Machine Learning Model for Stock Market Trend Prediction

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Introduction:

The project is about predicting a stock price for a specific amount of days.

The days ahead is the user's input.

We take into account the user's inputs on various added tunable parameters and further process the procedure.

This project uses a deep-learning Convolutional neural network (CNN) with Long short-term memory (LSTM) layer to try and comprehend the stock market patterns and price changes.

In order to achieve that we slice given data to train and validation sets and stride the input into tunable batches of trading history data.

Discussions:

Further development of the project may include addition feature engineering, such as experimentation of different financial indicators, financial news semantic, or including the derivative of price change.

Furthermore, sampling the time periods and learning other similar stocks behaviors might

improve the model ability to comprehend more price change patterns.

Conclusions:

Learning different stocks produced varied learning curves, MSE values, and Accuracy scores.

Some of our model predictions and evaluations are presented in the table below:
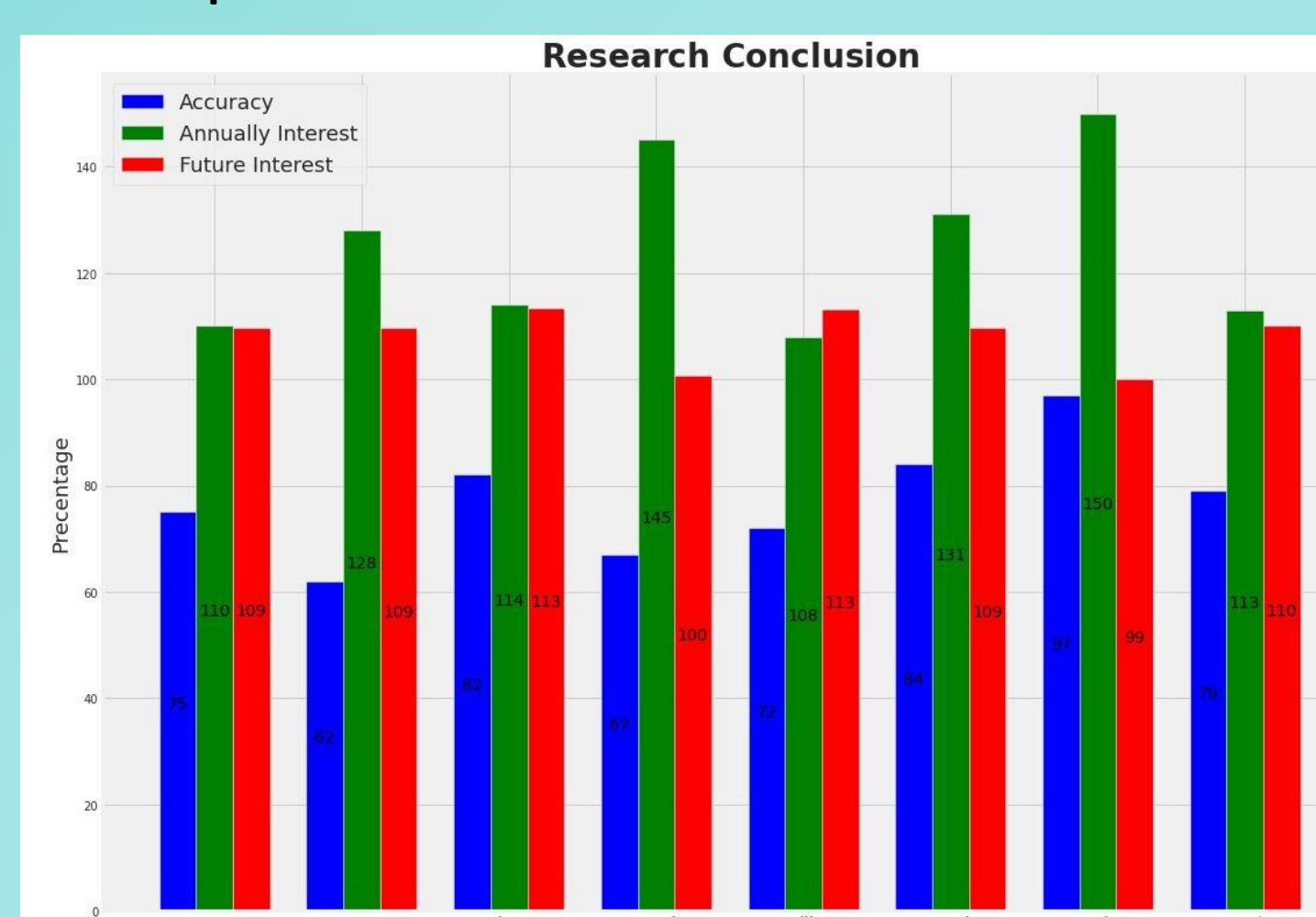
Prediction Method:

In order to predict the stock market trend and interest, We use deep learning model.
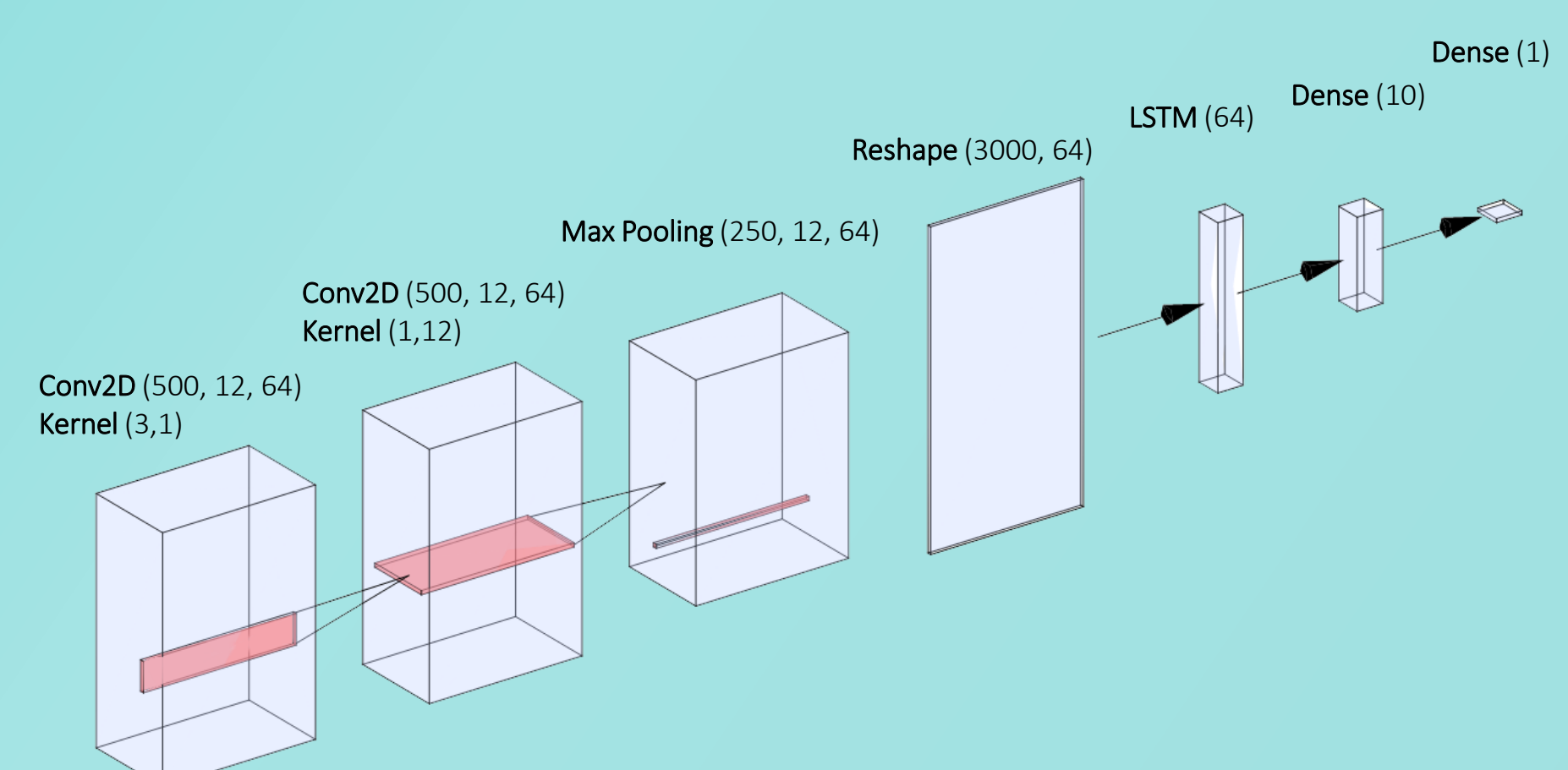
Model Input:

The model learns for a specific stock its (normalized) price history and some of its financial indicators. Each data consists of predefined amount of days into the past, and the desired prediction value.

Model Output:

The models' prediction value is the future normalized stock price.

Model Layers:

Evaluation:

Our model uses Mean Square Error (MSE) as loss function. Therefore, in order to evaluate the models' performance we convert the regression problem (Stock price prediction) to a binary problem (Will the price be higher or lower?).

Next, we use Accuracy score to present how well our model performed. The score is calculated by the following formula:

TP = True Positive
TN = True Negative
FP = False Positive
FN = False Negative

$$\text{Total Predictions} \longrightarrow \frac{TN + TP}{TP + FP + TN + FN} \longleftarrow \text{How many times the model predicted the correct price direction}$$

The accuracy is compared between binary values so we had to transform our result into binary representation.