

Project Name: Ethical Hacking Image Steganography

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Demo



First image is input and second image is created as output. And if you will see carefully then in second image you will see light yellow color vertical line on left edge of the image which hides the message.

Overview

This is a Static Image Steganography which hides the confidential message.

Steganography is the technique of hiding secret data within file in order to avoid detection. This secret data is then extracted at its destination. Steganography replaces bits of useless data with bits of different invisible information.

Let's say I want to share a secret recipe with you. I could pull up my favorite picture, encode the recipe into the picture, and post it on social media. To the world, it looks like I just sent you a cool picture. But since you have the decoder, you run the image through it and now you know how to make my grandmother's world-famous mouth-watering cookies.

This repository contains the code for Image Steganography using python's various libraries. It used Opencv, os and string libraries.

These libraries help to perform individually one particular functionality.

Opencv is a library of Python bindings designed to solve computer vision problems.
os means miscellaneous operating system interfaces.
string module performs common string operations.
The purpose of creating this repository is to get hands on with EH and Python.
These python libraries raised knowledge in discovering these libraries with practical use of it.
It leads to grow in my EH subject knowledge combined with python.

Motivation

The reason behind making Steganography is, I have studied EH in my Master Degree as one of the subjects and since I am building my python skills so I wanted to try combination of it. This gave me thoroughly practical approach to my subject knowledge. One more reason is that EH is also flourishing field and it interests me as well so wish to create mini project on the same. It is also useful for many big corporate and governmental bodies to keep their data safely. This is especially more applicable in today's world as people have become techno-savvy and using technology and various gadgets continuously to be aware of world and there are people who also mis-uses it and leads to cyber-attacks. Therefore, using these techniques can save from junior hackers at least and then of course we can use may other functionalities to be more secure.

Technical Aspect

Opencv makes use of Numpy. All the Opencv array structures are converted to and from Numpy arrays. It is used for all sorts of image and video analysis. In Opencv latest release is cv2 module. It is a cross-platform library using which we can develop real-time applications. cv2 means card verification value. Here, it is used to encode and decode secret messages inside an image file. Image files are basically a serialization of an image's pixels and RGB values. The file tells the computer which pixels to light up and with which color. When we use the cv2, function imread and pass it an image file, that image file is translated into a numpy array containing the RGB value for each pixel in the image.
os provides a portable way of using operating system dependent functionality. It makes it possible to automatically perform many operating system tasks. It provides functions for creating and removing a folder, fetching its contents, changing and identifying the current folder etc.
strings in Python are arrays of bytes representing Unicode characters. String module contains some constants, utility functions and classes for string manipulation. It's a built-in module. We have to import/load it before using it.

Installation

Using intel core i5 9th generation with NVIDIA GFORCE GTX1650.

Windows 10 Environment Used.

Already Installed Anaconda Navigator for Python 3.x

The Code is written in Python 3.8.

If you don't have Python installed then please install Anaconda Navigator from its official site.

If you are using a lower version of Python you can upgrade using the pip package, ensuring you have the latest version of pip, *python -m pip install --upgrade pip and press Enter.*

Run/How to Use/Steps

Keep your internet connection on while running or accessing files and throughout too.

Follow this when you want to perform from scratch.

Open Anaconda Prompt, Perform the following steps:

Creating Virtual Environment named "EH". You can give any name of your choice.

```
conda create -n EH python=3.7
```

```
y
```

```
conda activate EH
```

```
pip install opencv-python
```

```
cd <PATH>
```

You can also create requirement.txt file as, `pip freeze > requirements.txt`

run files

```
conda deactivate
```

Creating Virtual Environment is necessary so that you do not have to install packages every-time you run the code. Once all required packages are installed in virtual environment then you only need to access/open the virtual environment and run the final file.

Follow this when you want to just perform on local machine.

Download ZIP File.

Right-Click on ZIP file in download section and select Extract file option, which will unzip file.

Move unzip folder to desired folder/location be it D drive or desktop etc.

Open Anaconda Prompt, write `cd <PATH>` and press Enter.

```
eg: cd C:\Users\Monica\Desktop\Projects\Python Projects  
1\3\EHProjects\EH_Image_Stagenography
```

Now, open virtual environment that you have created ie

```
conda activate EH
```

In Anconda Prompt, `pip install -r requirements.txt` to install all packages.

In Anaconda Prompt, write `python <filename>.py` and press Enter. That is,

In Anaconda Prompt, write `python image_stagenography.py` and press Enter.

It will create encrypted_img as output in same working directory, which has hidden message in image.

Please be careful with spellings or numbers while typing filename and easier is just copy filename and then run it to avoid any silly errors.

You can also run all codes from Command Prompt instead of Anaconda Prompt after setting Environmental Variable Path Settings.

Note: I have created EH virtual environment and used for more than one project and therefore you might see more than one unused library in requirements.txt especially for this project so do not worry because I am using them in another project under similar virtual environment. Whenever you get No Module <name of package> Error then see its PyPI Documentation and Install it using `pip install <package-name>` written there. In some cases, you need to install its .whl file which I will inform you if its necessary.

Note: `cd <PATH>`

[Go to Folder where file is. Select the path from top and right-click and select copy option and paste it next to `cd` one space <path> and press enter, then you can access all files of that folder] [cd means change directory]

Directory Tree/Structure of Project

Folder: EHProjects > EH_Image_Stagenography
image_stagenography.py

To Do/Future Scope

Can do steganography with Audio, Video also.

Can also add encryption feature to it for protecting data.

Technologies Used/System Requirement/Tech Stack



Credits

MEH Channel