MLGround

PROJECTS

Market Data Analysis and Segmentation

Required Libraries and Installation Commands

Numpy [pip install numpy], pandas [pip install pandas], matplotlib [pip install matlpotlib], scipy [pip install scipy] and sklearn [pip install scikit-learn]

Tasks perfomed under Market Analysis

- **Exploratory Data Analysis using Numpy, Pandas and matplotlib**
  Data visualization using matplotlib and data preprocessing using pandas and numpy

- **Observations Based on EDA**
  Observations carried out to perform market segmentation based on given Data

- **Streamlit Deployment**
  App.py file with streamlit code is run to provide user interactive data visualizations.

Multi Class Classification

Required Libraries and Installation Commands

Numpy [pip install numpy], pandas [pip install pandas], matplotlib [pip install matlpotlib], scipy [pip install scipy] , sklearn [pip install scikit-learn], tensorflow [pip install tensorflow], wordcloud [pip install wordcloud],imblearn [pip install imblearn], xgboost [pip install xgboost], keras [pip install keras].

Tasks perfomed

- **Exploratory Data Analysis using Numpy, Pandas and matplotlib**
  Data visualization using matplotlib and data preprocessing using pandas and numpy

- **Models considered**
  Neural Network, XGB, SVM, OrdinalModel, Bidirectional LSTM, RBFN , Logistic Model, Decision Tree classifier, Random Forest classifier, Extra Trees classifier, AdaBoost , GradientBoost, Bagging Classifier and Convolutional Neural Network4

- **Model Evaluation**

  Model Evaluation using Metrics such as Accuracy , Precision , Recall, F1 score, RMSE and AUC score

Product Recommender System

Required Libraries and Installation Commands

Numpy [pip install numpy], pandas [pip install pandas], matplotlib [pip install matlpotlib], sklearn [pip install scikit-learn],BentoML [pip install bentoml]

Tasks perfomed

- **Exploratory Data Analysis using Numpy, Pandas and matplotlib**
  Data visualization using matplotlib and data preprocessing using pandas and numpy

- **Models used**
  Popularity Based , Utility Based and item-item based Models.

- **Model Serving**

  Model Serving using BentoML , Refer the following link to start with bentoML [https://docs.bentoml.org/en/latest/quickstart.html]

Different Types of Recommender System

Required Libraries and Installation Commands

Numpy [pip install numpy], pandas [pip install pandas], matplotlib [pip install matlpotlib], sklearn [pip install scikit-learn],BentoML [pip install bentoml], lightfm [pip install lightfm], scikit-optimize [pip install scikit-optimize], scipy [pip install scipy], Pandas-profiling [pip install pandas-profiling], surprise [pip install surprise]

Tasks perfomed

- **Exploratory Data Analysis using Numpy, Pandas and matplotlib**
  Data visualization using matplotlib and data preprocessing using pandas and numpy

- **Models used**
  Popularity based, Utility Based, item-item based , Content Based,

Knowledge Based, Demo Filtering, Meta Based , Hybrid and Model Based Recommender System Models.

- **Model Serving**

  Model Serving using BentoML , Refer the following link to start with bentoML [https://docs.bentoml.org/en/latest/quickstart.html]

Deep Learning Model to classify person's actions while driving

Required Libraries and Installation Commands

Numpy [pip install numpy], OpenCV [pip install opencv-python], uuid [pip install uuid], pandas [pip install pandas], matplotlib [pip install matlpotlib],sklearn [pip install scikit-learn]

Tasks perfomed

- **Custom Image Data Generation using Webcam**

  Using OpenCV to collect significant amount of images for each class. Classes considered here are : Phone , PhoneEar and awake

- **Models used**

  Custom VGG Model Refer the following link to start with VGG [https://www.analyticsvidhya.com/blog/2021/06/build-vgg-net-from-scratch-with-python/]

What is VGG?

VGG- Network is a convolutional neural network model proposed by K. Simonyan and A. Zisserman in the paper "Very Deep Convolutional Networks for Large-Scale Image Recognition" [1]. This architecture achieved top-5 test accuracy of 92.7% in ImageNet, which has over 14 million images belonging to 1000 classes.

It is one of the famous architectures in the deep learning field. Replacing large kernel-sized filters with 11 and 5 in the first and second layer respectively showed the improvement over AlexNet architecture, with multiple 3×3 kernel-sized filters one after another. It was trained for weeks and was using NVIDIA Titan Black GPU's.

- **Model Evaluation**

  Custom VGG Model is evaluated using classification report .A classification report is a performance evaluation metric in machine learning. It is used to show the precision, recall, F1 Score, and support of your trained classification model.