CHAPTER – 1

INTRODUCTION
CHAPTER 1
INTRODUCTION

1.1 PRELUDE

The need for fast identification of a person is ever growing. The individuality of a human face depends on the fine details of the facial components and it is necessary to extract and describe these patterns in order to recognize human face. Face detection is currently a very active research area and the technology has come a long way since the survey of Chellappa et.al. (1995). A variety of studies on face components such as eye, lips, nose, and teeth have been proceeding in medicine, psychology, biometrics authentication and other areas. Face is the main part of human body which communicates information (emotions and expression) through non-verbal communication. Various researches have been carried out to study the effect of emotions on face. Ekman and Rosenberg (2005) proposed six basic emotions namely joy, surprise, anger, sadness, fear and disgust. In their own words: “the six emotions studied were those which had been found by more than one investigator to be discriminable within any one literate culture” Ekman P. (1971). Apart from these six basic emotions, the human face and eye is capable of displaying expressions for a variety of other emotions. In 2000, Parrott identified 136 emotional states that humans are capable of displaying and categorized them into separate classes and subclasses Parrott W.G. (2000).

Eye are the most silent and stable features in the human face and hence eye configuration is considered as most important step as person identifier. Eye configuration in human facial images is important in preprocessing for face recognition, since the results can be used to determine the position, size, and direction
of the face. It is claimed that eye location accuracy is very important for person identification system performance.

Person identification under varying situations such as illumination, angular difference etc. remains a challenging problem. Much progress has been made toward a solution through methods that require multiple gallery images of each subject under varying illumination and angular difference. Yet for many applications, this requirement is too severe. The normalization of the eyes under scale, rotation and translation, as well as under contrast and brightness variation, is a crucial step for the extraction of stable features used to recognize a person. A way to improve the speed and the recognition performance of the overall system is to have an accurate normalization of the images, especially in scale.

Fractal is an image or picture that can be completely described by a mathematical algorithm in its infinitely fine texture and details. It has details at every scale. They are self-similar and have fractional dimensions. The fractal mechanism in human vision is extremely effective and powerful as it follows the same procedure of understanding a current theme by referring it to what is known Ning Lu Michael Barnsley (1997). Dimension is an independent term from size. We should remember that a line has 1 dimension, a surface has 2 dimensions and a cube has 3 dimensions. The most important property of fractals is their decimal dimension. Fractal dimension (FD) is a useful feature for texture segmentation, shape classification and graphic analysis in many fields. It is proposed to characterize roughness and self-similarity in a picture.
1.2 OBJECTIVE

Eye Controls provide turnkey integrated identification systems to support electronic record access and physical access operations for applications beyond the medical field. Our work is aimed to identify person based on their Eye using Fractal dimensions. To achieve this aim we have prepared a detailed database. Data was collected from Shri Ram dance academy and Nrithyathi Kalakshetram Bhurapara, Raipur, Chhattisgarh. Image of other dancers were also taken from youtube and CDs. The Data was collected and Pre-processed. Persons in data were of different Age group and Gender. Corresponding to each person values are taken of nine different rasas and corresponding to each rasas parameter like Entropy, Mean, Area, Perimeter, Histogram, Variance, Kurtosis, Skewness Moment, Standard Deviation are calculated through MatLab11. This was the part of standardization. After that we took some test data from known persons. We found that our software is giving approximate result.

The main objective of this research work could be identified as:

- Development of a database for Eye Configuration.
- Extraction and Pre-Processing of Eye and Eyebrows from Image
- Study of Eye Feature Parameter for Navarasa using fractal dimension.
- Standardization by developing an Algorithm depending on the values of Eye Feature Parameters.
- Identification of Age and Gender of the Person by comparing test values with the standardized data.
1.3 METHODOLOGY

The methodology, as shown in Figure 1.1, has been adopted during the possession of this research.

Figure 1.1 Methodology adopted during the present study

1.4 ORGANIZATION OF THESIS

Eye Configuration as Identifier of Person Using Fractal Dimensions is the aim of our present work. Eye expression plays an important role in person identification. In this area, various researchers have been contributed a lot which has been discussed in Chapter 2. The literature review has been divided into following categories. These are:

1. Preliminary work done in this field.
2. Literatures Review describing the methods for Extracting and Pre-Processing the Eye and Eyebrows from face using fractal dimensions.
3. Literatures Review describing Eye expression analysis.
4. Some more literatures review relevant to the present study.

Chapter 3 is dedicated to muscular anatomy of eye muscles and related area of eyebrows, marking of eye expressions and its complexity, navarasa expression

**Chapter 4** has been dedicated to analysis of Eye expression. This chapter starts with the definitions of the Eye action coding system, Eye expression standardization approaches, static Eye in MatLab11, development of Eye Feature Parameter, Eye feature parameter extraction, standardization of image, Test value format.

**Chapter 5** is devoted to finding and Analysis of various outcome of various parameters how this parameters are used as base for person identification, Finally Standardization of the work has been set and Identification of Age and Gender of a Person through Eye Feature Parameter for Navarasa Status

**Chapter 6** is devoted to the outcomes of the present investigational research work and scope for future work.