**CNN Model for Stock Market Prediction**

**Model Formulation**

Two different CNN models have been used in the paper: 2D CNN-pred and 3D-CNN-pred. 2D CNN-pred uses the idea that a single DL model can be used to predict the future fluctuations in stock market indices given the historical information about that stock market. In simple words, it uses market information from a particular market to predict the index fluctuation for that market. In contrast, the 3D-CNN-pred is based on the idea that market information from other markets is also important in predicting future stock market fluctuation. It also assumes that the DL model will be different for different stock markets. Hence, in contrast to the 2D CNN-pred, the 3D CNN-pred uses market information from the 5 markets as input to predict the stock market fluctuation of a single market.

The CNN model used in the paper is discussed under ‘Week 6: Paper Summary’. There may be various ways to improve on the architecture. Filters are the number of possible features that can be extracted. More the number of filters, more are the features learnt and more are the chances of overfit. Overfitting can be reduced by using techniques like L1/L2 regularisation, dropouts etc. Other parameters that can be optimised include the stride length and padding.

In my model, I have increased the number of filters from 8 to 10 in order to learn for features which might increase the accuracy of our model. As this could increase the overfitting, I have also increased the dropout rate from 0.1 to 0.2. Further, a convolution layer is also added after the second max pooling layer. In order to decrease the computational time, I have tried to decrease the future matrix sizes by using a higher kernel size of 4x1 instead of 3x1. However, it is to be noted, that the general convention is to use kernel size in odd numbers.

After these modifications, I ran the model. The F1 score was 0.628 for the test set in comparison to 0.645 which is comparable. Further improvements is needed in the model and for this, different famous architectures like LeNet and AlexNet have been used in the further weeks.