SHARP-EDGES STEGANOGRAPHY IN ARABIC CHARACTERS FOR INFORMATION HIDING

By

NUUR ALIFAH BINTI ROSLAN

This thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia, in Fulfillment of the Requirement for the Degree of Master of Science

June 2011
DEDICATION

This work is dedicated to my beloved parents and family and also my dearest friends for their endless love, patience and support.

My Parents and family

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Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfillment of the requirement for the degree of Master of Science

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Supervisor : Ramlan Mahmod, PhD

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Steganography also known as covered writing creates attention in information hiding field in the past few years in the information security research area. Since the benefit towards this knowledge as the best way of covert communication, many methods and algorithms were implemented through Steganography. Even though many research were concern on image steganography, but in the past two years the text steganography had come with many algorithms and methods. There are two main issues arise in the text steganography: firstly, is a limited redundancy place to hide secret bit which lead to low capacity in hiding secret bits; and the second issue is to have a high invisibility stego-text document at the same time. In order to resolve the problem, sharp-edges stego method focusing in the individual Arabic characters as the redundant data. By using the
sharp-edges for each Arabic character, each character in the cover text has possibility one to five places of hiding secret bits where, the number of sharp-edges is equals to the number of places to hide the secret bit. As a result, the capacity was increased up to 37.8% compared to the previous works and this method has high invisibility with 1.02 points over 10 points in invisibility ratio. Finally, the sharp-edges stego method had utilized the Arabic text for text steganography and this method also can be implemented to the same area of language such as Jawi, Persian or Urdu.
Abstrak tesis ini dikemukakan kepada Senat Universiti Putra Malaysia bagi memenuhi syarat-syarat untuk memperolehi Ijazah Master Sains

STEGANOGRAFI PINGGIR-TAJAM DALAM AKSARA ARAB BAGI PENYEMBUNYIAN MAKLUMAT

Oleh

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Bidang kajian penyelidikan steganografi yang juga dikenali sebagai “penulisan yang tersembunyi” mencuri perhatian dalam bidang penyembunyian maklumat kebelakangan ini terutama dalam lapangan keselamatan maklumat. Memandangkan banyak kebaikan steganografi dalam lapangan penyembunyian maklumat ini sebagai komunikasi terlindung, maka terdapat banyak implementasi dari segi algoritma dan kaedah dalam bidang steganografi. Terdapat dua isu utama yang muncul didalam steganografi teks: terbatasnya bit rahsia yang menjurus kepada kurangnya muatan bagi penyembunyian bit rahsia; pada masa yang sama perlu meningkatkan kesamaran dokumen teks-stego. Bagi menyelesaikan masalah tersebut, kaedah pinggir-tajam stego telah memberi tumpuan pada setiap aksara individu bagi set aksara dalam dokumen teks sebagai data yang
berulang. Dengan menggunakan pinggir-tajam bagi setiap aksara Arab di dalam teks penyembunyi, mereka mempunyai kebarangkalian menyembunyikan satu atau lima bit rahsia dimana, jumlah pinggir-tajam itu adalah bersamaan jumlah tempat untuk menyembunyikan bit rahsia. Sebagai hasilnya, muatan bagi bit rahsia telah meningkat kepada 37.8% berbanding kaedah-kaedah sebelum ini dan kaedah ini juga memiliki kesamaran yang tinggi iaitu 1.02 mata berbanding 10 mata dalam skala kesamaran. Akhir sekali, kaedah pinggir-tajam ini telah memanfaatkan sepenuhnya ruang-rupa aksara Arab untuk teks steganografi dan kaedah ini juga boleh diaplikasikan pada bahasa yang sama jenis seperti Jawi, Parsi atau Urdu.
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Last but not least, I would like to thank all the professors and lecturers from Faculty of Science Computer and Information Technology and those who had helped me directly and indirectly in order to improve and complete this thesis.
I certify that the Examination Committee has met on 20 Jun 2011 to conduct the final examination of Nuur Alifah binti Roslan on her thesis entitled “Sharp-Edges Stego Method in Arabic Character for Information Hiding” in accordance with the Universities and University Colleges Act 1971 and the Constitution of the Universiti Putra Malaysia [P.U.(A) 106] 15 March 1998. The Committee recommends that the student be awarded the Master of Science.

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DECLARATION

I declare that the thesis is my original work except for quotations and citations, which have been duly acknowledged. I also declare that it has not been previously and is not concurrently, submitted for any other degree at Universiti Putra Malaysia or other institutions.

 NUUR ALIFAH BINTI ROSLAN  
 Date: 20 June 2011
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEDICATION</td>
<td>ii</td>
</tr>
<tr>
<td>ABSTRACT</td>
<td>iii</td>
</tr>
<tr>
<td>ABSTRAK</td>
<td>v</td>
</tr>
<tr>
<td>ACKNOWLEDGEMENTS</td>
<td>vii</td>
</tr>
<tr>
<td>APPROVAL</td>
<td>viii</td>
</tr>
<tr>
<td>DECLARATION</td>
<td>x</td>
</tr>
<tr>
<td>LIST OF TABLES</td>
<td>xiv</td>
</tr>
<tr>
<td>LIST OF FIGURES</td>
<td>xv</td>
</tr>
<tr>
<td>LIST OF ABBREVIATION</td>
<td>xvii</td>
</tr>
</tbody>
</table>

## CHAPTER

### 1 INTRODUCTION

1.1 Introduction 1
1.2 Problems Statement 4
1.3 Research Objective 5
1.4 Research Scope 6
1.5 Research Contribution 6
1.6 Research Methodology 7
   1.6.1 Problem Identification 7
   1.6.2 Method Design 8
   1.6.3 Method Implementation 8
   1.6.4 Analysis 9
1.7 Thesis Organization 10

### 2 LITERATURE REVIEW

2.1 Introduction 12
2.2 Classification of Steganography in Information Hiding 13
2.3 Fundamental of Steganography Concept 15
   2.3.1 Capacity, Invisibility and Robustness 16
2.4 Steganography in various digital media 17
   2.4.1 Steganography in Images 18
   2.4.2 Steganography in Audio 19
   2.4.3 Steganography in Video 20
   2.4.4 Steganography in Documents 20
2.5 Text Steganography
  2.5.1 Linguistic Text Steganography 23
  2.5.2 Non-Linguistic Text Steganography 24
  2.5.3 Feature Based 25
2.6 Arabic Script Steganography 32
  2.6.1 Pointed Character Approach 33
  2.6.2 Letters Points and Extention 34
  2.6.3 La Steganography Method 36
  2.6.4 Multiple Diacritics in Arabic Script Method 36
  2.6.5 Pseudo-Space and Pseudo-Connection Character Method 37
2.7 Underlying the Sharp-Edges Stego Method 38
2.8 Summary 39

3 THE DESIGN OF SHARP-EDGES STEGO METHOD IN ARABIC CHARACTER
  3.1 Introduction 41
  3.2 Sharp-Edges Stego Method System Architecture 41
  3.3 Hiding Module 43
    3.3.1 Stego Key 45
    3.3.2 Input Key Type Identification 45
    3.3.3 Identification of Arabic Character Features 46
    3.3.4 Hiding Place Capacity Calculation 48
    3.3.5 Secret Bit Capacity Calculation 51
    3.3.6 Hiding Validation 52
    3.3.7 Bit Hiding Process 53
  3.4 Retrieving Module 56
    3.4.1 Conceal Secret Message 57
  3.5 System Development Requirement (Hardware & Software) 60
  3.6 Summary 60

4 RESULT AND DISCUSSION
  4.1 Introduction 61
  4.2 Experimental Design 61
    4.2.1 Data Preparation 62
    4.2.2 Performance Measurement 66
  4.3 Text Steganography 69
    4.3.1 Hiding Module Implementation 69
    4.3.2 Retrieving Module Implementation 73
4.4 Experimental Results and Analysis
   4.4.1 Capacity Test Result and Analysis 75
   4.4.2 Invisibility Test Result and Analysis 87
4.5 Summary 90

5 CONCLUSION AND FUTURE WORKS
   5.2 Conclusion 91
   5.3 Future Works 93

REFERENCES 94
APPENDICES 99
BIODATA OF STUDENT 133