Codes and experiments for Deep switching auto-regressive factorization (DSARF)

Dependencies:

Numpy, Scipy, Pytorch, Tqdm, Matplotlib, Sklearn, Json, Pandas

****Run the following snippets to restore results (from checkpoints) for each dataset for short- and long-term predictions respectively. For short-term prediction, remove "-restore" to train from scratch, then add "-predict" to perform short-term prediction on the test set. For long-term prediction, remove "-restore" and add "-long" to train from scratch and perform long-term prediction on the test set.****

Birmingham:

Short-term: python dsarf.py -k 10 -file ./data/birmingham.mat -smod ./checkpoints/birmingham/short/ -dpath ./results_birmingham_short/ -ID birmingham -last 7 -lag 1 2 -epoch 500 -bs 30 -restore

Long-term: python dsarf.py -k 10 -file ./data/birmingham.mat -smod ./checkpoints/birmingham/long/ -dpath ./results_birmingham_long/ -ID birmingham -last 7 -lag 1 2 3 18 19 20 126 127 128 -epoch 500 -bs 30 -long -restore

Guangzhou

Short-term: python dsarf.py -k 30 -file ./data/guangzhou.mat -smod ./checkpoints/guangzhou/short/ -dpath ./results_guangzhou_short/ -ID guangzhou -last 5 -lag 1 2 -epoch 500 -bs 100 -restore

Long-term: python dsarf.py -k 30 -file ./data/guangzhou.mat -smod ./checkpoints/guangzhou/long/ -dpath ./results_guangzhou_long/ -ID guangzhou -lag 1 2 3 144 145 146 1008 1009 1010 -epoch 500 -bs 30 -last 5 -long -restore

Hangzhou

Short-term: python dsarf.py -k 10 -file ./data/ hangzhou.mat -smod ./checkpoints/hangzhou/short/ -dpath ./results_hangzhou_short/ -ID hangzhou -last 5 -lag 1 2 -epoch 1000 -bs 25 -restore

Long-term: python dsarf.py -k 10 -file ./data/hangzhou.mat -smod ./checkpoints/hangzhou/long/ -dpath ./results_hangzhou_long/ -ID hangzhou -last 5 -lag 1 2 3 108 109 110 756 757 758 -epoch 1000 -bs 25 -long -restore

Seattle

Short-term: python dsarf.py -k 30 -file ./data/seattle.npz -smod ./checkpoints/seattle/short/ -dpath ./results_seattle_short/ -ID seattle -last 5 -lag 1 2 -epoch 500 -bs 1000 -restore

long-term: python dsarf.py -k 30 -file ./data/seattle.npz -smod ./checkpoints/seattle/long/ -dpath ./results_seattle_long/ -ID seattle -last 5 -lag 1 2 3 288 289 290 2016 2017 2018 -epoch 500 -bs 1000 -long -restore

PST

Short-term: python dsarf.py -k 50 -file ./data/pacific.tsv -smod ./checkpoints/pacific/short/ -dpath ./results_pacific_short/ -ID pacific -lag 1 -epoch 500 -bs 100 -last 5 -s 2 -restore

Long-term: python dsarf.py -k 50 -file ./data/pacific.tsv -smod ./checkpoints/pacific/long/ -dpath ./results_pacific_long/ -ID pacific -lag 1 2 12 13 84 85 -epoch 500 -bs 100 -last 5 -long -restore

Google flu:

Short-term: python dsarf.py -k 10 -file ./data/google_flu.txt -smod ./checkpoints/flu/short/ -dpath ./results_flu_short/ -ID flu -lag 1 2 3 4 -epoch 1000 -bs 1 -last 2 -restore

Long-term: python dsarf.py -k 10 -file ./data/google_flu.txt -smod ./checkpoints/flu/long/ -dpath ./results_flu_long/ -ID flu -lag 1 2 52 53 104 105 -epoch 1000 -bs 1 -last 2 -long -restore

Google dengue:

Short-term: python dsarf.py -k 5 -file ./data/google_dengue.txt -smod ./checkpoints/dengue/short/ -dpath ./results_dengue_short/ -ID dengue -lag 1 2 -epoch 500 -bs 1 -last 2 -restore

Long-term: python dsarf.py -k 5 -file ./data/google_dengue.txt -smod ./checkpoints/dengue/long/ -dpath ./results_dengue_long/ -ID dengue -lag 1 2 52 53 104 105 -epoch 500 -bs 1 -last 2 -long -restore

Precipitation

Short-term: python dsarf.py -k 20 -file ./data/precipitation.json -smod ./checkpoints/precipitation/short/ -dpath ./results_precipitation_short/ -ID prec -lag 1 2 -epoch 500 -bs 1 -last 1 -s 3 -restore

Bat flight

Short-term: python dsarf.py -k 5 -s 2 -lag 1 2 -epoch 500 -bs 1 -last 2 -ID bat -file ./data/bat.json -smod ./checkpoints/bat/short/ -dpath ./results_bat_short/ -restore

Apnea

Short-term: python dsarf.py -k 1 -file ./data/apnea.txt -smod ./checkpoints/apnea/short/ -dpath ./results_apnea_short/ -lag 1 -epoch 2000 -bs 1 -s 2 -last 1 -ID apnea -restore

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Lorenz attractor

python dsarf_lorenz.py -k 3 -s 2 -lag 1 -epoch 5000 -bs 100 -file ./data/lorenz.json -smod ./checkpoints/lorenz/ -dpath ./results_lorenz/ -restore

Double pendulum

python dsarf_pendulum.py -k 4 -s 3 -lag 1 2 -epoch 500 -bs 100 -file ./data/pendulum.json -smod ./checkpoints/pendulum/ -dpath ./results_pendulum/ -last 2 -restore

Toy example

python dsarf_toy.py -k 2 -s 2 -lag 1 2 3 -epoch 500 -bs 100 -file ./data/toy.json -smod ./checkpoints/toy/ -dpath ./results_toy/ -restore