

OXFORD BOOKES UNIVERSITY

**BSc (HONS) COMPUTER AND
INFORMATION SYSTEMS**

U08096 PROJECT

**FACE FORTUNE ANALYSIS SYSTEM
(FFAS)**

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Abstract

In this project, Face Fortunes Analysis System (FFAS) will be introduced. It is a real time application for capturing human face, face recognition, facial features analysis and fortune analysis with China Physiognomy analysis methodology. First, FFAS can detect human face in still photographs automatically and capture human face directly by the imaging recordable device, such as WebCam or import image from other device, like Scanner or Digital Camera.

Second, FFAS applies neural network approach, which can detect and recognize whether the photograph is human face or none of human face. Third, the face recognition engine recognizes the coordinate of facial features points for face matching processing including eyes, eyebrows, mouth, nose and face contours. Finally, FFAS analyzes the facial features according to China Physiognomy Analysis Methodology.

The result of face fortune analysis by FFAS are based on some point of views of ancient China Physiognomy Methodology books including “SHEN XIANG QUAN BIAN”, “MA YI SHEN XIANG” and “ICE KAM” which were analyzing facial features particularly.

The development of face recognition with China Physiognomy Analysis methodology application must be one of an interesting and challenging academic topic because similar application cannot be found in recent decades. In addition, FFAS could help us to promote China Physiognomy globally and attract more people to widen their eyes on the topic of China Physiognomy.

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Chapter 1 Introduction

1.1 Background

China Physiognomy has been developed more than two thousand years, which is based on the ancient Chinese wisdom who sees the face as meeting place of heaven and earth, sharing with universe the harmony or disharmony of the cosmic energies such as active, passive, yin (feminine) and yang (masculine). These energies flow through the face along certain lines of force. By applying pressure message along these lines and at certain specific nodes, or pressure points, body function can be improved and the cosmic energies brought into balanced.

The Face Recognition technology has developed rapidly in this century. Computer visions are used for detecting and recognizing human face from a digital image or a video frame automatically. Face Recognition can identify the facial features such as eyes, eyebrows, mouth and nose. Several face recognition techniques can prove a wide range of possible application in real time such as biometric cryptosystems, cognitive sciences, credit card authentication, electronic and physical access control, law enforcement applications, multimedia system, secure information systems etc.

Areas	Specific Application
Biometrics	Drivers Licenses, Entitlement Programs, Immigration, National ID, Passports, Voter Registration,
Information Security	Desktop Login, Application Security, Database Security, File Encryption, Intranet Security, Internet Access,
Law Enforcement and Surveillance	Advance Video Surveillance, CCTV, Control, Portal Control, Post-Event Analysis, Shoplifting and Suspect Tracking and Investigation
Smart Cards	User Authentication
Access Control	Facility Access, Vehicular Access

Table 1-1 Typical Application of Face Recognition

For the concern of face recognition method selection, the Neural Network is the most successful decision making system that could be trained to perform

complex functions in any areas including face recognition, classification, identification, optimization, speech and vision. The Neural Network is the methodology that using many human face and non-human face images to train the method, which could lean whether the image is human face or not. The Neural Network also uses dynamic neural network architecture to extract the phase features, which are divided into frames and are matched using distance. Besides, reference to Haddadnia et al’s research, SFNN approach can provide high accuracy rate for face recognition as the reason for applying on FFAS.

Method	$E_{ave} \%$
Zernike Moment Invariant	10
Principal Component Analysis	6
Convolution Neural Network	3.83
Nearest Feature Line	3.125
Pseudo Zernike Moment Invariant	3
Single Feature Neural Network	1.323

**Table 1-2 Comparison of Error Rate for Face Recognition Methods
(Source by Haddadnia et al at 2002)**

FFAS is a design that comprised both of Face Recognition Technology and China Physiognomy Analysis Methodology to design. FFAS is also real time face detection and face recognition that detects a face and facial features and supports faces matching. Following the face detection and face recognition, FFAS refers to Single Feature Neural Network (SFNN) face recognition method (Haddadnia et al 2001) to develop, which is one of the Radial Base Function (RBF) neural network methodology to detect and recognize the coordinates of facial feature points during face matching processing. The feature points include eyes, eyes corners, eyebrows, mouth corners and nose tip etc. Besides, FFAS is able to control webcam to capture the photograph in real time. Therefore, FFAS can be placed in anywhere to capture human face at anytime, so we can analyze anyone we want by capturing their face accurately in using FFAS.

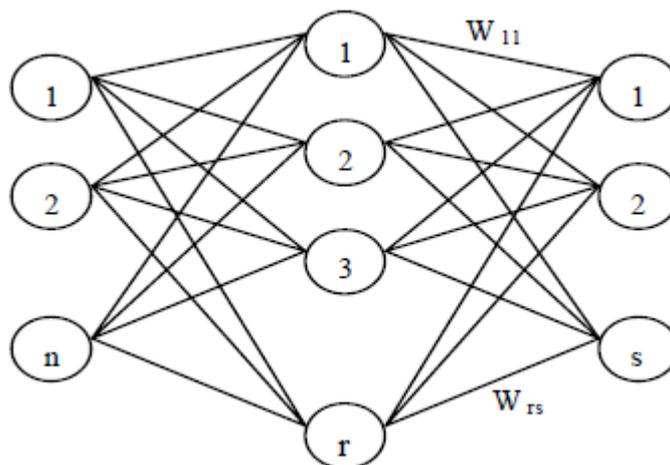


Figure 1-1 RBF Neural Network Structure

There are the scenarios of FFAS from Face Recognition to China Physiognomy Analysis which are listed as below:

1. Image is taken by some imaging recordable device, such as Webcam on site or import image from other device for instance scanner and digital camber.
2. Image is to be stored in temporary area which be used for detection, verification and identification. Afterward, FFAS would apply the HNFNN approach to perform face recognition.
3. FFAS could detect facial features points, such as eyes, eyebrows, mouth, nose, and face contours. The returned information is array of x and y coordinating of each facial feature point.
4. The definition of Chinese Physiognomy is recorded on FFAS for verification and identification. Base on the returned information, FFAS would process the calculation based on the Chinese Physiognomy methodology. After analyzing, the final result will be returned.

Face reading is used to reveal the physical capacities, strengths & weakness and the temperament or disposition of an individual as it relates to achievement in the world and also provides the necessary clues to areas where face function could be improved for both of well-being and success in your adventure. Reference to the analysis method of China Physiognomy, the FFAS bases on the ancient Chinese Physiognomy books including: "SHEN XIANG QUAN BIAN", "MA YI SHEN XIANG" and "ICE KAM".

1.2 Objective

China Physiognomy is a very hot famous topic around the world. There should not have any Chinese who never heard about China Physiognomy. Some people have a proficient skill to know how to analyze it correctly. For this reason, we want to assist more people to realize the China Physiognomy and make them easily to analyze.

Besides, many reference books have been searched to describe the analysis methodology of China Physiognomy but it is not easy to understand their writing due to ancient language development. Generally, FFAS could help us to study it effectively and efficiently.

Finally, we would like to prompt our China Physiognomy to everyone in everywhere. FFAS is one of the methods for us to do it. On the other hand, it is difficult to find the similar automatic application in the world.

1.3 Assumptions

There are some requirements for face images could work with. The photograph should be taken a full-faced person and oriented vertically. It must contain single person only who is the whole face of the person you need and include the head. The face on the photograph should not be covered with hands, eye glasses ... etc and it is not recommended that the mouth be open too much. On the other hand, the photo should be taken in good lighting conditions in order to have good analysis result. For system to recognize a face accurately, please make sure that face images are as close to there requirements as possible.

Face Fortune Analysis System (FFAS) is available for Windows XP or above platform. The program requires Visual Basic Runtime to execute.

Chapter 2 Literature Review

The purpose of this chapter is to introduce the concepts for Face Reading and Face Recognition on the literature research. Face Reading means that the art of understanding faces which is the study and interpretation of a person's face. The academic name is Physiognomy and other common name is Face Language, which is a tool that assists us to have a better understanding of ourselves and to be more conscious of our communication and interactions with others.

2.1 Physiognomy

Physiognomy is the art and science of determining a person's modus operandi from the person's facial structure. It identifies aptitudes and tendencies and then goes beyond momentary feelings and particular situations. Besides, the interpretation of face reading is an ancient art that has proven itself under rigorous scientific scrutiny. Our faces may sound outlandish but are same as DNA holds our character traits, facial features genetic blueprints, hold clues to our personal history, intimacy requirements, mental attitudes, work ethics and more. It is one of valuable tool to help us understand ourselves and to be more conscious of our communications and interaction with others.

Our faces are simply a result of heredity and consequently, but it is impossible to determine character by simply looking at someone's face. Expression Reading extends to the whole body as in Body language and is the interpretation of a person's feelings and thoughts by their facial expression. However, we are born with a number of potentials, including our personalities and talents, in the same way that we are born with a certain physique and facial features. As we progress through life, these inborn characteristics become more and more visible through our faces. We are reading facial expressions every time when we look at someone. Even small babies quickly learn to interpret the expressions in their parents' faces and we continue to make decisions based on what we read in the faces of others. We commonly judge people from their facial expression without even realizing

that we are doing so. We might say that someone has “shifty eyes” or has an “open face”. In making these assessments, we are intuitively the person’s face.

Moreover, physiognomy is not only about reading expression, but it is also about understanding structure. Your face never lies, the fact is written for all to see. For example, extreme high positioned ears have different personal expectations to people with mid or low position ears.

2.1.1 History of Physiognomy

The term of Physiognomy that derives from the Greek for judgment on nature. Historically, physiognomy constitutes an activity which seeks to understand personality and identity by analyzing the body and especially the face. Physiognomy has a long history in Arab and Western civilizations through the Middle Ages and is also found in other cultures like China, India and Japan etc. According to Queen et al (2009), physiognomy is extensively revised in the renaissance, the discipline suffered a lull of interest in the mid eighteenth century. It was revitalized from 1775 by the influential work of Swiss pastor, Johann Caspar Lavater ¹. There are many subjects that were influenced by physiognomic lore include: aesthetics, anthropology, criminology, medicine, penology, philosophy, psychology, theology and visual & performing arts etc. On the other hand, physiognomy is also reached out to political history that makes a major contribution to the emergence of political caricature as well as the occult sciences of astrology and palmistry.

1. Johann Caspar Lavater - Swiss pastor (1741 – 1801), wrote “Essays on Physiognomy for the promotion of the knowledge and the love of mankind”. Originally in German language this was translated into English by Thomas Holcroft at the beginning of nineteenth century.

Other reference of Marina (2009), in the ancient India, a person's progress in yogic path were described relating to physiognomy at "Svetasvatara Upanishad (Hindu text)", composed before 500 B.C. Based on the information, Samudra (deity of oceans) were first given "Anga Samudrika (Face Reading)".

In the ancient Greece, the writings of Plato and Hippocrates referred to physiognomy and Socrates ² was regarded as a great physiognomist around the 4th century B.C. The titled of "Displaying the Secrets of Nature Relating to Physiognomy" was a first book on Physiognomy, which was written by Aristotle ³.

2. Socrates - (469 – 399 B.C.), was one of the founders of western philosophy.

3. Aristotle - (384 – 322 B.C.), was a Greek favor philosopher and was the first to create a comprehensive system of Western philosophy, encompassing morality and aesthetics, logic and science, politics and metaphysics.

2.1.2 China Physiognomy

The ancient China system of physiognomy, which was also called “Siang Mien” (Rosetree 2001 p25 and Marina 2009 p9), which is as old as China Medicine, Acupuncture and come down to us today as fascinating but quite judgmental.

China have been developed the face reading for more than 2000 years. Based on the ancient Chinese wisdom sees the face as meeting place of heaven and earth, sharing with universe the harmony or disharmony of the cosmic energies such as active, passive, yin (feminine) and yang (masculine). These energies flow through the face along certain lines of force. By applying pressure message along these lines and at certain specific nodes, or pressure points, body function can be improved and the cosmic energies brought into balanced.

China Physiognomy are disclosing the physical capacities, fortunes, potential, strengths & weakness and the temperament or disposition of an individual as it relates to achievement in the world and also providing the necessary clues to areas where face function can be improved for both well-being and being successful in your adventure.

Face reading is an extremely old art. Consequently, many people think that it is derived from the “Book of Changes” (Lin 1999), the earliest book on China divination and possibly the oldest book in the world. The “Book of Changes” or “I Ching” played as a major role in the development of Chinese philosophical thinking and was just as important today as it ever has been. Its content included “Astrology”, “Divination”, “Facelogy” and “Medicine”, Everything in the world is subject to change. Not even our faces can escape this rule. This is proven in the changes our faces undergo as we age. To a student of face reading, such changes indicate a turn in the tide of fortune. Besides such natural causes of change, our oral status and behavior can also trigger facial changes. In the parlance of China physiognomy, one’s face changes with one’s mind. In other words, good deeds and intentions bring about positive changes in fate as reflected in the face, while bad deeds and malicious intentions cause unfortunate changes. This principle of physiognomy is encouraging to those who are not born with good fate or a

good face. Even those who are endowed with a good face should keep these words in mind, for nothing is constant, least of all good luck.

Over the China, “Observation”, “Hearing”, “Question” and “Diagnosis” had all become part of China Medicine and then asked for the patients in sequence. And as for face reading it closely related to fortune telling.

2.1.3 Categories of China Physiognomy

Reference to the different ancient Chinese Physiognomist books including: SHEN XIANG QUAN BIAN ⁴, MA YI SHEN XIANG ⁵ and ICE KAM ⁶, we have classified to seven categories for face analysis method as below

4. SHEN XIANG QUAN BIAN (神相全編) – The author is Chen Tuan and the year of publication is Song Dynasty

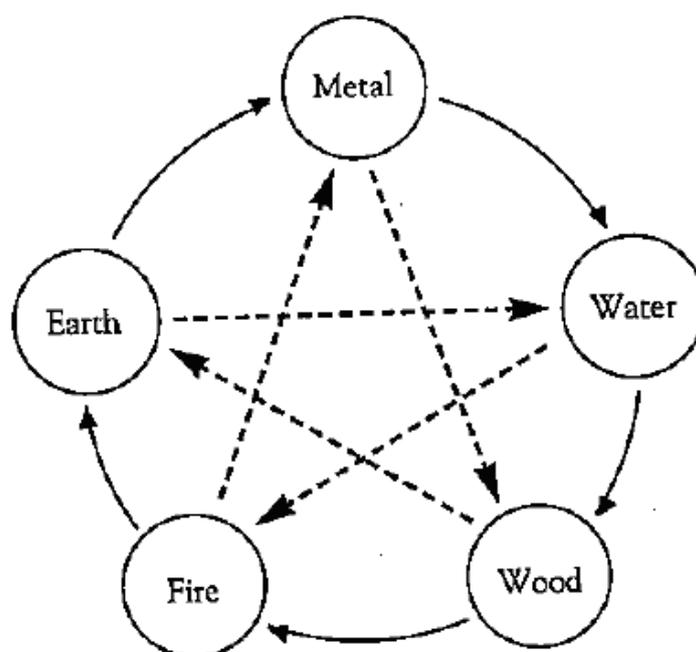
5. MA YI SHEN XIANG (麻衣神相) – The author is unknown and the year of publication is North Song Dynasty

6. ICE KAM (冰鑑) – The author is Zeng Guo Fan and the year of publication is Qing Dynasty

1. Element types, - Face Shape and Complexion Color as keys to temperament

Physiognomist assigns to each individual a certain temperament that could be recognized by oneself characteristic face shape and complexion color and other physical indicators. There are five basic temperaments, which are called element types.

The term of element is referred to the five planetary elements, which are the ancients believe the natural world: Gold, Wood, Water, Fire and Earth. Each of these elements are associated with a particular planet, a certain geometric form and face shapes and a certain color and complexion type.



Solid lines - mutual production
Dotted lines = mutual destruction

Figure 2-1 Mutual production and mutual destruction of the five elements

Element	Planet	Form	Face Shape	Color	Complexion
Gold	Venus	Oblong	Oblong	White	Ivory
Wood	Jupiter	Inverted	Triangular	Green	Olive
Water	Mercury	Circle	Round	Black	Dusky
Fire	Mars	Triangle	Pear-Shape	Red	Ruddy
Earth	Saturn	Square	Square	Yellow	Tawny

Table 2-1 Description of Elements

The elements also endow the individual of each type with a certain Vitality (form of energy) and Fortune (lot in life) and also with an ear of expertise in which he or she is most likely to find success.

Element	Vitality	Fortune	Enterprise
Gold	Grace	Status	Management
Wood	Rising	Wisdom	Arts, Sciences
Water	Flexibility	Wealth	Finance
Fire	Activity	Adventure	Showmanship
Earth	Stillness	Security	Industry

Table 2-2 Characteristics of Elements

The face shapes are the more important factor in defining the basic temperament and element type. The complexion colors are secondary along with other characteristics.

2. The Cosmic Energies - Are you a balanced personality

According to the ancient Chinese knowledge, the universe is comprised of two cosmic energies which is positive creative “Yang” (Day) and the receptive “Yin” (Night). In the face, the bony structure is Yang and the soft parts (the flesh and skin) are Yin.

When observing the face, look at the bone structure and for the prominence of the bony (Yang) features, such as the forehead, the cheekbones, the nose, the chin and the jawbones, those also check the firmness of the flesh and smoothness of the skin and fleshy areas of the face. Yin are included the tip of the nose and the mouth.

If the skin is saggy or puffy or loose and lined, this indicates diminished Yin energy. Conversely, exposed bones with little flesh and taut skin also show diminished Yin qualities. The bony structure (Yang) should be prominent but softened by firm flesh and smooth skin (Yin), indicating harmony between the cosmic energies.



Figure 2-2 Symbol of Taiji

3. The Three Stations - Life Stages

The face can be divided horizontally into Three Stations and each station is represented a major part of life. Station 1 is from top of forehead to the middle of the eyebrows that represents the status of youth with age 15 through 30. Station 2 is from middle of the eyebrows to the tip of the nose that represents the status of midlife with age 31 through 50. Station 3 is from the tip of the nose to the tip of chin that represents maturity with age 51 and older. Besides, the status of childhood that is Infant through 14 ages, is represented by ears.

If those stations are balanced that all three stations of equal length, each of three major life phased would be productive and contribute to a well-rounded life scenario. Background and education (Station 1) would lead to achievement in middle life (Station 2) resulting in a comfortable and satisfying maturity (Station 3). If one station is dominant, it indicates the part of life in which the individual would be the most effective and to which he or she will be most closely oriented

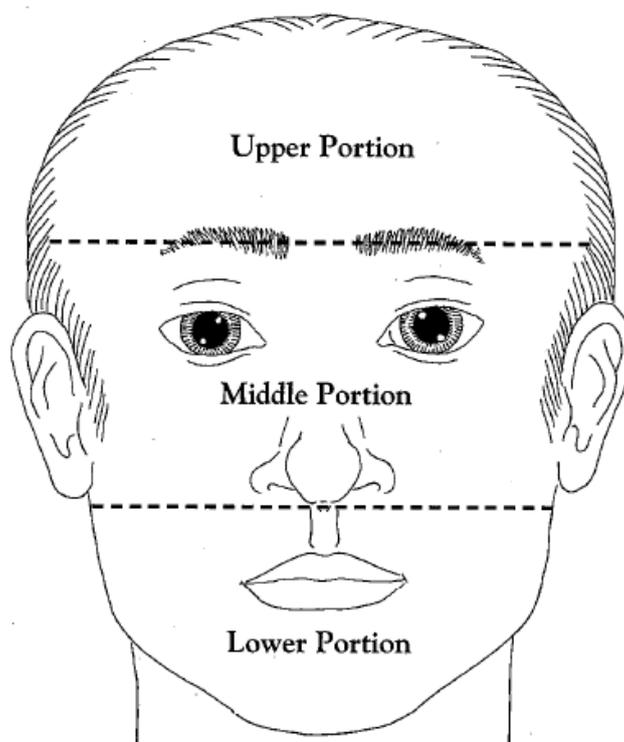


Figure 2-3 The Three Stations

The descriptions of Three Portion System are listed as below:

If the Station 1 is dominant, the individual is Youth-oriented and will have greatest success before age 30.

If the Station 2 is dominant, the individual is Success-oriented and will have greatest effectiveness in the middle years.

If the Station 3 is dominant, the individual is Family-oriented and life will be most comfortable and rewarding in the later years.

FFAS would return the result reference to the three stations analysis methodology.

4. Five Major Facial Features – Your Potential

The potentials are represented by the Five Major Facial Features are including:

- “EAR” symbolize the Life Potential
- “EYEBROWS” symbolize the Aspirations
- “EYES” symbolizes the Intelligence and Inner Energy
- “NOSE” symbolizes the Wealth and Achievement in Midlife
- “MOUTH” symbolizes the Personality

FFAS would return the result reference to the five major facial features analysis methodology (except Ears analysis).

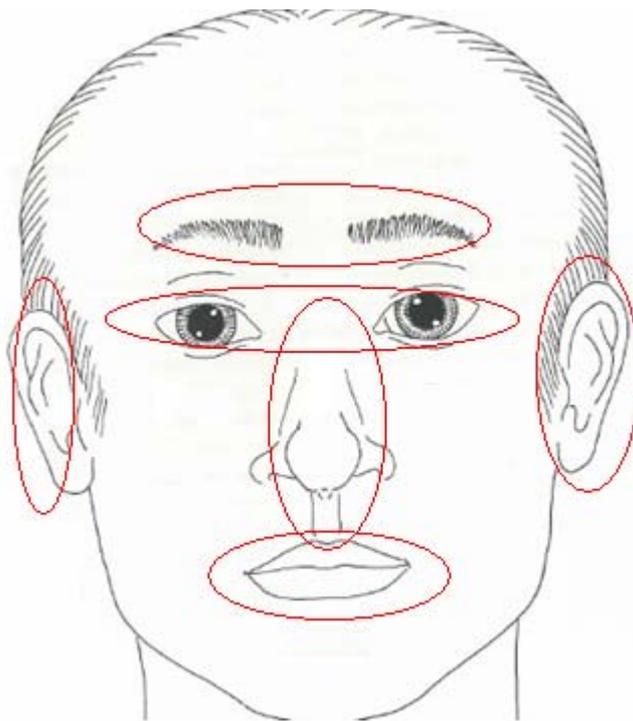
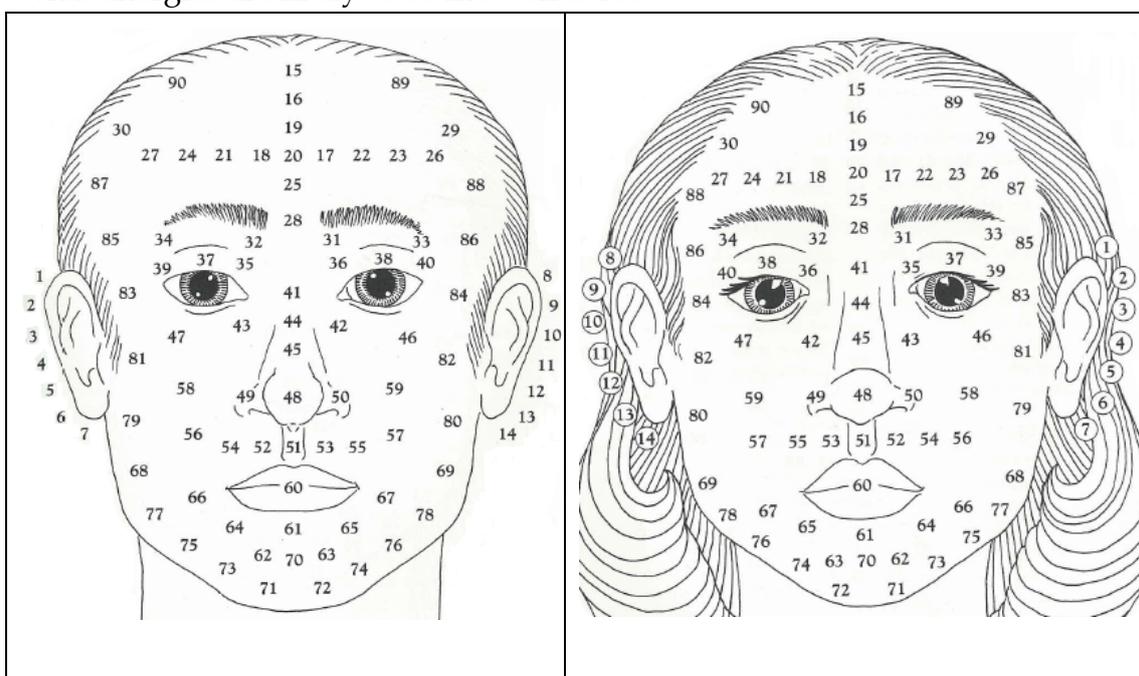


Figure 2-4 Five Major Facial Features

5. The 100 position Points of the Floating Year – Where you are now standing

Each of the Position Points represents a year in your life and yours Floating Year. From your present Position Point you could discover where you stand in present and what pursuits are most favored at this particular time, and what energies are likely to be most effective.



Age map for a male

Age map for female

Figure 2-5 The 100 Position Points

For your current Position Point is your age plus one. The Chinese measure life from the moment of birth that is, you are in the influence of Position Point 1 from the time you were born until you reach your first birthday. On your first birthday you enter Position 2 and so on. If you are now 21, look at Point 22. If you are 37, look at Point 38.

When you locate your present Position Point, observe whether it is on the left or right side of your face or in the middle. If it is on the left, you would be more concerned with the Yang (active) aspect of your life; if it is on the right, you will be more concerned with the Yin (receptive) aspects. If it is in the middle, you will be very much your own person. In other words, the Yang years would show you more interested in career and the Yin in recreational activities. The middle points often represent turning points or high points in your life.

6. Twelve Palaces – Checkpoints for Activities

The Palaces are areas to be checked for the probable outcome about good or bad fortune and other significant life enterprise such as love affairs, marriage, money matters, real estate, travel and so on. You can check the state of any particular Palace at any time to preview your possibilities for a successful action.

Basically, there are twelve Palaces and those appearing in the middle of the face are single. However those lie on the sides of the face are double, each of the two Palaces have a slightly different significance. So there are twenty of these checkpoints in all. When there are two same Palaces that one on the left side will be of the nature of “Yang” (active, outgoing and positive) and one on the right side will be of the nature of “Yin” (passive and receptive).

If the color is glowing and appropriate to the area occupied by the particular palace you are interested in, your promise of success is strong. If the area appears dull or the color is wrong for the area or if the Palace appears sunken, dark or blemished, you are warned of possible disappointment and perhaps should delay your venture or take an alternative course.

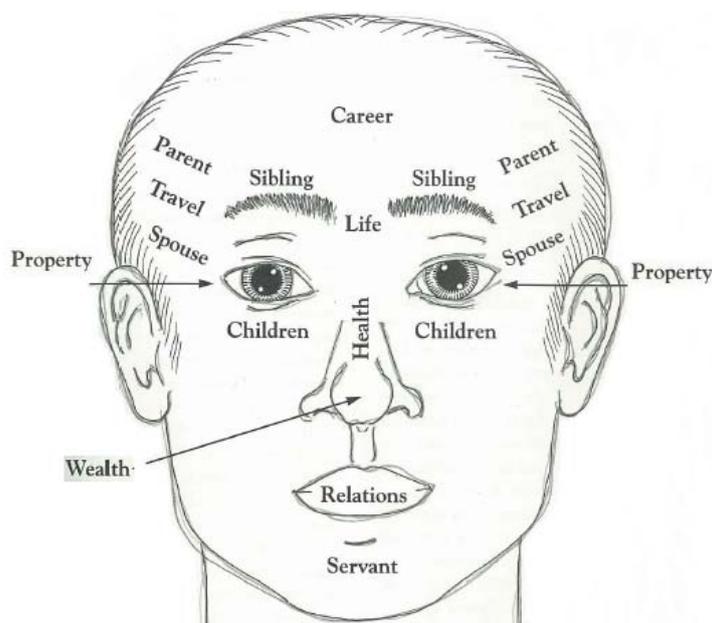


Figure 2-6 Twelve Palaces

The names of the Twelve Palaces are listed as below:

Point 1 is the Palace of Achievement

Point 2 is the Palace of Parents

Point 3 is the Palace of Friends and Siblings

Point 4 is the Palace of Transfer

Point 5 is the Palace of Happiness and Good Fortune

Point 6 is the Palace of Property

Point 7 is the Palace of Marriage

Point 8 is the Palace of Offspring

Point 9 is the Palace of Life

Point 10 is the Palace of Health

Point 11 is the Palace of Wealth

Point 12 is the Palace of Household

7. Other Facial Features – Special Traits

There are lesser facial features, such as (1) Beard (2) Eyelashes (3) Hair (4) Jawbones (5) Minor Facial Lines (6) Moles (7) Philtrum (8) Teeth, which have meaning in Face Reading and help bring out nuances of the individual's nature. These can often give quick insight into another's temperament.

China Physiognomy has many other theories to analysis not only the above method. While these concepts are separately in theory, they are intrinsically interconnected. In fact, they often overlap into each other's territory. The same facial feature could be described to the different perspectives.

Finally, our face, complexion color (spirit) can change from year to year, season to season, month to month and day to day. As they are so changeable, our fortunes are still changed as same as our face and therefore the fortunes are held on our hands. We can improve ourselves (Bridges 2004 p5-14).

2.2 Face Recognition

Human faces are complex objects that may change over time. For human being, we have a natural ability to recognize faces and can identify persons in a glance. Although our natural recognition ability extends beyond face recognition, we are equally able to quickly recognize patterns, sounds or smells. Unfortunately, this natural ability does not exist in machines and therefore why the need for us to simulate the recognition automatically to develop intelligent autonomous machines. Besides, intelligent systems have been rapid developed to simulate our perception of various inputs such as images, sound ... etc.

In 1960's, the terms of "Automatic Face Recognition" was created, the pioneers were included Woody Bledsoe, Helen Chan Wolf and Charles Bisson (Ballantyne et al 1996; Wikipedia 2009). They worked on develop the new system how to use the computer to recognize human faces.

The point of view of the biometric technologies, the face is defined that one of the important biometric identifier used for human recognition (Hiremath et al 2007, Ginhac et al 2008). Park and Paik's (2007, p. 447) conclusion supports that first, the views of Kong et al (2005), human biometric characteristics are unique and it is also hardly to be duplicated. A kind of information includes body, facial, fingerprints, hands and speech. Second, both the views of both Kriegman et al (2003) and Liu et al.(2002), the face detection and recognition techniques are proven to be more popular than other biometric based on efficiency and convenience. For the comparison of computer equipments requirement, it could use a web-camera instead of expensive equipments and require minimal user interface. On the other hands, the automatic face recognition or face recognition involves the computation of similarity between face images referring to the determination of the identity of the facial features such as eyes, eyebrows, ear, mouth, and nose. Moreover the variability of the facial features of the same human face is changed frequently to alter the face recognition such as the facial expressions, illuminations and pose. In addition, these facial variations, the background, lighting and scale changes might make face recognition even more challenging. The extra problematic conditions include noise, occlusion and many other possible factors. Third, face authentication has become a potential a research field to

face recognition latest years but face recognition is different from face authentication, it is because face authentication has to determine the identity of an object and face recognition needs to verify the claimed identity of a user. For the reason of single biometric information, this has its own limitation. Face recognition should present a multimodal biometric verification method to reduce false acceptance rate (FAR) and false rejection rate (FRR) in real time.

2.2.1 Reason of Grow Rapidly

The research of automatic face recognition has suddenly attracted significant amount of efforts and then a large number of paper published in journals and conferences dedicated to this area during last two decades. Automatic face recognition is an active area of research spanning several disciplines such as image processing, pattern recognition and computer vision. In the view of Delac and Grgic (2007, pV) stat that “Automatic face recognition across three main areas of interest: biometrics, cognitive models and human-computer interaction.” In additional to attempt many researchers due to security concern after the 9/11 terrorist attacked on the world trade center in New York City.

On the other hand, several face recognition techniques have been proved a wide range of possible application in real time such as biometric cryptosystems, cognitive sciences, credit card authentication, electronic and physical access control, law enforcement applications, multimedia system, secure information systems etc. For example, the US Department of Homeland Security is investing in face recognition technology that federal marshals can surreptitiously photograph people in airports, bus and train stations and elsewhere to check whether they are in terrorist databases (Electronic 2008).

Although face recognition is not as accurate as the other recognition method such as fingerprint, it still grabs huge attention of many researchers in the field of computer vision. The main reason is that human face is providing a more conventional way of people use for identifying rather than other method.

Another reason is the affordable hardware such as digital camera and digital video, which have made the acquisition of high quality and high resolution image ubiquitously.

Moreover, many researchers for example, Face Recognition papers have been published the computer vision community, a survey could be found in many journals, have still an interest on face recognition. The technology of face recognition could be simply and quickly defined as visual perception of familiar faces or biometric identification by matching human face through a face databases. Face datasets have been considered an essential tool for evaluating the efficacy of face recognition methods. Many of the commonly used face dataset, face image can be recognized accurately at a rate significantly higher than random even when no face, hair or clothes features appear in the image. The experiments have been done by cutting a small background area from each face image, so that each face dataset provided a new image dataset which included only seemingly blank image

In addition, for benchmark checking of Face Recognition, researchers should use a standard test data set to compare the results directly. In the meantime, many testing face image database in use currently as institutions and universities are willing to share their database to the public. Those are also freely available for developers download. The commonly sponsors are provided as following (Khashman 2008):

- The Color FERET Database, USA

<http://www.itl.nist.gov/iad/humanid/feret/>

- The Yale Face Database

<http://cvc.yale.edu/projects/yalefaces/yalefaces.html>)

- The Yale Face Database B

<http://cvc.yale.edu/projects/yalefacesB/yalefacesB.html>)

- PIE Database, CMU

http://www.ri.cmu.edu/projects/project_418.html)

- AT&T “The Database of Faces” (formerly “The ORL Database of Faces”)

<http://www.cl.cam.ac.uk/research/dtg/attarchive/facedatabase.html>

- Project – Face In Action (FIA) Face Video Database, AMP, CMU

<http://amp.ece.cmu.edu/projects/FIADDataCollection/>

- MIT-CBCL Face Recognition Database

<http://cbcl.mit.edu/software-datasets/heisele/facerecognition-database.html>

- NIST MugShot Identification Database

<http://www.nist.gov/srd/nistsd18.htm>

- BioID Face DB – HumanScan AG, Switzerland

<http://www.bioid.com/downloads/facedb/index.php>

- The UCD Colour Face Image Database for face detection

<http://ee.ucd.ie/%7Eprag/>

2.2.2 Categories of Face Recognition

Most face detection methods are based on local facial feature detection and classification for using statistical and geometric models. Moreover, other approaches are based on template matching to detect local sub-features and consider the face whether is rigid in appearance or deformable.

Reference to Singh et al (2008), Eleyan & Demirel (2007), Savvides et al (2007) and Dr. Hasanuzzaman & Dr. Ueno (2007) opinions, the Face Recognitions are generally performed by using three categories: (1) Global-based Approach, (2) Feature-based Approach and (3) Texture-based Approach.

The first category is global approach or appearance-based approach that is a representation of the face such as optical flow, raw pixels etc. This approach is broadly categorized into holistic and refer to as monolithic & parts-based representation. A major criticism of purely appearance-based approach is lack of shape registration. Over the world, when variation occurs, their lack of shape registration such as knowledge of the position of the eyes, eyebrow and mouth etc makes normalizing for translation and rotation difficult to achieve. Those algorithms such as: PCA, LDA, ICA etc are applied on appearance-based approach.

PCA - Principal Component Analysis

PCA is the most widely used dimensionality reduction technique. It enables us to extract a lower dimensional subspace that represents the principal directions of variations of the data with controlled loss of information. Also known as the Karhunen Loeve Transform (KLT) or Hotelling Transform, its application in face recognition is most commonly known as Eigenfaces.

PCA typically includes two phases: training and classification. In the training phase, an eigenspace is established from the training samples using PCA and the training face images are mapped to the eigenspace for classification. In the classification phase, an input face is projected to the same eigenspace and classified by an appropriate classifier.

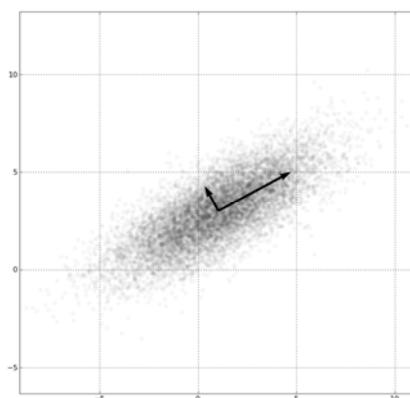


Figure 2-7 PCA of a multivariate Gaussian distribution centered at (1,3) with a standard deviation of 3 in roughly the (0.878, 0.478) direction and of 1 in the orthogonal direction

LDA - Linear Discriminant Analysis

LDA is also known as fisherfaces method is another example of appearance-based techniques which encodes discriminatory information in a linear separable space of which bases are not necessarily orthogonal.

LDA overcomes the limitations of eigenfaces method by applying the Fisher's linear discriminant criterion. This criterion tries to maximize the ratio of the determinant of the between-class scatter matrix of the projected samples to the determinant of the within-class scatter matrix of the projected samples

LDA finds the vectors in the underlying space that best discriminate among

classes. For all samples of all classes the between-class scatter matrix S_B and the within-class scatter matrix S_W are defined. The goal is to maximize S_B while minimizing S_W , in other words, maximize the ratio $\det |S_B| / \det |S_W|$. This ratio is maximized when the column vectors of the projection matrix are the eigenvectors of $(S_W^{-1} \times S_B)$.

ICA - Independent Component Analysis

ICA is techniques that examine thoroughly the higher-order statistical structure in the data. Addressing higher-order statistical dependencies, these methods allow the separation of multivariate signals into additive sub-components, assuming the mutual statistical independence of the non-gaussian source signals (blind source separation is a special case of this), which is a much stronger condition than uncorrelatedness.

Bartlett et al. (1998) provided two architectures of ICA for face recognition task: Architecture I - statistically independent basis images, and Architecture II - factorial code representation.

The second category is feature-based approach or component-based approach that are many methods to detect facial features (eyes, eyebrows, mouth, lips ...etc.) individually and from their geometrical relations to detect the faces. Human face skin color and texture also used as features for face detection. The major limitations with these feature-based methods are that the image features are corrupted due to illumination, noise and occlusion problem. The algorithm of GF and LFA are applied on feature-based approach.

GF - Geometrical Feature

GF uses mixture distances of the facial features for matching. This algorithm works on the distance between geometrical features. Facial features such as nose, mouth, eyes, and ears are extracted and their shape information is computed. For matching two images, this shape information is matched using Euclidean distance measure.

LFA - Local Feature Analysis

LFA could accommodate some changes in facial expression. LFA refers to a class of algorithms that extract a set of geometrical metrics and distances from facial images and use these features as the basis for representation and

comparison. The recognition performance is dependent on a relatively constant environment and quality of the image.

The third category is texture based approach that learns from a set of labeled faces and trying to fit the shape to any unknown face. The algorithm of LFA, LBP and NN are applied on texture based approach.

IGF - Independent Gabor Features

IGF extracts Gabor features from the face image and then reduces the dimensionality using PCA. The independent Gabor features are obtained from the reduced dimensionality feature vector by applying Independent Component Analysis. These independent Gabor features are classified using Bayes classifier and then matched using the Manhattan distance measure.

IBP - Local Binary Pattern

IBP extracts textural feature from the face images. The face image is divided into several regions and weighted LBP features are extracted to generate a feature vector. Matching of two LBP feature vectors is performed using weighted Chi square distance measure based algorithm.

NN - Neural Network

Neural Network commonly applies to handle nonlinear data and complex situation such as data in great magnitude or too less data available. Most of the NN applications are fast and reliable.

NN uses dynamic neural network architecture to extract the phase features, which are divided into frames and are matched using distance. A neural network is an interconnected group of neurons that uses a mathematical model for information processing. For face recognition, NN can be applied in classification, data processing, decision making of determine human face and facial features.

Other then above listed methods such as PCA, LDA and ICA, neural network has the ability to adapt and learn. And those methods are based on statistical techniques and may due to deficiencies.

Chapter 3 Analysis & Design

3.1 Methodology

The project aims at providing a functional program that able to work as Face Recognition and Face Fortune Analysis System with China Physiognomy Methodology by analysis photograph with human face loaded to the system.

In the program, we let the program analysis photograph based on coordinating of facial feature points detected. By fine tuning the analysis algorithm, faster respond and much accurate result could be achieved.

3.1.1 System Requirement

The system requirements are listed as below:

Functional Requirements

1. Program detect human face and facial feature point
2. Fortune analysis with china physiognomy

Non-functional Requirements

1. Able to handle image capture from webcam and loaded locally
2. Show the facial feature point detected to user
3. Facial feature points labeling
4. Face dividing to 3 zones refers to three stations theory of china physiognomy
5. Machine Independent
6. Result Consistent
7. Error handling in user friendly way
8. Flexible to future enhancement

3.1.2 Determining the Accuracy of the Program

The analysis results should be accurately if the program could perform stability and feasibility. Moreover the result should be presented the china physiognomy analysis methodology consistently. For example, if the program treats a girl with large eyes as a boy with small eyes on the same facial feature situation detected, the analysis process must be not accurate and useless to the end user. The accuracy of the program depended on the followings,

1. Facial feature points detection

The program first analyzes graphical data and detect human facial feature, and transform these data to facial point coordinates and then process these coordinates to get the final outcome. Thus, the detection of facial feature points deeply affects the whole analysis result as it's provide raw data for the program throughout the analysis process.

2. Algorithm that used to analyze the facial feature points data

As the facial feature detection result affected by the quality of photograph loaded to the program, the lightness and contrast in the photograph, the orientation of the photograph and other reasons, the algorithm could not be designed in only simple comparison on x- and y-coordinates of facial feature points. In some case, threshold has been introduced in the algorithm to improve the accuracy of the program.

3.1.3 Making the Result Standardized

As one of the criteria to determine the accurate of the program is the average time of performing one mouse action that the program requests the end user to perform, the exercises and tests could be made more standardized by reducing as many variable related to time latency as it can. The appearance of these variables maybe due to processing power of the machine that run the program, the variance of operating system version and the algorithm related to time used in the program. To minimize the effects of these variables, the program speed should be designed to be machine and operating system independent.

3.2 Software Process Models

After understanding the system requirement, we decide to use the Waterfall Model as the software process models. The Waterfall Model is a sequential development process.

We have chosen Waterfall model because this process model is suitable to be applied in the situation in the project as the requirements is simple and very clear at the early stage of development. In addition, Waterfall model is suitable for small and medium-sized software systems. Since the project is to design a Face Fortune Analysis System, the specification rarely changes during the development time. This process model provides a precise goal for us throughout the development process.

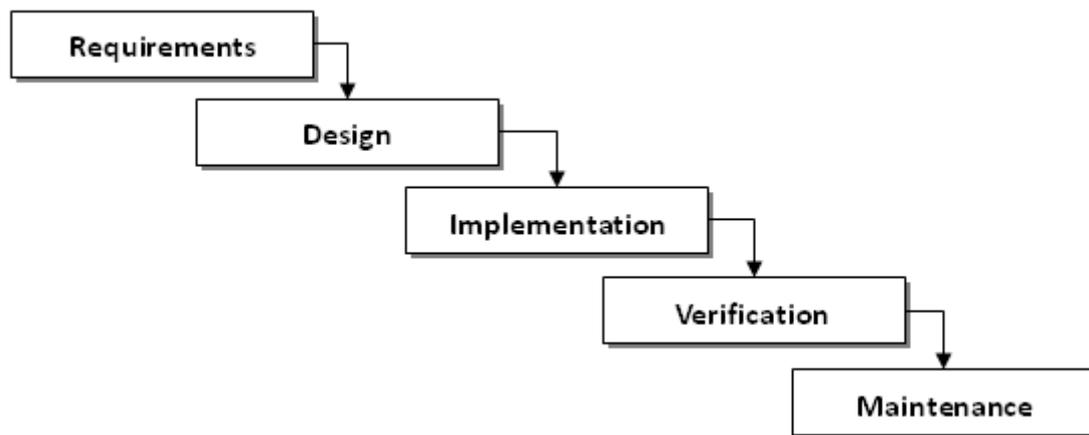


Figure 3-1 Workflow of Waterfall Model

3.3 Program Structure

The program has four main parts, namely, WebCam Capturing Module, Image Loading Module, Face Recognition Engine Module and Result Analysis Module. They linked up by the main program. These modules have distinct roles in the system and work together to provide total functionality of the system.

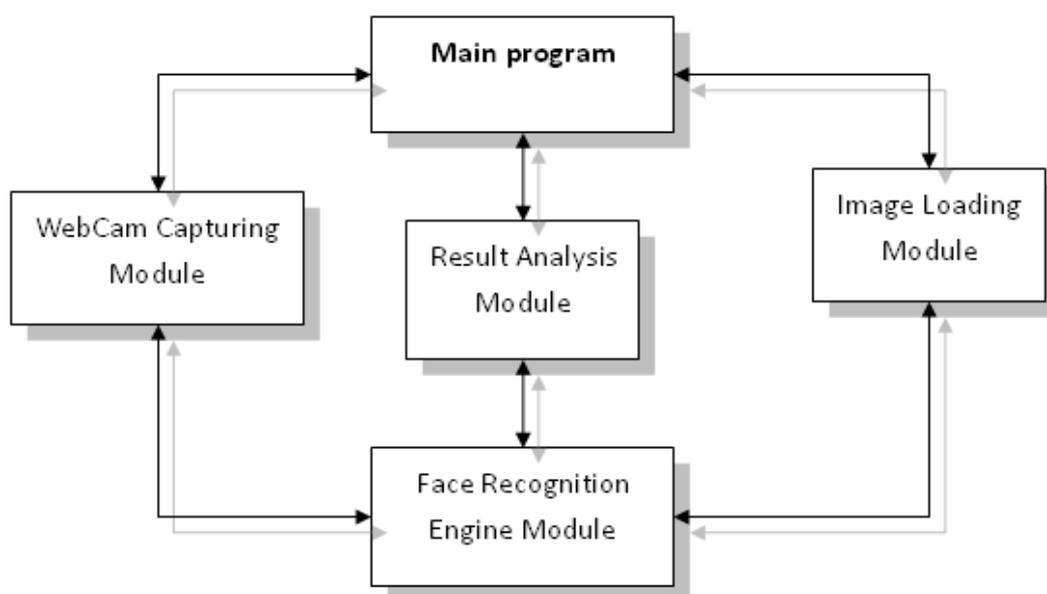


Figure 3-2 System Structure of Face Fortune Analysis System

3.3.1 WebCam Capturing Models

The WebCam Capturing Module gives the ability for the program to capture image from webcam. The aim of using a webcam is to enhance the program to analyze human faces not only to pre-taken photographs, but also real-time captured human face. Image captured would deliver to Face Recognition Engine Module for further processing.

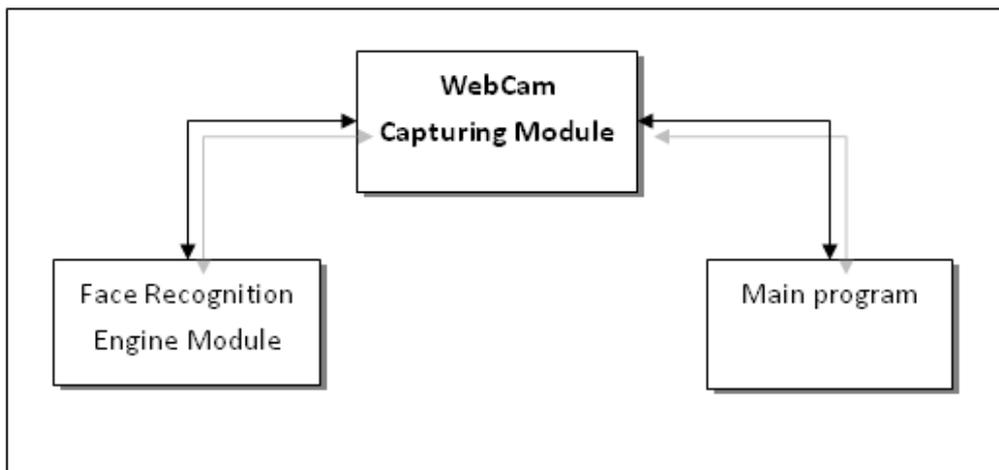


Figure 3-3 Interaction with Other Modules by WebCam Capturing Module

3.3.2 Image Loading Module

The Image Loading Module provides the ability for the program to retrieve image data from pre-taken photographs such as digital camera and scanner. Image loaded will deliver to Face Recognition Engine Module for further processing.

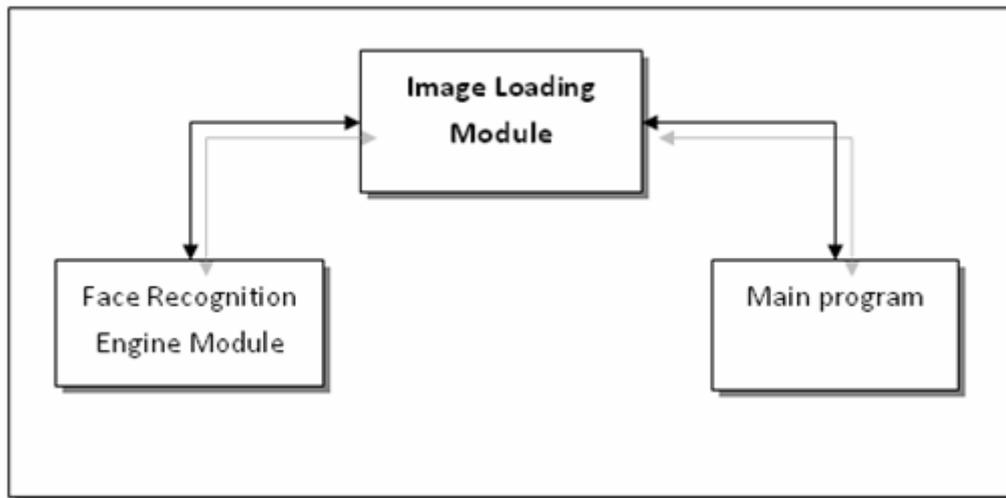


Figure 3-4 Interaction with Other Modules by Image Loading Module

3.3.3 Face Recognition Engine Module

The Face Recognition Engine Module is the key of the program. According to the reference to Haddadnia’s approach of Single Feature Neural Network (SFNN) Human Face Recognition method to perform face detection, facial features recognition.

After recognizing, FFAS will label the detected facial features points from 1 to 40 and use a red lines to divide the whole face into three zones under Three Station Theory of China Physiognomy ([Page 19](#)).

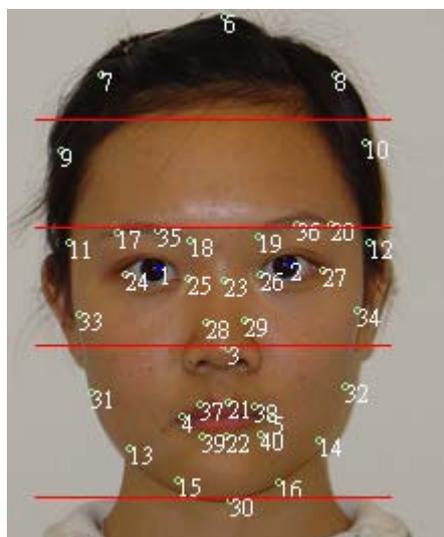


Figure 3-5 Face Labeling and three station dividing

The face recognition engine Module detects faces and recognizes facial features from image data from Webcam Capturing Module or Image Loading Module. The process returns coordinates of facial feature points. The coordinate information will pass to Result Analysis Module for final processing.

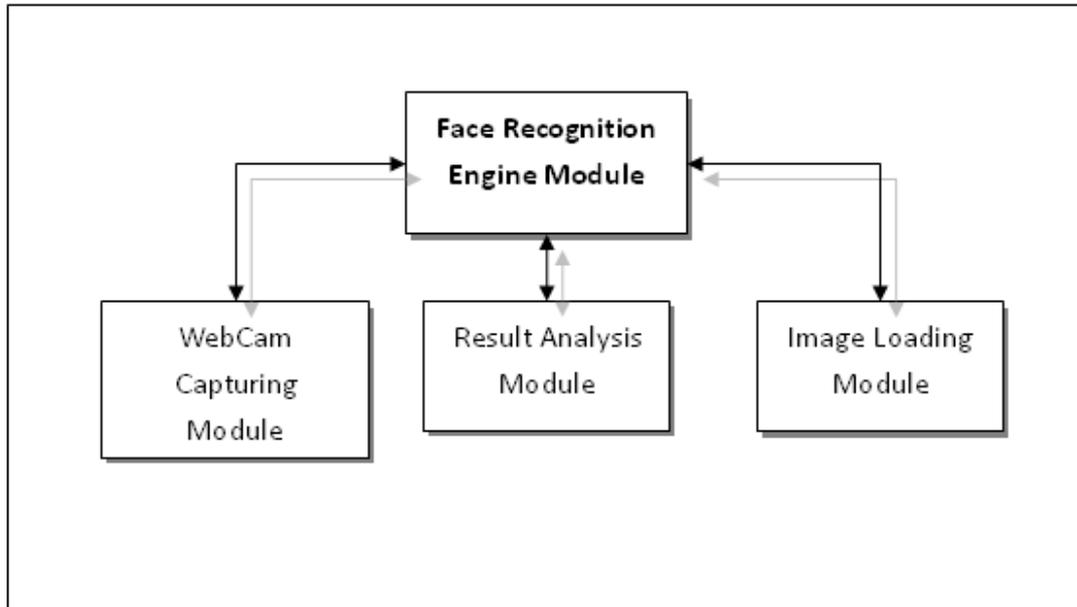


Figure 3-6 Interaction with Other Modules by Face Recognition Engine Module

3.3.4 Result Analysis Module

The Result Analysis Module gets data from Face Recognition Engine Module. Based on the data of facial feature coordinates detection, the system would process the facial fortune analysis with China Physiognomy Analysis Methodology to return the result accurately.

The results would include (1) Three Station Analysis (2) Eyebrows Analysis (3) Eye Analysis (4) Nose Analysis (5) Mouth Analysis.

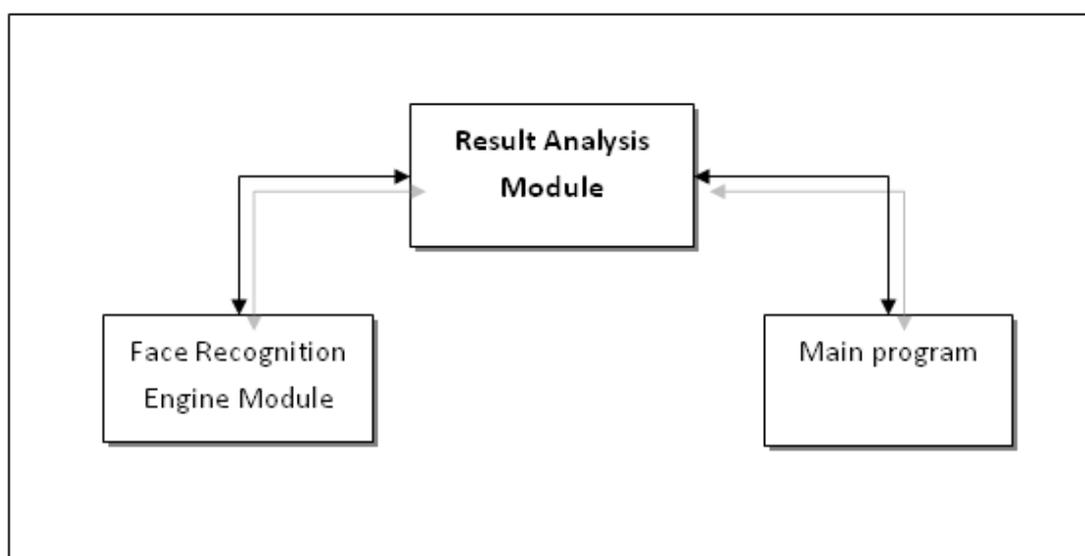
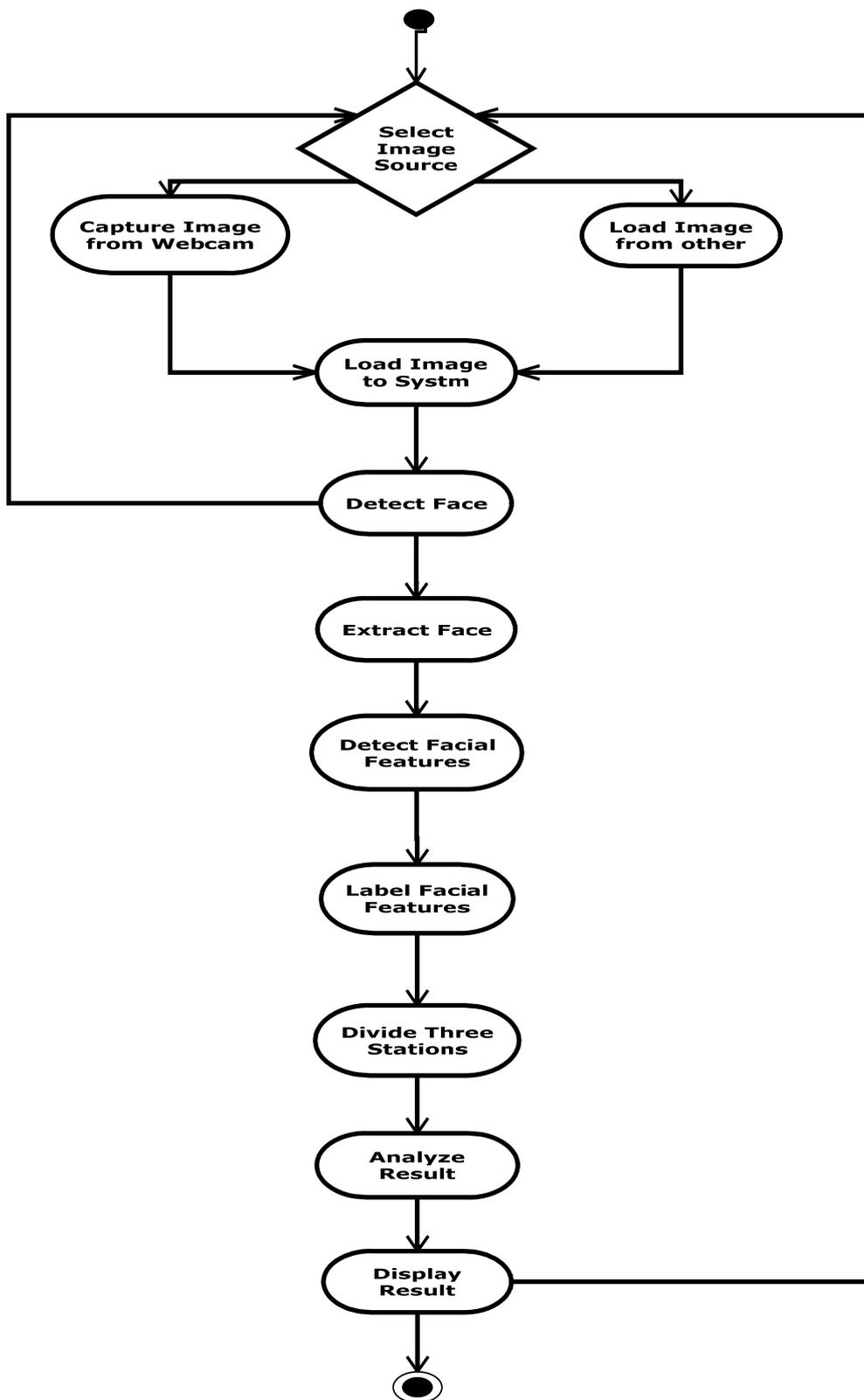


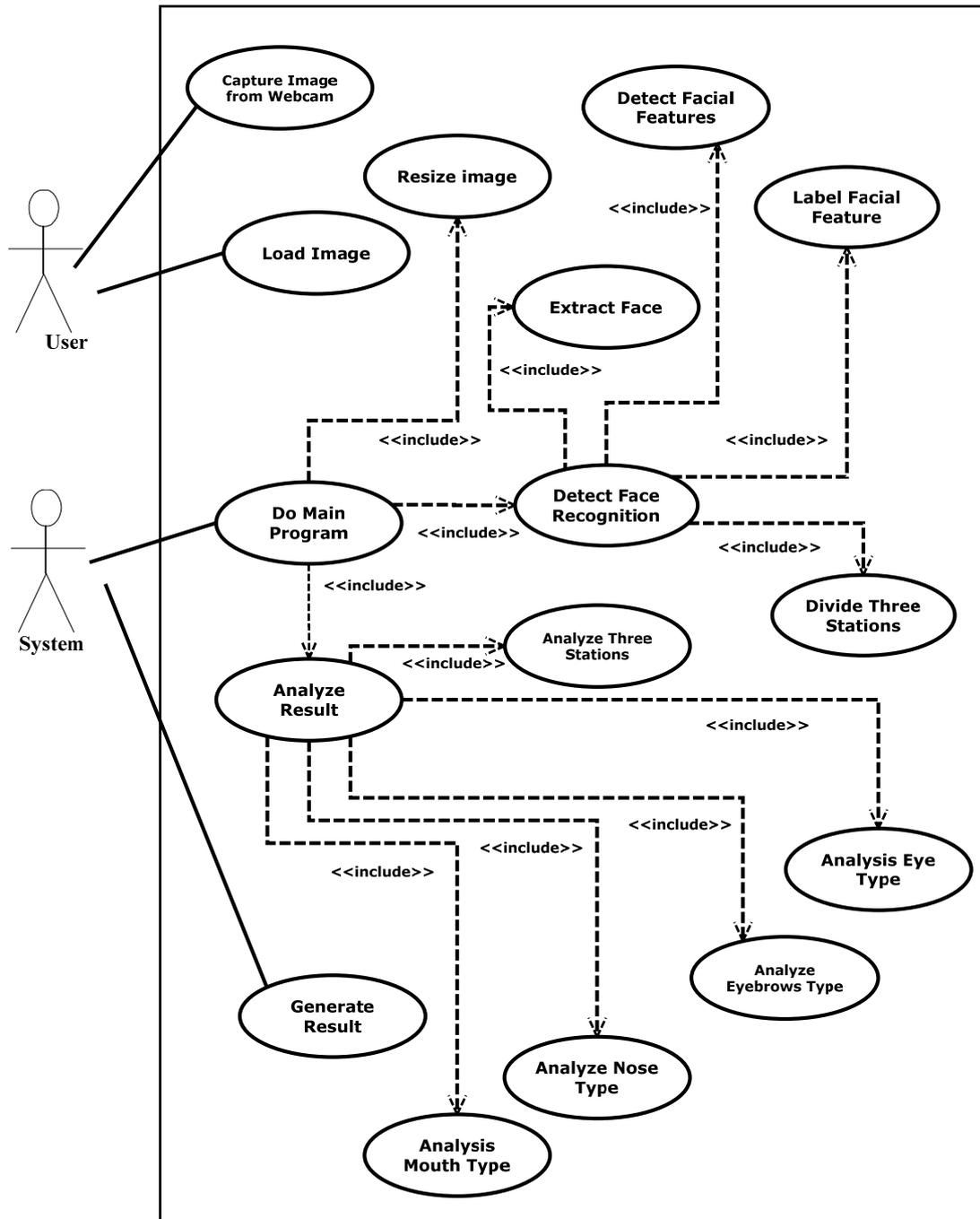
Figure 3-7 Interaction with Other Modules by Result Analysis Module

3.4 UML Diagram

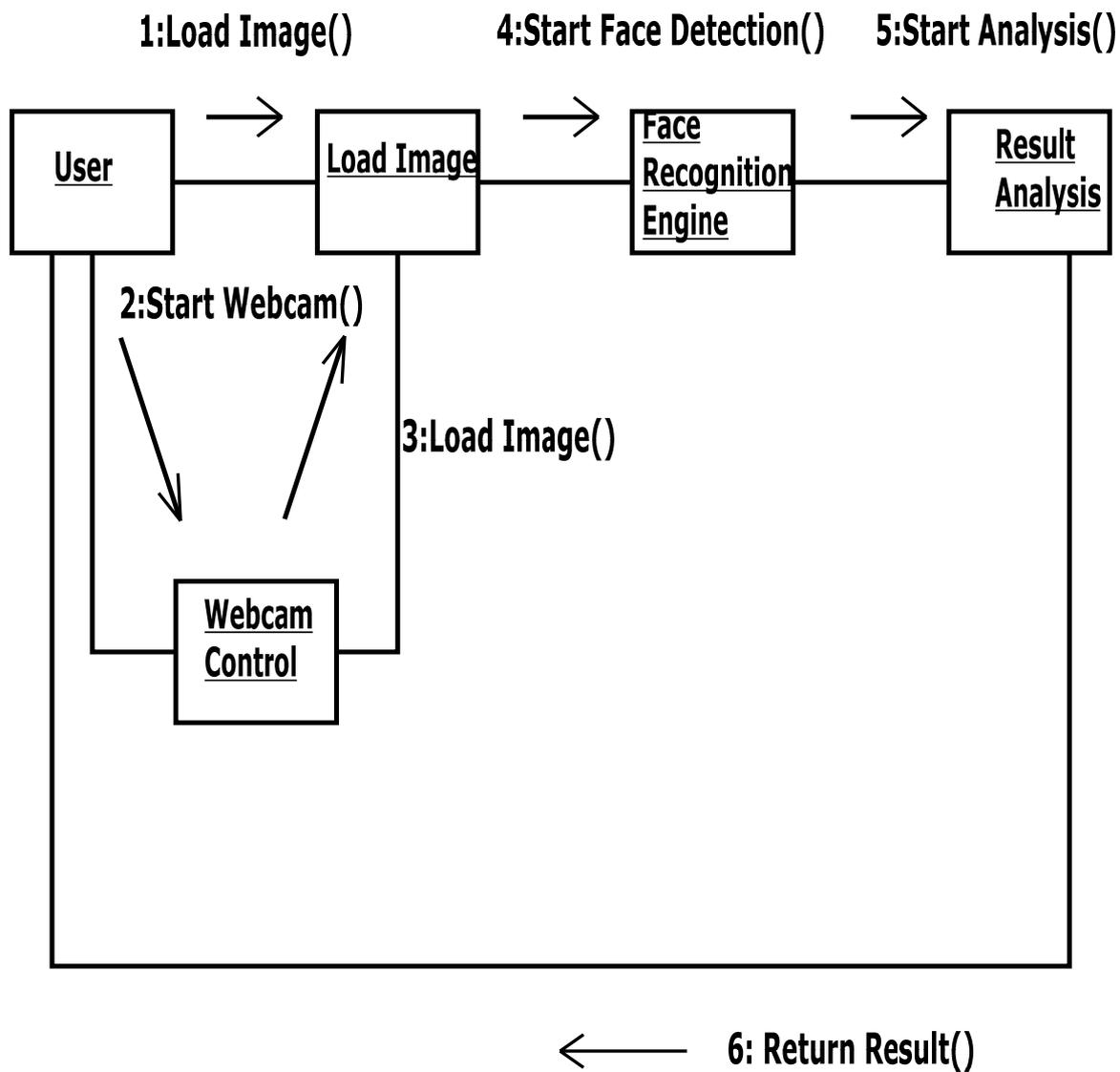
3.4.1 Activity Diagram



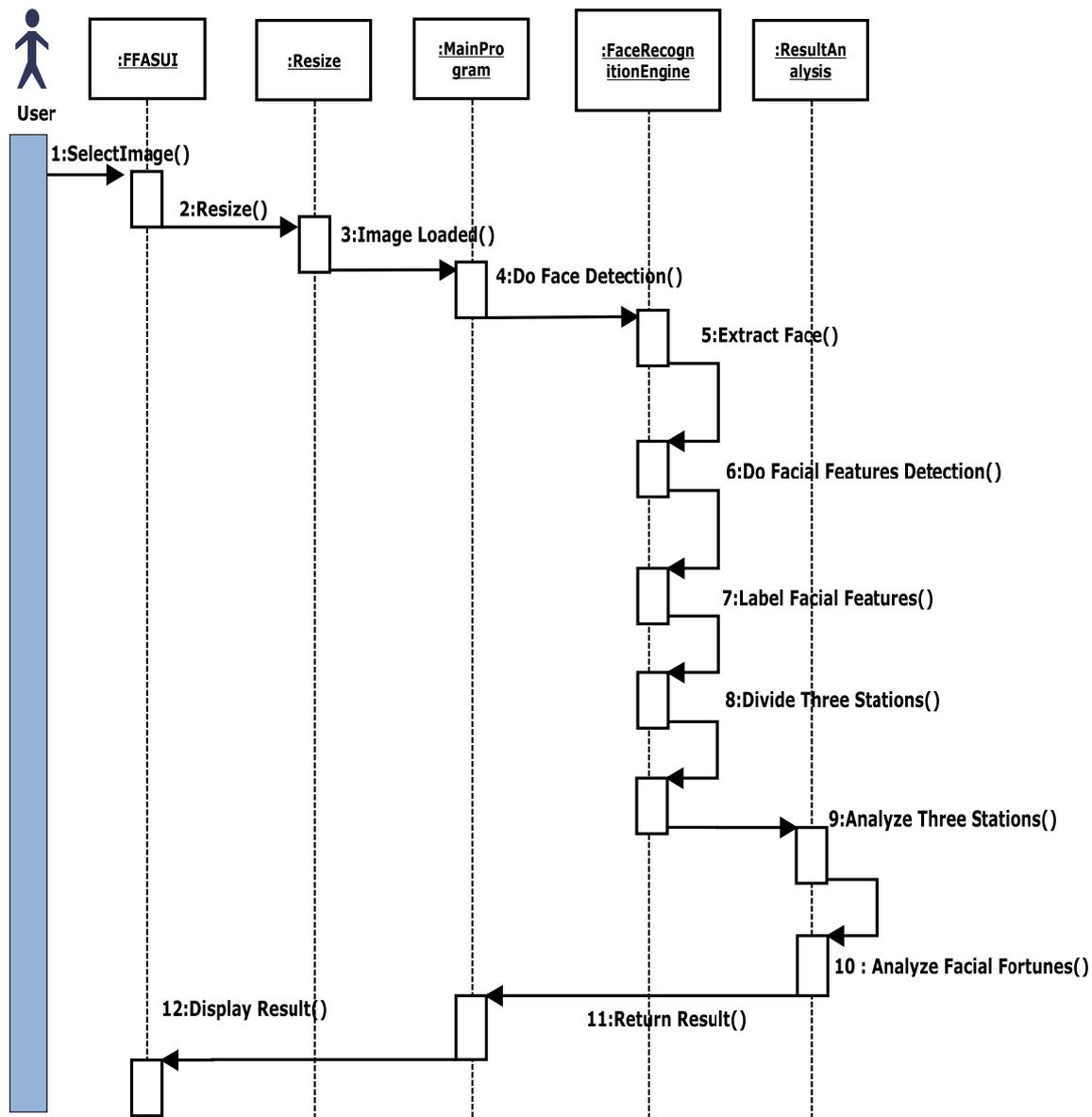
3.4.2 Use Case Diagram



3.4.3 Collaboration Diagram



3.4.4 Sequence Diagram



3.5 User Interface

3.5.1 User Interface – Inactivity Section

“**Result**” is showed the analysis result, like what is the type of Eyes, Eyebrows, Nose and Mouth.

“**Detail Result**” is showed the detail description of result, like what is the detail result of the “Three Station”, Eyes, Eyebrows, Nose and Mouth.

“**Image loaded area**” displays the image which imported to FFAS or captured by webcam.

“**Function Button**”

- “**Preview**” starts the webcam.
- “**Capture**” captures the image.
- “**Load Image**” inputs the selected image.
- “**Analysis**” processes the face recognition and face fortune analysis result.

“**Tool Bar**” displays the system menu.

“**Webcam Status**” displays the webcam status.

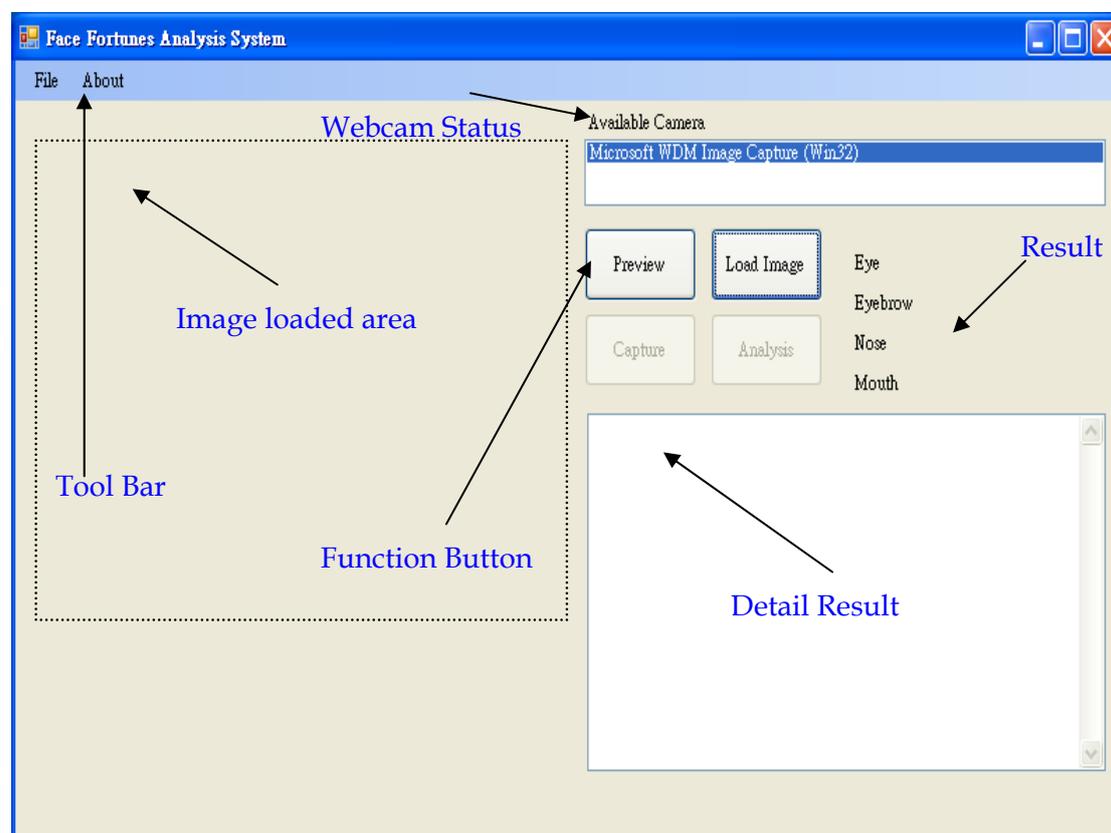


Figure 3–8 User Interface of Face Fortune Analysis System

3.5.2 User Interface – Activity Section

“Image loaded area” displays the image after facial features points labeling and three stations dividing.

“Result” refers the loaded image to show the analysis result

“Detail Result” refers the result section to show the detail description of face fortune analysis result.

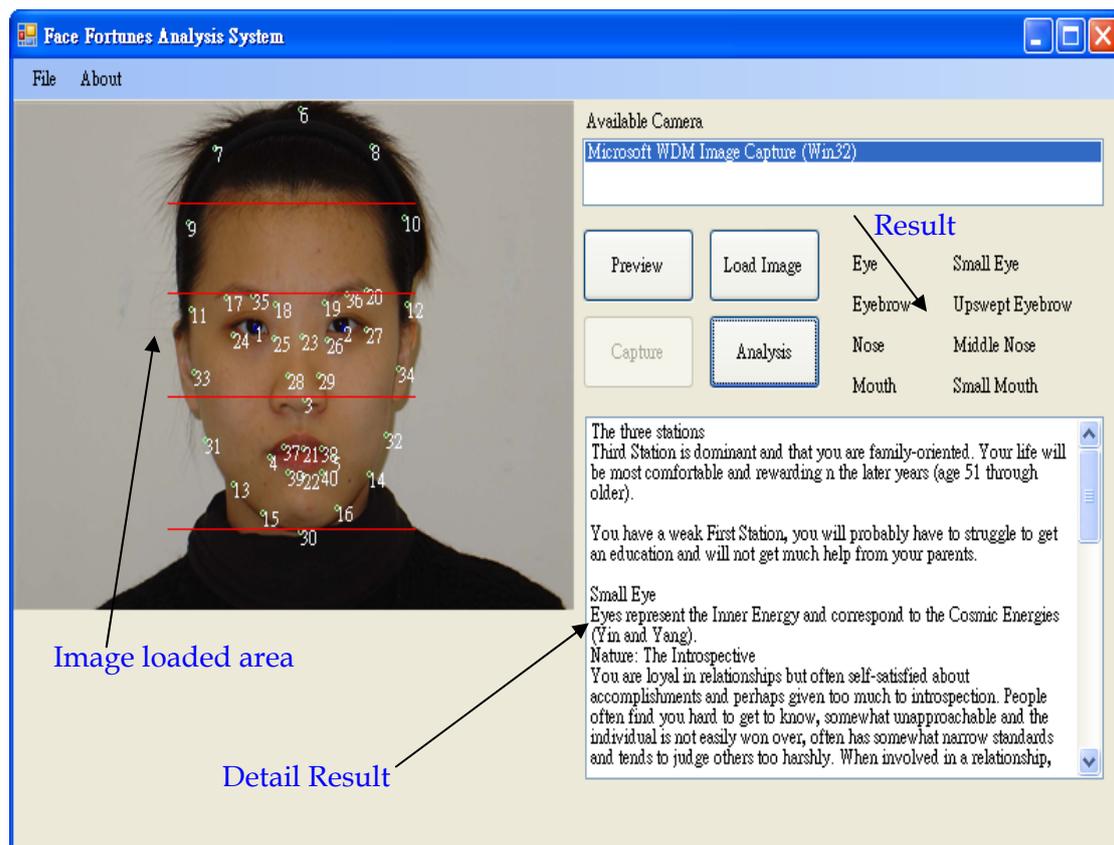


Figure 3-9 The result of Face Fortune Analysis System

Chapter 4 Implementation & Testing

4.1 Programming Language

We have chosen Visual Basic as the programming language that has been used in the project. The main reason for supporting this decision is that the product of this project will only be run on Microsoft Windows based on PC. This implied that the codes are not necessary to be portable to other platforms. The benefit we have got by using Visual Basic to implement the project that we could save time for making the basic layout. We could therefore concentrate on programming.

4.2 Implementation of Program Modules

4.2.1 Implement the Main Program

The core part of the program allows access to functions provided by other modules. By using Visual Basic, program layout could be changed easily. The appearance of the user interface in the main program has been revised several times in order to improve the easiness and effectiveness of using and accessing program functions. In the latest version of the program, the layout of the main program is in a clear and concise style.

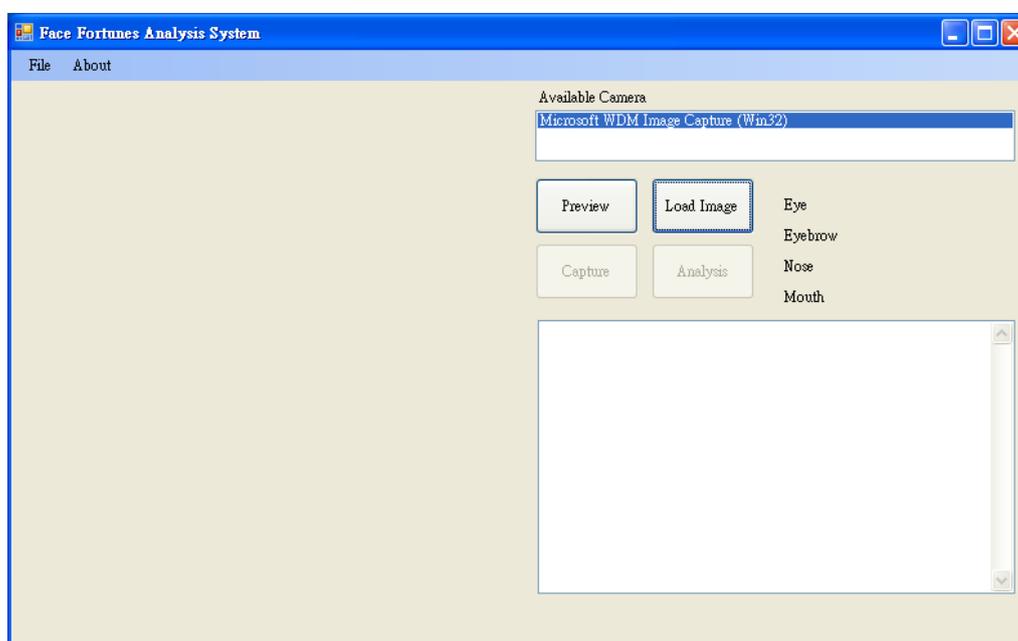


Figure 4-1 Latest Version of Main Program

4.2.2 Implement the Webcam Capturing Module

We start to build WebCam Capturing Module as we are able to process image capture from webcam in real time, which is an essential feature of the program. Therefore, webcam can be controlled by the program and the webcam image capture can be achieved anytime and anywhere. The flexibility should be enhanced the system utility.

```

Declare Function capCreateCaptureWindowA Lib "avicap32.dll" _
    (ByVal lpszWindowName As String, ByVal dwStyle As Integer, _
    ByVal x As Integer, ByVal y As Integer, ByVal nWidth As Integer, _
    ByVal nHeight As Short, ByVal hWndParent As Integer, _
    ByVal nID As Integer) As Integer

Declare Function capGetDriverDescriptionA Lib "avicap32.dll" (ByVal wDriver As Short, _
    ByVal lpszName As String, ByVal cbName As Integer, ByVal lpszVer As String, _
    ByVal cbVer As Integer) As Boolean
    
```

Figure 4-2 Source Code of Webcam Control

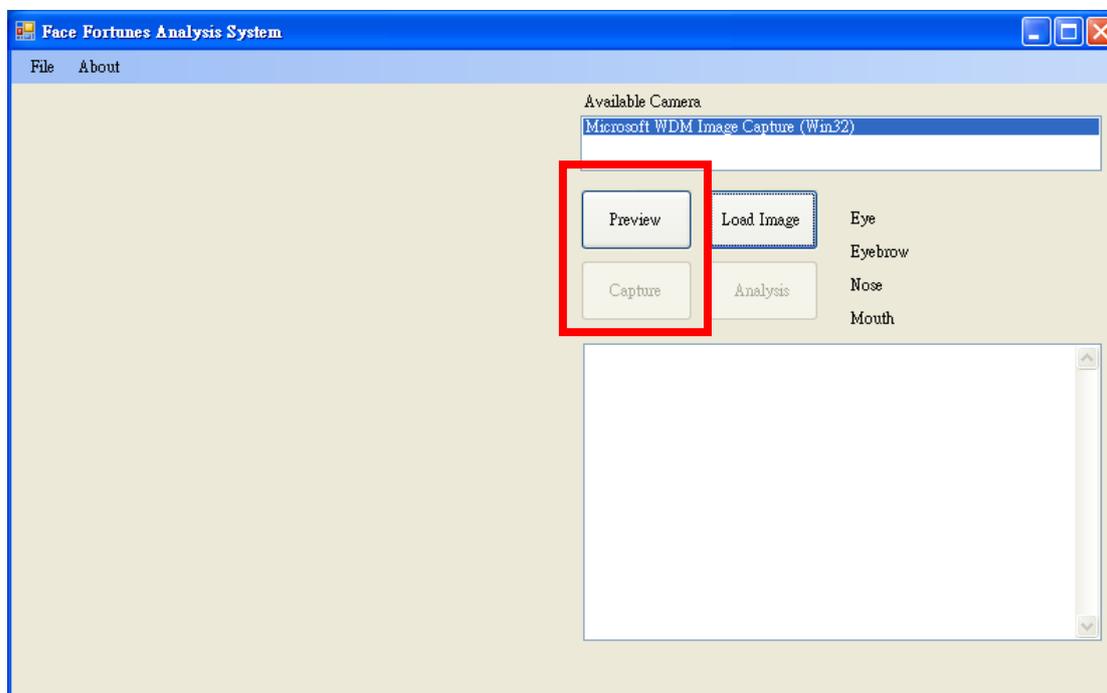


Figure 4-3 Webcam Control Function

4.2.3 Implement the Image Loading Module

The Image Loading Module loads bitmap and jpeg formats image to the system for analyzing. The image loads to the system will be resized to proper pixels for the analyzing purpose. This mechanism ensures that the processing speed of the system and standardized the result by analysis images with fixed-width generated from image loaded or captured.

```
Dim g As Graphics = Graphics.FromImage(thumb)
g.InterpolationMode = Drawing2D.InterpolationMode.HighQualityBicubic
g.DrawImage(bm, New Rectangle(0, 0, width, height), New Rectangle(0, 0, bm.Width, _
    bm.Height), GraphicsUnit.Pixel)
```

Figure 4-4 Source Code of Image Loading

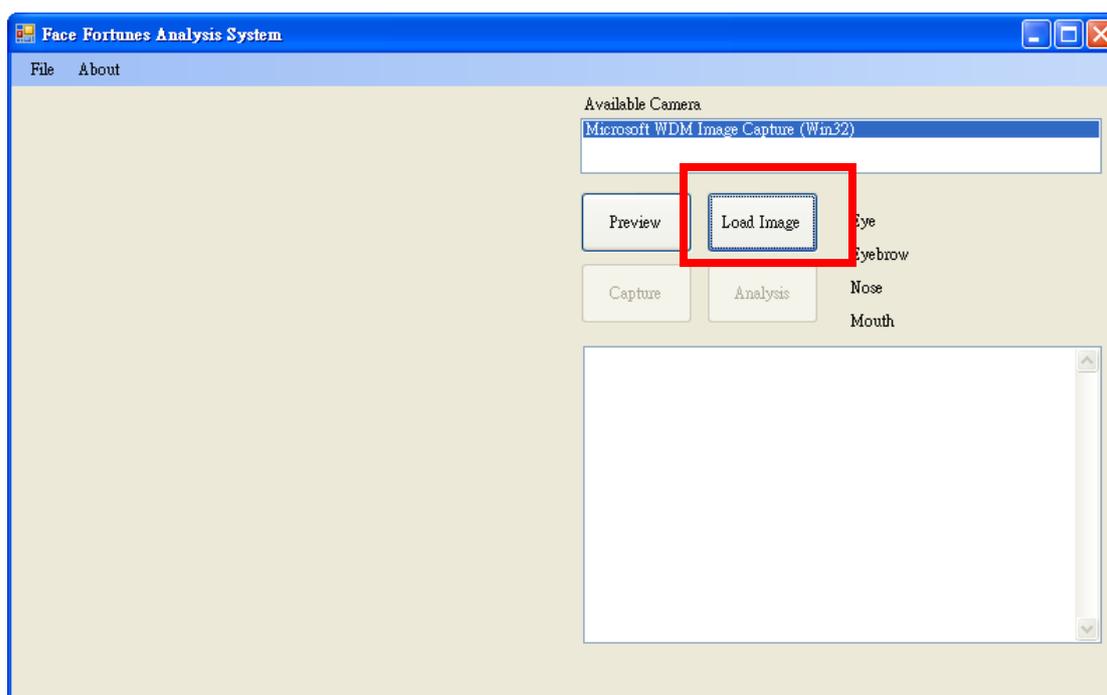


Figure 4-5 Load Image Function

4.2.4 Implement the Face Recognition Engine Module

The design of Face Recognition Engine Module is built reference to Single Feature Neural Network (SFNN) face recognition method, which is one of the Radial Base Function (RBF) neural network methodology. Face Recognition Engine Module performs face recognition by Face Localization, Face Extraction and Neural Network Classifier. The face localization can be performed by finds the best-fit ellipse to enclose the facial region of a human face. The following formulas are used to measure the best-fit ellipse:

$$\phi_i = P_{inside} / \mu_{0,0}$$

$$\phi_o = P_{outside} / \mu_{0,0}$$

where P_{inside} refers to background points inside the ellipse, $P_{outside}$ is the points of connected object outside the ellipse and $\mu_{0,0}$ is the size of connected object. If ϕ_i and ϕ_o is greater than 0.1, there is none human face detected. Accordingly ϕ_i and ϕ_o should be as small as possible.

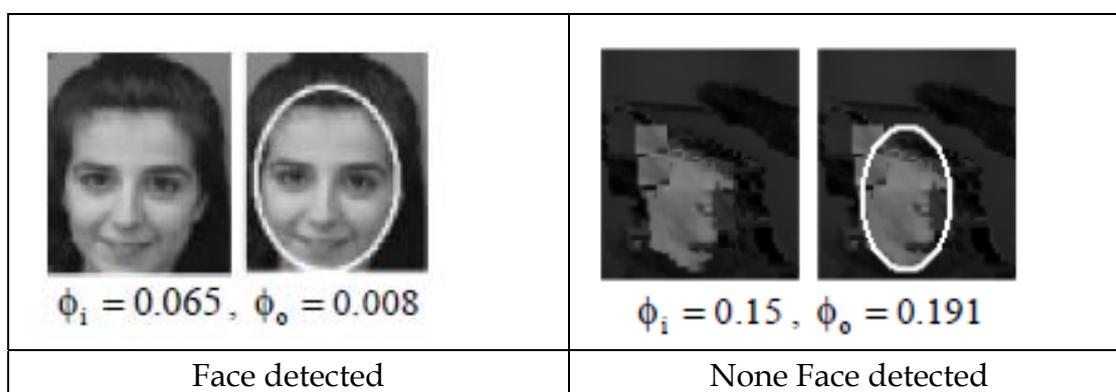


Figure 4-6 Detecting between Face and None Face

The face extraction can be done by after finding the best-fit ellipse. Afterward, the algorithm will use the subimage instead of selected whole image to recognize the facial features and the system should ignore the irrelevant facial portions, such as hair, shoulder and background.

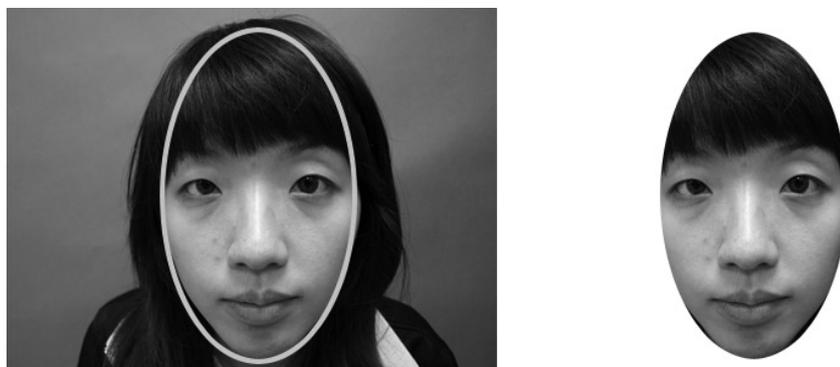


Figure 4-7 Face Location (Left) and Subimage (Right)

Neural network classifier could be viewed as a function mapping interplant that tries to construct hypersurfaces. The following formula is used to the Neural Network Classifier:

$$R_i(x) = R_i\left(\frac{\|x - c_i\|}{\sigma_i}\right) \quad , \quad i=1,2,\dots,r$$

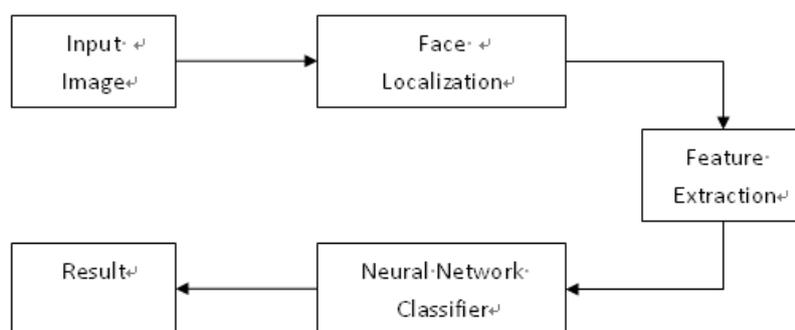


Figure 4-8 Workflow of Single Feature Neural Network

On the other hand, SFNN approach could provide the higher accuracy rate of face detection and face recognition on FFAS ([Appendix C](#)). It can be used in a short period of time to analyze facial feature coordinate.

4.2.5 Implement the Result Analysis Module

The Result Analysis Module performs analysis with China Physiognomy based on Facial Feature points detected by Face Recognition Engine Module. We use the coordination of those feature points to analysis result such as comparing the position of the feature points, length between two feature points, ratio of length segment etc. This module can be updated when a new face fortune character is introduced to the system. The accuracy to the analysis result is highly related to this module.

The results are listed as below:

1. Facial Features Point would be labeling and the head would be dividing to 3 zones.
2. Short result would be shown.
3. Detail result would be shown.

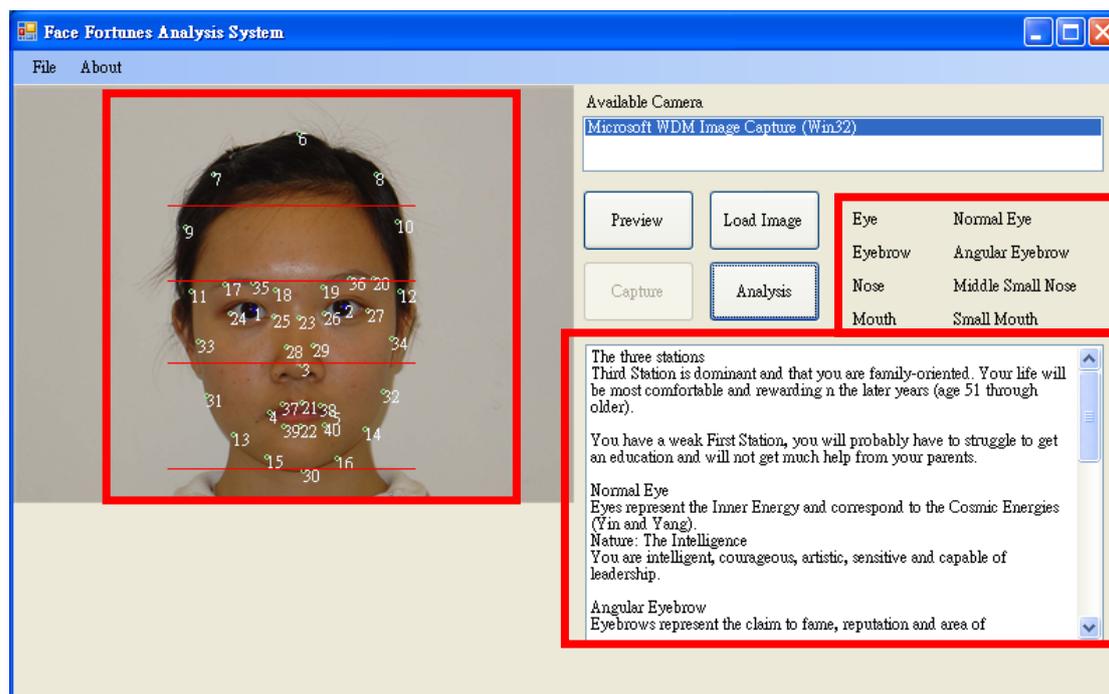


Figure 4-9 Result of Face Fortune Analysis System

4.3 Testing

4.3.1 Testing Environment

The program has been tested with machines with following specification:

PC1

Hardware:	Software:
- AMD Sempron 2Ghz	- MS Windows XP (SP2)
- 2GB RAM	- MS Visual Basic 2008 Express Edition
- Screen Resolution 1680*1050	
-Logitech USB webcam	

PC2

Hardware:	Software:
- Intel Pentium Dual Core 1.6Ghz	- MS Windows XP (SP2)
-1GB RAM	- MS Visual Basic Runtime
- Screen Resolution 1024*768	
-USB webcam	

4.3.2 Test Case

Test case ID: 1	Test Machine: PC1 / PC2
Test	Capture the image by Webcam
Description:	
Test Execution:	<ol style="list-style-type: none"> 1. Click “Preview” 2. Click “Capture”
Expected Result:	Image could be captured from webcam via FFAS controlled
Actual Result:	<ol style="list-style-type: none"> 1. Image could be captured 2. Image could be resized the pixels and saved as newimage.bmp and then loaded to the program left hand side.
Test Result:	The function of Webcam Control - PASS

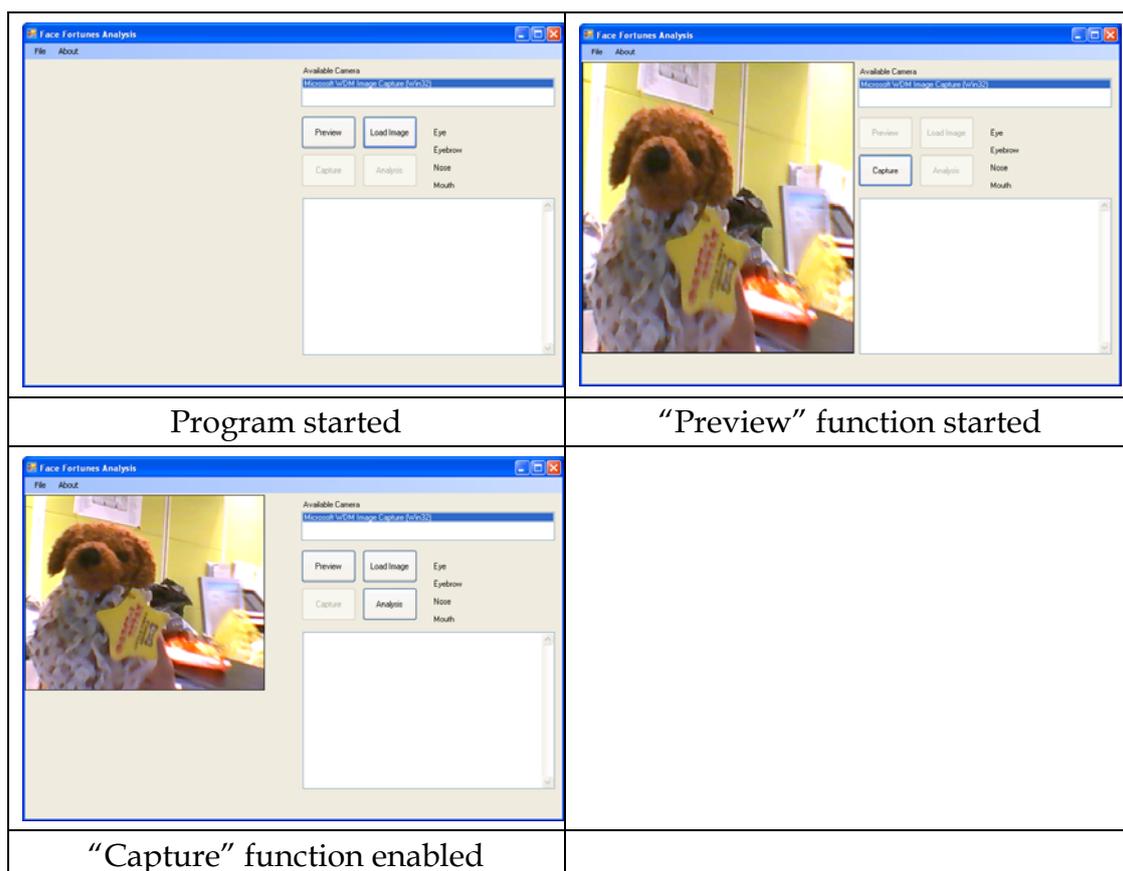


Figure 4-10 Result of Test Case 1

Test case ID: 2	Test Machine: PC1 / PC2
Test	Load the image
Description:	
Test Execution:	<ol style="list-style-type: none"> 1. Click “Load image” 2. Choose test image “F0230deg1.jpg”
Expected Result:	F0230deg1.jpg should be resized and saved as newimage.bmp, and newimage.bmp loaded to the program left hand side.
Actual Result:	After choose the selected image, this image could be loaded on program left hand side and this image should be resized the pixels.
Test Result:	The function of Load Image - PASS



Figure 4-11 Result of Test Case 2

Test case ID: 3	Test Machine: PC1 / PC2
Test Description:	Start Analysis from loaded image
Test Execution:	<ol style="list-style-type: none"> 1. Repeat test case #1 2. Click “Analysis”
Expected Result:	<ol style="list-style-type: none"> 1. Analysis start as human face should be detected 2. Facial features detected 3. Labeling the facial feature 4. Analysis with China Physiognomy Methodology 5. Get Result <ul style="list-style-type: none"> - Eye type & detail - Eyebrows type & detail - Nose type & detail - Mouth type & detail - Three station type & detail
Actual Result:	<p>As Expected Result</p> <ol style="list-style-type: none"> 1. Human face detected 2. Facial features detected 3. Point 1 to point 40 facial point detected 4. Analysis with China Physiognomy Methodology 5. Analysis done and detailed result show (Detail result as Figure 4-12)
Test Result:	<p>Face Recognition – PASS</p> <p>Facial Feature Analysis – PASS</p> <p>Fortune Analysis with China Physiognomy - PASS</p>

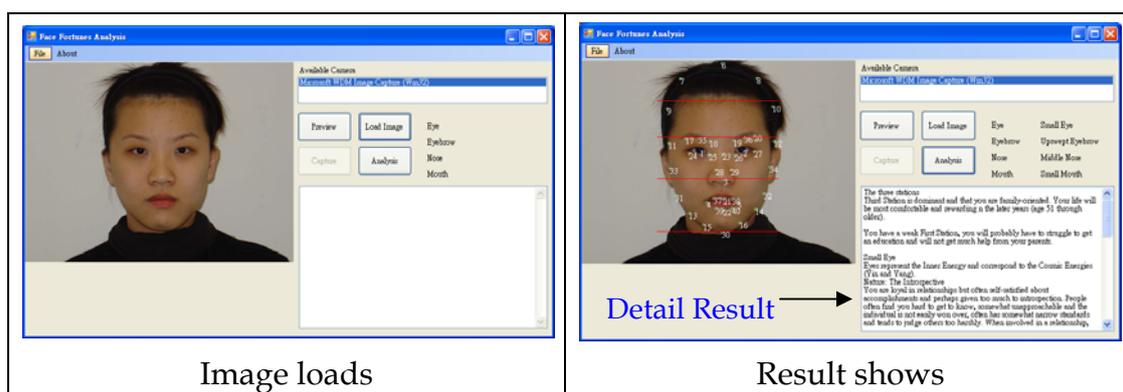


Figure 4-12 Result of Test Case 3

Test case ID: 4	Test Machine: PC1 / PC2
Test Description:	Attempt to analysis a photograph without human face
Test Execution:	<ol style="list-style-type: none"> 1. Load a image without human face 2. Click “Analysis”
Expected Result:	Warning message prompted
Actual Result:	After process the face recognition, the image could be detected to none human face type. The warning message should be prompted.
Test Result:	Face Recognition - PASS

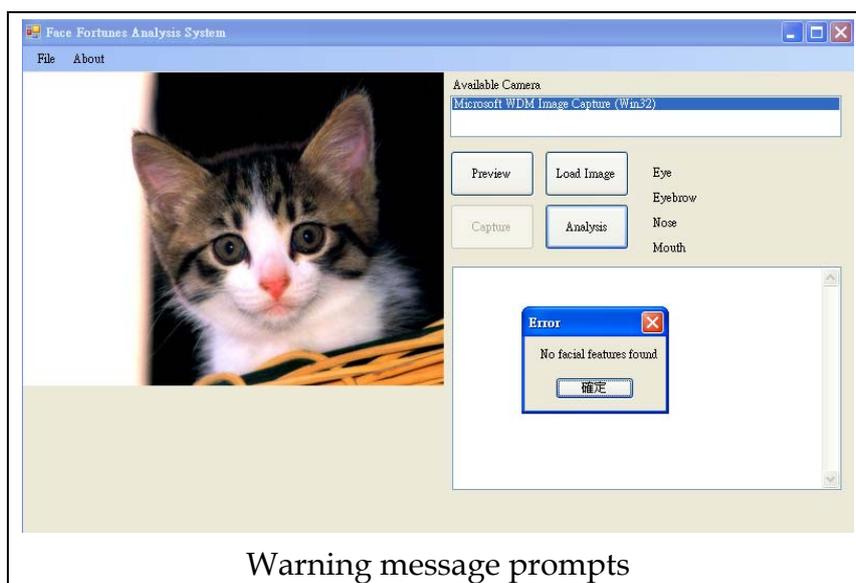


Figure 4-13 Result of Test Case 4

Test case ID: 5	Test Machine: PC1 / PC2
Test Description:	Test the accuracy rate of two different images with same person
Test Execution:	<ol style="list-style-type: none"> 1. Load two different images with same person 2. Click “Analysis”
Expected Result:	Two different image with same analysis result
Actual Result:	After analyzing, the result of imge A is same as the result of image B. (Detail result as Figure 4-14)
Test Result:	The result of image A is same as the result of image B – PASS

 <p style="text-align: center;">Image A</p>	 <p style="text-align: center;">Image B</p>
 <p style="text-align: center;">The result of Image A</p>	 <p style="text-align: center;">The result of Image B</p>

Figure 4-14 Result of Test Case 5

Chapter 5 Conclusion

5.1 Conclusion

China Physiognomy has been found more than two thousand years but none of computer system is used in evaluating the China Physiognomy automatically up to date. On the other hand, face recognition technology has been developed rapidly for different aspects such as Information Security and Access Control etc.

In this project, we have developed a new system for helping users to analyze their face fortune. The face recognition technology is applied the neural network approach, which can detect and recognize the coordination of facial features during face matching processing. When processing the system, facial features including eyes, eyebrows, mouth, nose and face contour can be recognized. The result of China Physiognomy Analysis will be demonstrated eventually.

Majority people, including me, are interested in China Physiognomy. For studying of China Physiognomy, I have looked over related articles and researches more than 3 years. Therefore, I have enough knowledge to develop the related project and ability to analyze it properly. Besides, I also use most of the times for continuing education of China Physiognomy. I would spend my life to study as it is an interesting topic that through China Physiognomy, we could know someone like his or her capacities, fortunes, potential etc when looking at his face.

Finally, the main objective is to help us realizing the China Physiognomy effectively and efficiently. Also, scientific approach could implement China Physiognomy methodology.

5.2 Future Work

As the time limitation, the evaluation of other China Physiognomy, such as Face Shape, Face Complexion etc have not been put into the system. We may apply those different theories to the next phase.

For the development of Face Recognition rapidly, we could also apply other different methodologies, such as three dimensional of face recognition model (Abate et al 2007, Papatheodorou and Rueckert 2007), or discriminating color faces for recognition model to recognize (Yang et al 008, Youssef and Woo 2008) the human face.

Moreover, we could develop the application to be available on Mobile platform, such as Windows Mobile, Symbian, Blackberry, Android etc in the near future.

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Appendix A – API Design

FFSA
Constructors
Public Class FFSA() Construct a new FFSA object.
Methods
Private Sub LoadDeviceList() List out capture device connected to the PC.
Private Sub OpenPreviewWindow() Start preview with selected capture device.
Private Sub Form1_Load(System.Object, System.EventArgs) Initial the Face Recognition engine when form is loaded.
Private Sub LoadImage() Load image from local drive. If load success, resize the image to a proper size and save as newimage.bmp.
Private Sub Cleanup() Resize the program interface to initial state.
Private Sub StartAnalysis() Call the analysis modules to work on loaded image.
Public Function length(FSDK.TPoint, FSDK.TPoint) Return Euclidean Distance of two FSDK.TPoint.
Private Function inBuffer(ByVal X, ByVal Y) Return boolean regarding on the percentage different with X and Y.

Appendix B – Source Code

Program Source Code

```
Imports System.Runtime.InteropServices

Public Class FFSA

    Dim ImageLoaded As Boolean

    Dim ImageHandle As UInteger

    Dim ImageHandle2 As UInteger

    Dim FacePosition As FSDK.TFacePosition

    Dim FacialFeatures(FSDK.FSDK_FACIAL_FEATURE_COUNT - 1) As FSDK.TPoint

    Dim FaceTemplate(92480) As Byte

    Dim FaceTemplate2(92480) As Byte

    Dim FaceTop, FaceBottom As Integer

    Dim F, S, T As Integer

    <StructLayout(LayoutKind.Sequential)> _

Private Structure SYSTEMTIME

    <MarshalAs(UnmanagedType.U2)> Public Year As Short

    <MarshalAs(UnmanagedType.U2)> Public Month As Short

    <MarshalAs(UnmanagedType.U2)> Public DayOfWeek As Short

    <MarshalAs(UnmanagedType.U2)> Public Day As Short

    <MarshalAs(UnmanagedType.U2)> Public Hour As Short

    <MarshalAs(UnmanagedType.U2)> Public Minute As Short

    <MarshalAs(UnmanagedType.U2)> Public Second As Short

    <MarshalAs(UnmanagedType.U2)> Public Milliseconds As Short

End Structure

<DllImport("kernel32.dll")> _

Private Shared Sub GetLocalTime(ByRef time As SYSTEMTIME)

End Sub

<DllImport("kernel32.dll")> _

Private Shared Function SetLocalTime(ByRef time As SYSTEMTIME) As Boolean

End Function

Public Sub New()
```

```

MyBase.New()

InitializeComponent()
End Sub

Friend WithEvents sfdImage As System.Windows.Forms.SaveFileDialog

Const WM_CAP As Short = &H400S

Const WM_CAP_DRIVER_CONNECT As Integer = WM_CAP + 10
Const WM_CAP_DRIVER_DISCONNECT As Integer = WM_CAP + 11
Const WM_CAP_EDIT_COPY As Integer = WM_CAP + 30

Const WM_CAP_SET_PREVIEW As Integer = WM_CAP + 50
Const WM_CAP_SET_PREVIEWRATE As Integer = WM_CAP + 52
Const WM_CAP_SET_SCALE As Integer = WM_CAP + 53
Const WS_CHILD As Integer = &H40000000
Const WS_VISIBLE As Integer = &H10000000
Const SWP_NOMOVE As Short = &H2S
Const SWP_NOSIZE As Short = 1
Const SWP_NOZORDER As Short = &H4S
Const HWND_BOTTOM As Short = 1

Dim iDevice As Integer = 0 ' Current device ID
Dim hHwnd As Integer ' Handle to preview window

Declare Function SendMessage Lib "user32" Alias "SendMessageA" _
    (ByVal hwnd As Integer, ByVal wParam As Integer, ByVal lParam As Integer, _
    <MarshalAs(UnmanagedType.AsAny)> ByVal IParam As Object) As Integer

Declare Function SetWindowPos Lib "user32" Alias "SetWindowPos" (ByVal hwnd As Integer, _
    ByVal hWndInsertAfter As Integer, ByVal x As Integer, ByVal y As Integer, _
    ByVal cx As Integer, ByVal cy As Integer, ByVal wFlags As Integer) As Integer

Declare Function DestroyWindow Lib "user32" (ByVal hwnd As Integer) As Boolean

Declare Function capCreateCaptureWindowA Lib "avicap32.dll" _
    (ByVal lpszWindowName As String, ByVal dwStyle As Integer, _

```

```

ByVal x As Integer, ByVal y As Integer, ByVal nWidth As Integer, _
ByVal nHeight As Short, ByVal hWndParent As Integer, _
ByVal nID As Integer) As Integer

Declare Function capGetDriverDescriptionA Lib "avicap32.dll" (ByVal wDriver As Short, _
ByVal lpszName As String, ByVal cbName As Integer, ByVal lpszVer As String, _
ByVal cbVer As Integer) As Boolean

Private Sub LoadDeviceList()
    Dim strName As String = Space(100)
    Dim strVer As String = Space(100)
    Dim bReturn As Boolean
    Dim x As Integer = 0

    Do ' Load name of all available devices into the lstDevices
        bReturn = capGetDriverDescriptionA(x, strName, 100, strVer, 100) ' Get Driver name and version
        If bReturn Then lstDevices.Items.Add(strName.Trim) ' If there was a device add device name to the list
        x += 1
    Loop Until bReturn = False
End Sub

Private Sub OpenPreviewWindow()
    Dim iHeight As Integer = PictureBox1.Height
    Dim iWidth As Integer = PictureBox1.Width

    '
    ' Open Preview window in picturebox
    '
    hWndnd = capCreateCaptureWindowA(iDevice, WS_VISIBLE Or WS_CHILD, 0, 0, 640, _
        480, PictureBox1.Handle.ToInt32, 0)

    '
    ' Connect to device
    '
    If SendMessage(hWndnd, WM_CAP_DRIVER_CONNECT, iDevice, 0) Then
        '
        'Set the preview scale
        '
    End If

```

```

SendMessage(hHwnd, WM_CAP_SET_SCALE, True, 0)

'
'Set the preview rate in milliseconds
'
SendMessage(hHwnd, WM_CAP_SET_PREVIEWRATE, 66, 0)

'
'Start previewing the image from the camera
'
SendMessage(hHwnd, WM_CAP_SET_PREVIEW, True, 0)

'
'Resize window to fit in picturebox
'
SetWindowPos(hHwnd, HWND_BOTTOM, 0, 0, PictureBox1.Width, PictureBox1.Height, _
    SWP_NOMOVE Or SWP_NOZORDER)

'btnSave.Enabled = True
btnStop.Enabled = True
btnStart.Enabled = False
Button1.Enabled = False
Button2.Enabled = False
Else
'
'Error connecting to device close window
'
DestroyWindow(hHwnd)

'btnSave.Enabled = False
End If
End Sub

Private Sub btnStart_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles btnStart.Click

    iDevice = lstDevices.SelectedIndex

    OpenPreviewWindow()

End Sub

```

```

Private Sub ClosePreviewWindow()
    '
    ' Disconnect from device
    '
    SendMessage(hHwnd, WM_CAP_DRIVER_DISCONNECT, iDevice, 0)

    '
    ' close window
    '

    DestroyWindow(hHwnd)
End Sub

Private Sub btnStop_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles btnStop.Click
    btnStart.Enabled = True
    btnStop.Enabled = False
    Button1.Enabled = True
    Button2.Enabled = True

    Dim data As IDataObject
    Dim bmap As Image

    '
    ' Copy image to clipboard
    '
    SendMessage(hHwnd, WM_CAP_EDIT_COPY, 0, 0)

    '
    ' Get image from clipboard and convert it to a bitmap
    '
    data = Clipboard.GetDataObject()
    If data.GetDataPresent(GetType(System.Drawing.Bitmap)) Then
        bmap = CType(data.GetData(GetType(System.Drawing.Bitmap)), Image)
        PictureBox1.Image = bmap
        ClosePreviewWindow()
        btnStop.Enabled = False
        btnStart.Enabled = True
    End If
End Sub

```

```

        Button1.Enabled = True
        Button2.Enabled = True

        If ImageLoaded Then
            FSDK.FreeImage(ImageHandle)
        End If

        bmp.Save("tempimage.bmp", Imaging.ImageFormat.Bmp)
        FSDK.LoadImageFromFile(ImageHandle, "tempimage.bmp")
        PictureBox1.Image = Image.FromStream(New
System.IO.MemoryStream(System.IO.File.ReadAllBytes("tempimage.bmp")))

    End If

End Sub

Private Sub Form1_Closing(ByVal sender As Object, ByVal e As System.ComponentModel.CancelEventArgs) Handles
MyBase.Closing
    If btnStop.Enabled Then
        ClosePreviewWindow()
    End If
End Sub

Private Sub sfdImage_FileOk(ByVal sender As System.Object, ByVal e As System.ComponentModel.CancelEventArgs) Handles
sfdImage.FileOk

End Sub

Private Sub Form1_Load(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles MyBase.Load
    LoadDeviceList()
    If lstDevices.Items.Count > 0 Then
        btnStart.Enabled = True
        lstDevices.SelectedIndex = 0
        btnStart.Enabled = True
    Else
        lstDevices.Items.Add("No Capture Device")
        btnStart.Enabled = False
    End If

```

```

btnStop.Enabled = False

Private Sub LoadImageToolStripMenuItem_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles
LoadImageToolStripMenuItem.Click
    LoadImage()
End Sub

Private Sub Button1_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles Button1.Click
    LoadImage()
End Sub

Private Sub LoadImage()
    PictureBox1.Visible = False
    Cleanup()
    If ImageLoaded Then
        FSDK.FreeImage(ImageHandle)
    End If

    Dim dlg As New OpenFileDialog
    dlg.Filter = "Image Files (*.bmp, *.jpg)|*.bmp;*.jpg|JPEG (*.jpg)|*.jpg|Windows bitmap (*.bmp)|*.bmp|All files|*.*"
    dlg.Multiselect = False

    If (dlg.ShowDialog() = DialogResult.OK) Then
        If (FSDK.LoadImageFromFile(ImageHandle, dlg.FileNames(0)) <> FSDK.FSDKKE_OK) Then
            MessageBox.Show("Error loading file", "Error")
            Return
        End If

        Dim ImageBmp As IntPtr
        If (FSDK.SaveImageToHBitmap(ImageHandle, ImageBmp) <> FSDK.FSDKKE_OK) Then
            MessageBox.Show("Error displaying picture", "Error")
            Return
        End If

        Dim ImageCLR As Image
        ImageCLR = Image.FromHbitmap(ImageBmp)
        PictureBox1.Image = ImageCLR
    
```

```

Dim bm As New Bitmap(PictureBox1.Image)

Dim divideBy, divideByH, divideByW As Double

divideByW = PictureBox1.Image.Width / PictureBox1.Width
divideByH = PictureBox1.Image.Height / PictureBox1.Height
If divideByW > 1 Or divideByH > 1 Then
    If divideByW > divideByH Then
        divideBy = divideByW
    Else
        divideBy = divideByH
    End If

Else
    divideBy = 1
End If

Dim width As Integer = PictureBox1.Image.Width / divideBy           'image width.
Dim height As Integer = PictureBox1.Image.Height / divideBy        'image height

Dim thumb As New Bitmap(width, height)

Dim g As Graphics = Graphics.FromImage(thumb)

g.InterpolationMode = Drawing2D.InterpolationMode.HighQualityBicubic

g.DrawImage(bm, New Rectangle(0, 0, width, height), New Rectangle(0, 0, bm.Width, _
bm.Height), GraphicsUnit.Pixel)

g.Dispose()

thumb.Save("newimage.bmp", _
System.Drawing.Imaging.ImageFormat.Bmp) 'can use any image format

bm.Dispose()

thumb.Dispose()

FSDK.LoadImageFromFile(ImageHandle, "newimage.bmp")

```

```

        PictureBox1.Image = Image.FromStream(New
System.IO.MemoryStream(System.IO.File.ReadAllBytes("newimage.bmp")))

        PictureBox1.Visible = True
        ImageLoaded = True
        Button2.Enabled = True
    End If

End Sub

Private Sub Form1_Resize(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles MyBase.Resize
    PictureBox1.Width = Me.Width - 50
    PictureBox1.Height = Me.Height - 50
End Sub

Private Sub DetectFaceToolStripMenuItem_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles
DetectFaceToolStripMenuItem.Click
    If PictureBox1.Image Is Nothing Then
        MessageBox.Show("Please load image first", "Error")
        Return
    End If

    If (FSDK.DetectFace(ImageHandle, FacePosition) <> FSDK.FSDKE_OK) Then
        MessageBox.Show("No faces found", "Error")
        Return
    Else
        Dim gr As Graphics
        gr = PictureBox1.CreateGraphics()
        gr.DrawRectangle(Pens.LightGreen, CType(FacePosition.xc - FacePosition.w / 2, Integer), CType(FacePosition.yc -
FacePosition.w / 2, Integer), CType(FacePosition.w, Integer), CType(FacePosition.w, Integer))
        gr.DrawEllipse(Pens.Red, CType(FacePosition.xc - FacePosition.w / 2, Integer), CType(FacePosition.yc - FacePosition.w /
2, Integer), 3, 3)

    End If
End Sub

Private Sub DetectFacialFeaturesToolStripMenuItem_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles

```

```

DetectFacialFeaturesToolStripMenuItem.Click

    StartAnalysis()

End Sub

Private Sub Button2_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles Button2.Click

    StartAnalysis()

End Sub

Private Sub Cleanup()

    tb_result.Text = ""

    LB_eyeset.Text = ""

    LB_eyeshape.Text = ""

    LB_eyesize.Text = ""

    LB_eyebrow.Text = ""

    LB_nose.Text = ""

    LB_mouth.Text = ""

End Sub

Private Sub StartAnalysis()

    Cleanup()

    If PictureBox1.Image Is Nothing Then

        MessageBox.Show("Please load image first", "Error")

        Return

    End If

    Dim result As Integer

    result = FSDK.DetectFacialFeatures(ImageHandle, FacialFeatures)

    If (result <> FSDK.FSDKE_OK) Then

        MessageBox.Show("No facial features found", "Error")

        Return

    Else

        Dim i As Integer

        i = 1

        For Each p In FacialFeatures

            Dim gr As Graphics

            gr = PictureBox1.CreateGraphics()

```

```

    If (i > 2) Then
        gr.DrawEllipse(Pens.LightGreen, p.x, p.y, 3, 3)
        gr.DrawString(i, DefaultFont, Brushes.AliceBlue, p.x, p.y) 'debug code
    Else
        gr.DrawEllipse(Pens.Blue, p.x, p.y, 3, 3)
        gr.DrawString(i, DefaultFont, Brushes.AliceBlue, p.x, p.y) 'debug code
    End If

    pos.Rows.Add(i.ToString, p.x.ToString, p.y.ToString)

    i = i + 1
Next

If (FSDK.DetectFace(ImageHandle, FacePosition) <> FSDK.FSDKE_OK) Then
    MessageBox.Show("No faces found", "Error")
    Return
Else
    Dim gr1 As Graphics
    gr1 = PictureBox1.CreateGraphics()

    gr1.DrawLine(Pens.Red, CType(FacePosition.xc - FacePosition.w / 2, Integer), CType(FacePosition.yc -
FacePosition.w / 2, Integer), CType(FacePosition.xc + FacePosition.w / 2, Integer), CType(FacePosition.yc - FacePosition.w / 2, Integer))
    gr1.DrawLine(Pens.Red, CType(FacePosition.xc - FacePosition.w / 2, Integer), FacialFeatures(34).y,
CType(FacePosition.xc + FacePosition.w / 2, Integer), FacialFeatures(34).y)
    gr1.DrawLine(Pens.Red, CType(FacePosition.xc - FacePosition.w / 2, Integer), FacialFeatures(2).y,
CType(FacePosition.xc + FacePosition.w / 2, Integer), FacialFeatures(2).y)
    gr1.DrawLine(Pens.Red, CType(FacePosition.xc - FacePosition.w / 2, Integer), FacialFeatures(29).y,
CType(FacePosition.xc + FacePosition.w / 2, Integer), FacialFeatures(29).y)

    FaceTop = CType(FacePosition.yc - FacePosition.w / 2, Integer)
    FaceBottom = FacialFeatures(29).y

    F = FacialFeatures(34).y - FaceTop
    S = FacialFeatures(2).y - FacialFeatures(34).y
    T = FaceBottom - FacialFeatures(2).y

End If

```

```

Analysis_3stations()

Analysis_eye()

Analysis_eyebrow()

Analysis_nose()

Analysis_mouth()

End If

End Sub

Public Function length(ByVal pointOne As FSDK.TPoint, ByVal pointTwo As FSDK.TPoint) As Single
    Return Math.Sqrt(Math.Pow(pointTwo.x - pointOne.x, 2) + Math.Pow(pointTwo.y - pointOne.y, 2))
End Function

Private Sub Analysis_eye()
    'eye set
    Dim d, l, ll, lr As Single
    d = length(FacialFeatures(24), FacialFeatures(25))
    ll = FacialFeatures(24).x - FacialFeatures(23).x
    lr = FacialFeatures(26).x - FacialFeatures(25).x
    l = (ll + lr) / 2

    'eye shape
    Dim o1, i1, o2, i2 As Single
    o1 = FacialFeatures(23).y
    i1 = FacialFeatures(24).y
    o2 = FacialFeatures(26).y
    i2 = FacialFeatures(25).y

    Dim s As Single

    s = (ll + lr) / (FacialFeatures(11).x - FacialFeatures(10).x)
    If (s > 0.545) Then
        LB_eyesize.Text = "Large Eye"
        tb_result.Text = tb_result.Text + "Large Eye" + vbCrLf + "Eyes represent the Inner Energy and correspond to the Cosmic
Energies (Yin and Yang). " + vbCrLf + "Nature: The(Artistic)" + vbCrLf + "You are naturally outgoing – intelligent, sensitive, artistic.
Open and frank, you make a fine leader, and succeed in the theater and other arts, and also an excellent observer. The vitality – inner energy
of the owner of these eyes is high and the ability to direct this energy intelligently is a quality of the one with large full eyes." + vbCrLf +
vbCrLf
    ElseIf (s <= 0.385) Then

```

LB_eyesize.Text = "Small Eye"

tb_result.Text = tb_result.Text + "Small Eye" + vbCrLf + "Eyes represent the Inner Energy and correspond to the Cosmic Energies (Yin and Yang). " + vbCrLf + "Nature: The Introspective " + vbCrLf + "You are loyal in relationships but often self-satisfied about accomplishments and perhaps given too much to introspection. People often find you hard to get to know, somewhat unapproachable and the individual is not easily won over, often has somewhat narrow standards and tends to judge others too harshly. When involved in a relationship, you can be very devoted and steadfast, loyal and committed but alas, also tend to be jealous and can fail to express it, letting it seethe inside, which often leads to lack of communication between partners. The small eyes indicate you are mean and petty. On the contrary, you can be very intense and giving when they are so move. They tend to be complacent, satisfied with their abilities, and do not try to extend themselves into large areas of achievement." + vbCrLf + vbCrLf

Else

If o2 - i2 > 3 Then

LB_eyesize.Text = "Down-turned Eye"

tb_result.Text = tb_result.Text + "Down-turned Eye" + vbCrLf + "Eyes represent the Inner Energy and correspond to the Cosmic Energies (Yin and Yang). " + vbCrLf + "Nature: The Easy Mark " + vbCrLf + "You are likely to be considerate of others to a fault, self-effacing, submissive, even masochistic, very eager to be helpful but silently asking to be helped, please. You often get involved in a kind of see-saw relationship, trying to help someone who then drags the helper down into a morass from which it is difficult to become extricated and he or she needs help to be restored. There is a kind of flow between submissiveness and a desire to control that somehow manages to be ineffectual. You are basically good, however, and often are found in the helping professions, truly trying to express compassion for those whose need is greater or more immediate than their own. The asset of this individual is a true appreciation of others problems, and although you does not want to assume much responsibility, are able to give sympathy and understanding – possessing as a prime asset a kind of emotional intelligence that is much needed in the world. In personal relationship, you may be slipshod, often pairing with the wrong person." + vbCrLf + vbCrLf

ElseIf i2 - o2 > 3 Then

LB_eyesize.Text = "Upturned Eye"

tb_result.Text = tb_result.Text + "Upturned Eye" + vbCrLf + "Eyes represent the Inner Energy and correspond to the Cosmic Energies (Yin and Yang). " + vbCrLf + "Nature: The Optimist " + vbCrLf + "You are encountering a cheerful person, someone with a shape sense of humor, quick-witted, alert and mischievous. You are also short-tempered person, someone who can snap quickly into a jealous age and react with a tantrum when frustrated. But such shortcomings often accompany these tip-tilted eyes. Good qualities abound – the person is optimistic, brave, a bit of an adventurer, one who may be opportunistic but is also confident and decisive. You are an idea person, someone who catches on quickly to the nuts and bolts of a situation and acts. Here you find enthusiasm and excitement, together with wit and quick intelligence and conviviality, an easy conversationalist. You thrive on work that offers quickly achieved short-term goals, where things happen fast, where he or she can move around, meet people, make superficial contacts, in short where there is action and where the individual can flaunt their abilities." + vbCrLf + vbCrLf

Else

LB_eyesize.Text = "Normal Eye "

tb_result.Text = tb_result.Text + "Normal Eye" + vbCrLf + "Eyes represent the Inner Energy and correspond to the Cosmic Energies (Yin and Yang). " + vbCrLf + "Nature: The Intelligence " + vbCrLf + "You are intelligent, courageous, artistic, sensitive and capable of leadership." + vbCrLf + vbCrLf

```

        End If

    End If

    Dim gr As Graphics

    gr = PictureBox1.CreateGraphics()

End Sub

Private Sub Analysis_eyebrow()

    'eyebrow

    Dim s, c, e, ebl, el As Single

    s = FacialFeatures(18).y 'Start point of eyebrow (Near Nose)

    c = FacialFeatures(35).y 'Center point of eyebrow

    e = FacialFeatures(19).y 'End point of eyebrow (Near Temple (太陽穴))

    ebl = length(FacialFeatures(18), FacialFeatures(19))

    el = length(FacialFeatures(25), FacialFeatures(26))

    If s < c Then

        LB_eyebrow.Text = "Dropping Eyebrow"

        tb_result.Text = tb_result.Text + "Dropping Eyebrow" + vbCrLf + "Eyebrows represent the claim to fame, reputation and area of achievement, ambitions, goals and the temperament that indicate possible accomplishment. " + vbCrLf + "Nature: The Appellant " + vbCrLf + "Your eyebrows represent that you seem to be appealing for help and looking somehow sad and forsaken. Others consider it the brow of life's natural victim. You have strength lies in apparent weakness and who can in fact be rather controlling and also demanding through a need forth help of others. You are often forthcoming because people love to be needed, even imposed upon. The eyebrow affected by the early movie heroines who were often portrayed as victims or waifs needing to be rescued by the doughty hero." + vbCrLf + vbCrLf

    ElseIf s = c Then

        If c > e Then

            LB_eyebrow.Text = "High-set Eyebrow"

            tb_result.Text = tb_result.Text + "High-set Eyebrow" + vbCrLf + "Eyebrows represent the claim to fame, reputation and area of achievement, ambitions, goals and the temperament that indicate possible accomplishment. " + vbCrLf + "Nature: The Leader " + vbCrLf + "Your eyebrows represent that you are far-sighted with a great chance of becoming political leaders. You must have considerable social positions to ensure that your livelihoods are sustained throughout life. You are also very demanding in term of privacy and want to keep your private life private. " + vbCrLf + vbCrLf

        Else

            LB_eyebrow.Text = "Straight Eyebrow"

            tb_result.Text = tb_result.Text + "Straight Eyebrow" + vbCrLf + "Eyebrows represent the claim to fame, reputation and area of achievement, ambitions, goals and the temperament that indicate possible accomplishment. " + vbCrLf + "Nature: The Organizer " + vbCrLf + "Your eyebrows represent that you enjoy challenges and you are good at sports, enjoys outdoor life, but you are basically an
    
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efficient organizer and manager, capable of putting affairs in order and of directing others, being clearheaded and emotionally cool. In
business, you tend to ignore the more human side of relationships and to think instead in terms of efficiency, authority, accomplishment.
Often you are rather distant in family relationships too, and may marry for position rather than for love." + vbCrLf + vbCrLf

        End If

    Else

        If c > e Then

            LB_eyebrow.Text = "Upswept Eyebrow"

            tb_result.Text = tb_result.Text + "Upswept Eyebrow" + vbCrLf + "Eyebrows represent the claim to fame, reputation
and area of achievement, ambitions, goals and the temperament that indicate possible accomplishment. " + vbCrLf + "Nature: The Activist
" + vbCrLf + "Your eyebrows represent that you are aggressive, sexy, enterprising, proud, and assured – ambitious and determined in the
pursuit of a goal. You tend to be outgoing, having a broad perspective, loving travel, and inclined to be rather cavalier in human
relationships. You also enjoy exerting authority and having a wide domain for your activities, coupled with a desire to control." + vbCrLf +
vbCrLf

            Else

                LB_eyebrow.Text = "Angular Eyebrow"

                tb_result.Text = tb_result.Text + "Angular Eyebrow" + vbCrLf + "Eyebrows represent the claim to fame, reputation and
area of achievement, ambitions, goals and the temperament that indicate possible accomplishment. " + vbCrLf + "Nature: The Adventurer "
+ vbCrLf + "Your eyebrow represent that you always a dramatic personality and fame will come through some form of showmanship and
adventure. You are creativity, brilliance in financial dealings and a long life to enjoy adventures. You trend to slash through obstacles and to
dominate any situation and any relationship and to be promiscuous rather than devoted to a single partner." + vbCrLf + vbCrLf

            End If

        End If

    End Sub

Private Sub Analysis_nose()

    Dim ln, lf, wn, wf As Single

    ln = length(FacialFeatures(22), FacialFeatures(2))

    lf = length(FacialFeatures(5), FacialFeatures(29))

    wn = length(FacialFeatures(27), FacialFeatures(28))

    wf = length(FacialFeatures(32), FacialFeatures(33))

    If (ln / lf >= 0.17 And wn / wf > 0.15) Then

        LB_nose.Text = "Big Nose"

        tb_result.Text = tb_result.Text + "Big Nose" + vbCrLf + "Nose represents wealth and also achievement in career the ability
to find opportunity, to accumulate or waste wealth. " + vbCrLf + "Nature: The Lucky " + vbCrLf + "Your nose represents that you are very
kind and also very fortunate. You may get out of trouble easily and have a long life. You will be successful in later years." + vbCrLf +
vbCrLf

        ElseIf (ln / lf >= 0.17 And wn / wf <= 0.15) Then

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        LB_nose.Text = "Long Nose"

        tb_result.Text = tb_result.Text + "Long Nose" + vbCrLf + "Nose represents wealth and also achievement in career the ability
to find opportunity, to accumulate or waste wealth. " + vbCrLf + "Nature: The Rational " + vbCrLf + "Your nose represents that you are a
logical mind, clear thinking and a conservative viewpoint. You should not be persuaded to take sudden chances and to gamble all on high
risk scheme in the middle years. You have the advance planning and think that get you to the goal. " + vbCrLf + vbCrLf

        ElseIf (ln / lf > 0.14 And wn / wf > 0.15) Then

            LB_nose.Text = "Middle Nose"

            tb_result.Text = tb_result.Text + "Middle Nose" + vbCrLf + "Nose represents wealth and also achievement in career the
ability to find opportunity, to accumulate or waste wealth. " + vbCrLf + "Nature: The Emperor " + vbCrLf + "Your nose represents that you
may get everything and has enough to pass on to others. You can achieve power and wealth. You are also up against an extremely important
person." + vbCrLf + vbCrLf

            ElseIf (ln / lf > 0.14 And wn / wf <= 0.15) Then

                LB_nose.Text = "Middle Small Nose"

                tb_result.Text = tb_result.Text + "Middle Small Nose" + vbCrLf + "Nose represents wealth and also achievement in career
the ability to find opportunity, to accumulate or waste wealth. " + vbCrLf + "Nature: The Ethical " + vbCrLf + "Your nose represents that
you are honest, even-tempered, and enterprising and likely to reach a high position in life. You usually enjoys good health and vitality and a
stable family life. You can admire and trust. You will treat others equably in any situation and will be tolerant of other's shortcomings." +
vbCrLf + vbCrLf

                ElseIf (ln / lf <= 0.14 And wn / wf > 0.15) Then

                    LB_nose.Text = "Small Nose"

                    tb_result.Text = tb_result.Text + "Small Nose" + vbCrLf + "Nose represents wealth and also achievement in career the
ability to find opportunity, to accumulate or waste wealth. " + vbCrLf + "Nature: The Enthusiastic " + vbCrLf + "Your nose represents that
you are an enthusiastic, optimistic person and enjoys life. You are sociable, friendly, open-minded, outgoing, but probably have only
short-term goals in life, often do not ambitious, and worries little about the future. This nose also shows you are a lack of the time and
calculation necessary to make a fortune. Money, if it comes in, arrives in short spurts and does not have staying power." + vbCrLf + vbCrLf

                Else

                    LB_nose.Text = "Short Nose"

                    tb_result.Text = tb_result.Text + "Short Nose" + vbCrLf + "Nose represents wealth and also achievement in career the
ability to find opportunity, to accumulate or waste wealth. " + vbCrLf + "Nature: The Spendthrift " + vbCrLf + "Your nose represents that
you are cheerful, unconventional and lighthearted individual. You do not worry about the future. Optimistic, you usually find friends and
helper easily. Everyone wants to give you a fresh chance and being fun to be around." + vbCrLf + vbCrLf

                End If

            End Sub

        Private Sub Analysis_mouth()

            Dim el, w, s, mouth_ratio As Single

            el = length(FacialFeatures(0), FacialFeatures(1)) ' Length from the Iris of Left eye to the Iris of Right eye
    
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w = length(FacialFeatures(3), FacialFeatures(4)) ' Length of mouth
s = length(FacialFeatures(10), FacialFeatures(11))
mouth_ratio = w / s

If (mouth_ratio > 0.34) Then
    LB_mouth.Text = "Big Mouth "
    tb_result.Text = tb_result.Text + "Big Mouth" + vbCrLf + "Mouth represents the personality " + vbCrLf + "Nature: The
Contented " + vbCrLf + "Your mouth represents that you have high status, a rich long life and lots of money. You also have a nice life with
peace and calm, enjoy good fortune." + vbCrLf + vbCrLf

    ElseIf (mouth_ratio > 0.31) Then
        LB_mouth.Text = "Middle Mouth "
        tb_result.Text = tb_result.Text + "Middle Mouth" + vbCrLf + "Mouth represents the personality " + vbCrLf + "Nature: The
Integrated Personality " + vbCrLf + "Your mouth represents that you are balanced, friendly, revealing warmth, charm and good fellowship.
You may be responsible members of society and manage to achieve a good position in life. You smile easily and enjoy spontaneous laughter.
You handle people well and find it easy to deal with the public and solve problem." + vbCrLf + vbCrLf

    Else
        LB_mouth.Text = "Small Mouth "
        tb_result.Text = tb_result.Text + "Small Mouth" + vbCrLf + "Mouth represents the personality " + vbCrLf + "Nature: The
Loner " + vbCrLf + "Your mouth represents that you are self-centered, perhaps supercritical and usually a loner. You may have low vitality
and marginal health, conditions that tend to isolate even further." + vbCrLf + vbCrLf

    End If

End Sub

Private Function inBuffer(ByVal X, ByVal Y)

    Dim z As Integer

    Dim buffer As Single

    buffer = 0.95

    If Y > X Then

        z = Y

        Y = X

        X = z

    End If

    If (Y / X) < buffer Then

        Return False
    
```

```

Else
    Return True
End If

End Function

Private Sub Analysis_3stations()
    Dim buffer, ubuffer, lbuffer As Single
    buffer = 0.03
    ubuffer = 1 / 3 + buffer
    lbuffer = 1 / 3 - buffer

    Dim title, A1, B1, B2, B3, C1, C2, C3 As String
    title = "The three stations" + vbCrLf

    A1 = "Each of the three major life phases (youth, midlife and maturity), you will be productive and contribute to a well-rounded life scenario. Background and education will lead to achievement in middle life resulting in a comfortable and satisfying maturity." + vbCrLf + vbCrLf

    B1 = "First Station is dominant and that you are a youth-oriented. You will have a greatest success before age 30." + vbCrLf + vbCrLf

    B2 = "Second Station is dominant and that you are a success-oriented. You will have a greatest effectiveness in the middle years (age 31 through 50)." + vbCrLf + vbCrLf

    B3 = "Third Station is dominant and that you are family-oriented. Your life will be most comfortable and rewarding n the later years (age 51 through older)." + vbCrLf + vbCrLf

    C1 = "You have a weak First Station, you will probably have to struggle to get an education and will not get much help from your parents." + vbCrLf + vbCrLf

    C2 = "You have a cramped Second Station, you may be difficulties in finding a position in life and success may be deferred until the later years." + vbCrLf + vbCrLf

    C3 = "You have a weak Third Station, you may be hard due to illness, poverty, with no children to care later years." + vbCrLf + vbCrLf

    Dim A As Integer
    A = F + S + T

    If (F / A < ubuffer And F / A > lbuffer) And (S / A < ubuffer And S / A > lbuffer) And (T / A < ubuffer And T / A > lbuffer) Then
        ' lb_3stations.Text = "Case A"
        tb_result.Text = tb_result.Text + title + A1 + vbCrLf + vbCrLf
    ElseIf (inBuffer(F, S)) And (F > T) Then

```

```

'lb_3stations.Text = "B1, B2 and C3 # Result"

tb_result.Text = tb_result.Text + title + B1 + B2 + C3

ElseIf (inBuffer(F, S)) And (F < T) Then

    'lb_3stations.Text = "B3, C1 and C2 # Result"

    tb_result.Text = tb_result.Text + title + B3 + C1 + C2

ElseIf (inBuffer(T, S)) And (S > F) Then

    'lb_3stations.Text = "B2, B3 AND C1 # Result"

    tb_result.Text = tb_result.Text + title + B2 + B3 + C1

ElseIf (inBuffer(T, S)) And (S < F) Then

    'lb_3stations.Text = "B1, C2 and C3 # Result"

    tb_result.Text = tb_result.Text + title + B1 + C2 + C3

ElseIf (inBuffer(F, T)) And (T > S) Then

    'lb_3stations.Text = "B1, B3 and C2 # Result"

    tb_result.Text = tb_result.Text + title + B1 + B3 + C2

ElseIf (inBuffer(F, T)) And (T < S) Then

    'lb_3stations.Text = "B2, C1 and C3 # Result"

    tb_result.Text = tb_result.Text + title + B2 + C1 + C3

ElseIf (F > S) And (S > T) Then

    'lb_3stations.Text = "B1 and C3 # Result"

    tb_result.Text = tb_result.Text + title + B1 + C3

ElseIf (F > S) And (F < T) Then

    'lb_3stations.Text = "B3 and C2 # Result"

    tb_result.Text = tb_result.Text + title + B3 + C2

ElseIf (S > T) And (T > F) Then

    'lb_3stations.Text = "B2 and C1 # Result"

    tb_result.Text = tb_result.Text + title + B2 + C1

ElseIf (T > S) And (T < F) Then

    tb_result.Text = tb_result.Text + title + B1 + C2

ElseIf (F > T) And (F < S) Then

    tb_result.Text = tb_result.Text + title + B2 + C3

ElseIf (T > S) And (S > F) Then

    tb_result.Text = tb_result.Text + title + B3 + C1

End If

End Sub

Private Sub MatchWithToolStripMenuItem_Click(ByVal sender As System.Object, ByVal e As System.EventArgs)

    If PictureBox1.Image Is Nothing Then

```

```

    MessageBox.Show("Please load image first", "Error")

    Return

End If

If (FSDK.GetFaceTemplate(ImageHandle, FaceTemplate) <> FSDK.FSDKKE_OK) Then

    MessageBox.Show("Error creating face template", "Error")

    Return

End If

Dim dlg As New OpenFileDialog

dlg.Filter = "JPEG (*.jpg)|*.jpg|Windows bitmap (*.bmp)|*.bmp|All files|*.*"

dlg.Multiselect = False

If (dlg.ShowDialog() = DialogResult.OK) Then

    If (FSDK.LoadImageFromFile(ImageHandle2, dlg.FileNames(0)) <> FSDK.FSDKKE_OK) Then

        MessageBox.Show("Error loading file", "Error")

        Return

    End If

    If (FSDK.GetFaceTemplate(ImageHandle2, FaceTemplate2) <> FSDK.FSDKKE_OK) Then

        MessageBox.Show("Error creating face template", "Error")

        FSDK.FreeImage(ImageHandle2)

        Return

    End If

    Dim Similarity As Single

    If (FSDK.MatchFaces(FaceTemplate, FaceTemplate2, Similarity) <> FSDK.FSDKKE_OK) Then

        MessageBox.Show("Error matching face template", "Error")

    Else

        MessageBox.Show("Faces matched with similarity " & Similarity)

    End If

    FSDK.FreeImage(ImageHandle2)

End If

End Sub

End Class

```

Appendix C – Other Test Case

For system accuracy rate checking, the testing database is from Visual Cognition Laboratory at the University of Hong Kong. Currently the database is over one hundred Hong Kong Chinese faces includes 71 males and 67 females. Moreover we adopt 30 images randomly to test the FFAS. There is listed of the testing result.

No.	File Name	Face Detection	Facial Feature Detection	Facial Feature Points Labeling	Analysis with China Physiognomy Methodology	Status
1	F0060deg1.jpg	✓	✓	✓	✓	PASS
2	F0070deg1.jpg	✓	✓	✓	✓	PASS
3	F0080deg2.jpg	✓	✓	✓	✓	PASS
4	F0090deg1.jpg	✓	✓	✓	✓	PASS
5	F0120deg1.jpg	✓	✓	✓	✓	PASS
6	F0130deg1.jpg	✓	✓	✓	✓	PASS
7	F0180deg1.jpg	✓	✓	✓	✓	PASS
8	F0190deg1.jpg	✓	✓	✓	✓	PASS
9	F0200deg1.jpg	✓	✓	✓	✓	PASS
10	F0220deg1.jpg	✓	✓	✓	✓	PASS
11	F0750deg1.jpg	✓	✓	✓	✓	PASS
12	F0810deg1.jpg	✓	✓	✓	✓	PASS
13	F0850deg1.jpg	✓	✓	✓	✓	PASS
14	F0950deg1.jpg	✓	✓	✓	✓	PASS
15	F0980deg1.jpg	✓	✓	✓	✓	PASS
16	M0040deg1.jpg	✓	✓	✓	✓	PASS
17	M0100deg2.jpg	✓	✓	✓	✓	PASS

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18	M0160deg1.jpg	✓	✓	✓	✓	PASS
19	M0170deg2.jpg	✓	✓	✓	✓	PASS
20	M0210deg1.jpg	✓	✓	✓	✓	PASS
21	M0260deg2.jpg	✓	✓	✓	✓	PASS
22	M0500deg2.jpg	✓	✓	✓	✓	PASS
23	M0600deg1.jpg	✓	✓	✓	✓	PASS
24	M0680deg1.jpg	✓	✓	✓	✓	PASS
25	M0740deg1.jpg	✓	✓	✓	✓	PASS
26	M0780deg2.jpg	✓	✓	✓	✓	PASS
27	M0830deg1.jpg	✓	✓	✓	✓	PASS
28	M0860deg1.jpg	✓	✓	✓	✓	PASS
29	M0870deg1.jpg	✓	✓	✓	✓	PASS
30	M0930deg1.jpg	✓	✓	✓	✓	PASS

Other results of Test Cases are listed as below:

Test case ID: C1	Test Machine: PC1 / PC2
Test Description:	Test the Facial Features Result
Test Execution:	<ol style="list-style-type: none"> 1. Click “Load Image” 2. Choose test image “F0060deg1.jpg” 3. Click “Analysis”
Expected Result:	<ol style="list-style-type: none"> 1. Analysis start as human face should be detected 2. Facial features detected 3. Labeling the facial feature 4. Analysis with China Physiognomy Methodology 5. Get Result <ul style="list-style-type: none"> - Eye type & detail - Eyebrows type & detail - Nose type & detail - Mouth type & detail - Three station type & detail
Actual Result:	<p>As Expected Result</p> <ol style="list-style-type: none"> 1. Human face detected 2. Facial features detected 3. Point 1 to point 40 facial point detected 4. Analysis with China Physiognomy Methodology 5. Analysis done and result show (Detail Result as Figure C-1)
Test Result:	<p>Face Recognition – PASS</p> <p>Facial Feature Analysis – PASS</p> <p>Fortune Analysis with China Physiognomy - PASS</p>

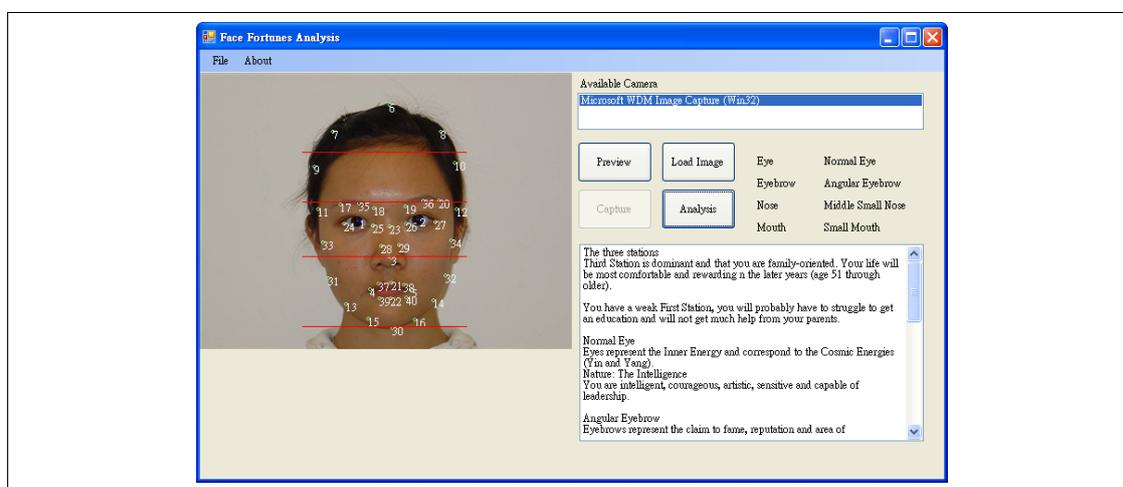


Figure C-1 Result of Test Case C1

Test case ID: C2	Test Machine: PC1 / PC2
Test Description:	Test the Facial Features Result
Test Execution:	<ol style="list-style-type: none"> 1. Click “Load Image” 2. Choose test image “F0750deg1.jpg” 3. Click “Analysis”
Expected Result:	<ol style="list-style-type: none"> 1. Analysis start as human face should be detected 2. Facial features detected 3. Labeling the facial feature 4. Analysis with China Physiognomy Methodology 5. Get Result <ul style="list-style-type: none"> - Eye type & detail - Eyebrows type & detail - Nose type & detail - Mouth type & detail - Three station type & detail
Actual Result:	<p>As Expected Result</p> <ol style="list-style-type: none"> 1. Human face detected 2. Facial features detected 3. Point 1 to point 40 facial point detected 4. Analysis with China Physiognomy Methodology 5. Analysis done and result show (Detail Result as Figure C-2)
Test Result:	<p>Face Recognition – PASS</p> <p>Facial Feature Analysis – PASS</p> <p>Fortune Analysis with China Physiognomy - PASS</p>

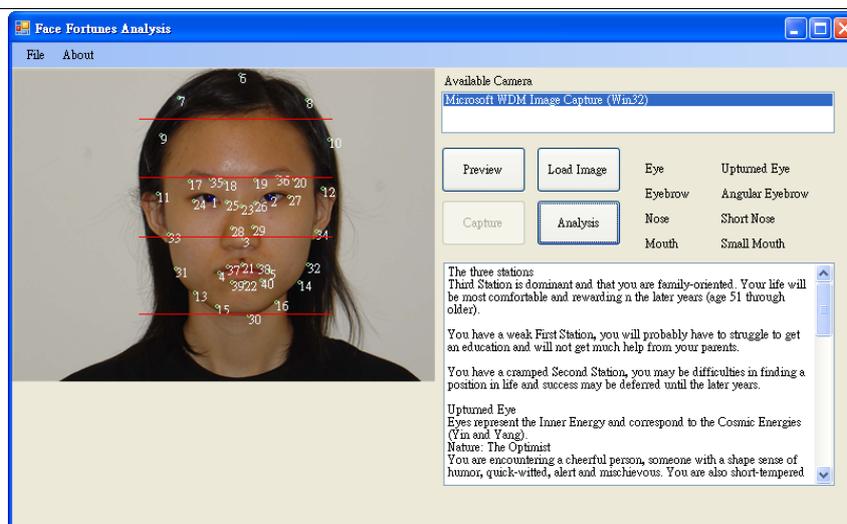


Figure C-2 Result of Test Case C2

Test case ID: C3	Test Machine: PC1 / PC2
Test Description:	Test the Facial Features Result
Test Execution:	<ol style="list-style-type: none"> 1. Click “Load Image” 2. Choose test image “F0850deg1.jpg.jpg” 3. Click “Analysis”
Expected Result:	<ol style="list-style-type: none"> 1. Analysis start as human face should be detected 2. Facial features detected 3. Labeling the facial feature 4. Analysis with China Physiognomy Methodology 5. Get Result <ul style="list-style-type: none"> - Eye type & detail - Eyebrows type & detail - Nose type & detail - Mouth type & detail - Three station type & detail
Actual Result:	<p>As Expected Result</p> <ol style="list-style-type: none"> 1. Human face detected 2. Facial features detected 3. Point 1 to point 40 facial point detected 4. Analysis with China Physiognomy Methodology 5. Analysis done and result show (Detail Result as Figure C-3)
Test Result:	<p>Face Recognition – PASS</p> <p>Facial Feature Analysis – PASS</p> <p>Fortune Analysis with China Physiognomy - PASS</p>

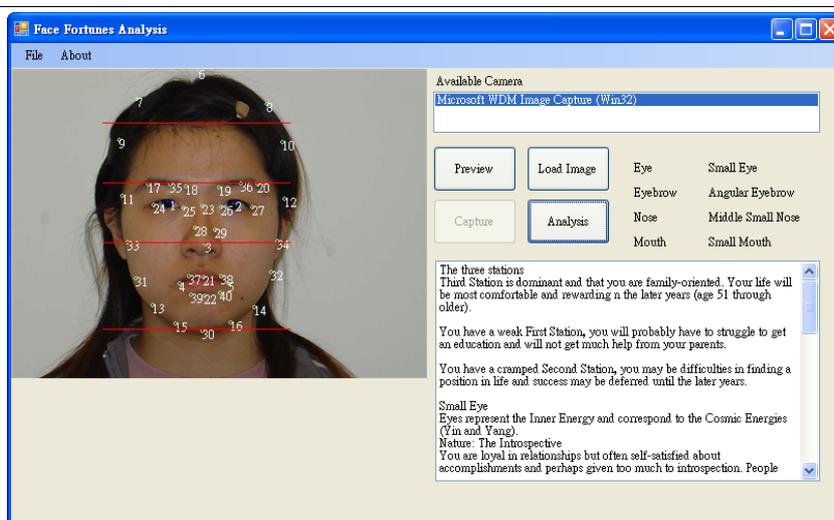


Figure C-3 Result of Test Case C3

Test case ID: C4	Test Machine: PC1 / PC2
Test Description:	Test the Facial Features Result
Test Execution:	<ol style="list-style-type: none"> 1. Click “Load Image” 2. Choose test image “F0810deg1.jpg” 3. Click “Analysis”
Expected Result:	<ol style="list-style-type: none"> 1. Analysis start as human face should be detected 2. Facial features detected 3. Labeling the facial feature 4. Analysis with China Physiognomy Methodology 5. Get Result <ul style="list-style-type: none"> - Eye type & detail - Eyebrows type & detail - Nose type & detail - Mouth type & detail - Three station type & detail
Actual Result:	<p>As Expected Result</p> <ol style="list-style-type: none"> 1. Human face detected 2. Facial features detected 3. Point 1 to point 40 facial point detected 4. Analysis with China Physiognomy Methodology 5. Analysis done and result show (Detail Result as Figure C-4)
Test Result:	<p>Face Recognition – PASS</p> <p>Facial Feature Analysis – PASS</p> <p>Fortune Analysis with China Physiognomy - PASS</p>

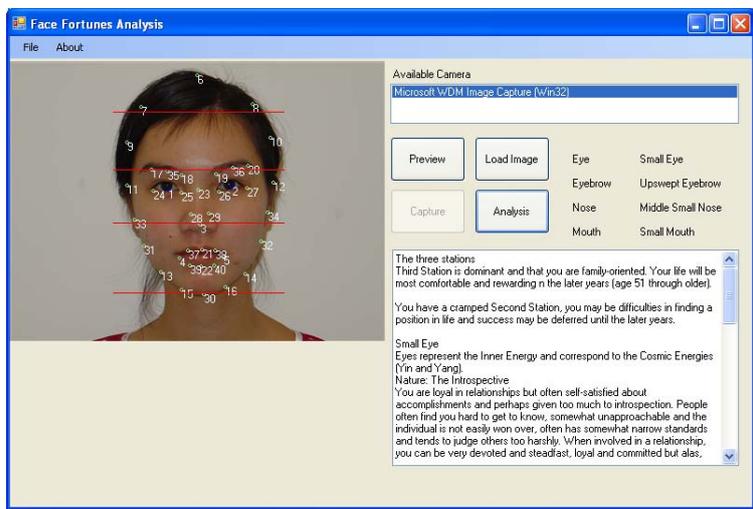


Figure C-4 Result of Test Case C4

Test case ID: C5	Test Machine: PC1 / PC2
Test Description:	Test the Facial Features Result
Test Execution:	<ol style="list-style-type: none"> 1. Click “Load Image” 2. Choose test image “M0740deg1.jpg” 3. Click “Analysis”
Expected Result:	<ol style="list-style-type: none"> 1. Analysis start as human face should be detected 2. Facial features detected 3. Labeling the facial feature 4. Analysis with China Physiognomy Methodology 5. Get Result <ul style="list-style-type: none"> - Eye type & detail - Eyebrows type & detail - Nose type & detail - Mouth type & detail - Three station type & detail
Actual Result:	<p>As Expected Result</p> <ol style="list-style-type: none"> 1. Human face detected 2. Facial features detected 3. Point 1 to point 40 facial point detected 4. Analysis with China Physiognomy Methodology 5. Analysis done and result show (Detail Result as Figure C-5)
Test Result:	<p>Face Recognition – PASS</p> <p>Facial Feature Analysis – PASS</p> <p>Fortune Analysis with China Physiognomy - PASS</p>

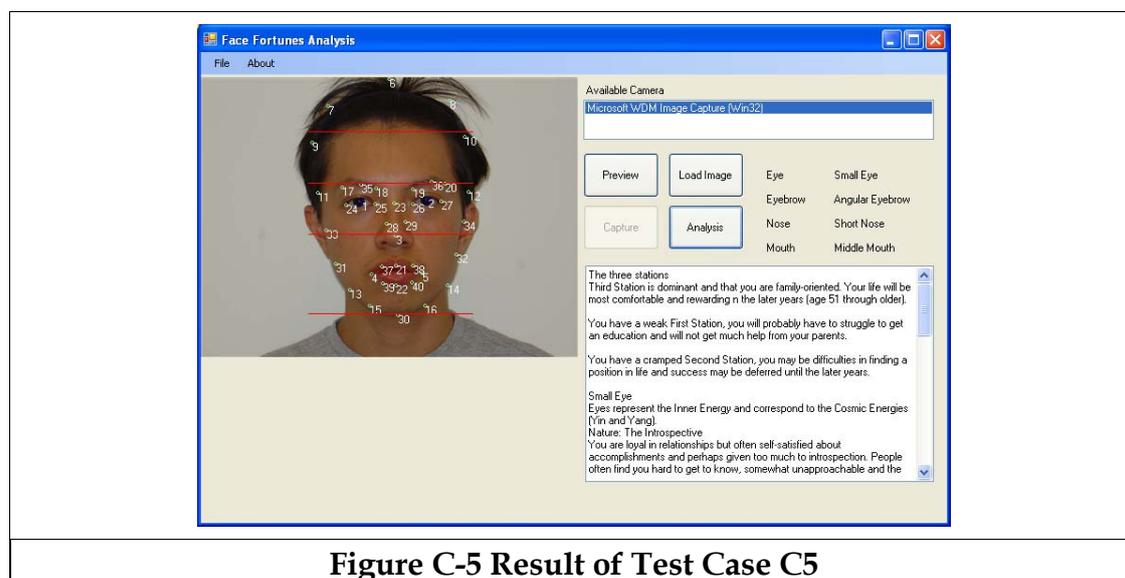


Figure C-5 Result of Test Case C5

Appendix D – Installation Guide

Hardware Requirement

- Process Type: Intel Pentium 4 or faster
- Process Speed: 2.0 GHz or above
- RAM: Minimum: 1024 MB
- Hard Disk: 40GB
- Display: 1024 x 768 pixel resolution
- Other Devices: Scanner, Webcam (Optional)

Software Requirement

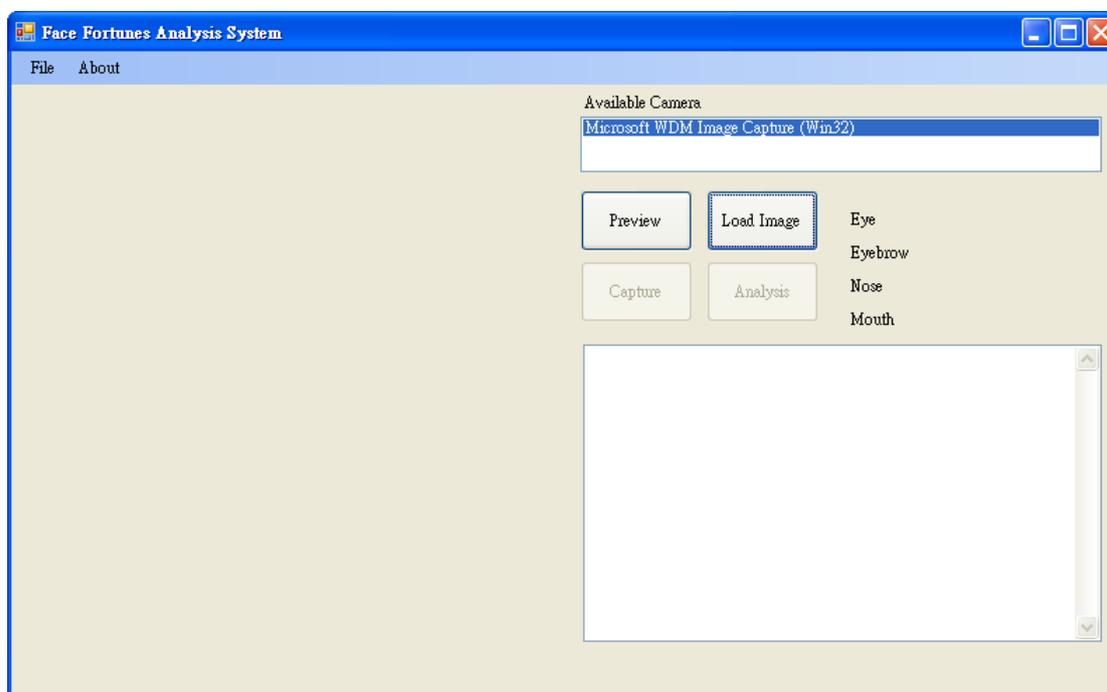
- Operating System: Microsoft Windows XP Pro SP2 or above
- Application Framework: Microsoft .NET Framework 3.5
- Visual Basic Runtime to execute

Appendix E – User Manuel

How to execute the FFAS

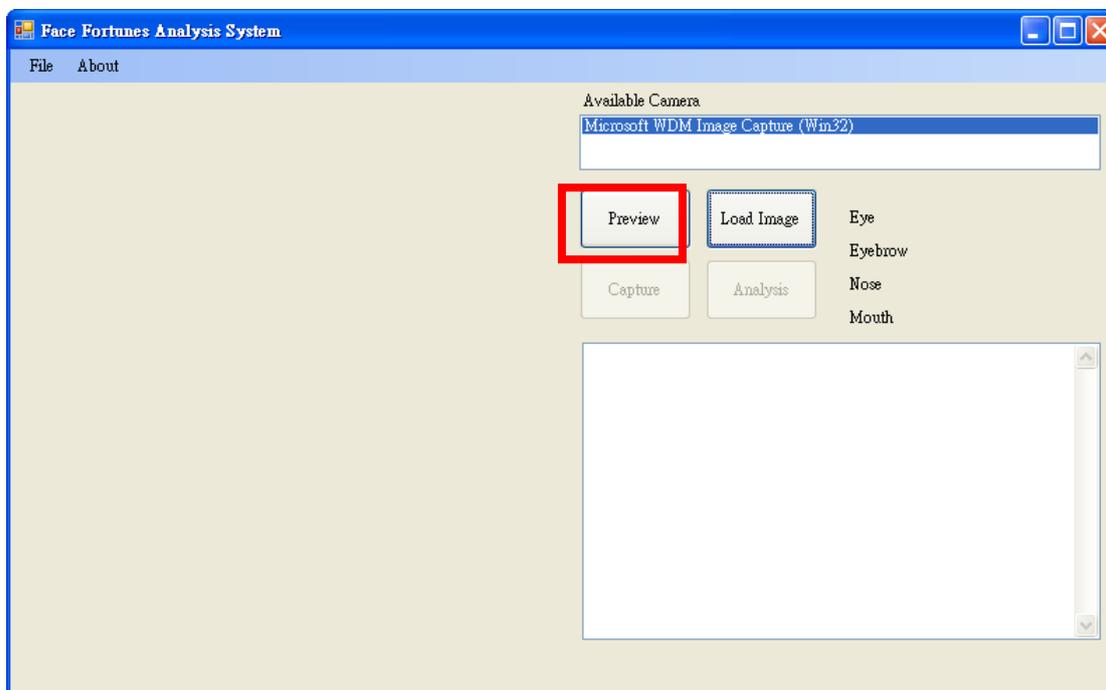
1. Copy the “FFAS” folder  to the local hard disk.
2. Open the “FFAS” folder.

3. Double click “FFAS.exe”  to execute the program.
4. “FFAS” main program should be shown

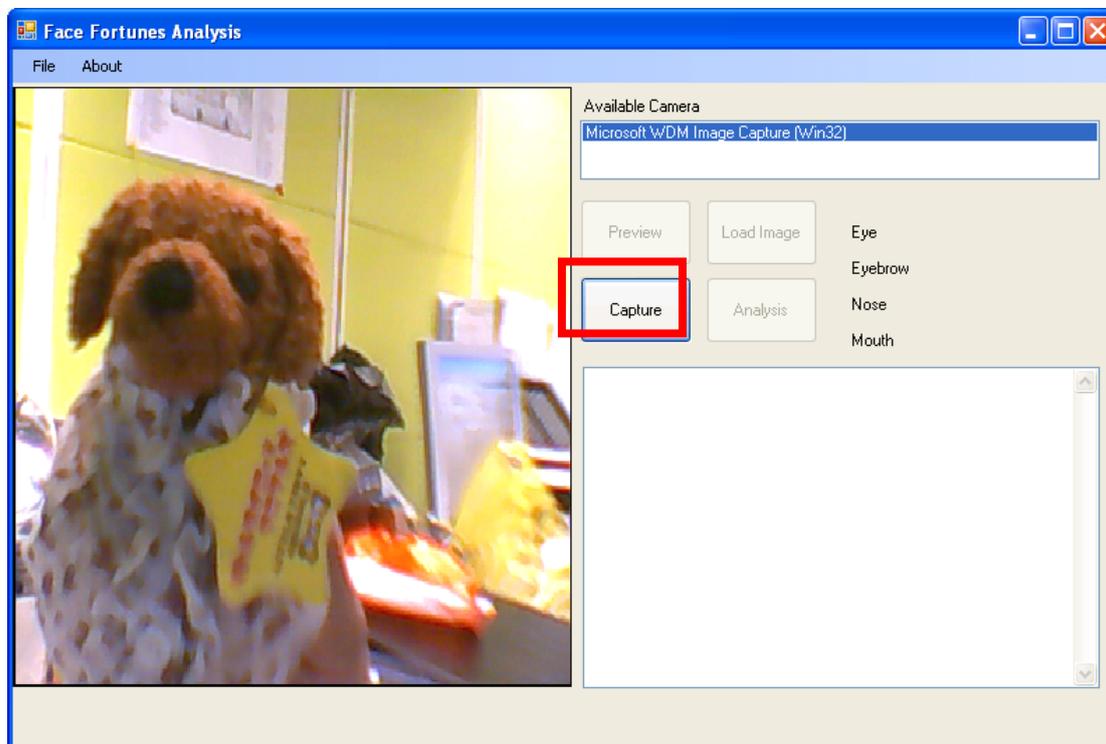


How to analyze the Face Fortune – Method I Webcam Captured

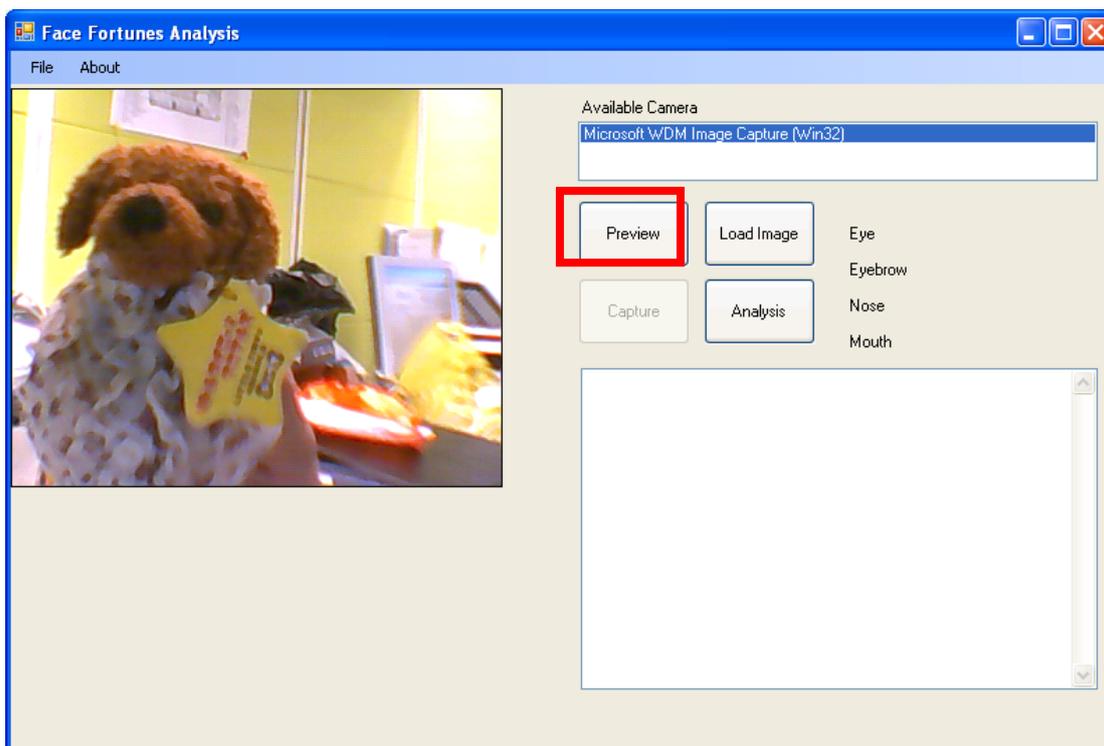
1. Click “Preview” to enable the preview mode function.



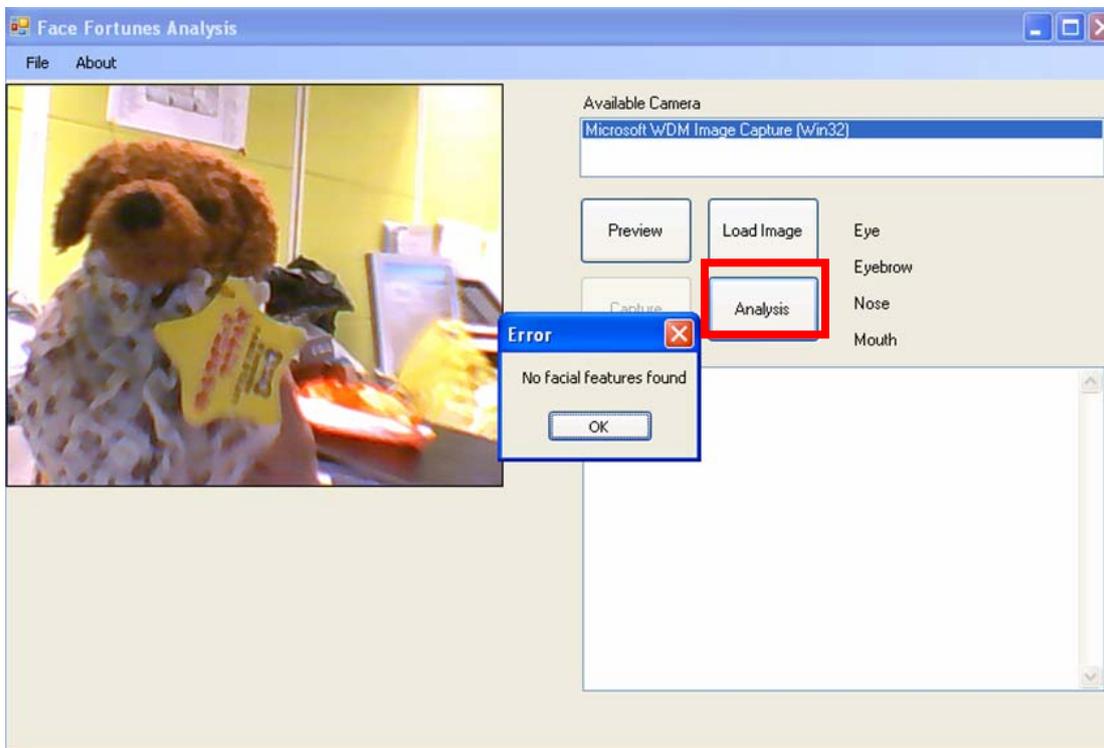
2. Webcam starts to preview image and click “Capture” to save image



3. If you want to recapture the image, click “Preview” to enable the preview mode again.

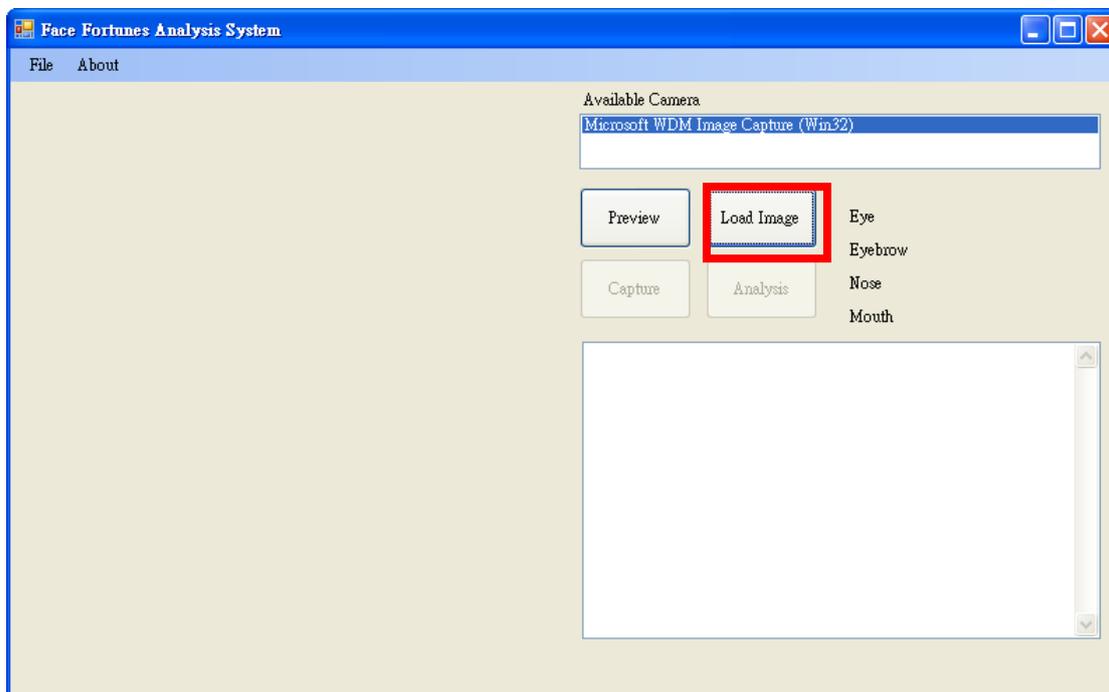


4. Click “Analysis” to process the face recognition and face fortune analysis.

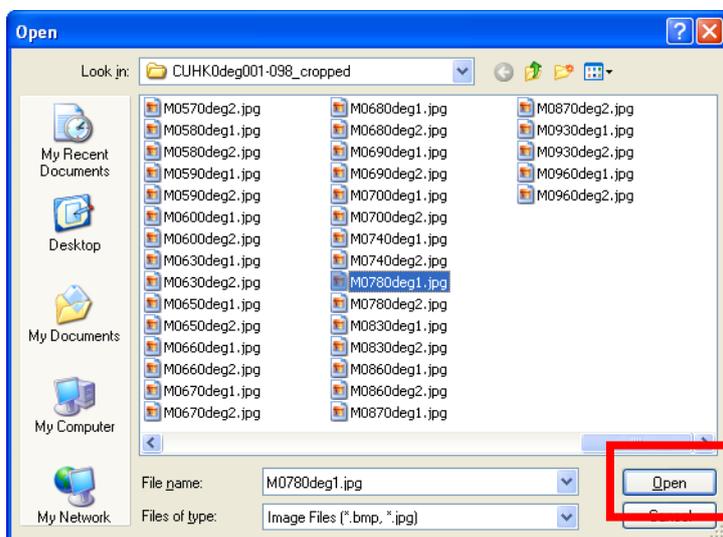


How to analyze the Face Fortune – Method II Image Loaded

1. Click “Load Image” to input the image.

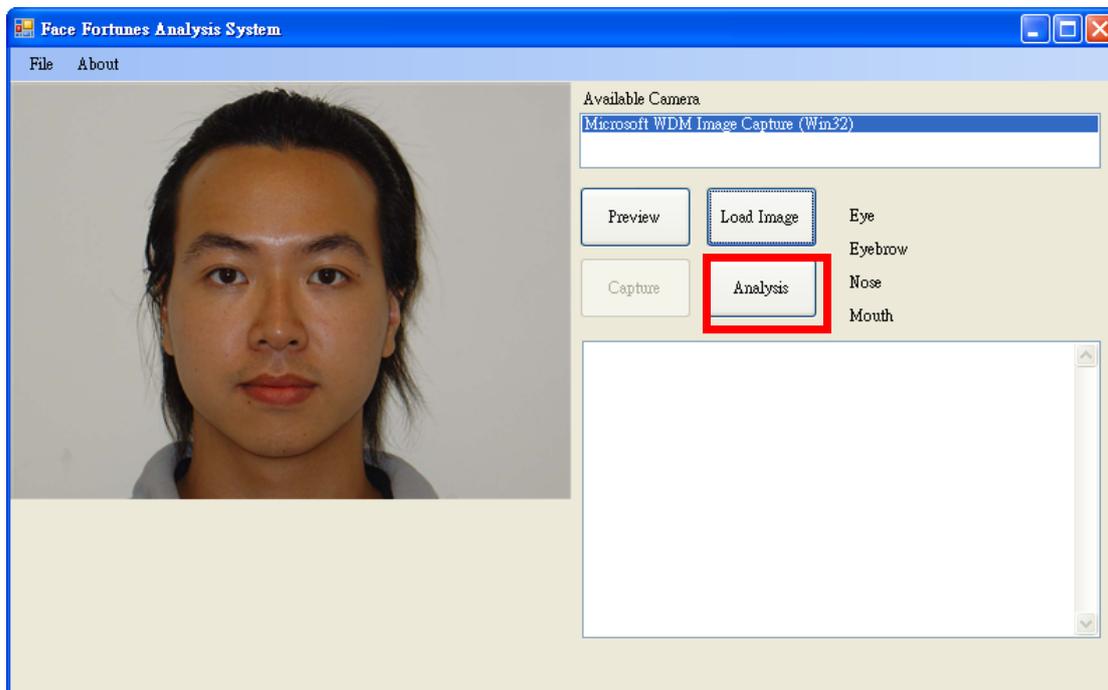


2. Select the image to input

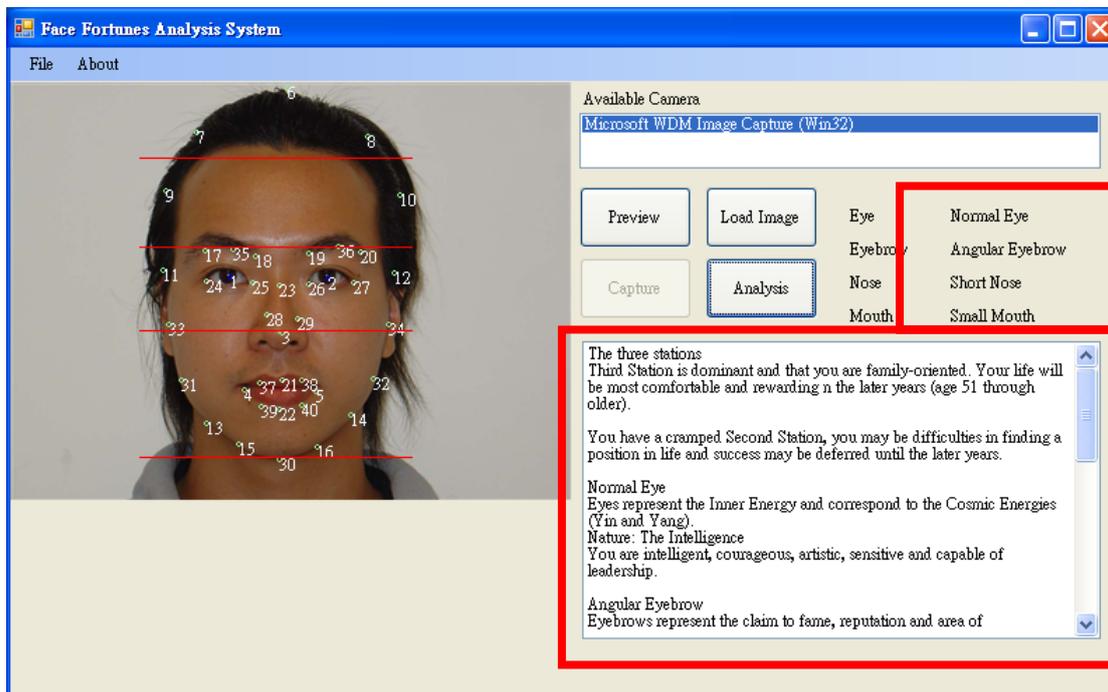


3. Click “Open” to load the image

- Click “Analysis” to process the Face Recognition and Face Fortune Analysis.



- Both of short result and detail result shows.



Appendix F – Project Proposal

Project Proposal Submission Form

Instructions :			
1. Please complete the form using Capital Letters.			
2. Completed proposal must be submitted through the Service counter			
Course :	Oxford Brookes University		
Name of Student :	CHAN WING KEUNG, VINCENT		
Email Address :		Contact No :	
Student ID :	0301-0907-0303	Class Code :	U08096
Project Title :	FACE FORTUNE ANALYSIS SYSTEM (FFAS)		
Track	<input checked="" type="checkbox"/> Computing and Information Systems <input type="checkbox"/> Computing and Software Engineering <input type="checkbox"/> Information Systems and Software Engineering <i>(**Please tick the appropriate module)</i>		
Total Number of Pages including this cover page :	8 <i>(** Please note the proposal should not exceed more than 8 pages. This excludes title, table of content, reference list and appendix pages)</i>		
Date of Submission	5 Oct 2009		
Declaration :		Signature :	
I declare that this assignment is my original work and that I have acknowledged any use of published or unpublished works of other people. I understand that I will be penalized for plagiarism and late submission.		_____	

For Office Use Only			
Date of Receipt:		Collected By:	
For the Attention of:	The Project Co-Ordinator, GSD Dept		

Oxford Brookes University

U08096

Project

Project Title

Face Fortune Analysis System(FFAS)

Student Name	Chan Wing Keung, Vincent
Student ID	0301-0907-0303

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Abstract

In this project, Face Fortune Analysis System (FFAS) will be introduced. It is a real time application for capturing human face, face recognition, facial features analysis and fortune analysis with China Physiognomy analysis methodology. First, FFAS can detect human face in still photographs automatically and capture human face directly by the imaging recordable device, such as WebCam or import image from other device, like Scanner or Digital Camera.

Second, FFAS applies neural network approach, which can detect and recognize whether the photograph is human face or none of human face. Third, the face recognition engine recognizes the coordinate of facial features points for face matching processing including eyes, eyebrows, mouth, nose and face contours. Finally, FFAS analyzes the facial features according to China Physiognomy Analysis Methodology.

The result of face fortune analysis by FFAS are based on some point of views of ancient China Physiognomy Methodology books including “SHEN XIANG QUAN BIAN”, “MA YI SHEN XIANG” and “ICE KAM” which were analyzing facial features particularly.

The development of face recognition with China Physiognomy Analysis methodology application must be one of an interesting and challenging academic topic because similar application cannot be found in recent decades. In addition, FFAS could help us to promote China Physiognomy globally and attract more people to widen their eyes on the topic of China Physiognomy.

Project Narrative

Project Title

Face Fortune Analysis System (FFAS)

Project Objective

China Physiognomy is a very hot famous topic around the world. There should not have any Chinese who never heard about China Physiognomy. Some people have a proficient skill to know how to analyze it correctly. For this reason, we want to assist more people to realize the China Physiognomy and make them easily to analyze

We would like to prompt our China Physiognomy to everyone in everywhere. Besides, FFAS is one of the methods for us to do it. On the other hand, it is difficult to find the similar automatic application in the world.

Problems and Justification

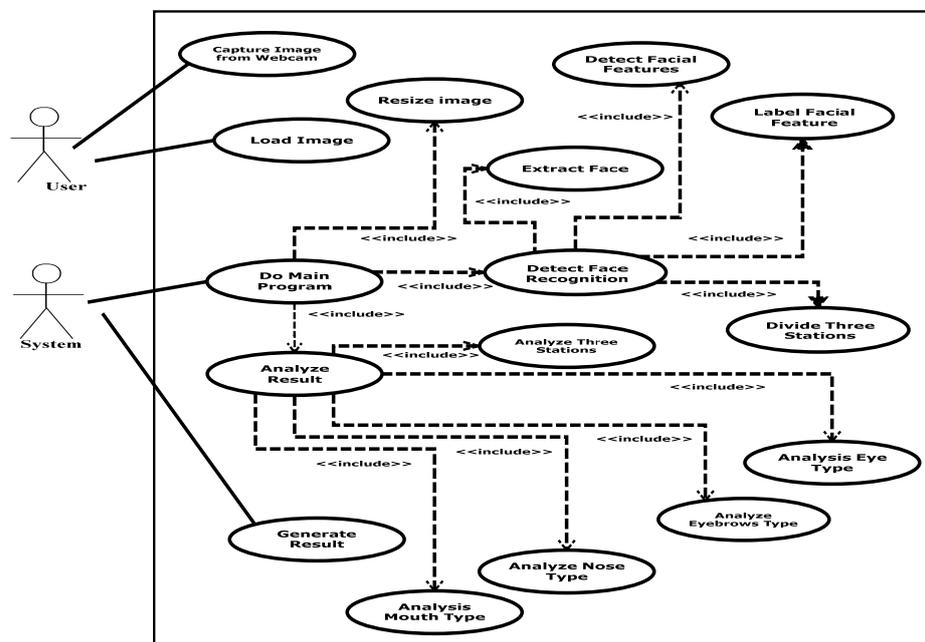
The Face Recognition technology has developed rapidly in this century. Computer visions are used for detecting and recognizing human face from a digital image or a video frame automatically. Face Recognition can identify the facial features such as eyes, eyebrows, mouth and nose. Several face recognition techniques can prove a wide range of possible application in real time such as biometric cryptosystems, cognitive sciences, credit card authentication, electronic and physical access control etc.

China Physiognomy has been developed more than two thousand years, which is based on the ancient Chinese wisdom who sees the face as meeting place of heaven and earth, sharing with universe the harmony or disharmony of the cosmic energies such as active, passive, yin (feminine) and yang (masculine).

FFAS is a design that comprised both of Face Recognition Technology and China Physiognomy Analysis Methodology to design. FFAS is also real time face detection and face recognition that detects a face and facial features and supports faces matching.

System Architecture

Use Case Diagram



Major Functions

Realize the Face fortune

1. The Three Stations
2. Eyes
3. Eyebrows
4. Nose
5. Mouth

Resource Required

Hardware

- Process Type: Intel Pentium 4 or faster
- Process Speed: 2.0 GHz or above
- RAM: Minimum: 1024 MB
- Hard Disk: 40GB
- Display: 1024 x 768 pixel resolution
- Other Devices: Scanner, Webcam

Software

- Operating System: Microsoft Windows XP Pro SP2 or above
- Development Tool: Microsoft Visual Studio 2008

Appendices I – Literature Review

Queen Mary University of London, Ecole Normale Superieure, Scuola Normale Superiore (2009), *About Physiognomy*. Available at <http://physiognomy.history.qmul.ac.uk/aboutphys.html> [Accessed: 20 Sep 2009]

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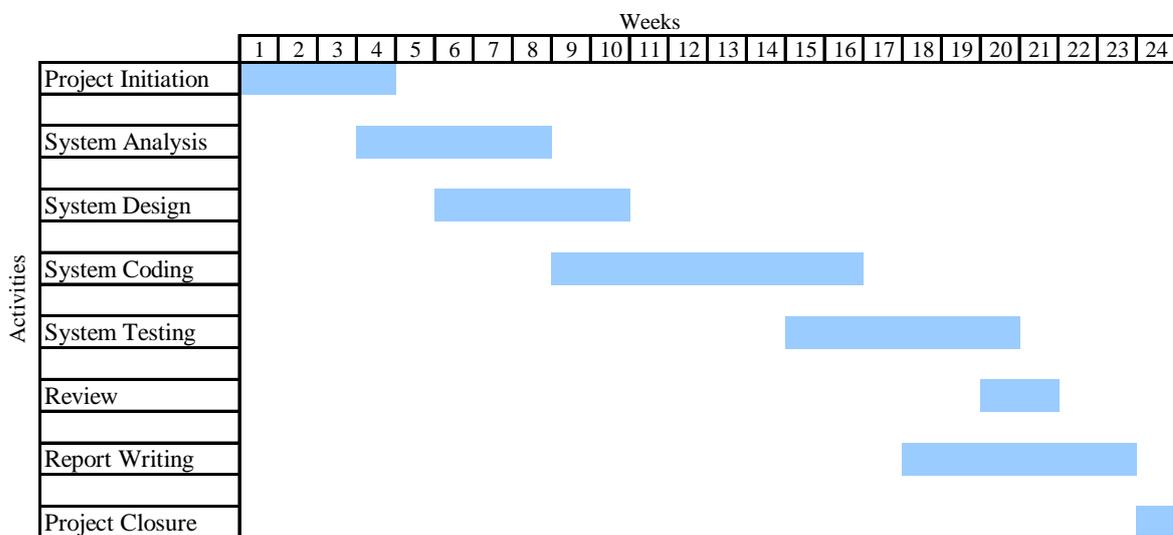
Wikipedia (2009), *Face Recognition System*, Available at http://wikipedia.org/wiki/Facial_recognition_system [Accessed: 10 Sep 2010].

Haddadnia Javad, Faez Karim, P Moallem (2001), *Neural Network Based Face Recognition with Moments Invariant*, In: *IEEE Int. Conf. On Image Processing*, Vol. I, (p1018-1021), Thessaloniki, Greece

Haddadnia Javad, Faez Karim, Ahmadi Majid (2002), *N-Feature Neural Network Human Face Recognition*, Available at: <http://www.cipprs.org/vi2002/pdf/s6-2.pdf> [Accessed 18 Sep 2009]

Electronic Privacy Information Center (2008), *Face Recognition*, Available at: <http://epic.org/privacy/facerecognition/> [Accessed 13 Sep 2009]

Appendices II – Project Plan Gantt Chart



Appendix G – Progress Report



Oxford Brookes University -Project

Progress Report No : 1

Date : 5 Oct 2009

(to be completed by student)

To discuss the selective project topic
To study Face Recognition
To study China Face Reading Methodology

Progress evaluation (to be completed by the supervisor)

<p>General Progress: (a) very slow (b) behind (c) satisfactory (d) impressive</p> <p>Research: (a) very slow (b) behind (c) satisfactory (d) impressive (e) done (f) N/A</p> <p>Tool Studying: (a) very slow (b) behind (c) satisfactory (d) impressive (e) done (f) N/A</p> <p>Implementation: (a) very slow (b) behind (c) satisfactory (d) impressive (e) done (f) N/A</p> <p>Comments:</p> <p>_____</p> <p>_____</p>

Supervisor Signature: _____

Duration _____(hours)

Start Time: _____

End Time: _____

Oxford Brookes University -Project

Progress Report No : 3

Date : 7 Dec 2009

(to be completed by student)

To complete the Literature Review
To review the System Analysis & Design
To prepare the program Coding

Progress evaluation (to be completed by the supervisor)

<p>General Progress: (a) very slow (b) behind (c) satisfactory (d) impressive</p> <p>Research: (a) very slow (b) behind (c) satisfactory (d) impressive (e) done (f) N/A</p> <p>Tool Studying: (a) very slow (b) behind (c) satisfactory (d) impressive (e) done (f) N/A</p> <p>Implementation: (a) very slow (b) behind (c) satisfactory (d) impressive (e) done (f) N/A</p> <p>Comments:</p> <p>_____</p> <p>_____</p>

Supervisor Signature: _____

Duration _____(hours)

Start Time: _____

End Time: _____

Oxford Brookes University -Project

Progress Report No : 5

Date : 8 Feb 2010

(to be completed by student)

To complete the Program Coding
To test the Program Features
To prepare the Project Report

Progress evaluation (to be completed by the supervisor)

<p>General Progress: (a) very slow (b) behind (c) satisfactory (d) impressive</p> <p>Research: (a) very slow (b) behind (c) satisfactory (d) impressive (e) done (f) N/A</p> <p>Tool Studying: (a) very slow (b) behind (c) satisfactory (d) impressive (e) done (f) N/A</p> <p>Implementation: (a) very slow (b) behind (c) satisfactory (d) impressive (e) done (f) N/A</p> <p>Comments:</p> <p>_____</p> <p>_____</p>

Supervisor Signature: _____

Duration _____(hours)

Start Time: _____

End Time: _____

Appendix H – Project Presentation

OXFORD BOOKES UNIVERSITY

U08096 PROJECT

FACE FORTUNE ANALYSIS SYSTEM (FFAS)

by Vincent Chan 0301-0907-0303

Agenda

1. Problem Statement
2. Background Information
3. Program Design and Features
4. Demonstration
5. Conclusion
6. Future Work
7. Q & A

Problem Statement

- To develop a Face Fortune Analysis System (FFAS).
- To provide a stability and feasibility analysis result.
- To prompt China Physiognomy to everyone in everywhere.

Face Fortune Analysis System (FFAS)

-3-

Background Information – CHINA PHYSIOGNOMY

Definition of China Physiognomy

- Revealed the physical capacities, fortunes, potential, strengths & weakness and the temperament or disposition of an individual by facial feature.
- Other common name is Face Reading and Face Language.

Definition of Face Recognition

- Face Recognition is a computer application for detecting and recognizing human face from a digital image or a video frame automatically .

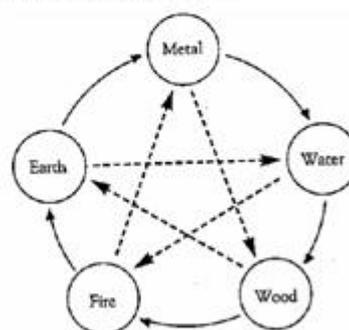
Face Fortune Analysis System (FFAS)

-4-

Background Information – CHINA PHYSIOGNOMY

Element Type - Face Shape and Complexion Color as keys to temperament

Physiognomist assigns to each individual a certain temperament that can be recognized by the characteristic face shape and complexion color and other physical indicators. There are five basic temperaments, which are called element types.



Solid lines - mutual production
Dotted lines - mutual destruction

Face Fortune Analysis System (FFAS)

-6-

Background Information – CHINA PHYSIOGNOMY

The Cosmic Energies – Are you a balanced personality

According to the ancient Chinese knowledge, the universe is comprised of two cosmic energies which is positive creative “Yang” (Day) and the receptive “Yin” (Night). In the face, the bony structure is Yang and the soft parts (the flesh and skin) are Yin.



Face Fortune Analysis System (FFAS)

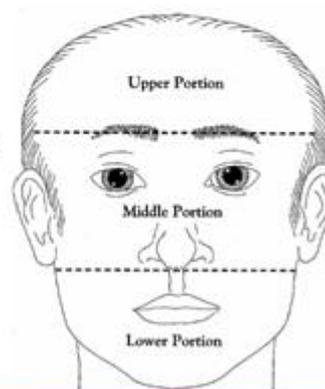
-6-

Background Information – CHINA PHYSIOGNOMY

The Three Stations – Life Stages

The face is divided horizontally into Three Stations each station is represented a major part of life.

- Station 1 represents the status of youth with age 15 through 30.
- Station 2 represents the status of midlife with age 31 through 50.
- Station 3 represents maturity with age 51 and older.



Face Fortune Analysis System (FFAS)

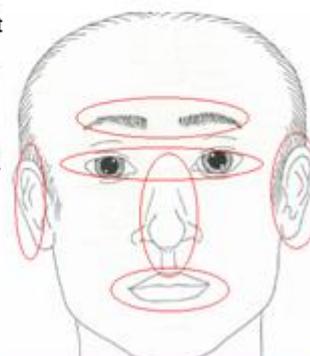
-7-

Background Information – CHINA PHYSIOGNOMY

Five Major Facial Features – Your Potential

The potentials are represented by the Five Major Facial Features are including:

- “EARS” symbolize the Life Potential.
- “EYEBROWS” symbolizes the Aspir
- “EYES” symbolizes the Intelligence and Inner Energy.
- “NOSE” symbolizes the Wealth and Achievement in Midlife.
- “MOUTH” symbolizes the Personality.



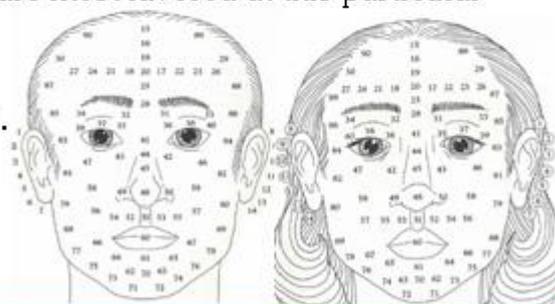
Face Fortune Analysis System (FFAS)

-8-

Background Information – CHINA PHYSIOGNOMY

The 100 position Points of the Floating Year – Where you are now standing

Each of the Position Points represents a year in your life and yours Floating Year. From your present Position Point you could discover where you stand in present and what pursuits are most favored at this particular time, and what energies are likely to be most effective.



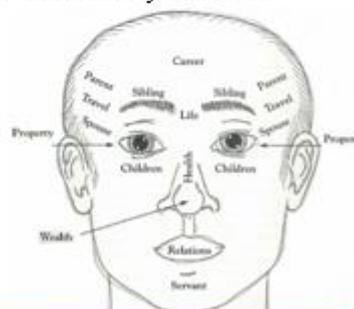
Face Fortune Analysis System (FFAS)

-9-

Background Information – CHINA PHYSIOGNOMY

Twelve Palaces – Checkpoints for Activities

The Palaces are areas to be checked for the probable outcome about good or bad fortune and other significant life enterprise such as love affairs, marriage, money matters, real estate, travel and so on. You can check the state of any particular Palace at any time to preview your possibilities for a successful action.



Face Fortune Analysis System (FFAS)

-10-

Background Information – CHINA PHYSIOGNOMY

Other Facial Features – Special Traits

There are lesser facial features, such as (1) Beard (2) Eyelashes (3) Hair (4) Jawbones (5) Minor Facial Lines (6) Moles (7) Philtrum (8) Teeth, which have meaning in Face Reading and help bring out nuances of the individual's nature. These can often give quick insight into another's temperament.

Face Fortune Analysis System (FFAS)

-11-

Background Information – FACE RECOGNITION

Face Recognition

Face Recognition has developed rapidly in the century, which is a computer application for detecting and recognizing human face from a digital image or a video frame automatically. Face Recognition can identify the facial features such as eyes, eyebrows, mouth and nose.

Face Fortune Analysis System (FFAS)

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Background Information – FACE RECOGNITION

Areas	Specific Application
Biometrics	Drivers Licenses, Entitlement Programs, Immigration, National ID, Passports, Voter Registration
Information Security	Desktop Login, Application Security, Database Security, File Encryption, Intranet Security, Internet Access, Medical Records
Law Enforcement and Surveillance	Advance Video Surveillance, CCTV, Control, Portal Control, Post-Event Analysis, Shoplifting and Suspect Tracking and Investigation
Smart Cards	Stored Value Security, User Authentication
Access Control	Facility Access, Vehicular Access

Face Fortune Analysis System (FFAS)

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Background Information – FACE RECOGNITION

Categories of Face Recognition

- *Global approach or appearance-based approach*
PCA – Principal Component Analysis, LDA – Linear Discriminant Analysis
- *Feature-based approach or component-based approach*
LFA – Local Feature Analysis, GA – Geometrical Feature
- *Texture based approach*
NN – Neural Network, IGF – Independent Gabor Features

Face Fortune Analysis System (FFAS)

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Program Design - SOFTWARE PROCESS MODEL

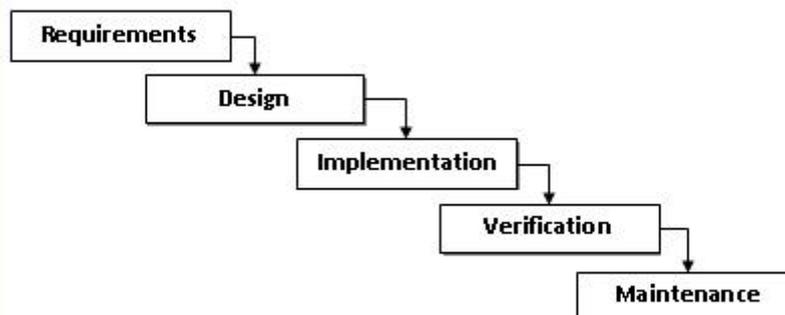
Waterfall Model

- Suitable for small and medium-sized software systems.
- For FFAS , the specification rarely changes during the development time.

Face Fortune Analysis System (FFAS)

-15-

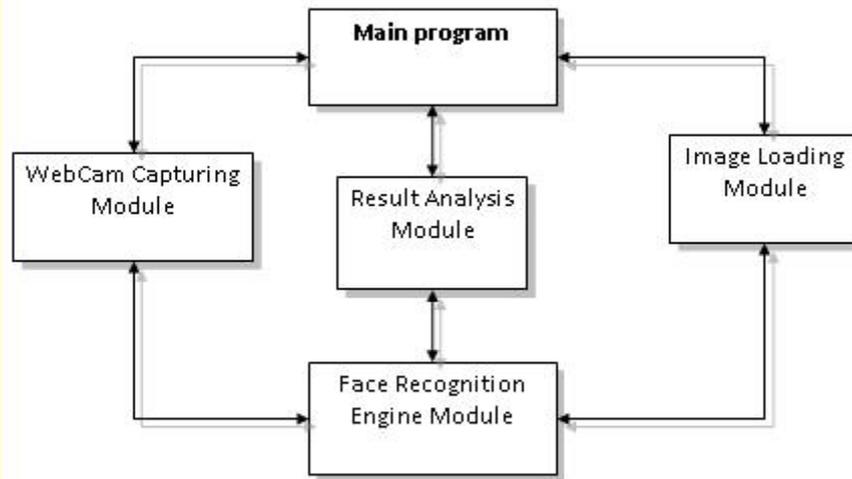
Program Design - SOFTWARE PROCESS MODEL



Face Fortune Analysis System (FFAS)

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Program Design – PROGRAM STRUCTURE



Face Fortune Analysis System (FFAS)

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Program Feature

FFAS includes four modules:

- WebCam Capturing Module
- Image Loading Module
- Face Recognition Engine Module
- Result Analysis Module

Face Fortune Analysis System (FFAS)

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Program Features – PROGRAM MODULE

WebCam Capturing Module

- Provides the ability for the program to capture image from WebCam.
- Enhance the program to analysis faces not only to pre-taken photographs, but real-time captured face.

Face Fortune Analysis System (FFAS)

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Program Features – PROGRAM MODULE

Image Loading Module

- Retrieve image data from pre-taken photographs.
- Process the loaded image before analysis for consistent result.

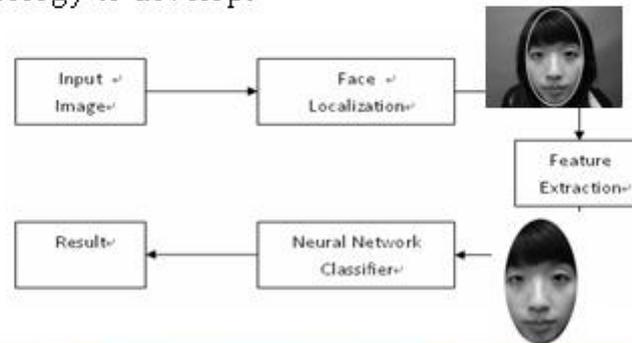
Face Fortune Analysis System (FFAS)

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Program Features – PROGRAM MODULE

Face Recognition Engine Module

- Reference to Haddadnia's approach of Single Feature Neural Network (SFNN) human face recognition which is one of Radial Basis Function (RBF) Neural Network Methodology to develop.



Face Fortune Analysis System (FFAS)

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Program Features – PROGRAM MODULE

Single Feature Neural Network (SFNN)

- Formulas for Face Localization

$$\phi_1 = P_{inside} / \mu_{0,0}$$

$$\phi_0 = P_{outside} / \mu_{0,0}$$

- Formulas for Neural Network classifier

$$R_i(x) = R_i\left(\frac{\|x - c_i\|}{\sigma_i}\right) \quad , \quad i=1,2,\dots,r$$

Face Fortune Analysis System (FFAS)

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Program Features – PROGRAM MODULE

Face Recognition & Facial Features Analysis

- Scenario of Face Recognition Engine
 - Face Detection
 - Facial Features Recognition
 - Processes the image and returns coordinates of facial feature points
 - Facial feature points labeling
 - Three stations dividing

Face Fortune Analysis System (FFAS)

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Program Features – PROGRAM MODULE

Result Analysis Module

- Get data from Face Recognition Engine
- Process the facial fortune analysis with China Physiognomy Analysis Methodology
- The returned result would includes (1) Three Station Analysis (2) Eyebrows Analysis (3) Eye Analysis (4) Nose Analysis (5) Mouth Analysis

Face Fortune Analysis System (FFAS)

-24-

- Demonstration -

Conclusion

- China Physiognomy has been found more than two thousand years but none of computer system is used in evaluating China Physiognomy automatically up to date.
- To develop the new system for helping users to analyze their face fortune.
- Realizing the China Physiognomy effectively and efficiently.
- Scientific approach could implement China Physiognomy methodology.

Future Work

- As the time limitation, the evaluation of other China Physiognomy, such as Face Shape, Face Complexion etc have not been put into the system. We may apply those different theories to the next phase.
- Apply other face recognition methodologies as 3D Face Recognition Models or Discriminating Color Face Recognition Models.
- Develop the application on other platform such as Mobile platform in the near future.

Face Fortune Analysis System (FFAS)

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- The End -

Thank you!

- Q & A -

