HIGHER TECHNICAL INSTITUTE

ELECTRICAL ENGINEERING DEPARTMENT

DIPLOMA PROJECT

IMAGE PROCESSING APPLIED IN TELEMEDICINE USING MATLAB

PROJECT NUMBER E.1401

BY

ANDREAS CHRISTOFOROU

CLASS 3E2

JUNE 2006

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HIGHER TECHNICAL INSTITUTE | PROJECT NO 3653

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Project report

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CHAPTER 3 Quality evaluation of medical images using MATLAB software

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SUMMARY

The purpose of this project is to present the methodology used for compression and transmission of medical images in telemedicine and also to study the process required to compress medical images and the methods used. Additionally the available wireless technologies for the transmission of images through a telemedicine channel were investigated. An other objective is the comparison of the original image with the processed image (compressed or transmitted) both visually and mathematically using certain evaluation metrics. The quality evaluation of the images using the evaluation metrics was done using the MATLAB software

INTRODUCTION

When appropriate health professionals cannot be physically present to diagnose patients, telecommunications technology can be used to connect these professionals to those in need of their expertise. In hospitals and homes, telemedicine has been shown to reduce the cost of health-care and increase efficiency through better management of chronic diseases, shared health professional staffing, reduced travel times, and fewer or shorter hospital stays [1].

Telemedicine can be defined as the distant delivery of health care and remote sharing of medical knowledge using telecommunication means. In recent years, several telemedicine applications have been successfully implemented over wired and wireless communication technologies. However, nowadays, modern wireless telecommunication means like GSM and GPRS and the UMTS (Universal Mobile Telephone System) mobile telephony standards allow the operation of wireless telemedicine systems freeing the medical personnel and/or the patient from fixed locations[9,11].

Delivery of medical images or videos is one of the most important benefit of telemedicine The size of medical images (X-ray, MRI) transmitted through a telemedicine channel must be low enough so the delivery of the information is done fast .

To reduce the size of the images with out having any distortion or data loss we must compress them with the best compression standard. The compression standard that we examine is the JPEG2000. JPEG2000 is a newborn standard for image compression and transmission. It may compress efficiently images in lossless mode.

Images will be compared to find out if any distortions or losses created during the compression or the transmission through GPRS, ADSL or 3G telemedicine networks.

This will be done first visually and then mathematically using MATLAB software.