PRACTICE SCHOOL – 1 PROGRAMME REPORT

Name: R a j u l T i w a r i

ID: 2021A3PS3044

Campus: Birla Institute of Technology and Science, Pilani, K.K Birla Goa Campus

Name of PS Station: MobileMSK LLC, Saint Cloud, Minnesota

Name of PS Faculty: Dr. Panchagnula Jayaprakash Sharma

Table of Contents

BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE PILANI (RAJASTHAN)

PRACTICE SCHOOL DIVISION

Station: MobileMSK LLC, Saint Cloud, Minnesota

Duration: 31/05/2023 TO 21/07/2023

Date of Start: 30th May, 2023

Date of Submission: 2nd July, 2023

Title of the Project: Application of machine learning and AI in the field of healthcare.

STUDENT DETAILS:

Name: Rajul Tiwari

ID: 2021A3PS3044G

Degree: B.E.(Hons.) Electrical and electronics Engineering

Designation at the Organisation: SDE Intern (ML)

MENTOR DETAILS:

Name of PS Faculty: Dr. Panchagnula Jayaprakash Sharma

Name of Industry Mentors: Mr Sam Nelson and Mr Apurv Sibal

Designation: CEO and Founder respectively

ACKNOWLEDGEMENT

I would like to thank BITS, Pilani Practice School Division for providing this excellent opportunity to pursue the Practice School-1 program at MobileMSK LLC, Saint Cloud, Minnesota. I would also like to express gratitude to all those people whose efforts have made my professional experience at MobileMSK LLC, Saint Cloud, Minnesota a fruitful one.

I would like to thank my PS1 Faculty, Dr. Panchagnula Jayaprakash Sharma, my mentors Sam Nelson sir and Apurv Sibal sir for helping me settle in the initial period and guiding me through the entire onboarding process as well as getting the access to necessary groups, tools and resources to progress through my internship successfully. I would also like to thank me mentors for continuously guiding me on a day-to-day basis in whatever doubts arose and for their able guidance and unceasing support in the project.

Finally, I would like to thank my family and friends, for their immense support throughout the project.

About MobileMSK LLC

"MobileMSK is building software to streamline healthcare for back pain - We want to be your first stop, and in many cases, a go-to solution for managing this condition. Our model provides immediate access and ongoing guidance, relief, and support for back pain.

Our clinical software is designed to work like an interprofessional care team communicating through a trusted loved one. It's as if your lifelong advice-giver or confidant was programmed as an expert on health and wellbeing.

Our platform involves:

1. Screening tests to understand the cause of pain.
2. Advice, referrals, and care coordination to support follow up with live clinicians.
3. Periodic check-ins to encourage good health.
4. Longitudinal programming for relief, recovery, and prevention of future episodes of pain."

Major milestone:

- MobileMSK has received about $50,000 of support from organizations like the Medical Alley Association and Microsoft
- In many ways, software like MobileMSK offers a buffer to the inefficiencies of traditional brick-and-mortar healthcare. The ability to record and respond to patient care data in real-time opens avenues for more proactive and cost-effective care. Eventually, it will make sense to restructure high-performance clinical care alongside an ambient virtual healthcare environment.
- With MobileMSK, patients stay healthier in their homes, and healthcare is streamlined when a crisis occurs

PROJECTS COMPLETED SO FAR:

1. **Introduction to basic tool and requirements**

2. **yoga pose detection application**

3. **Harvard CS50 Flask Assignment**

1. Introduction to Basic Tools and Requirements:

In this assignment, we were asked to get acquainted with the basics of Python, Git/Github, Linux Shell Scripting by watching courses on YouTube and Udemy. By AI techniques like machine learning and data analytics, medical records can be analyzed to identify patterns, predict outcomes, and provide personalized treatment recommendations.

AI algorithms can process and interpret large volumes of medical data, enabling healthcare professionals to gain valuable insights into individual patients' conditions.This information can aid in diagnosis, treatment planning, and monitoring of patients' progress

AI-powered systems can identify potential drug interactions, recommend personalized treatment plans, and assist in early detection of diseases based on historical data analysis.

AI-powered systems can identify potential drug interactions, recommend personalized treatment plans, and assist in early detection of diseases based on historical data analysis.

Links for the courses and videos (Ctrl + Left click to open):

- Python Course with Training Projects (6 hours)
- Intro to Linux Scripting (1 hour)
- Intro to Git and Github (1 hour)
- basics of coding in Python (1 hour)

Summary of Assignment:

- In the Python course, I learned the fundamentals of the Python programming language.I gained a solid understanding of variables, data types, control flow, and basic coding concepts.I explored more advanced topics like functions, modules, and file handling.I learned about lists, list methods, and tuples and how lists and tuple differ from each other, I learnt basics such as the way of functions, parameters, return statement, string methods, Math functions, etc..I learnt the way of writing If statements and different types of loops, and how loops can be nested,list methods, tuples, dictionaries, exception handling,I learnt OOP part of Python and topics like classes, constructors, inheritance, and modules and packages.

- Git is a distributed version control system that helps you track changes in your code, collaborate with others, and manage your projects effectively. GitHub is a popular web-based hosting service for Git repositories. i learnt how to create a repository, clone,comitting and collaborate with others using GitHub. Understanding Git and GitHub is essential for software development projects, enabling efficient teamwork and code management.

- Shell scripting allows for automating tasks, managing systems, and manipulating files and directories through the command line interface
  I gained knowledge of essential concepts like variables,add coments. I also explored how to interact with system commands included the basic codes for performing different tasks such as the meaning rwx, #!=shebang

2. Yoga pose detection application

- This repository provides a practical demonstration of live video recognition of 7 different yoga poses using PoseNet, a Convolutional Neural Network (CNN) that detects joints and skeletal connections. The poses are classified using a K-Nearest Neighbors (KNN) classifier. The repository includes code for data preparation, such as resizing images and creating videos, although these are not necessary for using the repository. The "static" folder contains audio and image files used in the websites, while the "p5" library offers animation and graphics capabilities in JavaScript.

- The "train" folder contains code for training the KNN classifier, including a user interface (UI) for interactive training. The "test" folder includes prediction code and a JSON file with the trained model. The classifier utilizes the "drawKeypoints()" and "drawSkeletons()" functions to identify joints and skeletal structures, displaying them as ellipses and lines respectively over the webcam feed. The classifier predicts confidence levels for each pose and labels the result as the pose with the highest confidence, with an accuracy of 75% as claimed by the repository creator.

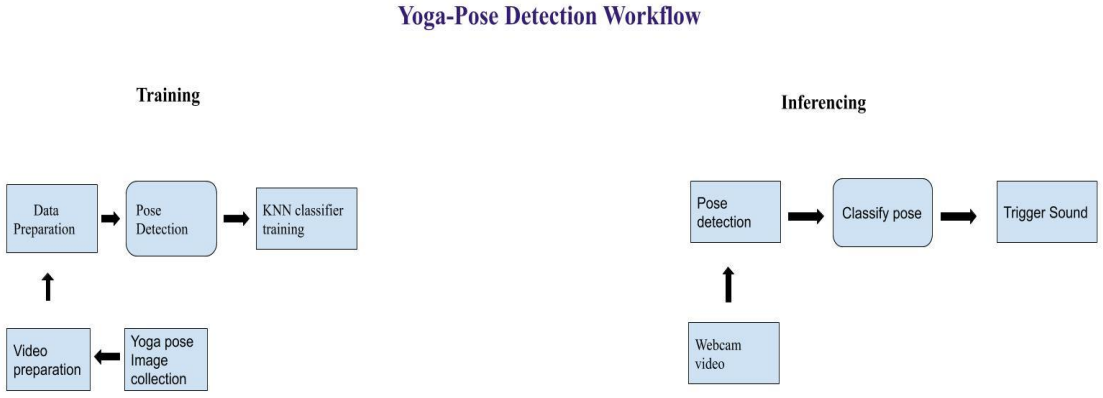
- The repository also includes templates and code for two websites: one for training the model and another for pose prediction. These websites are built using Django. However, there are issues with the "requirements.txt" file, as it contains dependencies with incorrect installation commands. This can be easily fixed by modifying the "requirements.txt" file to include the correct dependencies. To run the application, the required dependencies must be installed, the server can be started using "manage.py," and the website can be accessed at the provided local address.

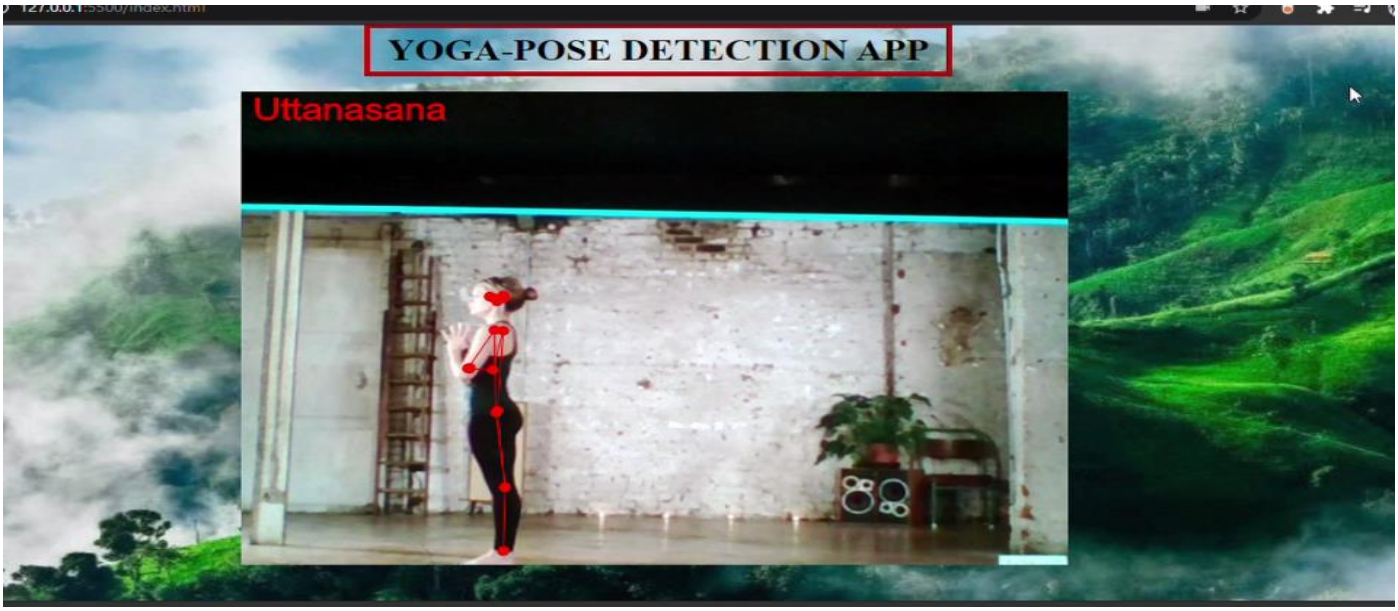
- The training website allows users to feed examples of different poses to the model using buttons. Once the training is complete, a JSON file with the trained model can be downloaded. On the prediction website, users are prompted to grant access to their webcams, enabling PoseNet to identify joints and skeletons in real-time. The model then predicts the pose being performed from the live webcam feed.

- In summary, the yoga-pose-detector repository offers a useful application for predicting yoga poses from live video, utilizing the capabilities of PoseNet.Ive downloaded and installed all the files previously while i was attempting the assignment.Ive set the directory for the cloned repository to be my desktop so it would be easy for me to operate,for this i downloaded all the raw files and saved it to mydesktop.

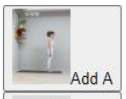
- link to the video explanation and overall application

  https://drive.google.com/file/d/1AezLowxyuwiQ0wH6sk_bxUQZtD9LVrbo/view?usp=sharing





KNN Classification on PoseNet data from Videos


Add A


Add B


Add C


Add D


Add E


Add F


Add G

Save Model !

0 A examples 0 B examples

0 C examples 0 D examples

3. Harvard CS50 Flask Assignment:

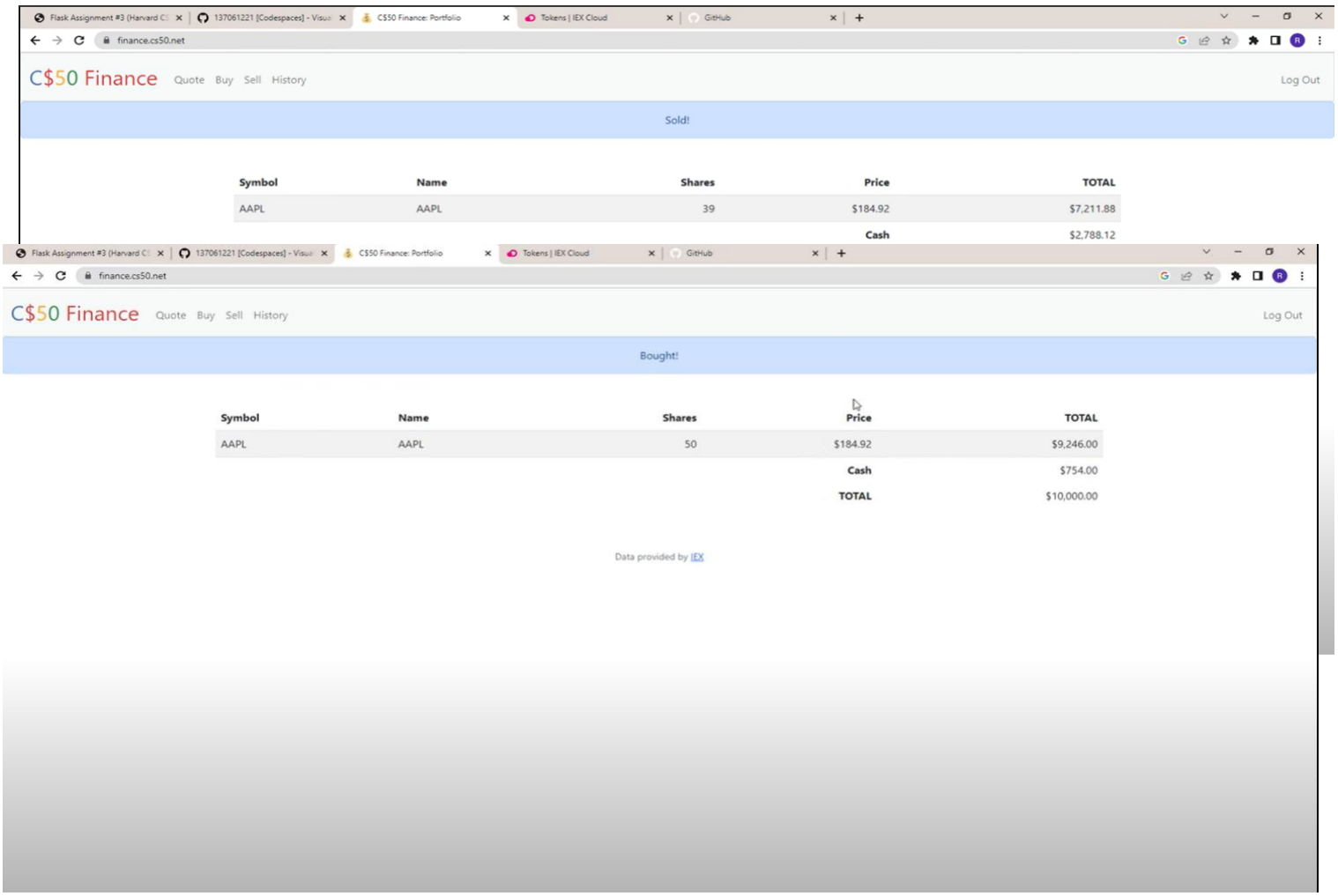
I was tasked with creating a website using the Flask framework for buying and selling stocks Flask is a framework where the library of code comes with a set of conventions for how it should be used. For example like other libraries flask includes functions we can use to parse requests individually

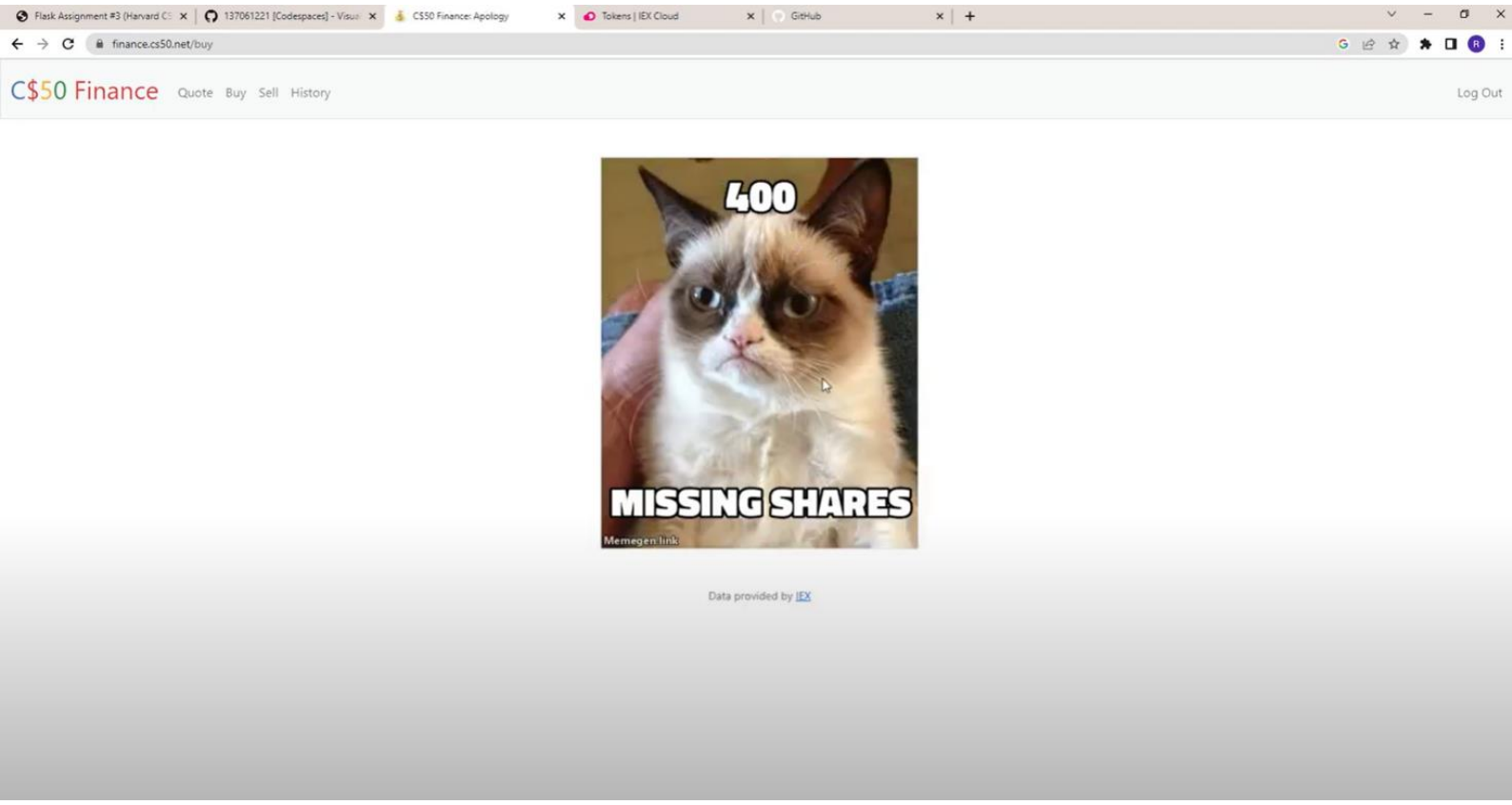
This project included several features, including a user registration and login system to manage user accounts, a stock quote function for displaying real- time stock prices, and the real time portfolio which included our stocks which we bought and sold

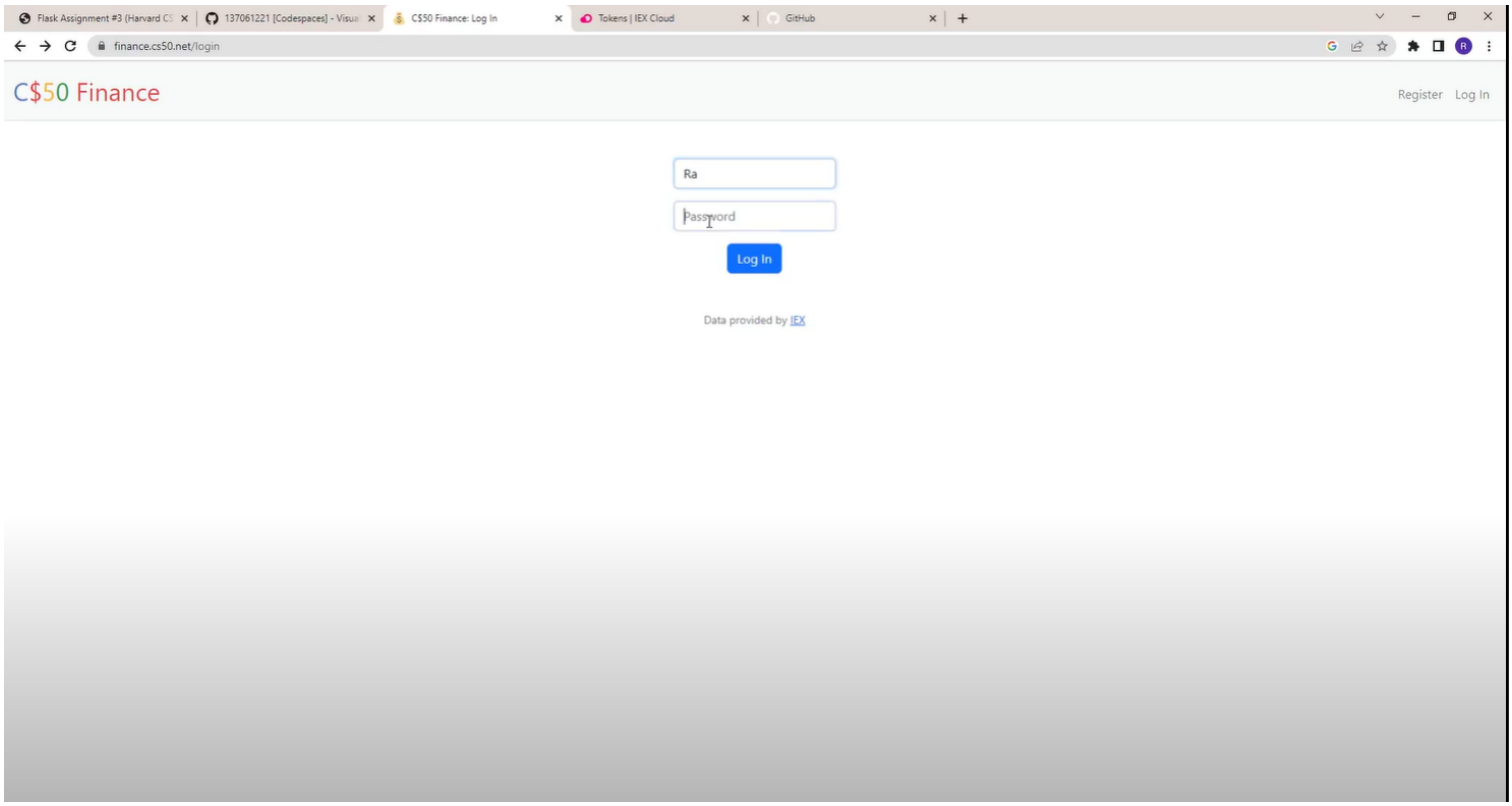
To gather stock price information, we made use of the IEX API, which provided the necessary data for displaying stock prices to theusers. Additionally, we employed an SQL database to store and manage user information efficiently.

Link to the video:
https://drive.google.com/file/d/1OivtgbV2PReWEA2QFeDLV6Q-YgdXCNtS/view

The resultant application with snapshots of buying and selling securities,and overall functions are given below:




C$50 Finance
Quote
Buy
Sell
History
Log Out
400
MISSING SHARES
Memegen.link
Data provided by IEX


C$50 Finance
Register
Log In
Ra
Password
Log In
Data provided by IEX

SUMMARY OF LEARNINGS:

- **Practical Knowledge:**
  - Module building with Python
  - Decision Tree Classifier
  - Git and Github
  - Linux Shell Scripting
  - Machine Learning Implementation

- **Tools and Software:**
  - Python
  - Flask
  - HTML

- Git BASH

- **Corporate work experience:**

  - Collaboration and Teamwork
  - Time Management
  - Ownership and accountability
  - Professionalism and Work-ethics

REFERENCES:

1. Python Course with Training Projects
2. Intro to Linux Scripting
3. Intro to Git and Github
4. basics of coding in Python
5. Intro to EMR data and AI applications
6. Framework for secure medical record summarization
7. Open source medical record aggregation project
8. https://cs50.harvard.edu/x/2023/weeks/9/