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DIGITAL STEGANO GRAPHY

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KeyWords

Cropping, Cryptography, Decripted data, Encripted data, Information hiding, Metadata, Secret information, Steganography.

ABSTRACT

Steganography refers to the science of “invisible" communication. Unlike cryptography, where the goal is to secure communications from an eaves- dropper, steganographic techniques strive to hide the very presence of the message itself from an observer. The general idea of hiding some information in digital content has a wider class of applications that go beyond steganography. The techniques involved in such applications are collectively referred to as information hiding. For example, an image printed on a document could be annotated by metadata that could lead a user to its high resolution version. In general, metadata provides additional information about an image. Although metadata can also be stored in the ¯le header of a digital image, this approach has many limitations. Usually, when a ¯le is transformed to another format (e.g., from TIFF to JPEG or to BMP), the metadata is lost. Similarly, cropping or any other form of image manipulation destroys the metadata. Finally, metadata can only be attached to an image as long as the image exists in the digital form and is lost once the image is printed.

1. INTRODUCTION

Maintaining secrecy is very important in a large corporation and because of the intelligent of the hackers it becomes tedious. Already we have crypto graphy for transmitting secret information. Even though crypto graphy successfully transmitting secret information, it will give a suspicion to the hackers and it affects unintended users.

The application of this paper, Digital Stegano Graphy overcomes this factor and it gives a solution for transmitting secret formation with out affecting unintended users. Stegano graphy uses multimedia data as a covering medium (Covering secret information). By using stegano graphy data (secret information) can hided with in data (multimedia data, here multimedia data is an image) and it can be sent anywhere to transfer the message easily without giving any suspicion to others.

The Internet as a whole does not use secure links, thus information in transit may be vulnerable to interception as well. The important of reducing a chance of the information being detected during the transmission is being an issue now days. Some solution to be discussed is how to passing information in a manner that the very existence of the message is unknown in order to repel attention of the potential attacker. Besides hiding data for confidentiality, this approach of information hiding can be extended to copyright protection for digital media. In this research, I clarify what steganography is, the definition, the importance as well as the technique used in implementing steganography. We focus on the Least Significant Bit (LSB) technique in hiding messages in an image. The system enhanced the LSB technique by randomly dispersing the bits of the message in the image and thus making it harder for unauthorized people to extract the original message.

One of the reasons that intruders can be successful is that most of the information they acquire from a system is in a form that they can read and comprehend. Intruders may reveal the information to others, modify it to misrepresent an individual or organization, or use it to launch an attack. One solution to this problem is, through the use of steganography. Steganography is a technique of hiding information in digital media. In contrast to cryptography, it is not to keep others from knowing the hidden information but it is to keep others from thinking that the information even exists.

2. System Analysts

2.1 Existing System

In the existing system, secret messages can be transferred but it gives irritation to the unintended people. And also maintaining secrecy is very tough because of the intelligent of the hackers. Already we have crypto graphy for transmitting secret information. Even though crypto graphy successfully transmitting secret information, it will give a suspicion to the hackers and it affects unintended users.

2.2 Proposed System

The application of this paper, Digital Stegano Graphy overcomes this factor and it gives a solution for transmitting secret formation with out affecting unintended users. Stegano graphy uses multimedia data as a covering medium (Covering secret information). By using stegano graphy data (secret information) can hided with in data (multimedia data, here multimedia data is an image) and it can be sent anywhere to transfer the message easily without giving any suspicion to others.

Features of Proposed System:

- Provides a user friendlier interface.
- Developed in java. So platform independent.
- Highly flexible.

3. Design and Implementation

3.1 Java

The inventors of Java wanted to design a language which could offer solutions to some of the problems encountered in modern programming. They wanted the language to be not only reliable, portable and distributed but also simple, compact and interactive. Sun Microsystems officially describes java with the following attributes.

3.1.1 Compiled and Interpreted

Usually a computer language is either compiled or interpreted. Java combines both these approaches thus making java a two-stage system. First, java compiler translates source code into what is known as byte code instructions. Byte codes are not machine instructions and therefore, in the second stage, java interpreter generates machine code that can be directly executed by the machine that is running the java program. We can thus say that java is both a compiled and interpreted languages.

3.1.2 Platform-Independent and Portable

The most significant contribution of java over other languages is its portability. Java programs can be easily moved from one computer system to another, anywhere and anytime. Changes and upgrades in operating systems, processors and system resources will not force any changes in Java programs. This is the reason why Java has become a popular language for programming on Internet which interconnects different kinds of systems worldwide. We can download a Java applet from a remote computer onto out local system via Internet and execute it locally. This makes the Internet an extension of the user's basic system providing practically unlimited number of accessible applets and applications.

Java ensures portability in two ways. First, Java compiler generates byte code instructions that can be implemented on any machine. Secondly, the sizes of the primitive's data types are machine-independent.

3.1.3 Object-Oriented

Java is a true object-oriented language. Almost everything in Java is an object. All program code and data reside within objects and classes. Java comes with an extensive set of classes, arranged in packages that we can use in our programs by inheritance. The object model in Java is simple and easy to extend.

3.1.4 Robust and Secure

Java is a robust language. It provides many safeguards to ensure reliable code. It has strict compile time and run time checking for data types. It is designed as a garbage-collected language relieving the programmers virtually all memory management problems. Java also incorporates the concept of exception handling which captures series errors and eliminates any risk of crashing the system.

Security becomes an important issue for a language that is used for programming on Internet. Threat of viruses and abuse of resources is everywhere. Java systems not only verify all memory access but also ensure that no viruses are communicated with an applet. The absence of pointer in Java ensures that programs cannot gain access to memory locations without proper authorization.

3.1.4 Distributed

Java is designed as a distributed language for creating applications on networks. It has the ability to share both data and programs. Java applications can open and access remote objects on Internet as easily as they can do in a local system. This enables multiple programmers at multiple remote locations to collaborate and work together on a single project.

3.1.5 Simple, Small and Familiar

Java is a small and simple language. Many features of C and C++ that are either redundant or sources of unreliable code are not part of Java. For example, java does not use pointers, preprocessor header files, go to statement and many others. It also eliminates operators overloading and multiple inheritance.

Familiarity is another striking feature of Java. To make the language look familiar to the existing programmers, it was modeled on C and C++ languages. Java uses many constructs of C and C++ and therefore, Java code "looks like a C++" code.

3.1.6 Multithreaded and Interactive

Multithreaded means handling multiple tasks simultaneously. Java supports multithreaded programs. This means that we need not wait for the application to finish one task before beginning another. For example, we can listen to an audio clip while scrolling a page and at the same time download an applet from a distant computer. This feature greatly improves the interactive performance of graphical applications. The Java runtimes comes with tools that support multiprocess synchronization and construct smoothly running interactive systems.

3.1.7 High Performance

Java performance is impressive for an interpreted language, mainly due to the use of intermediate byte code. According to Sun, Java speed is comparable to the native C/C++. Java architecture is also designed to reduce overheads during runtime. Further, the incorporation of multithreading enhances the overall execution speed of java programs.

3.1.8 Dynamic and Extensible

Java is a dynamic language. Java is capable of dynamically linking in new class libraries, methods and objects. Java can also determine the type of class through a query, making it possible to either dynamically link or abort the program, depending on the response. Java programs support functions written in other languages such as C and C++. These functions are known as native methods. This facility enables the programmers to use the efficient functions available in these languages. Native methods are linked dynamically at runtime.

3.2 Swing - Overview

The original GUI components from the Abstract Windowing Toolkit package Java.awt (also called the AWT) are tied directly to the local platform's graphical user interface capabilities. So, a java program executing on different platforms has a different appearance and sometimes even different user interacts with the program are known as that program's look and feel. The Swing components allow the programmer to specify a different look and feel across all platforms, or even to change the look-and-feel while the program is running.

Swing components are often referred to as lightweight components they are written completely in java so they are not "weighed down" by the complex GUI capabilities of the platform on which they are used. AWT

Components (many of which parallel the Swing components) that are tied to the local platform are correspondingly called heavyweight components they are rely on the local platform's windowing system to determine their functionality and their look feel. Each heavyweight component has a peer (from package java.awt.peer) that is responsible for the interactions between the component and the local platform to display and manipulate the component.

Features of Swing Over AWT:

Even the simplest Swing components have capabilities far beyond what the AWT components offer.

- Swing buttons and labels can display images instead of , or in addition to, text
- You can easily add or change the borders drawn around most Swing components. For example, it's easy to put a box around the outside of a container or label.
- You can easily change the behavior or appearance of a Swing component by either invoking methods on it or creating a subclass of it.
- Swing components don't have to be rectangular. Buttons, for example, can be round.
- Assistive technologies such as screen readers can easily get information from Swing components. For example, a tool can easily get the text that's displayed on a button or label.
- Swing lets you specify which look and feel your program's GUI uses. By contrast, AWT components always have the look and feel of the native platform.

4. System Design

4.1 Architecture Of The System:

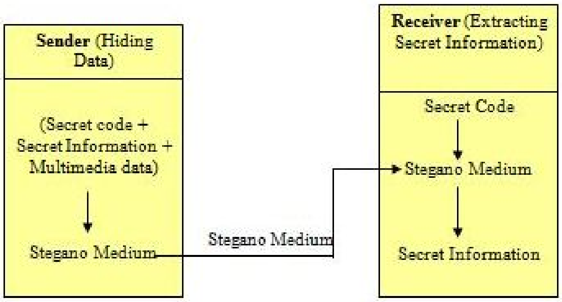

Sender (Hiding Data)
(Secret code + Secret Information + Multimedia data)
Stegano Medium
Stegano Medium
Receiver (Extracting Secret Information)
Secret Code
Stegano Medium
Secret Information

Fig. 4.1 Architecture of the system

4.2 Module Description

In this application of paper, there are two modules, namely

1. **Making stegano Medium:**
   In making stegano Medium side, the secret information is hided with in an /image file. Before hiding, for security, user has to enter a user code and secret information. A secret code will be generated using user code + secret information and this secret code will be used by the receiver to extract the secret information. After generating secret code stegano medium will be generated. This stegano medium is the final output and expected output from the sender side.
2. **Getting secret information from stegano medium:**
   In getting secret information from stegano medium Side, Actually anyone may get this stegano medium that is picture with secret information, but only the person who knows secret code can read the message. Inputs for breaking the stegano medium are stegano medium and secret code.

4.3 Detailed Design Algorithm

Making Stegano Medium:

Step 1: Start the process
Step 2: Enter the Secret Information
Step 3: Enter the User Code
Step 4: Load a multimedia data, here it is an Image
Step 5: Creation of Secret Code by using user code + secret information
Step 6: Hiding secret information with its security into the multimedia data
Step 7: A message box showing the secret key will appear
Step 8: Stop the process

Extracting secret information from Steganography medium:

Step 1: Start the process
Step 2: Enter the Secret Code
Step 3: Enter the Stegano Medium
Step 4: Extract secret information from stegano medium by using secret code.
Step 5: Stop the Process

4.4 Software Modeling

Sequence Diagram:

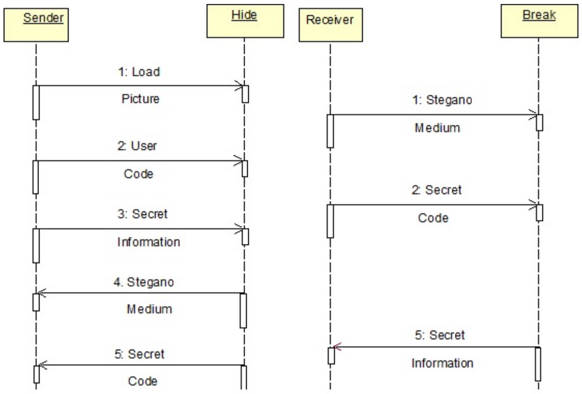


Fig 4.2 Sequence Diagram

Use Case Diagram:

Sender

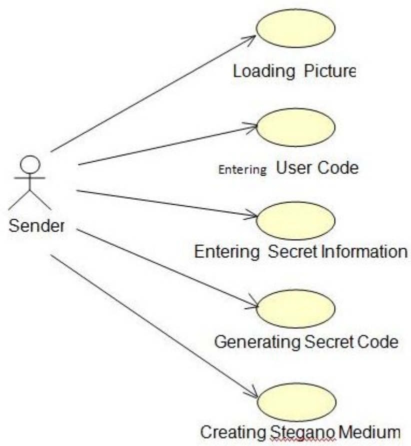


Fig 4.3 Case Diagram-Sender

Receiver

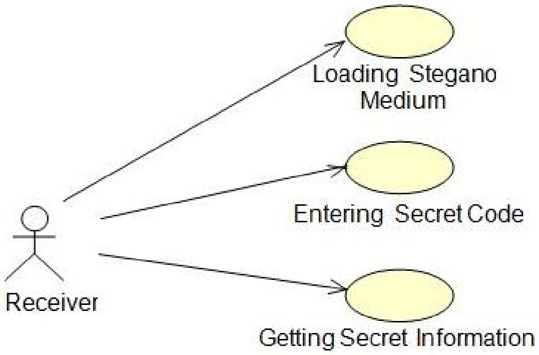


Fig 4.4 Case Diagram-Receiver

Class Diagram: Client:

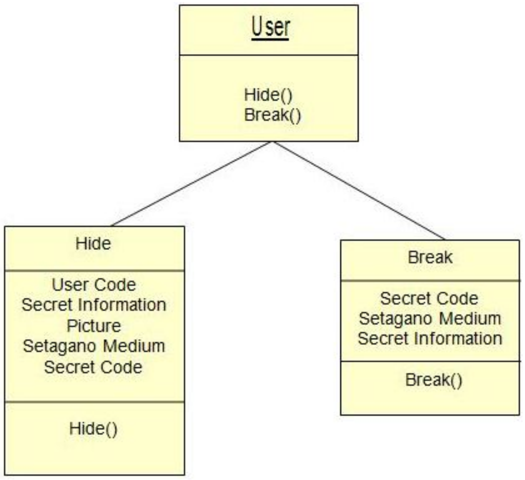
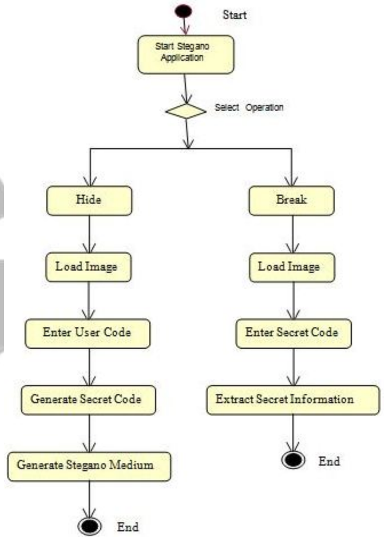


Fig 4.5 Class Diagram-Client

Activity Diagram



Flowchart 4.1 Project Flow Diagram

5. System Implementation

The application of this paper needs a java development kit (J2sdk1.4.1 and above). The application of this paper is implemented in java, so it can be run in any Operating Syatem. For hiding data with in a picture we need to run the sender side program. For extracting the hidden secret information we need to run receiver side program.

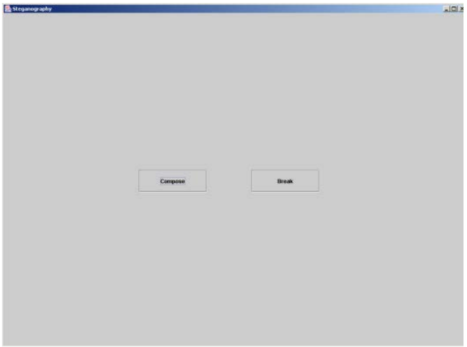
Our stegano graphy application will contain both sender and receiver side programs. If a user wants to hide data he can use sender side program and if he wants to extract secret information he can use the receiver side program.

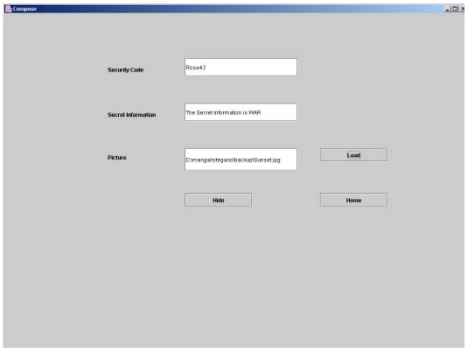
6. System Testing

The testing of a conventional software system involves some of the following phases. They are

- **Unit Testing:**
  A software module can be created by building up of many small parts into a single module. This small part is called as a unit. A unit is a piece of code that will perform a specific task. At the end of this testing all units will be tested so that we can get the correct result. By using unit testing we can easily identify the errors.
- **Integrated Testing:**
  Combining all programs into a single application and testing its correct is called as Integration testing. Even all programs work correctly they may give a false result when they work together. Integration is very important to get the completed result.
- **System Testing:**
  System testing means testing the whole system at once. By giving different inputs to the system we can check its correctness. For all inputs the system should produce correct result.

7. RESULTS

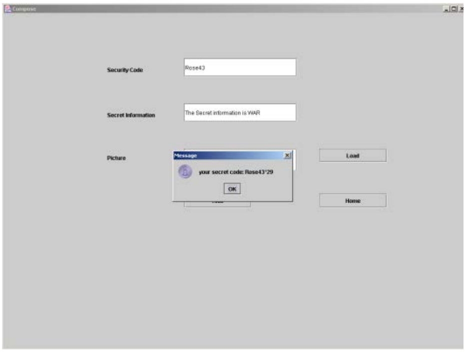




Security Code: Rose43

Secret Information: The Secret information is WAR

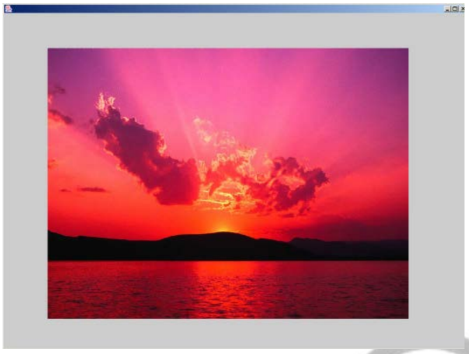
Picture: D:\mangal\stegano\backup\Sunset.jpg

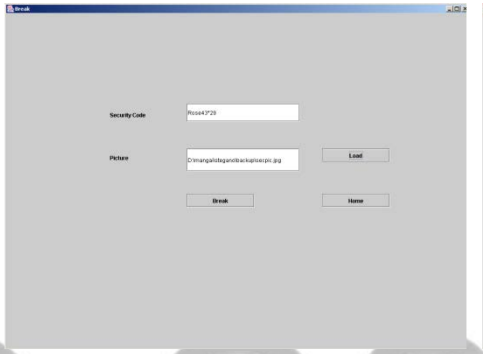


Security Code: Rose43

Secret Information: The Secret information is WAR

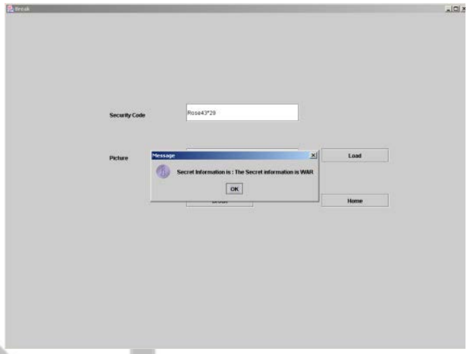
your secret code: Rose43*29





Security Code: Rose43*29

Picture: D:\mangal\stegano\backup\secpic.jpg



Security Code: Rose43*29

Secret Information is : The Secret information is WAR

7. CONCLUSION AND FUTURE SCOPE

The application of this paper provides a GUI, a user friendlier system, where secret information can easily be hided with in a picture file. It attains all java futures. It is platform independent so that it can be used in any Operating System. Thus secret information can be transferred to the intended user without giving any suspicion to the unintended user.

The Scope of the paper is to limit unauthorized access and provide better security during image transmission. To meet the requirement the application of this paper used the simple and basic approach of stenography. In this paper the proposed approach find the suitable algorithm for embedding the data in an image using stenography which provides the better security pattern for sending messages through a network. For practically implementing the function of the algorithm Microsoft dot net framework is used.

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