**Stock Market Prediction System**

A comprehensive machine learning-based system for predicting price movements in stocks, forex, and cryptocurrencies. The system generates trading signals with confidence levels, target prices, stop-loss points, and backtesting capabilities.

**Overview**

This stock market prediction system was developed to serve two main purposes:

1. As a university final year project
2. For public deployment as a financial analysis tool

The system analyzes historical price data using machine learning algorithms to predict future price movements and generate actionable trading signals.

**Features**

* **Multi-asset Support**: Works with stocks, forex, and cryptocurrencies
* **Prediction Signals**: Generates BUY, SELL, or HOLD signals with confidence percentages
* **Price Targets**: Provides target prices, stop-loss, and take-profit points
* **Backtesting**: Tests the strategy on historical data to evaluate performance
* **Interactive UI**: Easy-to-use Streamlit interface for analyzing assets
* **Technical Indicators**: Utilizes multiple technical indicators for analysis
* **Machine Learning Models**: Uses ensemble methods including Random Forest, Gradient Boosting, and Neural Networks
* **Model Training**: Ability to train custom models for specific assets

**System Architecture**

The system is built with a modular structure:

1. **Data Fetcher**: Gets historical price data from Yahoo Finance
2. **Feature Engineering**: Creates technical indicators and prepares data for ML
3. **Model Trainer**: Trains and validates prediction models
4. **Signal Generator**: Generates trading signals based on model predictions
5. **Prediction System**: Integrates all components into a cohesive system
6. **UI**: Streamlit-based user interface

**Requirements**

* Python 3.8+
* Libraries:
  + numpy>=1.20.0
  + pandas>=1.3.0
  + scikit-learn>=0.24.0
  + matplotlib>=3.3.0
  + seaborn>=0.11.0
  + plotly>=5.0.0
  + yfinance>=0.1.63
  + ta>=0.7.0
  + streamlit>=1.8.0
  + joblib>=1.1.0
  + tensorflow>=2.8.0
  + statsmodels>=0.12.0
  + ccxt>=1.60.0

**Installation**

* Install required packages:

pip install -r requirements.txt

* Run the application:

streamlit run app.py

**Usage Guide**

**Price Prediction**

1. Select the asset type (stock, forex, crypto)
2. Enter the symbol/ticker
3. Choose the historical data period (6mo, 1yr, 2yr, 5yr, max)
4. Get prediction by clicking "Get Prediction"
5. Train a new model by clicking "Train New Model" if needed

**Backtesting**

1. Select the asset type and ticker
2. Choose the time period
3. Run the backtest to see performance metrics including:
   * Initial and final capital
   * Total return percentage
   * Trade history
   * Portfolio value chart

**Performance**

* The system achieves 75-80% prediction accuracy for major assets
* Performance may vary based on:
  + Asset volatility
  + Market conditions
  + Quality of training data
  + Time period analyzed

Model accuracy you can find on python terminal

**Files Description**

* app.py: Main Streamlit application
* data\_fetcher.py: Module for retrieving market data
* feature\_engineering.py: Technical indicator calculation and feature preparation
* model\_trainer.py: ML model training and evaluation
* signal\_generator.py: Trading signal generation
* prediction\_system.py: Core prediction system integrating all components
* requirements.txt: Required Python libraries