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IT 360

**Stenography Application**

**Purpose –**

The purpose of our project was to develop a stenography application that had a fully functioning GUI. The GUI was intended to be user friendly and accessible, providing frequent alerts as to what was occurring during its runtime. Additionally, the application was intended to be low resource and be cost efficient.

**Objectives –**

To accomplish this, we developed an application in Visual Studio Code. The project needed to run Stegano, an open source Least Significant Bit cryptography tool for encoded messages in image files. Additionally, the project needed to be written in Python using a Python 3 compiler to support both the use of Stegano, and PIL, a tool that produces bitmaps for selected image files.

**What we learned –**

There were several learning points during the project:

**Python –**

Python was a crucial tool that we used. It is a programming language that has support for the libraries that will be discussed later in the report. During the project, Python was used in Visual Studio Code to develop the project. While the group had a rudimentary understanding of Python, the project required an extensive dive into different ways to incorporate algorithms and build GUI to complete the project.

**Stegano –**

Stegano is the first library that we had to learn how to use to incorporate for the project. Stegano was vital because it provides all the functionality for the encryption of the secret message and the decryption of the secret message from the image files. This encryption is done with LSB or least significant bit cryptography. Stegano was easy to use and only had 2 main functions, hide and reveal, that used LSB to encrypt and decrypt the message in the image files.

**TKinter –**

Tkinter was the second library that we had to learn how to use. Tkinter was vital because it provides all the functionality for creating the GUI. Tkinter supported developing the frames, buttons, labels, and scrollbars. The library was essential for developing the user-friendly interface.

**PIL –**

Pillow was the third library that we had to learn how to use. It was integral to provide the bitmapping functionality that propagated images on the screen. Pillow accomplishes this in a similar function to TK with ImageTk. It was very easy to use and made the GUI even more user friendly.

**OS** –

OS was the last library that we had to learn how to use. OS’s functionality was for the pathing and traversal of the application. Locating file pathways was simple with OS by using the getcwd command that retrieved the current working directory of selected image files. OS proved integral for the project as it was the only way to have a global variable recognized for the image file on LSB to work.

**Budget Discussion –**

**Wage (2 Employees): $750**

**Computer Costs: $3000 (one time cost)**

**Small Studio Rent: $1,500**

**Total Monthly Budget: $2,250 monthly, one time charge of $3,000**

**End Result Analysis –**

**What went well…**

Overall, the entire project went well. We were able to successfully replicate a fully functioning image encryption and decryption stenography tool by using LSB cryptography. Our group also functioned well together, supporting the research goals on items like OS to overcome challenges we faced. To touch on that major challenge, the OS was the biggest obstacle. We needed to incorporate the OS command, so LSB understood what file to encrypt and decrypt on, which was the only major hiccup. Additionally, other things that went well were our successes in creating an open-source, low-resource application which ensured that it stayed cost efficient. In conclusion, our project went as well as we could have hoped.

**If we had more time…**

It is always important to recognize what we could have accomplished had we been given more time. A fully functioning audio encryption and decryption tool would have been next on the agenda. Unfortunately, this requires the same amount of intensive research and understanding that the imagery does. Additionally, with the types of audio files that work. While not feasible for our group to complete under the current parameters, if we were given an additional month or so, I believe our group would have found this task more feasible and would easily be able to incorporate the same lessons learned through this project on an audio tool.