HIGHER TECHNICAL INSTITUTE

COMPUTER STUDIES COURSE

DIPLOMA PROJECT

IMAGE PROCESSING OF HISTOPATHOLOGICAL SPECIMENS

CS/101

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IMAGE PROCESSING OF HISTOPATHOLOGICAL SPECIMENTS

Project Number : CS/101

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To my mother.

Acknowledgements

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Well, but reflect; have we not several times acknowledge that names rightly given are the likenesses and images of the things which they name ?

Socrates

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SUMMARY

The aim of this project is to create an Image Processing system for the needs of the image processing lab of the Cyprus Institute of Neurology and Genetics (CING).

In this project, image data was captured using an Image Acquisition card and a software package which ~~process~~ processes these ~~image~~ images has been developed. Image analysis, image quality enhancement and image coding algorithms have been implemented and documented in detail. A software package has been developed, and has also been tested on actual image data.

This report presents in detail the whole project. A general introduction to image processing is presented. There is a brief description of image processing concepts and the various types of images (binary images, gray-level images, colour images). A detailed investigation on existing image processing hardware and software is presented, followed by a description of the implemented algorithms. Finally, examples of each operation on images are presented, together with a picture of every image before and after the operation is applied.

Finally, the software package that has been developed, has been tested on actual image data. There are examples of each operation, together with a picture of the image before and after the operation is applied.

Organization of project

The pages following in this report are organized as follows:

Introduction presents a general introduction of what this project is about.

Chapter 1 gives some basic information about MDRTC and describes the objective of the project. Also, a primary investigation of existing resources that will be utilized in this project is presented.

Chapter 2 explains some basic terms related to the field of image processing: digitization, resolution, binary images, gray-level images, colour images etc. Moreover, the image representation of the images that will be used, is specified.

Chapter 3 contains all the investigations that have been carried out and involve existing imaging software and hardware. Specifically, detailed information about: the EyeGrabber Image Board, the 'Basic Imaging S/W package for Genstar Systems' and the 'Development of S/W for the Classification of two dimensional Inputs' package, are given.

Chapter 4 presents an analysis of the outputs, output devices, inputs, input devices, interface as well as performance criteria for the system.

Chapter 5 discusses the mathematical theory behind the algorithms used and describes how this theory is implemented using computers.

Chapter 6 gives examples of a number of applications that have been carried out for testing purposes. Pictures of the images, before and after each operation is applied on them, are presented.

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