**The Timeline Recordings of the JP Morgan Intern Project**

**Zihao LIU**

1. **Date: 11/20/2022**

**[Update]:** (1)We have learned the original paper: “Diffusion-based Time Series Imputation and Forecasting with Structured State Space Models”. So, you can find there are some marks and comments in the uploaded paper. (2) We have fully learned the paper’s relevant codes (in Pytorch version). Now I have known how to read and use them including: collecting data, train the different imputer models and generate the filling data to fill the missing parts. So, you will find there are some comments written by myself to help better understand the whole training process.

Based on my plan, this is the essential first step as we need to understand the paper and codes before we transfer them into the TensorFlow version. Also, I use Google Colab to complete the whole code running.

1. **Date: 11/27/2022**

**[Update]:** (1) I have read all the four given relevant literatures, especially the first two. I can understand most of the contents and the structure of the models. In the future, I will use some more time on the model inference in the first two papers. The last two papers are related with the bonus questions so I will read the details in them later. All the papers with my marks and comments with my notes have been uploaded.

1. **Date: 12/11/2022**

**[Update]:** (1) I used some time to read some TensorFlow books and have understand all the necessary NN knowledges under this framework. I read the train().py file again and tried to understand all the torch models. Now, I have understand most of them and have marked the places where torch models are used. Next, I need more time to check the equivalent models in TensorFlow frameworks and convert all of them.

1. **Date: 12/31/2022**

**[Update]:** (1) I have completed the converting work of SSSDS4 Model from the pytorch framework to the TensorFlow framework. Now, only the model’s training part has been done and the testing part will be completed in the next step. Except some very small proportions are kept the pytorch.tensors’ attributions (as we need their specific features), all other parts have been converted to the TensorFlow framework. The converted TF model can save and load every 100 iterations and the saved configuration is in the saved “.h5” TF framework files. Now, the “S4Model.py” file is kept under the pytorch framework as it includes much basic information used in the “SSSDS4Imputer.py”. We can confirm that this converted model can run, and I will convert “S4Model.py” to the TensorFlow framework to make this model is totally under the TensorFlow framework. Moreover, the batch part may be improved later as it takes lots of time to do the loop.

1. **Date: 01/18/2023**

**[Update]:** I have fixed the issue in the last update. Now the model can be correctly trained, saved and loaded in this version’s update file.

1. **Date: 01/21/2023**

**[Update]:** I have completed the testing part of the transformed TensorFlow model. Using the given Mujoco data and based on a small-scale experiment, the model can run successfully with the correct results.