SMART PORTFOLIO ADVISER

User Guide

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Getting Started

Access to the deployed version

For a quick start, a version has been deployed to Digital Ocean. The application can be accessed from anywhere through the given URL.

Steps:

- Open any web browser (preferably chrome) and go to:
  http://smartportfolioadvisor.ngrok.io/

  The application will be opened as shown in the image below
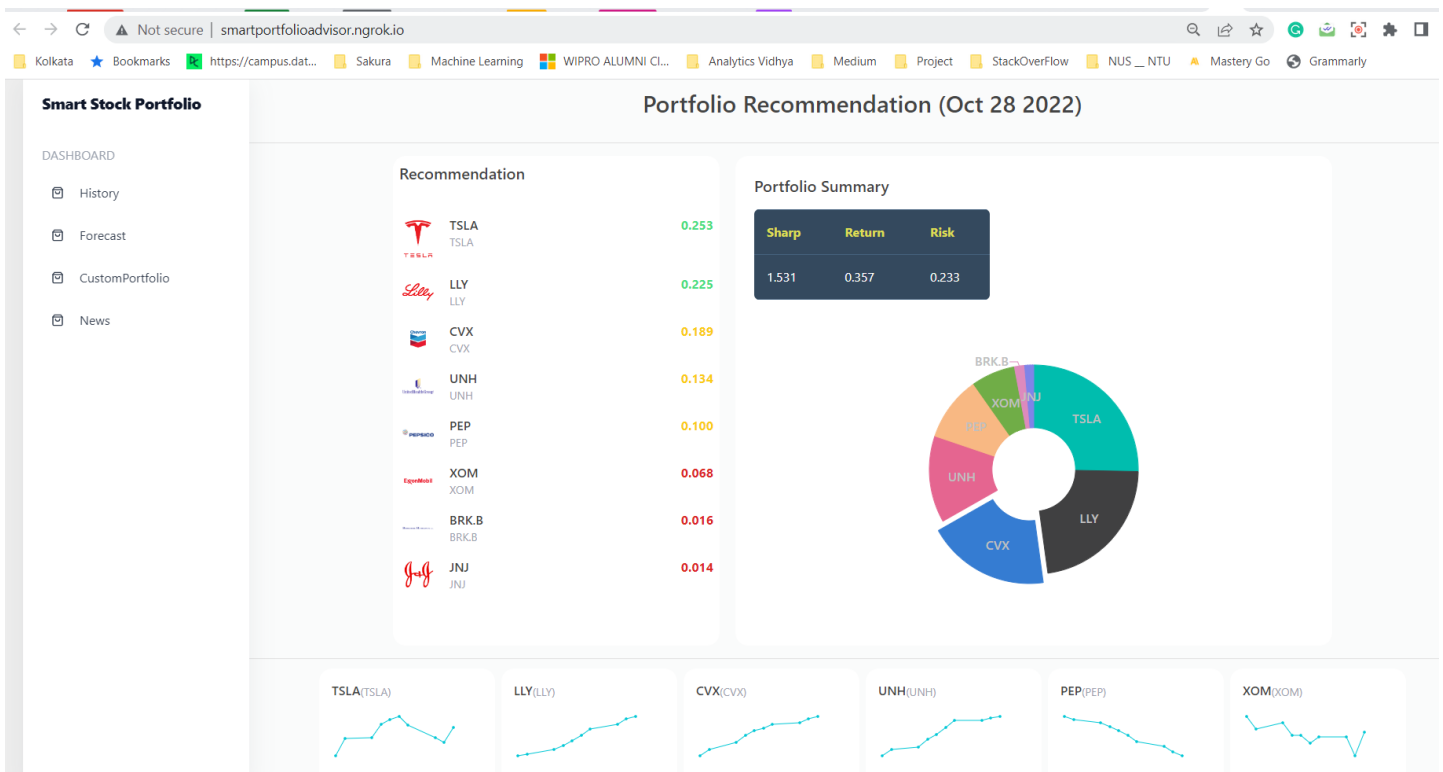
Full Installation

The user may want to deploy the application locally. The process and the pre-requisites are mentioned below.

System Requirements

- Python or Anaconda, and Python libraries as specified in requirements.txt

- A modern web browser. Recommended Google Chrome version 76 and above.

- NodeJS and NPM: Use **Option 2** from https://www.digitalocean.com/community/tutorials/how-to-install-node-js-on-ubuntu-20-04

- Flask

- Git [Optional]: https://www.digitalocean.com/community/tutorials/how-to-install-git-on-ubuntu-20-04

DISCLAIMER: Smart Portfolio Adviser has only been tested on the following operating systems below

- Ubuntu 20.4: We need to use Linux based system for Flask backend as we parallelized the code and it will not run well on Windows.

Pre-Requisites

- Clone the GitHub code: git clone https://github.com/NamrataThakur/SmartPortfolioAdvisor.git
- Alternatively, download the source code from the GitHub link directly if GIT is not installed

Installing Frontend

Once the code is downloaded in the system, please open the terminal, and enter the folder where the extracted project is present. After that, follow the below steps:

   i.   cd System Code/frontend
  ii.   sudo apt install npm
 iii.   npm install –legacy-peer-deps

Starting the frontend server

To start the frontend server, please follow the below steps:

    i.   npm start

Open another terminal:

    i.   cd System Code/frontend
    ii.   cd src/server
    iii.   npm run start

Installing Backend

Once the frontend is up and running, we need to install and start the backend.

    i.   sudo apt install python3-pip (If an error rises saying 'pip' is not present)
    ii.   pip install -r requirements.txt (To install all the packages needed)
    iii.   sudo apt install python3-flask (If flask installation from requirements.txt failed)

Starting the backend server

    i.   cd System Code/backend
    ii.   export FLASK_APP=app.py
    iii.   export FLASK_ENVIRONMENT=development
    iv.   flask run

```
^C(py36) namrata@namrata-VirtualBox:~/Desktop/MTECH_NUS_AI/SmartPortfolioAdvisor-main/System Code/backend$ export FLASK_APP=appMerged.py
(py36) namrata@namrata-VirtualBox:~/Desktop/MTECH_NUS_AI/SmartPortfolioAdvisor-main/System Code/backend$ export FLASK_ENVIRONMENT=development
(py36) namrata@namrata-VirtualBox:~/Desktop/MTECH_NUS_AI/SmartPortfolioAdvisor-main/System Code/backend$ flask run
 * Serving Flask app 'appMerged.py' (lazy loading)
 * Environment: production
   WARNING: This is a development server. Do not use it in a production deployment.
   Use a production WSGI server instead.
 * Debug mode: off
2022-10-28 17:57:33.568330: W tensorflow/stream_executor/platform/default/dso_loader.cc:64] Could not load dynamic library 'libcudart.so.11.0'; dlerror: libcudart.so.11.0: cannot open shared object file:
No such file or directory
2022-10-28 17:57:33.568417: I tensorflow/stream_executor/cuda/cudart_stub.cc:29] Ignore above cudart dlerror if you do not have a GPU set up on your machine.
number of processors:  1
WebSocket transport not available. Install simple-websocket for improved performance.
 * Running on http://127.0.0.1:5000/ (Press CTRL+C to quit)
```

With this the flask is started on http://127.0.0.1:5000/ and the frontend will be started on https://localhost:3000 and https://localhost:3001

Test Scenarios

Follow the steps below to access and navigate the webpage:

- Go to https://localhost:3000/
- You would reach the Homepage

HOMEPAGE:

The best performing stocks are recommended. A portfolio summary is given that mentioned the best Sharpe Ratio value, Return Percentage and Risk Percentage.
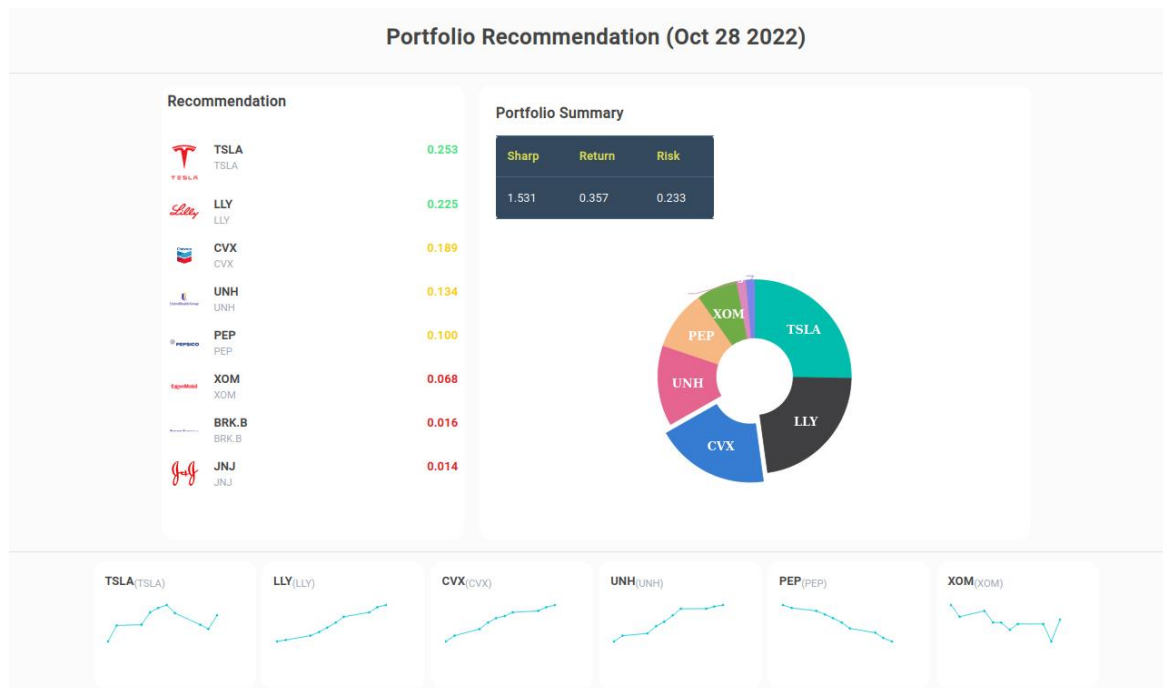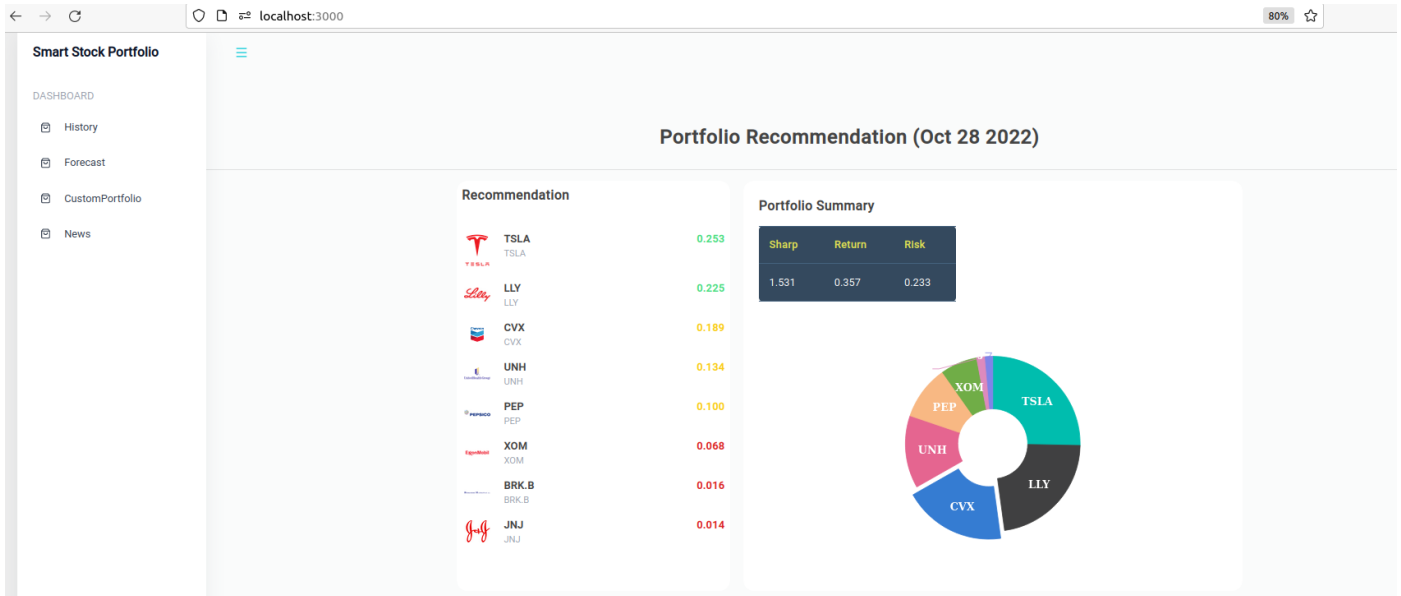
The LSTM predictions for the best performing stocks are showed in the below section.

By hovering over the charts, you would see how the performance of the stocks changed day-over-day for the time period.
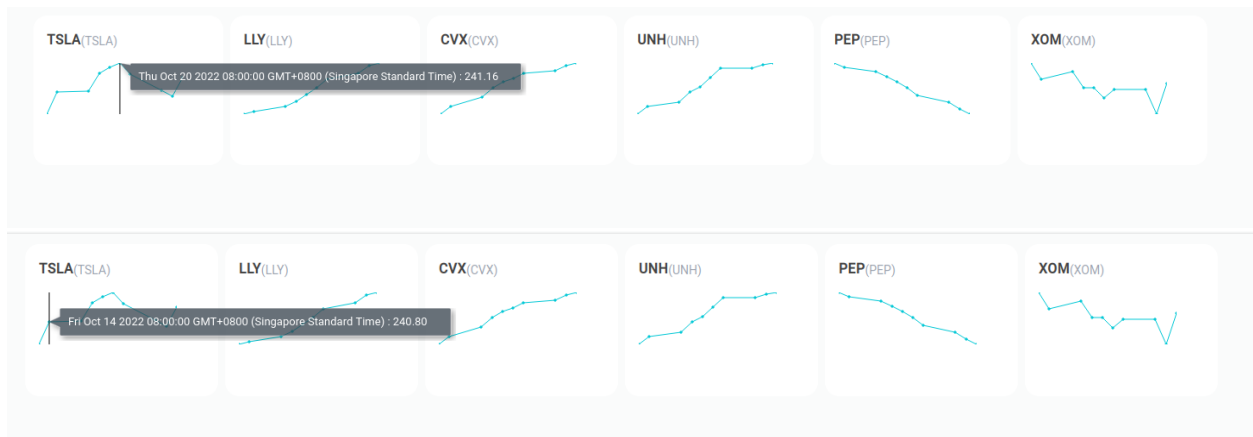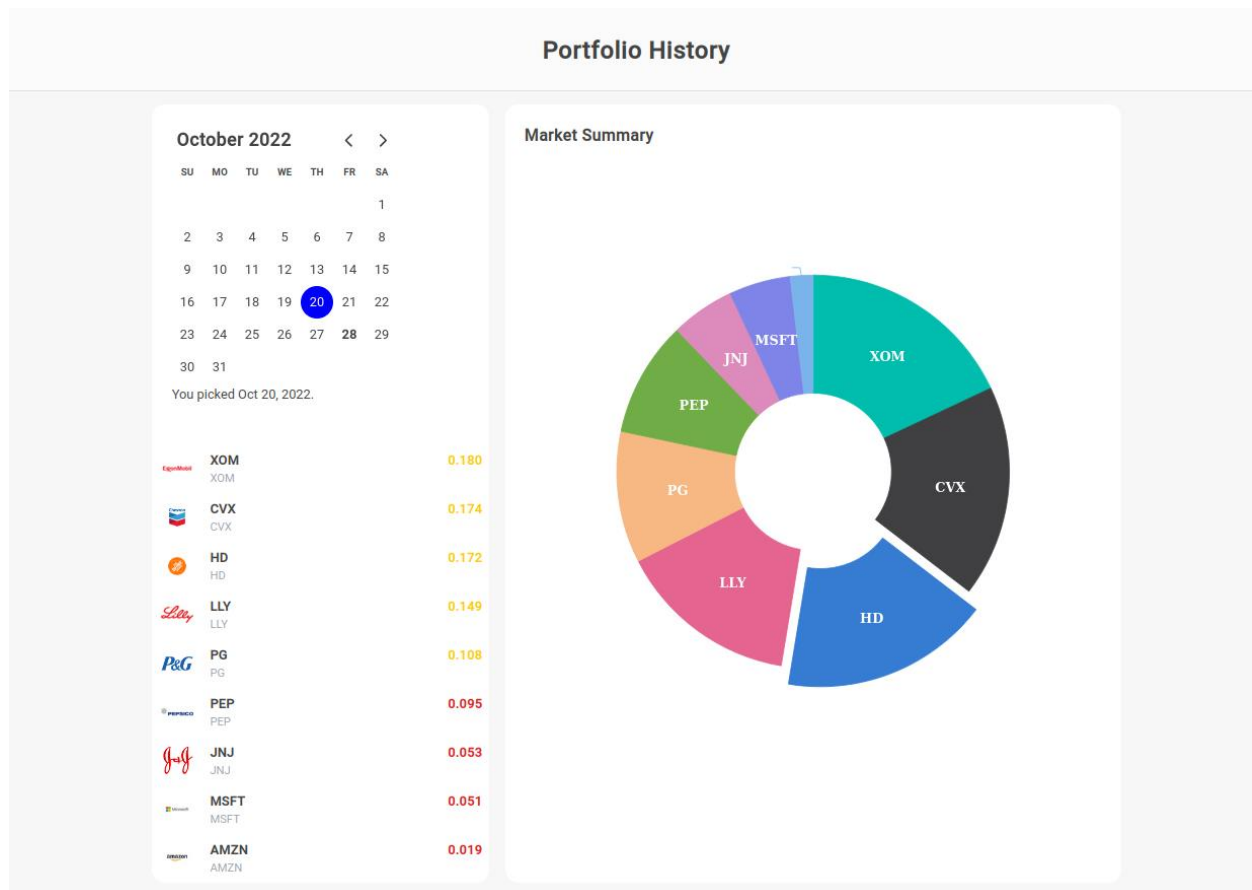

Hovering over the Pie chart shows the recommended distribution of the stocks.

PORTFOLIO HISTORY

You can access all the previous portfolio recommendation from the HISTORY tab of the left navigation bar. It shows a calendar and the recommended stock allocation distribution for the date selected.

CUSTOM PORTFOLIO

The custom portfolio gives the user access to create a basket of stocks according to one's preference. The user also has the choice to update any of the training hyper-parameters to tweak the resultant Sharpe ratio.

Upon selecting the stocks and updating the hyper-parameters (if needed), user needs to press **SUBMIT.** A random **runId** will be generated for every request and the outputs for every epoch will start showing up in the page.

User can click on the '**CLICK HERE**' part of every epoch to see how for every epoch the Genetic Algorithm is performing and how the recommended stock distribution is changing.

[87a4b1] Epoch 19 ======== Best Sharpe: 0.7664180746581707 (Click here) ^

Run ID: 87a4b1
Epoch: 19

popid	sharpe	AAPL	AMZN	PFE	V	LLY
0	0.77	0.19	0.00	0.27	0.18	0.36
1	0.76	0.18	0.00	0.27	0.19	0.36
2	0.76	0.18	0.00	0.27	0.19	0.36
3	0.72	0.27	0.00	0.18	0.19	0.36
4	0.71	0.18	0.00	0.19	0.27	0.36
5	0.50	0.36	0.00	0.27	0.18	0.19
6	0.50	0.18	0.19	0.27	0.00	0.36
7	0.45	0.18	0.00	0.27	0.36	0.19
8	0.22	0.18	0.27	0.00	0.19	0.36
9	-0.26	0.19	0.36	0.27	0.18	0.00

When the Genetic Algorithm reaches its termination stage, the **final GA Result** will be shown that will contain the overall **Best Sharpe ratio** and the **final stock allocation percentage**.

Custom Portfolio

Portfolio Optimizations Hyperparameters

Server received request for runid: 87a4b1

Stocktickers: AAPL, AMZN, PFE, V, LLY	Number of Epochs: 40	Crossover Rate: 0.6
Population Size: 10	Selection Rate: 0.4	Mutation Rate: 0.6

SUBMIT

Server output

GA RESULT ======== BEST SHARPE: 0.8125160554376372 (Click here) ^

Run ID: 87a4b1
Sharpe Ratio: 0.8125160554376372

AAPL	AMZN	PFE	V	LLY
0.182	0.001	0.202	0.202	0.412

FORECAST

The forecast of the stocks can be accessed from the '**FORECAST'** tab of the left navigation bar. The user needs to mention the stock name for which the forecast is needed.

NEWS

The user can access the financial news for the stocks present. The news will help the user to quickly assess the decision for choosing a particular stock in the basket.