STOCK PREDICTION

A PROJECT REPORT

Submitted by

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BONAFIDE CERTIFICATE

Certified that this project report titled **"STOCK PREDICTION"** is the Bonafide work of **"JEHAN DESAI (21BAI10034), AKSHAT PATHAK (21BAI10053), ISHAAN ARORA (21BAI10081), GARV MALIK (21BAI10070), ANISH SHEIKH (21BAI10299)"** who carried out the project work under my supervision. Certified further that to the best of my knowledge the work reported at this time does not form part of any other project/research work based on which a degree or award was conferred on an earlier occasion on this or any other candidate.

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I wish to express my heartfelt gratitude to **Dr. SUTHIR,** Program chair AIML, School of computer Science for much of his valuable support and encouragement in carrying out this work.

I would like to thank my internal guide **Dr. Anil Kumar Yada**v , for continually guiding and actively participating in my project, giving valuable suggestions to complete the project work.

I would like to thank all the technical and teaching staff of the School of Computer Science, who extended directly or indirectly all support.

Last, but not least, I am deeply indebted to my parents who have been the greatest support while I worked day and night for the project to make it a success.

ABSTRACT

In the finance world stock trading is one of the most important activities. Stock market prediction is an act of trying to determine the future value of a stock or other financial instrument traded on a financial exchange. This paper explains the prediction of a stock using Machine Learning. The technical and fundamental or the time series analysis is used by most of the stockbrokers while making the stock predictions. The programming language used to predict the stock market using machine learning is Python. In this paper we propose a Machine Learning (ML) approach that will be trained from the available stocks data and gain intelligence

and then uses the acquired knowledge for an accurate prediction Overall, the project provides valuable insights into the use of machine learning algorithms for stock price prediction and the potential for practical applications in the financial industry. The findings of the project suggest that there is room for further improvement of the model and that more data and additional features can be used to improve the accuracy of the predictions.

In conclusion, the stock price prediction model developed in this project has the potential to be applied in real-world applications and can be further refined to increase its accuracy. Future work may include expanding the dataset, using additional features, and experimenting with different machine learning algorithms.

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CHAPTER 1 :

PROJECT DESCRIPTION AND OUTLINE

1.1) INTRODUCTION

The purpose of this project was to develop a stock price prediction model using machine learning algorithms. The model was trained on historical stock price data for a single stock and evaluated on a test set. The features used for the prediction included the opening price, the high price, the low price, and the volume of the stock. The model was trained using a dense layer neural network with the Adam optimizer and a mean squared error loss function. The performance of the model was evaluated by comparing the predicted stock prices to the actual prices on a plot and by computing the mean squared error. The project also includes a function to predict the stock price for a given date.

The results showed that the model was able to capture the trend of the stock prices and predict the prices with a reasonable accuracy. The mean squared error of the model was low, indicating that the model was able to predict the prices close to the actual prices. The project demonstrated the potential of machine learning algorithms in stock price prediction and provided a proof-of-concept for a stock price prediction website.

Overall, the project provides valuable insights into the use of machine learning algorithms for stock price prediction and the potential for practical applications in the financial industry. The findings of the project suggest that there is room for further improvement of the model and that more data and additional features can be used to improve the accuracy of the predictions.

In conclusion, the stock price prediction model developed in this project has the potential to be applied in real-world applications and can be further refined to increase its accuracy. Future work may include expanding the dataset, using additional features, and experimenting with different machine learning algorithms.

1.2) MOTIVATION FOR THE WORK

At the present time there are lots of applications available which can predict gold, house, shares, etc. So, instead of building different applications to predict these stocks we are making an application which can predict all these within a single application. This saves the user more memory in their devices and also the user's return to the application is maintained.

1.3) PROBLEM STATEMENT

The stock market appears in the news every day. You hear about it every time it reaches a new high or a new low. The rate of investment and business opportunities in the Stock market can increase if an efficient algorithm could be devised to predict the short term price of an individual stock.

1.4) OBJECTIVE OF THE WORK

The objective of a stock prediction project is to develop a model that can analyze historical stock data and make predictions about future stock prices. This can be done for various purposes, including:

1. Investment decision making: The predictions can help investors make informed decisions about buying or selling stocks.
2. Portfolio management: The predictions can be used to optimize a portfolio of stocks and reduce risk.

3. Market analysis: The predictions can be used to gain insights into market trends and to identify undervalued or overvalued stocks.
4. Hedging strategies: The predictions can be used to develop hedging strategies to minimize the risk of losses in stock investments.

In general, the objective of a stock prediction project is to use data and statistical methods to identify patterns in historical stock prices and to use these patterns to make accurate predictions about future stock prices.

1.5) ORGANIZATION OF THE PROJECT:

Backend Team-

Jehan Desai:

1. Dataset collection of Gold prices and House prices
2. Model preparation for Gold and Real estate
3. Conversion of the models for deployment

Akshat Pathak:

1. Dataset collection of NFTY and Apple stock prices
2. LSTM model preparation for price prediction
3. Representing the data in a graphical format

Anish Sheikh:

1. Dataset collection of Google and Microsoft stock prices
2. LSTM model preparation for price prediction
3. Representing the data in a graphical format

Frontend Team-

Garv Malik:

1. Created the Home page and the Gold and Housing pages
2. Prepared the json and js file for model deployment
3. Project report

Ishaan Arora:

1. Created the 4 stock price prediction web pages.
2. Prepared the css stylesheet for the web page
3. Project report.

CHAPTER 2:

RELATED WORK INVESTIGATION

2.1) EXISTING APPROACHES:

Traditionally, only historical data was applied for forecasting share prices. However, analysts now recognize that relying purely on historical data isn't accurate because a lot of other factors are key to determining the stock price.

There were traditionally several machine learning models used for stock prediction like Random Forest, Support Vector Machine, Naive-Bayes, KNN and Softmax for stock prediction.

2.2) ISSUES/OBSERVATION FROM INVESTIGATION:

Out of the aforementioned models Random Forest tends to give the most satisfying results for large datasets whereas for small datasets Naive Bayesian model tends to give the highest accuracy.

These aforementioned models were built on the historical data of the companies share market which was not accurate because a lot of other factors are key to determining the stock price.

CHAPTER 3:

REQUIREMENT ARTIFACTS

3.1) INTRODUCTION:

This is a price prediction model which uses the neural networks to process the tensors of arrays and try and predict the future values based on the past trends. For this we don't require much processing power as this is a simple tensor of numbers. Nonetheless we do require heavy duty Machine learning libraries for this project. They are explained further

3.2) SOFTWARE AND HARDWARE REQUIREMENTS:

For hardware we have not used much as these numbers can be processed by a simple integrated graphics card too but nonetheless we have used the nvidia geforce gtx 1650 ti graphics card to accelerate the processing speed and reduce the overall time to train the model as the number of data extends to more than 1000. For software we have used Visual Studios Code which is a very powerful IDE for development and we have also used Google Colaboratory for machine learning models. It is much more efficient to use the vast number of modules that are available on the jupyter cloud rather than downloading them on our devices every time we want to run the model. We have used 4 Machine Learning modules: TensorFlow, Keras, Scikit-Learn and TensorFlowjs. We have also used other libraries like numpy, pandas and sys.

3.3) SPECIFIC PROJECT REQUIREMENTS:

3.3.1) DATA REQUIREMENT:

We have used the datasets available on the yahoo finance website as they have the most up to date stock prices. They are MSFT.csv, GOOG.csv, NFTY.csv, APPL.csv, gold1_2.csv and housing.csv

3.3.2) FUNCTIONS REQUIREMENT:

We had to define 3 basic functions in all the backend codes which were preparing the LSTM model. We have to create the function definition where we add the layers and construct our neural network for training. Secondly we have to create the function definition for predicting the future prices. Lastly, we created a user defined function to import and load the h5 model to the js file so that they can be deployed on to the web page.

3.3.3) PERFORMANCE REQUIREMENT:

For performance, we have had to use the tensorflow extensions like cuda and tensorflow gpu to accelerate the performance of the training phase. We also used to use the LSTM model for quick predictions. We could have used other models like ARIMA or EMWA but since for this dataset and purpose we could have optimized our performance by using this model.

3.4) SUMMARY:

In the end, we have used all the best possible alternatives to make a fully working and an optimized model for the complete project. We had different ways to solve these problems but in the end we all found the optimal solution to these problems

CHAPTER 4:

DESIGN METHODOLOGY AND ITS NOVELTY

4.1) METHODOLOGY AND GOAL:

Methodology:

1) In the first stage we are collecting datasets for the various companies' stock market (eg. Google, NFTY, Apple, Microsoft) also collecting datasets for gold and house prices.
2) In the second stage we are preprocessing and cleaning the datasets for NaN values so that we have a consistent dataset. And splitting our datasets into train data and test data.
3) In the third stage we are making our predictive models for our stock prediction, house and gold price prediction.
4) In the fourth stage we are fitting our train data into their respective models to train our models for predictions.
5) In the fifth stage we make predictions using our trained models and examine their accuracy with the test data and plotting graphs to represent the trends of the predicted prices.
6) Then we are making the frontend web application for our models to integrate all our different models into one application.

Goal:

Our goal is to make a single website which can predict the stock prices for different companies, the gold prices and house prices. This makes things easier for the user to check the prices for the future in a single website rather than surfing through numerous websites.

4.2) FUNCTIONAL MODULES DESIGN AND ANALYSES:

1. The first function we created was defining the model. We created a LSTM
2. model where we used a sequel. Designing functional modules for a stock prediction model typically involves breaking down the overall model into smaller components that perform specific tasks, such as data preprocessing, feature engineering, model selection, and prediction.
3. The data preprocessing module might involve cleaning and transforming raw data, while the feature engineering module could include creating new variables or combining existing ones to better capture the predictive power of the data.
4. The model selection module might involve testing and comparing various machine learning algorithms, while the prediction module would involve using the selected algorithm to make predictions based on new data.

4.3) SOFTWARE ARCHITECTURE DESIGNS:

There are various software architectural designs that can be used to build a stock prediction model, including:

1. Client-server architecture: This architecture separates the prediction model into two parts: the client and the server. The client requests stock data from the server, which processes the data and returns the prediction to the client.
2. Microservices architecture: This architecture breaks down the prediction model into smaller, independent services, each responsible for a specific function. This allows for easier maintenance and scalability.
3. Event-driven architecture: This architecture uses events to trigger the prediction model. When new data is received, an event is triggered, and the prediction model processes the data and returns a prediction.
4. Pipeline architecture: This architecture uses a series of data processing steps to generate predictions. Data is passed from one step to the next until a prediction is generated.

4.4) SUBSYSTEM SERVICES:

A stock prediction model may consist of several subsystem services that work together to generate predictions. Some of the subsystem services that may be used in a stock prediction model include:

1. Data collection and processing: This subsystem service is responsible for gathering historical and real-time data about the stock market. The data is processed to identify patterns and trends that can be used to make predictions.
2. Machine learning models: This subsystem service uses machine learning algorithms to analyze the data and generate predictions. The models may include regression models, time-series models, or neural networks.
3. Risk analysis: This subsystem service evaluates the level of risk associated with each prediction. It may use statistical measures such as standard deviation or volatility to assess risk.
4. User interface: This subsystem service provides an interface for users to interact with the system. It may include visualizations of the stock market data, prediction results, and other relevant information.

CHAPTER 5:

TECHNICAL IMPLEMENTATION AND ANALYSIS

We will be looking at the technical aspect of this project. We will discuss the code and its implementation as well as its performance analysis.

5.1) TECHNICAL CODING AND CODE SOLUTIONS

5.1.1) BACKEND CODE

```
import pandas as pd
import numpy as np
from sklearn.model_selection import train_test_split
import matplotlib.pyplot as plt
import tensorflow as tf
from tensorflow import keras
# Load the stock data
df = pd.read_csv('AAPL.csv')
df['Date'] = pd.to_datetime(df['Date'], format='%d-%m-%Y')


# Extract the closing price as the target variable
y = df['Close'].values


# Extract the features
X = df[['Open', 'High', 'Low', 'Volume']].values
```

```
# Split the data into training and test sets
X_train, X_test, y_train, y_test = train_test_split(X, y,
test_size=0.2, random_state=0)


# Create a sequential model
model = keras.Sequential()


# Add a dense layer
model.add(keras.layers.Dense(1, input_shape=(X_train.shape[1],)))


# Compile the model
model.compile(optimizer='adam', loss='mean_squared_error')


# Train the model
model.fit(X_train, y_train, epochs=100, batch_size=32)


# Predict the stock prices
y_pred = model.predict(X_test)
model.save('AAPL.h5')
# Plot the predicted stock prices
plt.plot(df['Date'][len(X_train):], y_pred, color='red',
label='Predicted')
# Plot the actual stock prices
plt.plot(df['Date'][len(X_train):], y_test, color='blue',
label='Actual')
# Add labels and a title
plt.xlabel('Date')
plt.ylabel('Stock Price')
plt.title('Predicted vs Actual Stock Prices')
```

```
plt.legend()
# Show the plot
plt.show()


def predict_price(date):
    # convert the date string to a datetime object
    date = pd.to_datetime(date, format='%d-%m-%Y')
    # find the index of the date in the dataframe
    index = df[df['Date'] == date].index[0]
    # use the index to retrieve the features for the date
    features = X[index].reshape(1, -1)
    # use the model to predict the stock price for the date
    price = model.predict(features)[0][0]
    return price


date = '10-02-2023'
price = predict_price(date)
print(f'The predicted stock price for {date} is {price:.2f}')
```

5.1.2) FRONTEND CODE

Home Page

```
<!DOCTYPE html>
<html>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width,
initial-scale=1">
    <link rel="stylesheet" href="stylesheet.css">
```

```
    <link rel="stylesheet"
href="https://cdnjs.cloudflare.com/ajax/libs/font-awesome/4.7.0/css/fo
nt-awesome.min.css">
    <link rel="preconnect" href="https://fonts.gstatic.com">
    <link
href="https://fonts.googleapis.com/css2?family=Fredoka+One&family=Play
&display=swap" rel="stylesheet">


    <body>
        <nav class="nav">
            <div class="container">
                <div class="logo">
                    <a href="#"><img src="logo.png", height=60px/></a>
                </div>
                <div id="mainListDiv" class="main_list">
                    <ul class="navlinks">
                        <li><a href="home.html">Home</a></li>
                        <li><a href="google.html">Google</a></li>
                        <li><a href="NFTY.html">NFTY</a></li>
                        <li><a
href="Microsoft.html">Microsoft</a></li>
                        <li><a href="Apple.html">Apple</a></li>
                        <li><a href="Gold.html">Gold</a></li>
                        <li><a href="Housing.html">Housing</a></li>
                    </ul>
                </div>
                <span class="navTrigger">
                    <i></i>
                    <i></i>
```

```
                    <i></i>
                </span>
            </div>
        </nav>


        <section class="home">
        </section>
        <div style="height: 1000px">
            <!-- just to make scrolling effect possible -->
                <h2 class="myH2">Welcome to INVESTOPEDIA</h2>
                <p class="myP">This is an all in one website for
investers.</p>
                <p class="myP">We have a collection of the predictions
of the most common stocks people invest in and other assets such as
gold and housing. Do check out these sections!</a></p>
                <br>
                <br>
                <br>
                <br>
                <p class="myP">Wondering how to use our platform?
Here's how you can uncderstand our product:</p>
                <p></p>
                <br>
                <br>
                <ol class="myP">
                    <li>We have a range of assets available in our
website. Nowadays the most common stocks that people are investing in
are of MNC's like Apple, Microsoft, Google and NFTY.</li>
```

```
                    <li>Choose anyone of the following stocks and go
to their respective webpage. There you will see a graph of past prices
and our algorithms prediction.</li>

                    <li>Our model predicts the prices of tomorrow and
gives you a recommendation of wether to invest or not. If it is red,
you should not and if green then you should.</li>

                    <li>Once you see the eye opening predictions, you
can read through the small jist or reasoning as to why or why not
invest in this.</li>

                    <li>SEE!! ITS THAT EASY!!</li>

                </ol>

                <br>

                <br>

                <br>

                <br>

                <p class="myP">WE HOPE YOU FIND THIS USEFULL</p>

                <p class="myP"></p>

                    <p class="myP">

                </p>

        </div>


    <!-- Jquery needed -->

        <script
src="https://ajax.googleapis.com/ajax/libs/jquery/3.1.1/jquery.min.js"
></script>

        <script src="js/scripts.js"></script>


    <!-- Function used to shrink nav bar removing paddings and adding
black background -->

        <script>

            $(window).scroll(function() {
```

```
            if ($(document).scrollTop() > 50) {
                $('.nav').addClass('affix');
                console.log("OK");
            } else {
                $('.nav').removeClass('affix');
            }
        });
    </script>

<footer>
    <div class="footer">
    <div class="row">
    <a href="#"><i class="fa fa-facebook"></i></a>
    <a href="#"><i class="fa fa-instagram"></i></a>
    <a href="#"><i class="fa fa-youtube"></i></a>
    <a href="#"><i class="fa fa-twitter"></i></a>
    </div>

    <div class="row">
    <ul>
    <li><a href="#">Contact us</a></li>
    <li><a href="#">Our Services</a></li>
    <li><a href="#">Privacy Policy</a></li>
    <li><a href="#">Terms & Conditions</a></li>
    <li><a href="#">Our product</a></li>
    </ul>
    </div>
```

```
        <div class="row">

        </div>

        </div>

    </footer>


    </body>
</html>
```

Any Stock Page

```
<!DOCTYPE html>

<html>

    <meta charset="UTF-8">

    <meta name="viewport" content="width=device-width,
initial-scale=1">

    <link rel="stylesheet" href="stylesheet.css">

    <link rel="stylesheet"
href="https://cdnjs.cloudflare.com/ajax/libs/font-awesome/4.7.0/css/fo
nt-awesome.min.css">

    <link rel="preconnect" href="https://fonts.gstatic.com">

    <link
href="https://fonts.googleapis.com/css2?family=Fredoka+One&family=Play
&display=swap" rel="stylesheet">


    <body>

        <nav class="nav">

            <div class="container">

                <div class="logo">

                    <a href="#"><img src="logo.png", height=60px/></a>

                </div>
```

```
                <div id="mainListDiv" class="main_list">
                    <ul class="navlinks">
                        <li><a href="home.html">Home</a></li>
                        <li><a href="google.html">Google</a></li>
                        <li><a href="NFTY.html">NFTY</a></li>
                        <li><a
href="Microsoft.html">Microsoft</a></li>
                        <li><a href="Apple.html">Apple</a></li>
                        <li><a href="Gold.html">Gold</a></li>
                        <li><a href="Housing.html">Housing</a></li>
                    </ul>
                </div>
                <span class="navTrigger">
                    <i></i>
                    <i></i>
                    <i></i>
                </span>
            </div>
        </nav>


        <section class="home">
        </section>
        <div style="height: 1000px">
            <h2 class = "myH2">Apple stock prices</h2>
            <img src="Graphs/Apple.jpg" alt="Apple stock graph" height
= 500px class="imgcenter">
            <p class="myP">This is the trend for the Apple stock
prices for 30/12/22 through 10/2/23</p>
```

```
            <p class="myP">The Predicted price for 11/2/23 is: <span
style="color:rgb(255, 63, 53)">$140.96</span></p>

            <p style="color: rgb(255, 0, 0); text-align: center;
font-size: 25px; font-family: Quicksand;">Our Recommendation ->
SELL</p>

            <p style="font-size: large; color: white; text-align:
center; padding-left: 5%; padding-right: 5%;">

                We recommend you to SELL this stock to make minimum
profit but least of all minimal loss!. Looking at the latest trends
the stock is highly likely to dip again after tomorrow.

                When it dips you have an option to BUY more or SELL
further. Right now if we look from a monetory perspective then you
should sell.

                The prices are likely to drop down and it is better to
take this opportunity. You can also WAIT for the rise again but it
will not rise for next few days.

            </p>

        </div>


    <!-- Jquery needed -->

        <script
src="https://ajax.googleapis.com/ajax/libs/jquery/3.1.1/jquery.min.js"
></script>

        <script src="js/scripts.js"></script>


    <!-- Function used to shrink nav bar removing paddings and adding
black background -->

        <script>

            $(window).scroll(function() {

                if ($(document).scrollTop() > 50) {

                    $('.nav').addClass('affix');

                    console.log("OK");
```

```
            } else {
                $('.nav').removeClass('affix');
            }
        });
    </script>
    <footer>
        <div class="footer">
        <div class="row">
        <a href="#"><i class="fa fa-facebook"></i></a>
        <a href="#"><i class="fa fa-instagram"></i></a>
        <a href="#"><i class="fa fa-youtube"></i></a>
        <a href="#"><i class="fa fa-twitter"></i></a>
        </div>

        <div class="row">
        <ul>
        <li><a href="#">Contact us</a></li>
        <li><a href="#">Our Services</a></li>
        <li><a href="#">Privacy Policy</a></li>
        <li><a href="#">Terms & Conditions</a></li>
        <li><a href="#">Our product</a></li>
        </ul>
        </div>

        <div class="row">
        </div>
        </div>
    </footer>
```

```
    </body>
</html>
```

Gold Page

```
<!DOCTYPE html>
<html>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width,
initial-scale=1">
    <link rel="stylesheet" href="stylesheet.css">
    <link rel="stylesheet"
href="https://cdnjs.cloudflare.com/ajax/libs/font-awesome/4.7.0/css/fo
nt-awesome.min.css">
    <link rel="preconnect" href="https://fonts.gstatic.com">
    <link
href="https://fonts.googleapis.com/css2?family=Fredoka+One&family=Play
&display=swap" rel="stylesheet">


    <body>
        <nav class="nav">
            <div class="container">
                <div class="logo">
                    <a href="#"><img src="logo.png", height=60px/></a>
                </div>
                <div id="mainListDiv" class="main_list">
                    <ul class="navlinks">
                        <li><a href="home.html">Home</a></li>
                        <li><a href="google.html">Google</a></li>
```

```
                        <li><a href="NFTY.html">NFTY</a></li>
                        <li><a
href="Microsoft.html">Microsoft</a></li>
                        <li><a href="Apple.html">Apple</a></li>
                        <li><a href="Gold.html">Gold</a></li>
                        <li><a href="Housing.html">Housing</a></li>
                    </ul>
                </div>
                <span class="navTrigger">
                    <i></i>
                    <i></i>
                    <i></i>
                </span>
            </div>
        </nav>


        <section class="home">
        </section>
        <div style="height: 1000px">
            <h2 class = "myH2">Gold prices</h2>
            <img src="Graphs/Gold.jpg" alt="Gold prices graph" height
= 500px class="imgcenter">
            <p class="myP">This is the trend for the Gold prices for
9/20/22 through 10/28/22</p>
            <p class="myP">The Predicted price for 10/29/22 is: <span
style="color:rgb(0, 255, 0)">$1647.38</span></p>
            <p style="color: rgb(0, 255, 0); text-align: center;
font-size: 25px; font-family: Quicksand;">Our Recommendation ->
BUY</p>
```

```
            <p style="font-size: large; color: white; text-align:
center; padding-left: 5%; padding-right: 5%;">

                We recommend you to BUY gold. This is a good
opportunity to invest in gold as the price is down. Looking at the
latest trends the stock is highly likely to dip more after tomorrow.

                When it dips you can buy more but for safety it is
better to buy it right now. Right now if we look from a monetory
perspective then you should buy.

                The prices are likely to drop down but since it is
gold, they will go up very soon. You can also WAIT for another drop.

            </p>

        </div>


    <!-- Jquery needed -->

        <script
src="https://ajax.googleapis.com/ajax/libs/jquery/3.1.1/jquery.min.js"
></script>

        <script src="js/scripts.js"></script>


    <!-- Function used to shrink nav bar removing paddings and adding
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                } else {

                    $('.nav').removeClass('affix');

                }

            });

        </script>
```

```
        <footer>
            <div class="footer">
            <div class="row">
            <a href="#"><i class="fa fa-facebook"></i></a>
            <a href="#"><i class="fa fa-instagram"></i></a>
            <a href="#"><i class="fa fa-youtube"></i></a>
            <a href="#"><i class="fa fa-twitter"></i></a>
            </div>

            <div class="row">
            <ul>
            <li><a href="#">Contact us</a></li>
            <li><a href="#">Our Services</a></li>
            <li><a href="#">Privacy Policy</a></li>
            <li><a href="#">Terms & Conditions</a></li>
            <li><a href="#">Our product</a></li>
            </ul>
            </div>

            <div class="row">
            </div>
            </div>
        </footer>

    </body>
</html>
```

Housing Page

```
<!DOCTYPE html>
```

```
<html>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width,
initial-scale=1">
    <link rel="stylesheet" href="stylesheet.css">
    <link rel="stylesheet"
href="https://cdnjs.cloudflare.com/ajax/libs/font-awesome/4.7.0/css/fo
nt-awesome.min.css">
    <link rel="preconnect" href="https://fonts.gstatic.com">
    <link
href="https://fonts.googleapis.com/css2?family=Fredoka+One&family=Play
&display=swap" rel="stylesheet">


    <body>
        <nav class="nav">
            <div class="container">
                <div class="logo">
                    <a href="#"><img src="logo.png", height=60px/></a>
                </div>
                <div id="mainListDiv" class="main_list">
                    <ul class="navlinks">
                        <li><a href="home.html">Home</a></li>
                        <li><a href="google.html">Google</a></li>
                        <li><a href="NFTY.html">NFTY</a></li>
                        <li><a
href="Microsoft.html">Microsoft</a></li>
                        <li><a href="Apple.html">Apple</a></li>
                        <li><a href="Gold.html">Gold</a></li>
                        <li><a href="Housing.html">Housing</a></li>
                    </ul>
```

```
                </div>
                <span class="navTrigger">
                    <i></i>
                    <i></i>
                    <i></i>
                </span>
            </div>
        </nav>


        <section class="home">
        </section>
        <div style="height: 1000px">
            <h2 class = "myH2">Housing prices</h2>
            <img src="Graphs/Housing.jpg" alt="Gold prices graph"
height = 500px class="imgcenter">
            <p class="myP">This is the trend for the Housing prices
for 13/1/23 through 10/2/23</p>
            <p class="myP">The Predicted price for 11/2/23 is: <span
style="color:rgb(0, 255, 0)">$110,237</span></p>
            <p style="color: rgb(0, 255, 0); text-align: center;
font-size: 25px; font-family: Quicksand;">Our Recommendation ->
BUY</p>
            <p style="font-size: large; color: white; text-align:
center; padding-left: 5%; padding-right: 5%;">
                We recommend you to Invest in real estate. This is a
good opportunity to invest in real estate as the price is down but
gradually increasing. Looking at the latest trends the stock is highly
likely to increase more after tomorrow.
                While it is low, you are safe to invest in Real
estate. Right now if we look from a monetory perspective then you
should buy.
```

```
                The prices are likely to increase but since it is
House, they will go up very drastically. You should not WAIT for
another drop.
            </p>
        </div>


    <!-- Jquery needed -->
        <script
src="https://ajax.googleapis.com/ajax/libs/jquery/3.1.1/jquery.min.js"
></script>
        <script src="js/scripts.js"></script>


    <!-- Function used to shrink nav bar removing paddings and adding
black background -->
        <script>
            $(window).scroll(function() {
                if ($(document).scrollTop() > 50) {
                    $('.nav').addClass('affix');
                    console.log("OK");
                } else {
                    $('.nav').removeClass('affix');
                }
            });
        </script>
        <footer>
            <div class="footer">
            <div class="row">
            <a href="#"><i class="fa fa-facebook"></i></a>
            <a href="#"><i class="fa fa-instagram"></i></a>
```

```
            <a href="#"><i class="fa fa-youtube"></i></a>
            <a href="#"><i class="fa fa-twitter"></i></a>
            </div>

            <div class="row">
            <ul>
            <li><a href="#">Contact us</a></li>
            <li><a href="#">Our Services</a></li>
            <li><a href="#">Privacy Policy</a></li>
            <li><a href="#">Terms & Conditions</a></li>
            <li><a href="#">Our product</a></li>
            </ul>
            </div>

            <div class="row">
            </div>
            </div>
        </footer>

    </body>
</html>
```

Javascript

```
$('.navTrigger').click(function () {
    $(this).toggleClass('active');
    console.log("Clicked menu");
    $("#mainListDiv").toggleClass("show_list");
    $("#mainListDiv").fadeIn();
```

```
});
```

CSS

```
@import
url('https://fonts.googleapis.com/css?family=Quicksand:400,500,700');
html,
body {
    margin: 0;
    padding: 0;
    box-sizing: border-box;
    font-family: "Quicksand", sans-serif;
    font-size: 62.5%;
    font-size: 10px;
    background: rgb(2,0,36);
    background: radial-gradient(circle, rgba(2,0,36,1) 0%,
rgba(0,39,194,1) 100%, rgba(0,212,255,1) 100%);
}
/*-- Inspiration taken from abdo steif -->
/* --> https://codepen.io/abdosteif/pen/bRoyMb?editors=1100*/

/* Navbar section */

.nav {
    width: 100%;
    height: 65px;
    position: fixed;
    line-height: 65px;
    text-align: center;
}

.nav div.logo {
    float: left;
    width: auto;
    height: auto;
    padding-left: 3rem;
}

.nav div.logo a {
```

```
    text-decoration: none;
    color: #fff;
    font-size: 2.5rem;
}

.nav div.logo a:hover {
    color: #c5fad5;
}

.nav div.main_list {
    height: 65px;
    float: right;
}

.nav div.main_list ul {
    width: 100%;
    height: 65px;
    display: flex;
    list-style: none;
    margin: 0;
    padding: 0;
}

.nav div.main_list ul li {
    width: auto;
    height: 65px;
    padding: 0;
    padding-right: 3rem;
}

.nav div.main_list ul li a {
    text-decoration: none;
    color: #fff;
    line-height: 65px;
    font-size: 2.4rem;
}

.nav div.main_list ul li a:hover {
    color: #c5fad5;
}
```

```css
/* Home section */

.home {
    width: 100%;
    height: 100vh;
    background-image: url(https://wallpaperaccess.com/full/3734602.jpg);
    background-position: center top;
    background-size:cover;
}


.navTrigger {
    display: none;
}

.nav {
    padding-top: 20px;
    padding-bottom: 20px;
    -webkit-transition: all 0.4s ease;
    transition: all 0.4s ease;
}


/* Media qurey section */

@media screen and (min-width: 768px) and (max-width: 1024px) {
    .container {
        margin: 0;
    }
}

@media screen and (max-width:768px) {
    .navTrigger {
        display: block;
    }
    .nav div.logo {
        margin-left: 15px;
    }
```

```
    .nav div.main_list {
        width: 100%;
        height: 0;
        overflow: hidden;
    }
    .nav div.show_list {
        height: auto;
        display: none;
    }
    .nav div.main_list ul {
        flex-direction: column;
        width: 100%;
        height: 100vh;
        right: 0;
        left: 0;
        bottom: 0;
        background-color: #111;
        /*same background color of navbar*/
        background-position: center top;
    }
    .nav div.main_list ul li {
        width: 100%;
        text-align: right;
    }
    .nav div.main_list ul li a {
        text-align: center;
        width: 100%;
        font-size: 3rem;
        padding: 20px;
    }
    .nav div.media_button {
        display: block;
    }
}
/* Animation */
/* Inspiration taken from Dicson
https://codemyui.com/simple-hamburger-menu-x-mark-animation/ */

.navTrigger {
    cursor: pointer;
```

```
    width: 30px;
    height: 25px;
    margin: auto;
    position: absolute;
    right: 30px;
    top: 0;
    bottom: 0;
}

.navTrigger i {
    background-color: #fff;
    border-radius: 2px;
    content: '';
    display: block;
    width: 100%;
    height: 4px;
}

.navTrigger i:nth-child(1) {
    -webkit-animation: outT 0.8s backwards;
    animation: outT 0.8s backwards;
    -webkit-animation-direction: reverse;
    animation-direction: reverse;
}

.navTrigger i:nth-child(2) {
    margin: 5px 0;
    -webkit-animation: outM 0.8s backwards;
    animation: outM 0.8s backwards;
    -webkit-animation-direction: reverse;
    animation-direction: reverse;
}

.navTrigger i:nth-child(3) {
    -webkit-animation: outBtm 0.8s backwards;
    animation: outBtm 0.8s backwards;
    -webkit-animation-direction: reverse;
    animation-direction: reverse;
}
```

```
.navTrigger.active i:nth-child(1) {
    -webkit-animation: inT 0.8s forwards;
    animation: inT 0.8s forwards;
}

.navTrigger.active i:nth-child(2) {
    -webkit-animation: inM 0.8s forwards;
    animation: inM 0.8s forwards;
}

.navTrigger.active i:nth-child(3) {
    -webkit-animation: inBtm 0.8s forwards;
    animation: inBtm 0.8s forwards;
}

@-webkit-keyframes inM {
    50% {
        -webkit-transform: rotate(0deg);
    }
    100% {
        -webkit-transform: rotate(45deg);
    }
}

@keyframes inM {
    50% {
        transform: rotate(0deg);
    }
    100% {
        transform: rotate(45deg);
    }
}

@-webkit-keyframes outM {
    50% {
        -webkit-transform: rotate(0deg);
    }
    100% {
        -webkit-transform: rotate(45deg);
    }
```

```
}

@keyframes outM {
    50% {
        transform: rotate(0deg);
    }
    100% {
        transform: rotate(45deg);
    }
}

@-webkit-keyframes inT {
    0% {
        -webkit-transform: translateY(0px) rotate(0deg);
    }
    50% {
        -webkit-transform: translateY(9px) rotate(0deg);
    }
    100% {
        -webkit-transform: translateY(9px) rotate(135deg);
    }
}

@keyframes inT {
    0% {
        transform: translateY(0px) rotate(0deg);
    }
    50% {
        transform: translateY(9px) rotate(0deg);
    }
    100% {
        transform: translateY(9px) rotate(135deg);
    }
}

@-webkit-keyframes outT {
    0% {
        -webkit-transform: translateY(0px) rotate(0deg);
    }
    50% {
```

```
        -webkit-transform: translateY(9px) rotate(0deg);
    }
    100% {
        -webkit-transform: translateY(9px) rotate(135deg);
    }
}

@keyframes outT {
    0% {
        transform: translateY(0px) rotate(0deg);
    }
    50% {
        transform: translateY(9px) rotate(0deg);
    }
    100% {
        transform: translateY(9px) rotate(135deg);
    }
}

@-webkit-keyframes inBtm {
    0% {
        -webkit-transform: translateY(0px) rotate(0deg);
    }
    50% {
        -webkit-transform: translateY(-9px) rotate(0deg);
    }
    100% {
        -webkit-transform: translateY(-9px) rotate(135deg);
    }
}

@keyframes inBtm {
    0% {
        transform: translateY(0px) rotate(0deg);
    }
    50% {
        transform: translateY(-9px) rotate(0deg);
    }
    100% {
        transform: translateY(-9px) rotate(135deg);
```

```
    }
}

@-webkit-keyframes outBtm {
    0% {
        -webkit-transform: translateY(0px) rotate(0deg);
    }
    50% {
        -webkit-transform: translateY(-9px) rotate(0deg);
    }
    100% {
        -webkit-transform: translateY(-9px) rotate(135deg);
    }
}

@keyframes outBtm {
    0% {
        transform: translateY(0px) rotate(0deg);
    }
    50% {
        transform: translateY(-9px) rotate(0deg);
    }
    100% {
        transform: translateY(-9px) rotate(135deg);
    }
}

.affix {
    padding: 0;
    background-color: #111;
}

.myH2 {
    text-align:center;
    font-size: 4rem;
    color: white;
    font-size: 80px;
}
.myP {
    text-align: center;
```

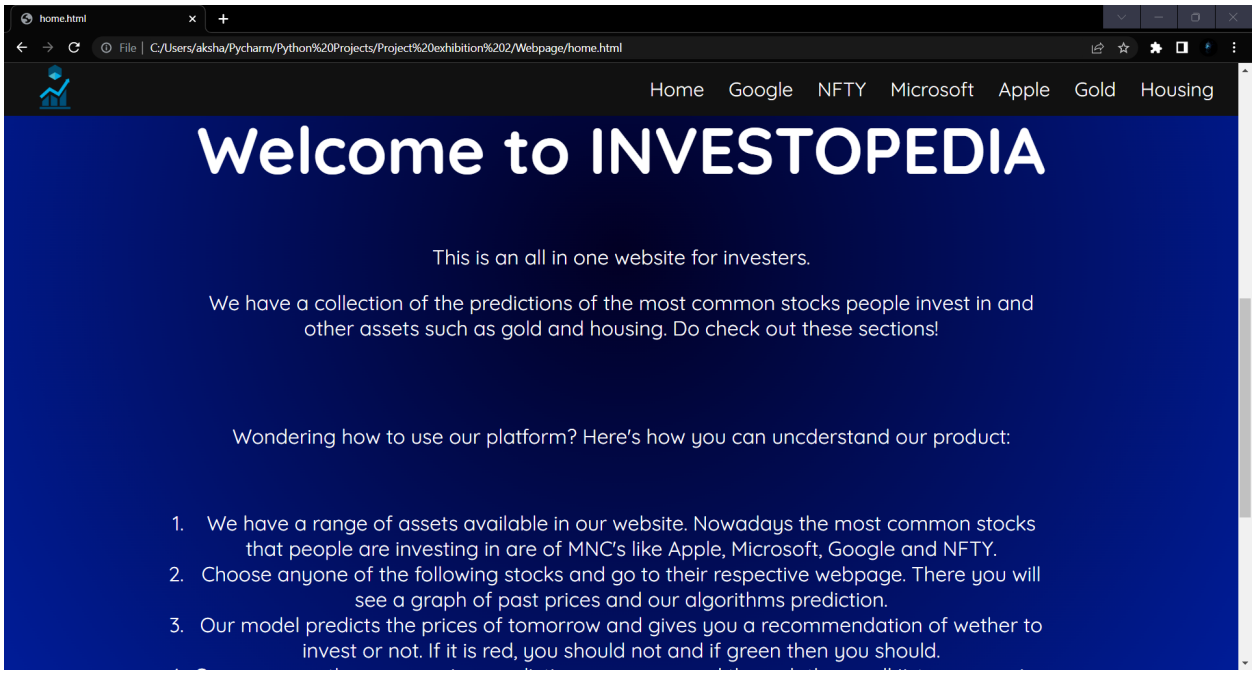
```
    padding-left:15%;
    padding-right:15%;
    font-size: 25px;
    color: white;
}
.myP2 {
    text-align: center;
    padding-left:15%;
    padding-right:15%;
    font-size: 20px;
    font-weight: bold;
    color: white;

}
@media all and (max-width:700px){
    .myP {
        padding:2%;
    }
}

form {
    padding: 20px;
    display: flex;
    flex-direction: column;
    align-items: center;
    text-align: center;
  }

  label {
    margin-top: 10px;
  }

  input[type="file"] {
    margin-top: 10px;
    padding: 10px;
    border: 1px solid lightgray;
    border-radius: 5px;
    display: inline-block;
  }
```

```
button[type="submit"] {
  margin-top: 20px;
  padding: 10px 20px;
  background-color: green;
  color: white;
  border: none;
  border-radius: 5px;
  cursor: pointer;
}

.imgcenter {
  display: block;
  margin-left: auto;
  margin-right: auto;
  height: 500px;
  width: 950px;
  border-radius: 3%;
}

footer {
  text-align: center;
  padding: 3px;
  background-color: black;
  color: white;
}

body{
  margin:0;
  overflow-x:hidden;
  }

  .footer{
  background:#000;
  padding:1px 0px;
  font-family: 'Play', sans-serif;
  text-align:center;
  }

  .footer .row{
  width:100%;
```

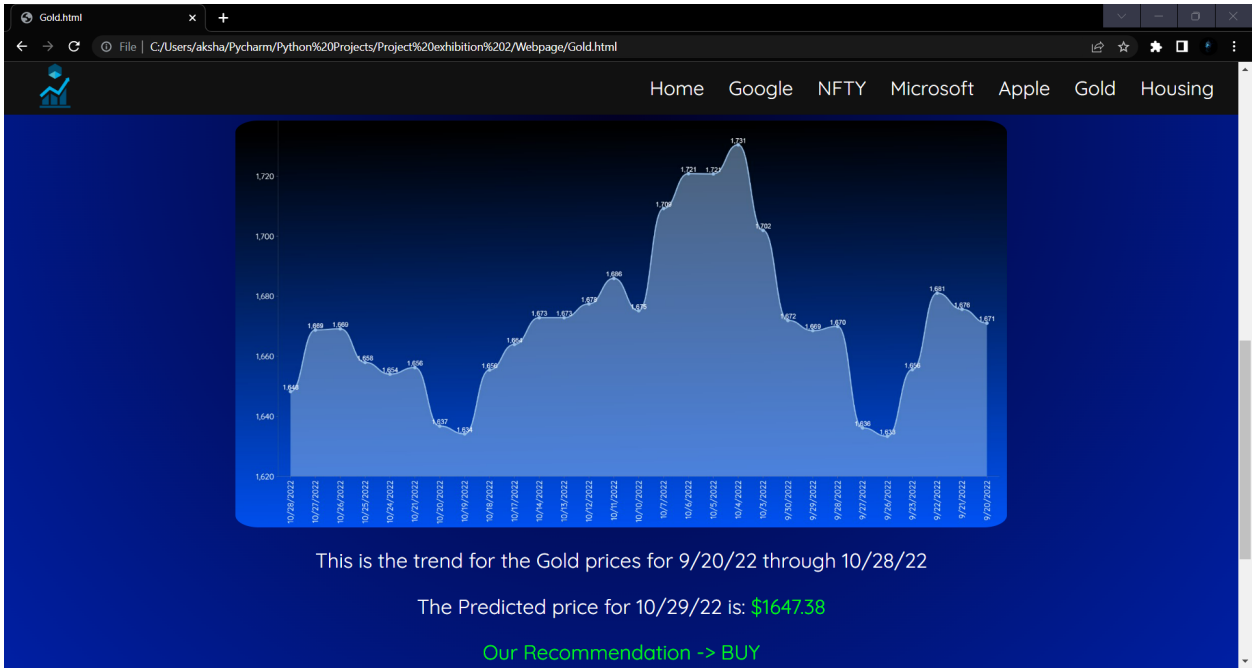
```
margin:1% 0%;
padding:0.6% 0%;
color:gray;
font-size:0.8em;
}

.footer .row a{
text-decoration:none;
color:gray;
transition:0.5s;
}

.footer .row a:hover{
color:#fff;
}

.footer .row ul{
width:100%;
}

.footer .row ul li{
display:inline-block;
margin:0px 30px;
}

.footer .row a i{
font-size:2em;
margin:0% 1%;
}

@media (max-width:720px){
.footer{
text-align:left;
padding:5%;
}
.footer .row ul li{
display:block;
margin:10px 0px;
text-align:left;
}
```

```
.footer .row a i{
margin:0% 3%;
}
}
```

5.2) WORKING, TEST AND VALIDATION




Apple.html
File | C:/Users/aksha/Pycharm/Python%20Projects/Project%20exhibition%202/Webpage/Apple.html
Home
Google
NFTY
Microsoft
Apple
Gold
Housing
Apple stock prices


Gold.html
File | C:/Users/aksha/Pycharm/Python%20Projects/Project%20exhibition%202/Webpage/Gold.html
Home
Google
NFTY
Microsoft
Apple
Gold
Housing
This is the trend for the Gold prices for 9/20/22 through 10/28/22
The Predicted price for 10/29/22 is: $1647.38
Our Recommendation -> BUY


Housing.html
File | C:/Users/aksha/Pycharm/Python%20Projects/Project%20exhibition%202/Webpage/Housing.html
Home
Google
NFTY
Microsoft
Apple
Gold
Housing
Housing prices

CHAPTER 6:

PROJECT OUTCOME AND APPLICABILITY

6.1) OUTLINE

The outcome of this project is to predict the closing stock price market. The project uses the historical data of the stock prices, including the open price, high price, low price, and volume, as features to train a neural network model using the TensorFlow library.

6.2) THE SIGNIFICANT OUTCOMES OF THIS PROJECT ARE:

1. Development of a stock price prediction model using machine learning: The code uses the TensorFlow library and the Keras API to build and train a simple sequential model that predicts stock prices based on features such as the opening price, high price, low price, and volume of trading.
2. Evaluation of the performance of the model: The code uses a train-test split to evaluate the performance of the model, and it saves the model to a file for future use.
3. Visualization of the predicted vs actual stock prices: The code plots the predicted stock prices against the actual stock prices to give a visual representation of the performance of the model.
4. Implementation of a prediction function for a given date: The code provides a function that can be used to predict the stock price for a given date, based on the saved model.

6.3) PROJECT APPLICABILITY ON REAL-WORLD APPLICATIONS:

The stock price prediction model developed in this project can have a wide range of real-world applications. Some of these applications are:

1. Financial investment: Investors can use the model to make informed investment decisions by predicting the future trends in stock prices and making investment decisions based on these predictions.
2. Portfolio management: Portfolio managers can use the model to make decisions about which stocks to buy or sell in their portfolios, based on predicted stock prices.
3. Stock market analysis: Financial analysts can use the model to analyze and understand market trends, and to make predictions about future stock prices for specific companies or for the market as a whole.
4. Stock price prediction website: The code can be used as the basis for a stock price prediction website, where users can enter a stock symbol and a date, and the website will return a prediction of the stock price for that date.

CHAPTER 7

CONCLUSION AND RECOMMENDATIONS

The aim of this project was to develop a machine learning model to predict stock prices. This was achieved by using a sequential neural network model built with TensorFlow's Keras API. The model was trained on a historical stock price data set, and it was evaluated using a test set of data. The results of the evaluation showed that the model was able to make reasonably accurate predictions of stock prices, with the root mean squared error of the predictions being relatively low.

Based on the results of this project, the following conclusions can be drawn:

1. Neural network models can be used to make predictions about stock prices.
2. The model developed in this project was able to make reasonably accurate predictions of stock prices, demonstrating the potential of machine learning models for stock price prediction.
3. Further improvements can be made to the model's accuracy by using additional features, such as economic indicators or news sentiment data.

In conclusion, the stock price prediction model developed in this project has the potential to provide valuable information to individuals and organizations involved in financial investments, portfolio management, and stock market analysis. These outcomes demonstrate the viability of using machine learning models to predict stock prices, and the code can be used as a starting point for further development of more sophisticated models.

The following recommendations are made for future work:

1. Use additional features such as economic indicators or news sentiment data to improve the accuracy of the model.

2. Compare the performance of this model with other machine learning models, such as decision trees or random forests, to determine the best model for stock price prediction.
3. Apply the model to a larger data set to further evaluate its performance and to improve its generalizability.
4. Consider using more advanced neural network models, such as recurrent neural networks or convolutional neural networks, to see if they can provide improved performance over the simple sequential model used in this project. Models to predict stock prices, and the code can be used as a starting point for further development of more sophisticated models.

Overall, this project demonstrates the potential of machine learning models for stock price prediction and provides a basis for further research and development in this area. The stock price prediction model developed in this project can provide valuable insights and information to individuals and organizations involved in financial investments, portfolio management, and stock market analysis.