

Cryptocurrency Prediction Website Documentation

Overview

This website allows users to predict cryptocurrency prices using LSTM (Long Short-Term Memory) models based on historical data. The platform leverages financial data from Yahoo Finance to analyze trends and forecast prices for selected cryptocurrencies.

Features

- Fetch historical cryptocurrency data for a user-specified date range.
- Compute technical indicators such as simple moving averages, volatility, and log returns.
- Train an LSTM model on the processed data to predict future price movements.
- Visualize actual vs predicted log returns, future price predictions, and fear & greed index trends.
- Provide customizable user inputs for cryptocurrencies, dates, and prediction periods.

How to Use

1. User Inputs

- Use the sidebar to input your preferences.
- Choose a cryptocurrency from the dropdown menu or manually enter its symbol.
- Specify a date range for historical data. Note that updating the date will re-run the algorithm.
- Select the number of future days to predict using the slider.

2. Fetching Data

- The app retrieves historical data for the selected cryptocurrency from Yahoo Finance.
- Data includes Open, High, Low, Close, Volume, and Adj Close prices.

3. Training the LSTM Model

- The data is preprocessed to compute indicators like moving averages, volatility, and log returns.
- These indicators serve as features for the LSTM model.
- The model is trained on a portion of the data and validated on the remaining data. Training typically takes around 90 seconds.

4. Model Evaluation

- The model's performance is evaluated using Mean Absolute Error (MAE) and Root Mean Square Error (RMSE).

- A graph comparing actual vs predicted log returns is displayed for visualization.

5. Future Predictions

- Future prices are predicted based on the trained model.
- Results are shown in a table with predicted prices formatted as currency (USD) and the corresponding dates in the format “DD MMM YYYY”.
- A graph illustrates the predicted price trend over the chosen number of future days.

6. Fear and Greed Index

- The app simulates a Fear and Greed Index for the historical data period.
- A graph shows the index trends over time, helping users understand market sentiment.

7. Footer Section

- The footer includes the developer’s name and contact information:
 - Developer: Ryan Baertlein
 - Email: rdaniel7077@gmail.com
- A link to documentation is provided for additional details on how the website works.

Technical Details

- **Libraries Used:**
 - TensorFlow/Keras: For LSTM model implementation.
 - pandas: For data manipulation.
 - matplotlib: For data visualization.
 - scikit-learn: For data preprocessing and evaluation metrics.
 - yfinance: For fetching cryptocurrency data.
 - streamlit: For building the user interface.
- **Model:**
 - The LSTM model includes two LSTM layers with dropout for regularization and a dense output layer.
 - Optimizer: Adam
 - Loss Function: Mean Squared Error (MSE)

Notes

- Ensure a stable internet connection to fetch cryptocurrency data and run predictions.

- Updating the date or changing input parameters will automatically re-train the model and re-run predictions.
- The Fear and Greed Index is simulated and does not reflect real-world data unless replaced with actual values.

For further questions or issues, contact Ryan Baertlein at rdaniel7077@gmail.com.