Improving Detection of Malicious URL’s using Ensemble Learning Techniques

Configuration Manual

MSc Research Project
Cyber Security

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MSc Project Submission Sheet

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Lecturer: Michael Pantridge
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Project Title: Improving Detection of Malicious URL’s using Ensemble Learning Tech

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Date: 16th August 2021

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Configuration Manual

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1 Pre Requisites

Hardware:

A Machine with Pentium Processor with multiple cores and hyperthreading enabled with minimum of 8 GB of RAM is required for being able to setup and

Software:

Operating System
Ubuntu 20

Application Software
Anaconda Jupyter Python Notebook – 2.04

Opensource Modules:

Pandas - Pandas is a library which can helps us with csv files and working with large datasets as through it were a spreadsheet. We are using pandas 1.1.5 version of the library. It is a very powerful, flexible and easy to use opensource data analysis and data manipulation tool for processing large data. This is very cumbersome for processing on a conventional

Numpy – Numpy is a library which is used for scientific number crunching. It is mostly used in conjunction with Pandas. However it can be used separately as well.

Requests: we use the python requests module to make http get API to capture the http_headers,

re – Python Regular Expression Module. Is used to pre process the required fields on the input dataset based on string patterns.

Urllib.parse – Used to Parse URL’S from the input dataset.

Plotly – Used to Generate plots of various kinds
Matplotlib – Used to generate graphs/plots of different kind.

Seaborn –

Time – Used to time the execution

Sklearn - Used to implement ML algorithms and Ensemble Machine Learning Algorithms

Lightgbm – used to implement light gradient boosting

Xgboost & LighGBM – Used to implement boosting algorithms

Custom Modules:

DataEditor – parsing of the input csv into interesting feature columns and is a custom module for the purpose

2  Configuration & Implementation

2a. Create a project directory

$ mkdir url.Scanner

2b. Copy the Source code tar ball into the project directory

$ cp malicious_url_analysis.tar.gz url.Scanner

2c. Extract the code tar ball to the project directory

$ tar -zavf malicious_url_analysis.tar.gz

2d. Install Python Jupyter Notebook

Setting up Python

• Update the package indexes for the apt repositories

$ sudo apt update

• Install Jupyter dependencies (pip and PYTHON Dev packages)

$ sudo apt install python3-pip python3-dev
• Create a virtualenv for the project

$ sudo -H pip3 install --upgrade pip
$ sudo -H pip3 install virtualenv

• Create the Project Directory Structure for hosting the local libraries

$ mkdir ~/my_project_dir
$ cd ~/my_project_dir

* Create the virtualenv for the Project

$ virtualenv my_project_env

* Activate the virtual Environment

$ source my_project_env/bin/activate

Install Jupyter Notebook

(my_project_env)sammy@your_server:~/my_project_dir$ jupyter notebook

Install the pre requisite libraries for the project. It is all accumulated in a single file called requirements.txt using the command

$ cd ~/project_dir
$ pip install -r requirements.txt
3. Validation

Start the Jupyter Notebook. You can replace the IP and the port to suit your purpose and that there is no conflicting port on another application

```
$jupyter notebook --no-browser --ip <IP> --port=<PORT>
```

Open a browser and access the URL accordingly with the token from the link output on the screen

References

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