Configuration Manual

MSc Research Project
MSc Cyber Security

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MSc Project Submission Sheet

School of Computing

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Lecturer:	Dr Vanessa Ayala-Rivera		
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Project Title:	Evaluation and Mitigation of Ransomware using Machine Learning		
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Configuration Manual

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1 Introduction

This document entails the details of all the configurations done in this research. The specifications of the environments, languages used, hardware specification and software specification are all mentioned in this document.

2 Hardware and Software Specifications

To run machine learning algorithms against a huge dataset, it usually requires an effective hardware and software devices. For it to have results fast, the performance of the hardware and software should be compatible with each other and should have good performance as well. The specifications are as follows:

Ram - 16 GB
Number of Processors - Intel 6 core processors and 12 logical processors.
Processor specification - Intel(R) Core(TM) i7-9750H CPU @ 2.60GHz
Internal Memory – 500GB
Hardware Environment – Windows 10
Programming language – Python
Programming Environment – Jupyter Notebook

3 Implementation

Using Jupyter notebook we will be implementing machine learning algorithms using the python programming language.

1. Download and install python[1] and jupyter notebook from official website[2]

To run the code, it is important to install all the libraries using the anaconda prompt from the command line. After importing all the libraries, they can be easily called from the notebook without needing to install them inside.

[1] https://www.python.org/
[2] https://jupyter.org/

```
import pandas as pd
import numpy as np
```

```
#Visualization libraries
import matplotlib.pyplot as plt
import seaborn as sns
```

```
#Import tensorflow library for mlp model
import tensorflow as tf
```

Figure 1: libraries

For the ease of duplication of this project, the version of the libraries shown in the above diagram Figure 1 are as follows:

- Tensorflow – 2.7.0
- NumPy – 1.16.4
- Pandas – 0.24.2
- Matplotlib – 3.1.0
- Seaborn – 0.11.2
- Scikit-learn – 0.21.2

2. Running the code

Before running the code, it is important to download the dataset and import it in the notebook and read using the pandas library as follows:

```
# Data import
data =pd.read_csv(r"C:\Users\Chiku\Downloads\NCI\1 Study\SEM 3\Dissertation\Dataset\Malware dataset.csv")
```

Figure 2: Data importing

Once the data path is specified correctly for your dataset and named as follows, in the notebook we can run the full code using the prompt in the Cells dialogue box 'Run all Cells' as shown in the following image

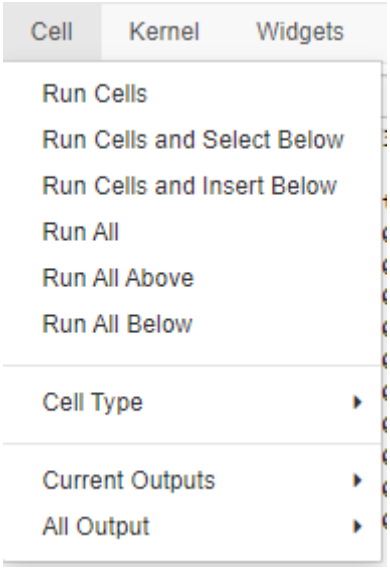

Figure 3: Run all cells

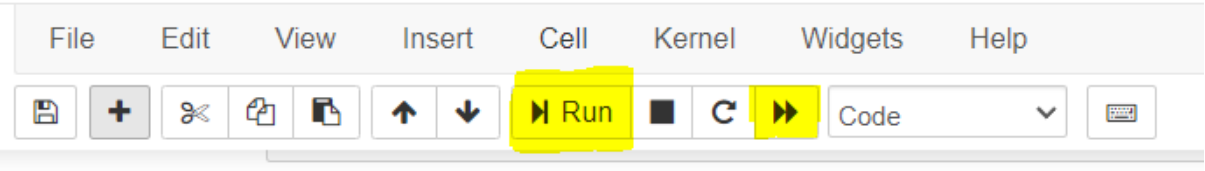

Figure 4: an alternate way to run

After the code has run, we can analyse the code for the desired accuracy and measurement as follows:

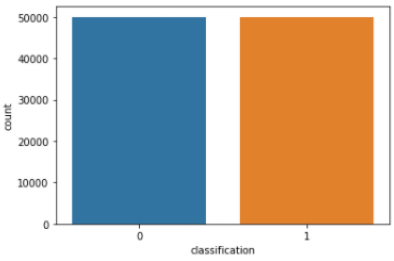

Figure 5: Output 1

```
In [41]: test_loss, test_accuracy = model.evaluate(x_test, y_test)

         print('\nTest loss: {0:.3f}. Test accuracy: {1:.3f}%'.format(test_loss, test_accuracy*100.))

         625/625 [==============================] - 1s 1ms/step - loss: 0.0046 - accuracy: 0.9987: 0s - loss: 0.0046 - accuracy: 0.99

         Test loss: 0.005. Test accuracy: 99.875%
```

Figure 6: Output 2