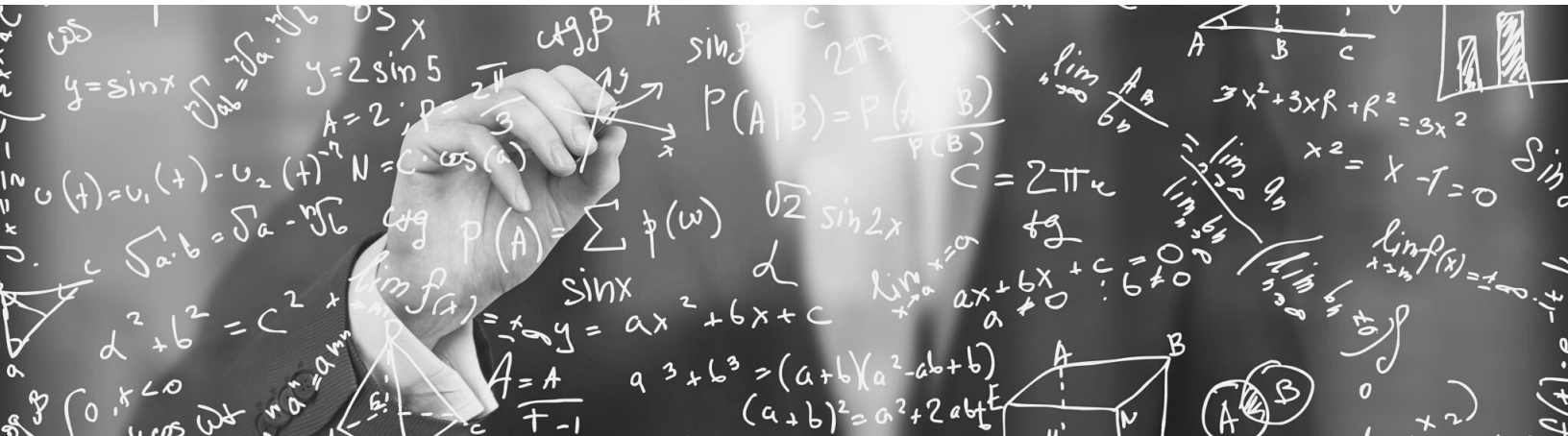




Weekly Educational Topics



Common Quantitative Prediction Methods

"TECHNOLOGY SUCH AS SENSORS TO SMARTPHONES MADE IT POSSIBLE TO TURN VIRTUALLY ANYTHING INTO DATA."

Technology such as sensors to smartphones made it possible to turn virtually anything into data. This coupled with high-speed data transfer methods make statistical methods for prediction and forecasting a very sought-after field, which is leading to its current fast paced growth. Even though we can't predict future stock prices due to the efficient market hypothesis, some of these methods can be used in the stock market to predict general movements and ballpark future valuations, to a certain degree of accuracy.

"IMPLEMENTING REGRESSIONS ON VOLATILE DATA SUCH AS STOCKS IS USUALLY A BAD IDEA. HOWEVER, UNDERSTANDING REGRESSION IS VITAL TO UNDERSTANDING MOST PREDICTION MODELS."

Some of the common prediction methods:

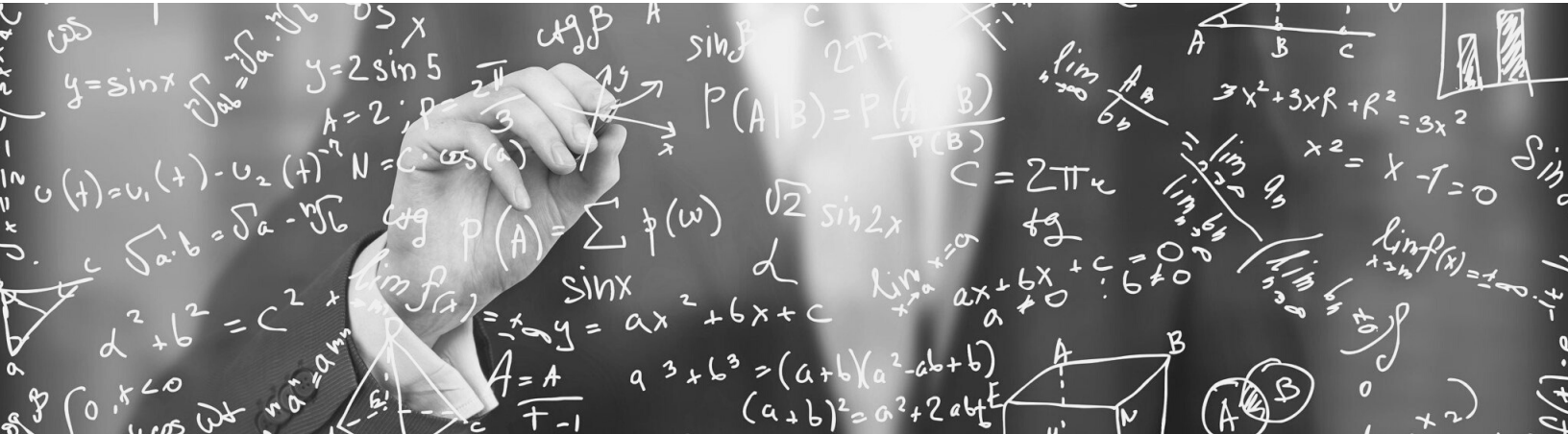
Regressions: Put simply, running a regression is fitting a line through your data using the well-known $y=mx+b$ equation. This is fitted by finding the line that leads to the shortest vertical distance between every point and the fitted line. Implementing regressions on volatile data such as stocks is usually a bad idea. However, understanding regression is vital to understanding most prediction models.

k-Nearest Neighbours (k-NN): The k-nearest neighbours method is a prediction that uses an arbitrary number "k" of similar data points. It compares the values of the other "k" data points and gives a value accordingly.

Time Series Forecasting: To understand time series forecasting, we need to understand how datasets for time series work. Every new data item is added as a new entry, and this is recorded on a time-axis. Multiple predictions are then made based on the time points of the data in hand. The predictions are then compared to the actual results, and the errors are calculated. The models with the lowest errors are then used again.



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Common Quatitative Prediction Methods

Long Short-term Memory (LSTM): Long short-term memory is a Machine Learning method and is one of the most advanced prediction methods available. LSTM uses only the parts of the data that are relevant and throws away the rest. This is done through three gates: the Forget gate, Input gate, and Output gate. These gates handle information in a cell. The Forget gate removes irrelevant information, the Input gate decides what is important enough to keep, and the Output gates selects some of the information the cell possesses and outputs it as a prediction. By only keeping meaningful data, the LSTM method is able to produce predictions more accurate than all the others mentioned.