Third peer review report (Koopman)

Polina Pilyugina, Alexey Voskoboinikov

May 24, 2021

1 Reproducibility

Running the code We rerun the code from the repository, contained in the notebook KoopmanAE_example. It is very useful, as it has a corresponding link to collab with all necessary installs for reproduction. In general, it runs the parts of the code, which the team created. We managed to run the whole notebook without any problem, and produced inputs are similar to the ones,

Reliability of the results For example, running the model with parameters: bottleneck 6, backward 1, we obtained the following results for the last epoch:

- Average error of first pred: 0.006302462
- Average error of last pred: 0.13594979
- Average error overarll pred: 0.06912103

The results in the team notebook are as follows:

- Average error of first pred: 0.006338742
- Average error of last pred: 0.12736337
- Average error overarll pred: 0.06507725

Which are very similar to the results we obtained. Therefore, the code is reproducible and results are reasonable and not just pure random coincidence. And ability to reproduce the results in colab environment is extremely convenient.

2 Recomendation to use the library

We would definitely recommend using this package in the process of time series analysis. Moreover, since the model class is written under the PyTorch Lightning framework, we see the possibility to add this model into our own library for time series forecasting. Additionally, the modular structure of the model allows to easily experiment with the model and its parts. In case of real-world physical data, it is usually driven by a non-linear dynamical process. And in order to forecast such data, it is important that the model can work with such data. One example of real-data application is forecasting processes, continuing in a complex mechanism with each part of it being dependent on the other. Therefore, this approach can have an application in industrial problems, where underlying physical processes affect the values we are interested in the forecasting.