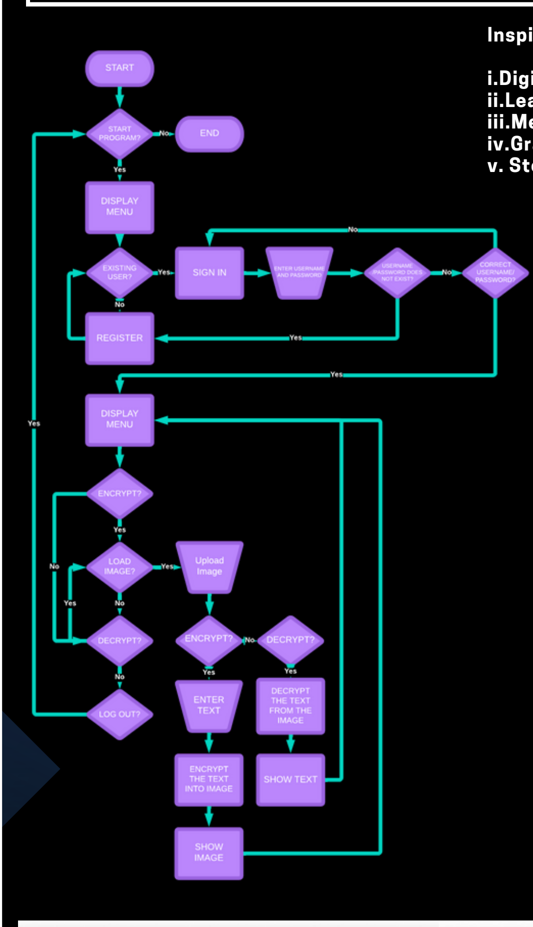
# A STEGANOGRAPHIC TEXT ENCRYPTION AND DECRYPTION APPLICATION IN MATLAB

## Abstract

Privacy and security have been a big issue in the 21st century given the advancements of the society's technology. With this it has been a priority that the users will be ensured that their data and information will be kept private and safe from the anomalies that will try to use it against them.

Thus, the proponents got the inspiration of the project from digital image processing wherein the image is altered to hide messages. The process is called steganography which uses least significant bit to manipulate the object, the image in this instance, to hide and encrypt the message which can only be decrypt using the same key used in the encryption process. The proponents decided to also utilize a log in and registration process wherein the keys are different for each user. The system uses Message Digest Algorithm Hashing, also known as MD5, to create a username and password system. The credentials are used as a key and save in a text file. Moreover, the application is only compatible with MATLAB, can load certain types of images, and has a limited text length which will depend on the image size.



Inspired from the concepts of:

i.Digital Image Processing
ii.Least significant bit
iii.Message Digest Algorithm Hashing
iv.Graphical User Interface
v. Steganography

main.m - The main script of the application. It runs the GUI of the login and registration page.

login.m - The script that allows the user to login to the application.

register.m - The script that allows the user to register to the application.

isusernameexist.m - The script that checks if the username entered by the user already exists in the application.

DataHash.m - The script that hashes the user's credentials to be used as a key to encrypt and decrypt the text.

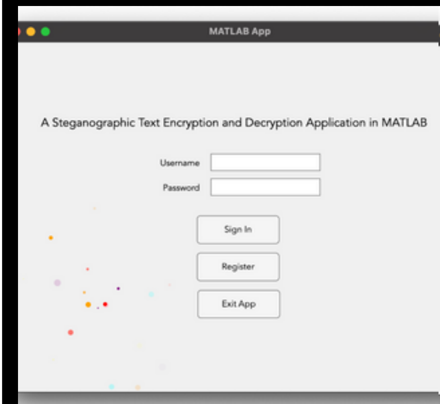
steg.m - The script that allows the user to encrypt and decrypt text using image-based steganography.

encrypt.m - The script that encrypts text using steganography.

decrypt.m - The script that decrypts hidden text using steganography.

lena_std.tiff - The image used to demonstrate the application.

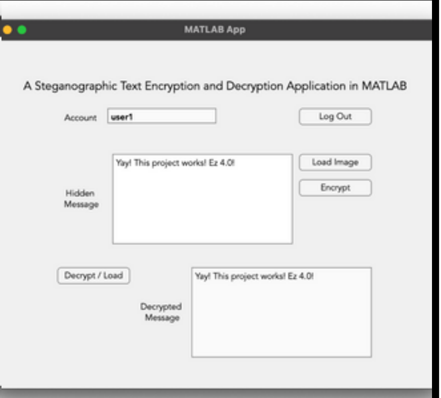
account.txt - The text file that stores the user's credentials. This file is updated when the user registers to the application.


MATLAB App

A Steganographic Text Encryption and Decryption Application in MATLAB

Username

Password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Account: user1

Hidden Message: Yay! This project works! Ez 4.0!

Decrypted Message: Yay! This project works! Ez 4.0!

As described by the flowchart, there will be a log in/registration is utilized and will start the whole system. The system is run by the main.m script, which its input will be the login credentials of the user. The process blocks can branch out into two. The output of the main is the main steganography application. Basically, it serves as a security measure on the application's accessibility.

The user has the ability to encrypt a message into an image or decrypt the message from the image loaded. As said in the sections beforehand, each user has a unique key code which is based on the user's credentials which is inputted into the registration menu.

Moreover, the length of the allowable message is based on the loaded image size. Exceeding the limit will immediately show and error in terms of encrypting the message while loading the wrong image will show an error message. Furthermore, the system will only show if the image that is being decrypted matches the key each user has and if the image indeed has a message.

The user also can log out of the system which will direct to the log in menu and once again asked for a new registration or a new account log in.

## Conclusion

The application was able to handle the encryption and decryption of text using steganography. The login and registration page works as the proponents hoped it to be, and provides a unique key for every user registration, while the main program encrypts and decrypts the message as how it was tasked to do. Overall, the proponents were able to use the concepts and lectures from the subject and was able to make use of MATLAB upon the creation of the application. Furthermore, the application provided seamless graphic user interface in where the user can interact with the program.

## Recommendations

It is recommended that the future developers and researchers perform and more in depth study and improvement of the bugs found in the said application. It is also recommended to improve on the user registration and login system where in the user is able to change their password in case they forgot their password, to delete the past encryptions, and to delete their account entirely. It is also recommended that the future developers improve the GUI even more as the application uses the default dialog boxes.

This project was created as a partial fulfillment of the requirements for the course LBYEC4A - Signals, Spectra, and Signal Processing Laboratory at De La Salle University - Manila. Every line of code was written by Team Aquaman, composed of Rocelle Belandres, Jelo Laca, and Keane Sulit. It was supervised by Ramon Stephen L. Ruiz.