TJHSST Senior Research Project
Implementation of Steganographic Techniques
2006-2007

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Abstract

My main areas of interest for this research project are steganography and steganalysis.

Keywords: steganography, steganalysis

1 Introduction - Purpose and Scope

The purpose of this research will be to investigate various methods of steganography (hiding data within different media). I will implement various known algorithms that achieve this, and possibly will develop a new program to hide data within a certain file type (mp3, pdf, etc.). The first part of the program itself will be able to accept two inputs: the 'clean' file and the hidden message. It will then combine the two and output a 'doctored' file with the hidden message inside it. The second part of the program will be able to reverse the process, receiving a 'doctored' file as an input and extracting the hidden message.

2 Background

Steganography is the science of hiding data in a way that only the recipient knows of its existence. This is different from cryptography, where the exis-

tence of the data is known, but it is not readable. The process of steganography can be achieved with various algorithms designed to undetectably doctor an image, audio file, or other type of file. There is already a diverse field of research about steganography and its various applications in communicating secret messages. Commercial and opensource programs that implement steganographic techniques include Stealth, stego, Wnstorm, Snow, FFencode, and many more. One example of an individual algorithm is the F5 technique for embedding messages in JPEG images. The algorithm changes the values of randomly generated bits by a very small amount, and is virtually undetectable by statistical analysis.

3 Procedures

I plan on using the following tools and sticking with the proposed time scale below.

3.1 Software

Computer language(s) I'll use

1. C
2. Fortran
3. Python

3.2 Algorithms/Programs

I'll be using the following algorithms/programs, in addition to designing my own:

1. F5
2. Outguess

4 Schedule

In the first quarter, I will focus on thoroughly researching different steganographic techniques, using only simple programs to practice implementation.

In the second quarter, I will begin to research one or more data types that I hope to use for steganography. I will have to learn how the data are stored and how to alter them in order to embed a hidden message. A program at this point would make simple alterations to a file, trying to make them as discreet as possible.

In the third quarter, I will bring together both earlier parts to form a complete steganography application. It will be able to manipulate the chosen file type, embed information, and export a file with the message at the end.

5 Expected Results

By the end of the year, I expect to have an application that implements steganographic techniques to discreetly hide data in a file. It should also be able to retrieve data from a modified file, displaying the hidden message. The proof of concept would simply be running the program, showing that the modifications to the file are virtually undetectable, and then retrieving the correct message from the file. This could be done multiple times with different messages in different files to ensure the project was successful.