National College of Ireland

Configuration Manual

MSc Research Project
Cloud Computing

Eromosele Idiagi Iriogbe
Student ID: 19242794

School of Computing
National College of Ireland

Supervisor: Vikas Sahni

National College of Ireland
Project Submission Sheet
School of Computing

National College of Ireland

Student Name:	Eromosele Idiagi Iriogbe
Student ID:	19242794
Programme:	Cloud Computing
Year:	2021
Module:	MSc Research Project
Supervisor:	Vikas Sahni
Submission Due Date:	16/08/2021
Project Title:	Configuration Manual
Word Count:	627
Page Count:	4

I hereby certify that the information contained in this (my submission) is information pertaining to research I conducted for this project. All information other than my own contribution will be fully referenced and listed in the relevant bibliography section at the rear of the project.

ALL internet material must be referenced in the bibliography section. Students are required to use the Referencing Standard specified in the report template. To use other author's written or electronic work is illegal (plagiarism) and may result in disciplinary action.

Signature:	
Date:	20th August 2021

PLEASE READ THE FOLLOWING INSTRUCTIONS AND CHECKLIST:

Attach a completed copy of this sheet to each project (including multiple copies).	☐
Attach a Moodle submission receipt of the online project submission, to each project (including multiple copies).	☐
You must ensure that you retain a HARD COPY of the project, both for your own reference and in case a project is lost or mislaid. It is not sufficient to keep a copy on computer.	☐

Assignments that are submitted to the Programme Coordinator office must be placed into the assignment box located outside the office.

Office Use Only	
Signature:	
Date:	
Penalty Applied (if applicable):	

Configuration Manual

Eromosele Idiagi Iriogbe
19242794

1 Introduction

In the research paper, hybrid computing is introduced as a means of reducing the cloud overhead for machine learning web applications. This configuration manual is provided to assist with setting up and testing the research project. It provides a detailed description of the prerequisites installations and steps to be carried out. This document is structured as follows. Section 2 describes the system configuration parameters. Section 3 discusses the model training. Section 4 presents how to run and access to the application.

2 System Configuration

2.1 Hardware Specification

- Model: MSI GF63 Thin 9RCX
- Processor: Intel (R) Core(TM) i5-9300H CPU @2.40 GHz 2.40 GHz
- Operating System: Ubuntu 20.04 dual boot with Windows 10 (version 10.0.19041)
- RAM: 16GB (15.8 GB usable)
- Hard Disk: 54 GB SSD Ubuntu partition

The project is demonstrated on this local device but can also be deployed to a suitable cloud server and tested.

3 Model Training

The web application utilises a model trained over the FER-2013 dataset which can be downloaded from https://www.kaggle.com/msambare/fer2013.

3.1 Prerequisites

- Python: Python can be downloaded from https://www.python.org/downloads/. Python version 3.8 is recommended.
- Jupyter Notebook: Can be downloaded on its own from https://jupyter.org/install or as part of the Anaconda data science toolkit from https://www.anaconda.com/products/individual

- TensorFlow: Installation guide available https://www.tensorflow.org/install

To train the model, follow the steps below.

1. Unzip the project zip file to access the files.
2. Upload the model_V2.ipynb file from the project folder to a Jupyter notebook
3. Update path to where the downloaded dataset is located

```
##### '''
this the version 2 of the model where we are trying to built the model from scratch using the combination of
VGG and inception blocks
'''
```

In [2]:
```
import matplotlib.pyplot as plt
import numpy as np
import os
import tensorflow as tf

from tensorflow.keras.preprocessing import image_dataset_from_directory
```

In [3]:
```
train_dir = './emotion_detection/images/train/'
BATCH_SIZE = 4
IMG_SIZE = (48, 48)

train_dataset = image_dataset_from_directory(train_dir,
                                             shuffle=True,
                                             batch_size=BATCH_SIZE,
                                             image_size=IMG_SIZE)
```

```
Found 28821 files belonging to 7 classes.
```

Figure 1: Snippet of Code

4 Running The Application

Two modes of running the application are developed. A hybrid mode where the trained model is exported to the client's device and inference carried out there and a complete cloud (server) mode where all computation is carried out on the server.

4.1 Prerequisites

- Download and setup ngrok. Instructions available at https://ngrok.com/download
  - Sign up and login
  - Download ngrok
  - Unzip to a folder of choice
  - Connect your account by running the specified command in a terminal
- Setup Python. Python can be downloaded from https://www.python.org/downloads/. Python version 3.8 is recommended. If using the same machine used for model training, then skip this step.

- Install packages
  - pip install -U tensorflow
  - pip install -U aiortc.
  - pip install -U opencv-python
  - pip install -U aiohttp

4.2 Hybrid Mode

1. Unzip the file and access the hybrid folder.
2. Open a terminal and run a HTTP server using the command below. Here port 8000 is used.
   - python3 -m http.server 8000

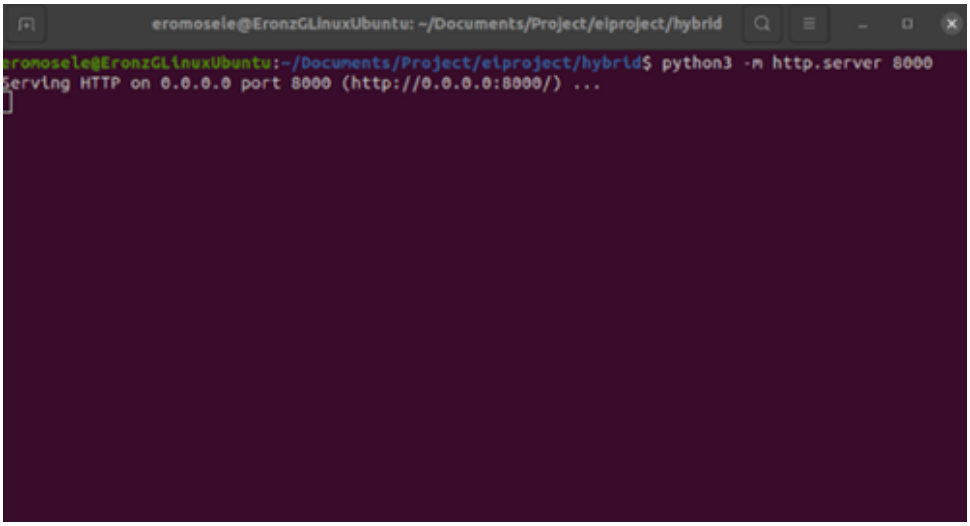

Figure 2: Run HTTP Server

3. Open a terminal from the ngrok folder and run the command below to open a tunnel. Here port 8000 is used.
   - ./ngrok http 8000
4. Open the https link generated by ngrok in a browser to access the web application.

4.3 Cloud (Server) Mode

1. Unzip the file and access the Server folder.
2. Open a terminal and run the server.py file using the command below.
   - python3 server.py

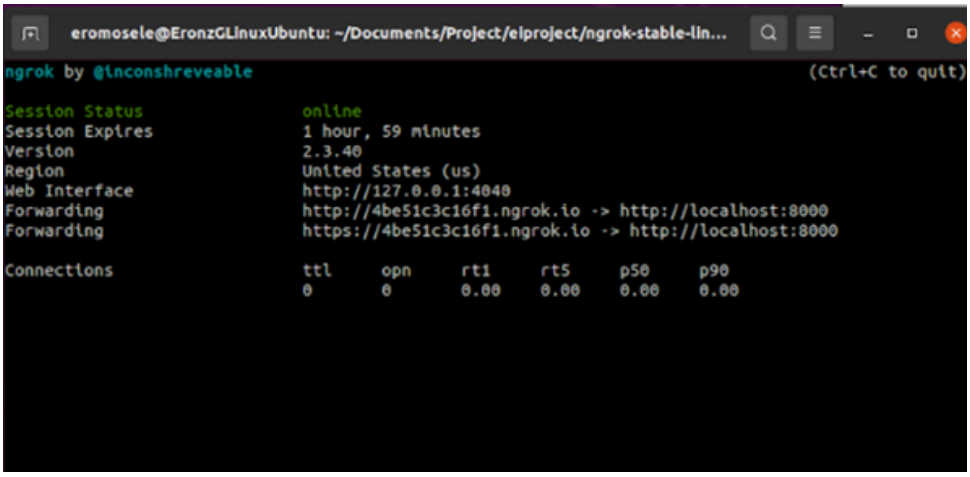

Figure 3: Open ngrok tunnel

3. Open a terminal from the ngrok folder and run the command below to open a tunnel. Here port 8080 is used.
    - ./ngrok http 8080
4. Open the https link generated by ngrok in a browser to access the web application.
5. Click the "Start" button

References