

## ABSTRACT

Biometric is a measure used to evaluate biological systems to establish identity of a person. General biometric systems are well known in public and systems based on retinal recognition belong, without question, to the recognition systems used today. Retinal biometrics has been used for identification and classification for a long time because their uniqueness and reliability have been proven in everyday life. Nowadays, there are a great number of such biometric systems based on retinal recognition on the market. One group is used for forensic purposes (person identification and classification). Another group is a topic of interest of this thesis, Diabetic retinopathy for Health Care Management systems.

Both such systems and related basic biometric terms and processes are described in chapter four, five and six of the thesis. The anatomy and physiology of normal and abnormal retina is described in chapter two of the thesis. The basis of these chapters have been laid from basic biometric identification, wherein blots on retina (haemorrhages) led to classification into mild, moderate, severe non proliferative diabetic retinopathy for patients suffering from diabetes. During this process, the anatomy and physiology of retina were taken into consideration for feature extraction for diabetic retinopathy. The different features extracted in this thesis are bifurcation points, micro- aneurysms, haemorrhages and exudates. The literature survey for the thesis is given in chapter three of the thesis, introduction for which is given in chapter one of the thesis. Chapter seven of the thesis deals with conclusion.

The salient features of the thesis are as follows:

- All the vessels have been segmented with all the retinal features clearly seen in this thesis.
- Feature extraction methods have used accurate shapes to identify basic retinal features in thesis.
- Better classification accuracies have been achieved for classification of test data into different categories in this thesis.
- Artifacts, distortion in images, have been correctly identified in this thesis.
- Some test items are misclassified by all classifiers, which being independent, and the test items having low net product probability of misclassification, indicates clinical reassessment of test items is necessary.