Development of an Adaptive Discrete Cosine Transform (DCT)-based Mod 4 Image Steganographic Tool

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THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE DEGREE OF BACHELOR OF COMPUTER SCIENCE

FACULTY OF COMPUTER AND MATHEMATICAL SCIENCES

UNIVERSITI TEKNOLOGI MARA

NOVEMBER 2010

ACKNOWLEDGEMENT

ABSTRACT

In developing a steganographic tool, the factor of imperceptibility is the most important factor to be highlighted. The stego-image must not leave any sign of modification in order to achieve higher level of imperceptibility. The proposed solution in this project is by using the adaptive Mod-4 steganographic technique in discrete cosine transform (DCT) domain. Groups of 2 x 2 quantized DCT coefficients (GQC) are selected as the valid embedding area from the selected standard steganography cover images. These images are grayscale JPEG images with size of 256 x 256 pixels. The modulo 4 arithmetic operation is further applied to all the valid GQCs to adaptively embed a pair of binary bits. The imperceptibility will be tested by using Peak-Singnal-Noise-Ratio (PSNR) The experimental results shows that all images achieved PSNR value greater than 30dB as well as high quality because the average value of PSNR for this tool is 40.526dB. Therefore, this demonstrates that the adaptive DCT-Mod-4 tool can successfully preserve the quality of the images and stays undetected.

TABLE CONTENTS

CHAPTER ONE

INTRODUCTION

1.0   Introduction

In this chapter, research background, problem statement, objectives, project scopes, technique employed and project significances will be discussed.

1.1   Research Background

Information hiding has emerged as an exciting and important research field. Information hiding not only complements the traditional techniques, but also brings to it new prospects. The information communicated comes in many forms. In a large number of these applications, it is desired that the communication to be done in secret. According to Dickman (2007), secrets communication ranges from the obvious cases of bank transfers, corporate communications, and credit card purchase, on down to a large percentage of everyday email.

As stated by Qi and Wong (2005), there are three techniques in information hiding which are watermarking, steganography and cryptography. Watermarking mainly prevents illegal claims of ownership of digital media. While steganography transmit data