam) sabzi + 2 medium sized chapatis + 200g boiled rice + 100g carrot salad	300g cooked potato - capsicum (shimla mirchi) + 2 medium chapatis with ghee + 100g boiled rice (with 50g peas)	400g cooked mustard leaves (sarson ka saag) + 2 medium sized chapati with ghee + 200g boiled rice	300g cooked brocolli sabzi + 2 medium chapatis with ghee + 100g boiled rice + 100g carrot salad
Evening snacks	100ml tea with goat milk + 2 nutrichoice biscuits	200g fresh gooseberry (amla) + 100ml fresh carrot juice	100ml tea with goat milk with dry ginger + 2 nutrichoice biscuits	300g boiled sprouts + 100ml pure rose water	100ml apple juice or 100ml carot ginger juice	100ml tea with goat milk + 2 nutrichoice biscuits	50g dhokla + 100ml aloe vera juice

Dinner	200g cooked aduki beans (red lobhia) daal + 2 medium sized chapati with ghee	200g mooth daal + 4 medium sized chapati with ghee	200g pinto beans (chitra rajmah) + 2 medium sized chapati with ghee	200g cooked urad daal + 2 medium sized chapati with ghee	200g cooked cow peas (white lobhia) daal + 2 medium sized chapati with ghee	200g cooked split peas (chana) daal + 2 medium sized chapati with ghee	200g chick pea (black channa) daal + 2 mediu m sized chapati with ghee

Notes:	1) Cooking should be done in sunflower oil only.
	2) Not more than 10g oil should be used for 1 full day cooking.
	3) Chapati must be made from 80% whole wheat & 20% barley (jaun).
	4) Avoid dried ginger (sonth), dry coriander (sookha dhaniya), hot pepper (lal mirch), fenugreek seeds (methi daana), asafoetida (hing), rock salt, pickles, amchoor, clove & olives.
	5) Curd must not be consumed at night.
	6) Small amounts of raw honey should be used for sweetning.
	7) Do not consume water immediately after tea, hot milk or guava.
	8) Use cooked garlic.
	9) Not more than 10g of ghee should be used with every 2 chapati.
	10) Sabzi can be varied. Fenugreek (methi) - potato, capsicum - cottage cheese (paneer), eggplant (bengan) bharta or with potato, only soyabean nuggets, peas - cauliflower-carrot mixed veg or peas - cauliflower - carrot - potato sometimes.
	13) Eat small amount of old jaggery (gur) as sweet, if urge of having some sweet appears.
	14) Apples are too be eaten with skin

Table 7.3: Diet chart of subject 2

Time\Days	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Early Morning (7a.m)	500ml warm water	500ml warm water	500ml warm water	500ml warm water	500ml warm water	500ml warm water	500ml warm water
	100ml tea with cow milk and ajwain + 2 marie biscuits	100ml tea with cow milk and fennel (saunf) + 2 marie biscuits	100ml tea with cow milk and basil (tulsi) + 2 marie biscuits	100ml tea with cow milk and cinnamon (daalchini) + 2 marie biscuits	100ml tea with cow milk and clove (long) + 2 marie biscuits	100ml tea with cow milk and cardamom (elachi) + 2 marie biscuits	100ml tea with cow milk and saffron (kesar) + 2 marie biscuits
Breakfast	200g poha + 100ml warm cow milk with 10g raisens	300g cooked daliya kheer with 100ml warm cow milk	250g warm milk cornflakes + 2 marie biscuits	4 idlis + 20g coconut chutney + 100ml warm cow milk with 10g raisens	100ml warm cow milk with 50g museli & fruits + 2 marie biscuits	100g sooji upma with 10g tomato ketchup + 100ml coconut water	1 masala dosa with 100ml sambhar
Snacks	100g fresh green berry (baer)	300g fresh cut apples	200g fresh cut apricot (khubani)	200g fresh cut guava	100g custard apple (shareefa) + 100ml green tea	100g coconut	50g fresh prunes + 100ml lemon tea
Lunch	100g cooked cabbage (band gobhi) + 2 medium chapatis	100g cooked potato - cauliflower (phool gobhi) sabzi + 2	50g cooked soyabean - peas sabzi + 2 medium	100g turnip (shalgam) sabzi + 2 medium sized chapatis	100g cooked potato - capsicum (shimla mirchi)	100g cooked mustard leaves (sarson ka saag) + 2 medium	100g cooked brocolli sabzi + 2 medium

	with ghee + 100g boiled rice (with 50g peas)	medium chapatis with ghee + 100g boiled rice	chapatis with ghee	+ 100g boiled rice + 100g carrot salad	+ 2 medium chapatis with ghee + 100g boiled rice (with 50g peas)	sized chapati with ghee + 100g boiled rice	chapatis with ghee + 100g carrot salad
Evening snacks	100ml tea with goat milk + 2 nutrichoice biscuits	100g fresh gooseberry (amla) + 100ml fresh carrot juice	100ml tea with goat milk with dry ginger + 2 nutrichoice biscuits	200g boiled sprouts + 100ml pure rose water	100ml apple juice or 100ml carot ginger juice	100ml tea with goat milk + 2 nutrichoice biscuits	50g dhokla + 100ml aloe vera juice
Dinner	100g cooked aduki beans (red lobhia) daal + 2 medium sized chapati with ghee	100g mooth daal + 2 medium sized chapati with ghee	100g pinto beans (chitra rajmah) + 2 medium sized chapati with ghee	100g cooked urad daal + 2 medium sized chapati with ghee	100g cooked cow peas (white lobhia) daal + 2 medium sized chapati with ghee	100g cooked split peas (chana) daal + 2 medium sized chapati with ghee	100g chick pea (black channa) daal + 2 medium sized chapati with ghee

Notes:	1) Cooking should be done in sunflower oil only.
	2) Not more than 10g oil should be used for 1 full day cooking.
	3) Chapati must be made from 80% whole wheat & 20% barley (jaun).
	4) Avoid dried ginger (sonth), dry coriander (sookha dhaniya), hot pepper (lal mirch), fenugreek seeds (methi daana), asafoetida (hing), rock salt, pickles, amchoor, clove & olives.
	5) Curd must not be consumed at night.
	6) Small amounts of raw honey should be used for sweetning.

	7) Do not consume water immediately after tea, hot milk or guava.
	8) Use cooked garlic.
	9) Not more than 10g of ghee should be used with every 2 chapati.
	10) Sabzi can be varied. Fenugreek (methi) - potato, capsicum - cottage cheese (paneer), eggplant (bengan) bharta or with potato, only soyabean nuggets, peas - cauliflower-carrot mixed veg or peas - cauliflower - carrot - potato sometimes.
	13) Eat small amount of old jaggery (gur) as sweet, if urge of having some sweet appears.
	14) Apples are too be eaten with skin

Table 7.4: Diet chart for subject 3

Time\Days	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
	500ml warm water	500ml warm water	500ml warm water	500ml warm water	500ml warm water	500ml warm water	500ml warm water
Early Morning (7a.m)	200ml tea with cow milk and saffron (kesar) + 2 marie biscuits	200ml tea with cow milk and saffron + 2 marie biscuits	200ml tea with cow milk and saffron + 2 marie biscuits	300ml tea with cow milk and saffron + 2 marie biscuits	100ml tea with cow milk and saffron + 2 marie biscuits	200ml tea with cow milk and saffron + 2 marie biscuits	100ml tea with cow milk and saffron + 2 marie biscuits
Breakfast	4 slices wheat bread (without crust) with 100g peas & 100g potato stuffing + 100ml warm cow milk	400g cooked daliya kheer with 100ml warm cow milk	250g warm milk cornflakes + 2 marie biscuits	4 idlis + 20g coconut chutney + 100ml warm cow milk with 10g raisens	100ml warm cow milk with 10g raisens, 100g museli & fruits + 2 marie biscuits	300g sooji upma with 30g tomato ketchup + 200ml coconut water	1 masala dosa with 200ml sambhar

	with 10g raisens						
Snacks	200g fresh green berry (baer)	400g fresh cut apples	100g fresh cut fig (anjeer)	300g fresh cut apricot (khubani)	200g fresh cut guava	100g coconut	100g custard apple (shareefa)
Lunch	400g cooked cabbage (band gobhi) + 2 medium chapatis (without ghee) + 200g boiled rice (with 50g peas)	400g cooked potato - cauliflower (phool gobhi) sabzi + 2 medium chapatis (without ghee) + 200g boiled rice	200g cooked soyabean nuggets sabzi + 2 medium chapatis (without ghee) + 100g boiled rice	300g kadhi + 2 medium sized chapati (without ghee) + 200g boiled rice	300g cooked potato - capsicum (shimla mirchi) + 2 medium chapatis (without ghee) + 100g boiled rice	200g shahi paneer (cottage cheese) + 300g vegetable pulao with 50g peas	400g cooked brocolli sabzi + 2 medium chapatis (without ghee) + 200g boiled rice
Evening snacks	100g fresh dates (khajoor) + 100ml tea with cow milk	150g fresh gooseberry (amla) + 100ml green tea	100ml tea with cow milk + 2 nutrichoice biscuits	400g boiled sprouts + 100ml aloe vera juice	200g poha + 200ml apple juice	100ml tea with cow milk + 2 nutrichoice biscuits	200g dhokla + 100ml pure rose water

Dinner	200g cooked split peas (chana) daal + 2 medium sized chapati (without ghee)	200g mung dhuli daal + 2 medium sized chapati (without ghee)	200g mung sabut daal + 2 medium sized chapati (without ghee)	200g pinto beans (chitra rajmah) + 2 medium sized chapati (without ghee)	200g mooth daal + 2 medium sized chapati (without ghee)	200g cooked cow peas (white lobhia) daal + 2 medium sized chapati (without ghee)	200g cooked aduki beans (red lobhia) daal + 2 medium sized chapati (without ghee)

Notes:	1) Cooking should be done in coconut, sunflower and olive oil alternatively on each day.
	2) Not more than 10g oil should be used for 1 full day cooking.
	3) Chapati must be made from 80% whole wheat & 20% barley.
	4) Avoid dry ginger (soonth), garam masala, hot pepper (red mirch), ajwain, cinnamon (dal-chini), cardamom (elaichi), mustard seeds (sarson), fenugreek seeds (methi daana), asafoetida (hing), inknut (harhad), pippali, rock salt, pickles, oregano, amchoor, black pepper (kali mirch), clove (long), basil (tulsi) & olives
	5) Curd must not be consumed at night.
	6) Food must be very less spicy, including poha & upma.
	7) Do not consume water immediately after tea, hot milk or guava.
	8) Use of mint leaves is helpful.
	9) Use unsalted butter, if required.
	10) Small amounts of raw honey should be used for sweetning that too only new honey.
	11) Eat small amount of old jaggery (gur) as sweet, if urge of having some sweet appears.
	12) Apples are too be eaten with skin.

Table 7.5: Diet chart for subject 4

Time\Days	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Early Morning (7a.m)	500ml warm water	500ml warm water	500ml warm water	500ml warm water	500ml warm water	500ml warm water	500ml warm water
	200ml tea with cow milk and saffron (kesar) + 2 marie biscuits	200ml tea with cow milk and saffron + 2 marie biscuits	100ml tea with cow milk and saffron + 2 marie biscuits	100ml tea with cow milk and saffron + 2 marie biscuits	300ml tea with cow milk and saffron + 2 marie biscuits	200ml tea with cow milk and saffron + 4 marie biscuits	300ml tea with cow milk and saffron + 2 marie biscuits
Breakfast	4 slices wheat bread (without sides) with 100g potato stuffing + 200ml warm cow milk	400g cooked daliya kheer with 100ml warm cow milk	250g warm milk cornflakes + 2 marie biscuits	4 idlis + 20g coconut chutney + 100ml warm cow milk	200ml warm cow milk with 100g museli & fruits + 2 marie biscuits	400g sooji upma with 40g tomato ketchup + 300ml coconut water	1 masala dosa with 100ml sambhar
Snacks	300g fresh water chestnut (singarde) + 100ml lemon tea	300g fresh cut apples	50g fresh coconut + 100ml lemon tea	200g fresh water chestnut (singarde) + 100ml lemon tea	200ml fresh apple juice	200g fresh grapes	200ml fresh grape juice

Lunch	400g fresh okra (bhindi) as bhindi do pyaza + 2 medium chapatis (without ghee) + 200g boiled rice	300g cooked green beans - potato sabzi + 2 medium chapatis (without ghee) + 200g boiled rice	200g cooked soyabean nuggets sabzi + 2 medium chapatis (without ghee)	300g fresh okra as masala bhindi + 2 medium chapatis (without ghee) + 200g boiled rice	300g kadhi + 2 medium sized chapatis (without ghee) + 200g boiled rice	200g shahi paneer (cottage cheese) + 300g vegetable pulao	200g chick peas (black chana) + 2 medium sized chapati (without ghee) + 200g boiled rice
Evening snacks	400g boiled sprouts + 100ml aloe vera juice	1 besan chilla (without oil) + 100ml green tea	200ml tea with cow milk + 2 nutrichoice biscuits	100g poha + 100ml pure rose water	200ml tea with cow milk + 2 nutrichoice biscuits	200ml tea with cow milk + 4 nutrichoice biscuits	100g dhokla + 100ml green tea
Dinner	200g cooked split peas (chana) daal + 2 medium sized chapati (without ghee)	200g mung dhuli daal + 2 medium sized chapati (without ghee)	200g mung sabut daal + 2 medium sized chapati (without ghee)	200g pinto beans (chitra rajmah) + 2 medium sized chapati (without ghee)	200g mooth daal + 2 medium sized chapati (without ghee)	200g cooked cow peas (white lobhia) daal + 2 medium sized chapati (without ghee)	200g cooked aduki beans (red lobhia) daal + 2 medium sized chapati (without ghee)

Notes:	1) Cooking should be done in coconut, sunflower and olive oil alternatively on each day.
	2) Not more than 10g oil should be used for 1 full day cooking.
	3) Chapati must be made from 80% whole wheat & 20% barley.

	4) Avoid dry ginger (soonth), garam masala, hot pepper (red mirch), ajwain, cinnamon (dal-chini), cardamom (elaichi), mustard seeds (sarson), fenugreek seeds (methi daana), asafoetida (hing), inknut (harhad), pippali, rock salt, pickles, oregano, amchoor, black pepper (kali mirch), clove (long), basil (tulsi) & olives
	5) Curd must not be consumed at night.
	6) Food must be very less spicy.
	7) Do not consume water immediately after tea or hot milk.
	8) Use of mint leaves is helpful.
	9) Use unsalted butter, if required.
	10) Poha & upma must be made very less spicy.
	11) Apples are too be eaten with skin.

CHAPTER 8

CONCLUSIONS & FUTURE SCOPE

8.1 CONCLUSION

i. Complete healthcare management system has been designed to manage dosha imbalance keeping season and body mass index as supplementary parameters.

ii. LabVIEW is selected for this system as it is a graphical user interface software and is therefore highly user friendly.

iii. LabVIEW is programmer friendly software as well because debugging is very easy in it through highlight execution option present.

iv. LabVIEW is dataflow language therefore executes when data is present, unlike sequential programming languages. Therefore it is a multiprocessing language.

v. Latency time in LabVIEW is very less even with such a large number of conditions because of simultaneous processing. Table 8.1 shows latency time period with respect to number of questions attempted.

Table 8.1: Latency period with respect to questions attempted

No. of questions attempted	Latency time (in seconds)
Minimum (1 question)	1.2
Maximum (all questions)	1.5

vi. Accuracy of the calculation in LabVIEW is upto 4 decimals for all the dosha values i.e. vata, pitta and kapha as well as for all doshas' percentages i.e. % vata, % pitta and % kapha.

vii. The questionnaire is exhaustive and consists of 318 questions ensuring every aspect is considered. One third of the questions correspond to each of the three dosha i.e. vata, pitta and kapha.

viii. Most precise result is obtained when one out of every three options is ticked. This is in accordance to point 7.

ix. On an average 92 questions have been answered by the subjects which is a quite good number to judge the prakriti. Table 8.2 shows the number of questions answered.

Table 8.2: Range of number of questions answered

Range	No. of questions answered
Minimum	59
Average	92.4359
Maximum	105

x. Owing to this answer set, precision is maintained even if a couple of questions get marked incorrectly by mistake. A minute variation might appear in dosha percentage but not in diet chart which is generated.

xi. This system can be used by any person to maintain health without supervision of any doctor.

xii. Doctors can combine their expertise with this system to give prescription to any individual in terms of medicine as no point in terms of diet is missed in the system.

xiii. Ayurveda does not deal with calorie system and hence only provides information on foods that can be eaten. Information on quantity of consumption is not given in ayurvedic medicine. This specially designed system gives quantity measurements based on present day calorie system to avoid any loop hole in proper health.

xiv. Every aspect of diet has been considered precisely. For example quantity and calorie in ghee to be applied on roti has also been taken care of.

xv. Each day's diet in the diet chart has approximately same number of calories which is to be provided to the person according to BMI.

xvi. 84 highly precise diet charts have been designed for balancing doshas and managing weight.

8.2 FUTURE SCOPE

This work is a healthcare management system. There is a scope of increasing the number of parameters for the diet charts like age group and hereditary diseases. In this manner, the diet chart would become more individual specific. Incorporating artificial intelligence within the system will further improve the system performance.

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