Tribhuvan University

INSTITUTE OF ENGINEERING

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A Project Proposal

on

Photocrypt

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Department of Electronics and
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Acknowledgement

This proposal is prepared for the project required for the partial fullfillment of the academic requirement of the 3rd semester (2nd year, 1st part) of Bachelors in Computer Engineering. Effort has been made to ensure that this proposal is accurate and professional as far as possible.

We are very grateful to the Department of Electronics and Computer Engineering (DoECE) of IOE Central Campus, Pulchowk for providing us with this great opportunity to develop a minor project. It will greatly enhance our knowledge of object-oriented programming paradigm and will give us the valuable experience of research and teamwork, which will definitely be of great help for our career development.

We would like to express our deepest gratitude to our project co-ordinator, Er. Daya Sagar Baral, for his supervision on the course of project development.

Sincerely,

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Abstract

Due to tremendous growth in communication technology, now it is a real challenge to send some confidential data/information via communication network. For this reason, several information security systems, such as cryptography and steganography were developed.

The problem with cryptography is that it attracts unwanted attention towards the encrypted information. Steganography overcomes that problem by concealing the information in a carrier object (such as a media file) in such a way that the career object remains practically identical to the original one and no one suspects the hidden information.

So, in this project, we are basically trying to develop a simple application that uses the concept of steganography to hide text files (probably containing some secret messages) in a career media file (eg. image file).

1 Introduction

This project, entitled ***Photocrypt***, is basically a simple computer program that implements the concept of *steganography*. It can be used to hide some secret information (messages) in a media file (image) of sufficient size.

1.1 Introduction to steganography

Steganography is described as "the art and science of writing hidden messages in such a way that no one apart from the sender and the intended recipient even knows that a message has been sent". The word *steganography* is derived from Greek words *steganos* (στεγανός), meaning "covered, concealed, or protected", and *graphein* (γράφειν), meaning "writing".

Digital steganography is the practice of concealing a message, image, or file within another message, image, or file.

1.2 Brief history of steganography

Steganography as a whole has existed in many forms throughout much of history. Some of their forms are given below:

- The ancient Chinese wrote notes on small pieces of silk that they then wadded into little balls and coated in wax, to be swallowed by a messenger and retrieved at the messenger's gastro-intestinal convenience.
- Herodotus (485 – 525 BC) recounts the story of Histaiaeus, who wanted to encourage Aristagoras of Miletus to revolt against the Persian king. In order to securely convey his plan, Histaiaeus shaved the head of his messenger, wrote the message on his scalp, and then waited for the hair to regrow. The messenger, apparently carrying nothing contentious, could travel freely. Arriving at his destination, he shaved his head and pointed it at the recipient.
- Giovanni Battista Porta described how to conceal a message within a hard-boiled egg by writing on the shell with a special ink made with an ounce of alum and a pint of vinegar. The solution penetrates the porous shell, leaving no visible trace, but the message stained on the surface of the hardened egg albumen, so it can be read when the shell is removed.
- Modern digital steganography entered the world in 1985 with the advent of personal computers being applied to classical steganography problems, and it has since taken off, going by the large number of steganogrphy software available:
  - Concealing messages within the lowest bits of noisy image or sound files.
  - Changing the orer of elements in a set.
  - Modifying the echo of a sound file (Echo Steganography) and so on.

2 Objectives

Our main objectives for this project will be:

- To learn the object-oriented programming (OOP) paradigm.
- To develop a useful application using object-oriented programming.
- To build a steganography application.
- To learn to use 3rd-party libraries to manipulate images.
- To create a simple graphical user-interface (GUI) for our application.

3 Existing System

Although the concept of steganography sounds very useful and important, there hasn't been any reasonable numbers of *really* successful steganography application. There *are* some (both open-source and proprietary), but most of them are not very high-quality and seem like they are made for experimental or learning purposes only.

4 Proposed System

In this project, we are going to develop a steganography application that is small, simple and easy. Since we are just learning to program using OOP, we won't be trying to build a *big* software. Instead, we'll be building a small software that does *one* thing *well*, and that one thing is to *encrypt/decrypt text files to/from image files*.

4.1 System Block Diagram

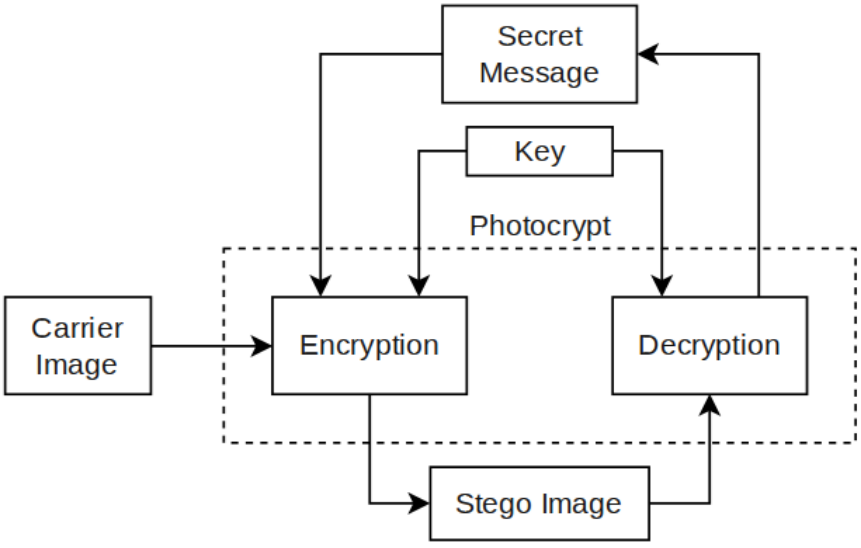

Figure 1: System block diagram

5 Methodology

To fulfill our objectives, we'll be using following concepts, algorithms, or libraries:

- Since we are dealing with image steganography in our project, we'll be using the least significant bit (LSB) algorithm to encrypt data in image. This algorithm is very common and is conceptually simple and probably the easiest to implement for new programmers like ourselves.

  All this algorithm does is use the LSB of pixels of image to contain the bits of the secret data.

- For image manipulation purposes, we'll be making use of the OpenCV library. It is a very popular, powerful and open-source image processing and computer vision library that will help us access the bits and pixels of images.

- We are aiming to possibly build a simple GUI for our program, and if we do so, we'll be most probably using the gtkmm (GTK+ binding for C++) library.

6 Project Scope

Althought right now our objective is just to build a small and simple steganography program that can hide text message in an image, steganography is a very interesting concept which has a very bright scope in the future of technology. It can be used as a beneficial tool for privacy, security, storing passwords and other confidential informations. It can also be very helpful to check terrorist activities.

This project can be extended, by adding more features and improving quality, to one of the most popular and useful steganography applications.

7 Project Schedule

We'll be trying to complete this project under following schedule.

Description	**Time duration** (estimation)
Learning necessary concepts	2 weeks
Coding, testing and debugging	4 weeks
Documentation and report-making	1 week