📊 Algo-Trading Market Analytics & Prediction System (TCS Stock)

🧾 Project Overview

This project builds a data-driven market analytics and prediction system using TCS stock data.
It covers the complete pipeline of a data science & algo-trading project:

- ❖ Data collection from Yahoo Finance

- ❖ Data cleaning and preparation

- ❖ Exploratory Data Analysis (EDA)

- ❖ Feature engineering (technical indicators)

- ❖ Machine learning models (classification & regression)

- ❖ Algorithmic trading strategy and backtesting

- ❖ Final insights and evaluation

📁 Dataset

Source: Yahoo Finance

Stock: TCS (Tata Consultancy Services)

Ticker: TCS.NS

Period: 2015 – 2024

Data is downloaded using the yfinance library.

📋 Technologies Used

➢ Python

➢ Google Colab

➢ Pandas, NumPy

➢ Matplotlib, Seaborn, Plotly

➢ Scikit-learn

➢ yfinance

📈 Final Insights

1. TCS shows long-term upward price trends with periods of volatility

2. Random Forest performed well for next-day direction prediction

3. Linear Regression provides a baseline for future price estimation

4. Moving Average strategy generates measurable profits but has drawdowns

5. Combining ML insights with trading strategies can improve decision-making

▶ How to Run This Project

1. Open Google Colab

2. Upload the notebook (.ipynb) or open it from GitHub

3. Run cells in order from top to bottom

4. Ensure internet access is enabled (for yfinance)

📊📈 Conclusion

1) In this project, historical TCS stock market data was analyzed using exploratory data analysis (EDA) and technical indicators to understand market behavior. Key trends such as

price movement, volume changes, volatility, and momentum were identified through visualizations and statistical analysis.

2)Two machine learning models were built:

3)A Random Forest Classifier to predict next-day price movement (Up/Down)

4)A Linear Regression model to predict the next-day closing price

5)A moving average crossover trading strategy was implemented and backtested on historical data. The backtesting results showed the strategy's profitability, drawdown, number of trades, and win ratio, helping evaluate its practical performance.

6)Overall, this project demonstrates how data analysis, machine learning, and algorithmic trading strategies can be combined to make informed trading decisions. While the models provide useful insights, market risks and external factors must always be considered before real-world trading.

Note:

1)All the code is in the notebook submitted.
2)After run each code we got outputs and visualisations clearly.
3)Technical indicators code,Model comparison results,Backtesting charts and insights are there in notebook submitted.