A Project Report

ON

[Stock Price Prediction & Investment Recommendation System]

BY

Student Name: AKSHUT   **Roll No:** 23CA2611004

Program Name: BCA (ds)   **Semester:** 5th

Group Project: NO   **Group Code:** -

Group Details:

APEX UNIVERSITY, JAIPUR

(DEC. 2025)

Table of Content

- **Abstract**

- • **Introduction**
2.1 Background of the Study
2.2 Problem Statement
2.3 Objectives of the Project
2.4 Scope of the Project

- • **Literature Review**

- • **System Analysis**
4.1 Existing System
4.2 Proposed System
4.3 Advantages of the Proposed System

- • **System Design**
5.1 Architecture Diagram
5.2 Data Flow Diagram
5.3 Module Description

- • **Methodology**
6.1 Data Collection
6.2 Data Preprocessing
6.3 Feature Engineering
6.4 Machine Learning Model
6.5 Model Evaluation Metrics

- • **Implementation**

Abstract

The project aims to **analyze historical stock market data**, **predict future stock prices**, and provide a **Buy/Sell/Hold recommendation**. Stock markets are volatile, and accurate predictions can assist investors in making informed decisions. This project uses **machine learning techniques** with **real-time data from Yahoo Finance**, along with **technical indicators like Moving Averages**, to forecast stock trends. The system is easy to understand,

highly practical, and demonstrates the application of **Python, data analysis, and machine learning** in finance.

Introduction

The stock market is an essential part of the economy, where investors buy and sell shares. Predicting stock prices is challenging due to market volatility and numerous influencing factors. This project focuses on:

Collecting historical stock data

Preprocessing and analyzing the data

Using machine learning to predict future prices

Providing actionable investment recommendations

Key Objectives:

Build a predictive model for stock prices.

Assist investors with Buy/Sell/Hold suggestions.

Visualize stock trends for better understanding.

Literature Review

Traditional stock prediction often relies on **technical and fundamental analysis**.

Machine learning models like **Linear Regression, Random Forest, and LSTM** are widely used in modern prediction systems.

Moving averages (MA) are popular indicators to smooth price trends and reduce noise.

Recent research shows ML-based systems can **improve prediction accuracy** and **provide investment insights**.

Methodology

1 Tools and Technologies

Programming Language: Python

Libraries: pandas, numpy, matplotlib, seaborn, scikit-learn, yfinance

IDE: Jupyter Notebook / VS Code

-

2 Data Collection

Historical stock data of **TCS** fetched from **Yahoo Finance** (2019–2024)

Features: Open, High, Low, Close, Volume

3 Data Preprocessing

Handle missing values

Compute **Moving Averages**: MA_10 and MA_50

Normalize features if needed

4 Feature Engineering

Use past stock prices and technical indicators as input features

Target variable: Closing Price

5 Machine Learning Model

Model Used: Linear Regression

Split data into **Training (80%)** and **Testing (20%)**

Evaluate using **Mean Absolute Error (MAE)** and **R2 Score**

6 Investment Recommendation

BUY: Predicted price > Current price

SELL: Predicted price < Current price

HOLD: Predicted price ≈ Current price