So let’s talk about the original paper first.

The paper EMD2FNN is developed majorly for stock market prediction by analyzing the trend of historical data.

It is majorly divided into 2 segments:

* Empirical Mode Distribution (EMD) on the given series
* Neural Network (NN) model

EMD:

* It is traditional method that is used for analyzing of time series data.
* It splits up the data into n Intrinsic Mode Functions (IMFs) arranged from high to low frequencies based on local characteristics of the data.
* These IMFs act like features of the data, incorporating high as well as low level features.
* The last IMF is attained when the graph starts showing a linear trend.
* Based on the data there are n number of IMFs possible.

NN:

* The paper has an implementation of a straight forward Multi-layer Perceptron or a simple Artificial Neural Network (ANN).
* It involves 2 Dense layers and an output layer.
* The data features are fed to the neural model for learning the trend.
* The loss function chosen by the paper is the Mean Squared Error (MSE).
* The activation function is chosen as linear.

Proposed changes:

* Although ANNs provide very good results for the given type of data, but as it is a time series data an LSTM model would lead to giving us better results.
* LSTM stands for Long Short Term Memory. These cell units are specially designed to understand sequences in a given data, it could be for sentences or stock values.
* For further development into the model instead of LSTMs we can also use better performing Bi-directional LSTMs.
* In this proposed algorithm only the neural network architecture has been changed.
* Instead of using 2 Dense layers, we have used 50 LSTM cell units.
* Rest of the parameters have been kept same so that the results can be compared.

Note:-

* The data needs to be pre-processed before being fed to the model or for EMD.
* Standardization of the data is of utmost importance for attaining better results.
* Further hyper-parameter tuning can be done in order to attain desired results.

Results:

* Original dataset

A screenshot of a cell phone

Description automatically generated

* For a subset of values from the available data

A close up of a map

Description automatically generated

* Predictions on all values

A screenshot of a cell phone

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