National College of Ireland

Integrating Edge and Cloud Computing for Actionable Insights in Military Decision-Making

MSc Research Project
Cloud Computing

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Project Submission Sheet
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Integrating Edge and Cloud Computing for Actionable Insights in Military Decision-Making

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1 Introduction

This user manual serves as a comprehensive guide outlining the hardware and software specifications, as well as the step-by-step implementation process for the project titled "Integrating Edge and Cloud Computing for Actionable Insights in Military Decision-Making."

2 System Configuration

2.1 Software Specification

• Programming Languages: Python, HTML.
• Libraries and Frameworks: Pandas, NumPy, Matplotlib, scikit-learn, Flask, Boto3.

2.2 Hardware Specification

• HP Pavilion x360, 128 GB SSD, 16.0 GB RAM.
• Processor: 1.30 GHz, Intel Core, i5.

3 AWS Cloud Integration

3.1 Amazon S3 (Simple Storage Service)

• AWS S3 was utilized as a central repository for storing the result generated by the web App.
• Set up an AWS account and create an S3 bucket for managing data storage within the bucket as part of the implementation process.

3.2 AWS Boto3 Integration

• Boto3, the AWS SDK for Python, was configured to establish secure connections with Amazon S3.
• Set up access keys to establish connections to the S3 bucket, and handling data uploads/downloads using Boto3.

```
from flask import *
from flask_sqlalchemy import SQLAlchemy
from flask_login import UserMixin, LoginManager, login_user, logout_user, login_required, current_user
import ml_model
import boto3
import json
```

Figure 1: app.py file

```
import numpy as np
import pandas as pd
from IPython.display import Image
import matplotlib.pyplot as plt
import chart_studio.plotly as py
import plotly.graph_objs as go
from plotly.offline import download_plotlyjs, init_notebook_mode, plot, iplot
init_notebook_mode(connected=True)
import seaborn as sns #remove?
from sklearn.model_selection import train_test_split
import six
from sklearn import tree
from sklearn.tree import plot_tree
import matplotlib.pyplot as plt
from sklearn.ensemble import RandomForestClassifier
from io import StringIO
from sklearn import tree
```

Figure 2: jupyter-source-file.ipynb

4 Implementation Steps

• Download the zip file uploaded on moodle under ICT Solution Artefact (code, data, etc.) to your local machine.
• Import all the required packages. Refer Figure 1, Figure 2.
• Replace AWS_ACCESS_KEY, AWS_SECRET_KEY, S3_BUCKET name in app.py file with your AWS access, security keys and S3 bucket name.
• Run all the cells in jupyter-source-file.ipynb so as to generate pickle file.
• Import generated pickle file into ml_model.py file.
• Run app.py file using the command python app.py and flask uses the port 5000 to run locally and web app will work on the same port.
• Login to the app and provide the input values for various labels and upon clicking submit, the result will be displayed on the top of the page.
• Login to your AWS account and download the toc.json file from your respective S3 bucket and check whether the result has been stored in it or not.

Thank you for navigating through this user configuration manual. Reach out to me for any queries or difficulties you face while following this manual.