**CNN PART**

|  |  |  |  |
| --- | --- | --- | --- |
|  | Accuracy | Val\_accuracy | Diagram |
| VGG 19 | 0.31 | 0.19 |  |
| ResNet50V2 | 0.85 | 0.21 |  |
| Inceptionv3 | 0.71 | 0.13 |  |

Summary:

First, all models suffer from the overfitting obviously, more regularization techniques should be applied.

Besides the overfitting issue, if we only focus on the blue line on each diagram, it’s easy to realize that VGG provides the worst performance due to that the model complex is relatively light compared to others. ResNet provides a decent accuracy, and it converges to the highest accuracy limitation faster than others. Meanwhile, Inception model is still increasing the accuracy, the increasing momentum is still moving upward.

Among ResNet, the network provides the direct connection between input and output; therefore, it provides a better chance of increasing accuracy. For Inception, it is slowly improving due to the most complex model structure; personally, I think it can obtain a better performance compared to ResNet if adding more training epochs.

**RNN PART**

Original Timeseries

|  |  |  |  |
| --- | --- | --- | --- |
|  | MSE | Val\_MSE | Diagram |
| LSTM | 0.018 | 0.034 |  |
| GRU | 0.014 | 0.028 |  |
| BIDirectional RNN | 0.007 | 0.014 |  |
| Deep RNN | 0.028 | 0.143 |  |

Three-time timeseries

|  |  |  |  |
| --- | --- | --- | --- |
|  | MSE | Val\_MSE | Diagram |
| LSTM | 0.0075 | 0.013 |  |
| GRU | 0.0023 | 0.0036 |  |
| BIDirectional RNN | 0.00024 | 0.0013 |  |
| Deep RNN | 0.021 | 0.39 |  |

Summary:

The performance in three-time timeseries dataset is better than the original dataset. This implies that more training data can provide more precise forecasting and lower error.

Among four models, BiDirectional RNN can provide the highest precision on validation data while Deep RNN provides the worst precision. Moreover, Bidirection RNN and Deep RNN have relative unstable improvement on validation dataset, as we can see from the diagrams.