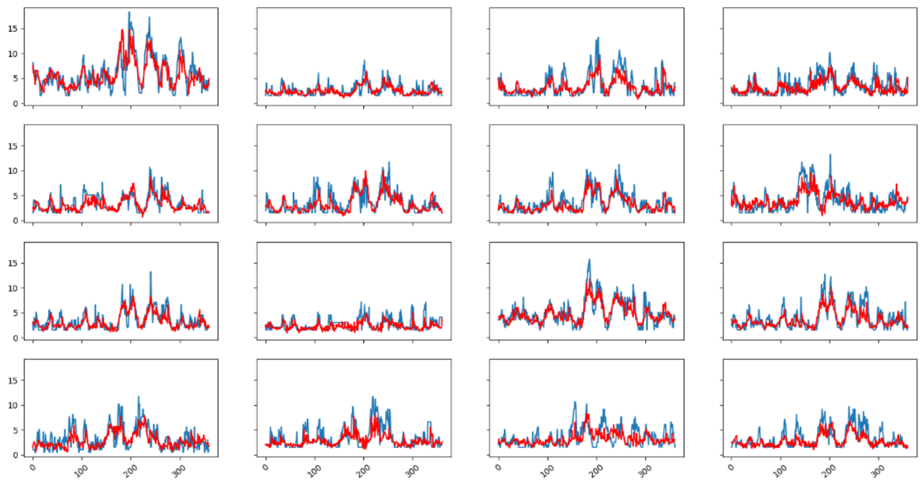
Experiment Notes

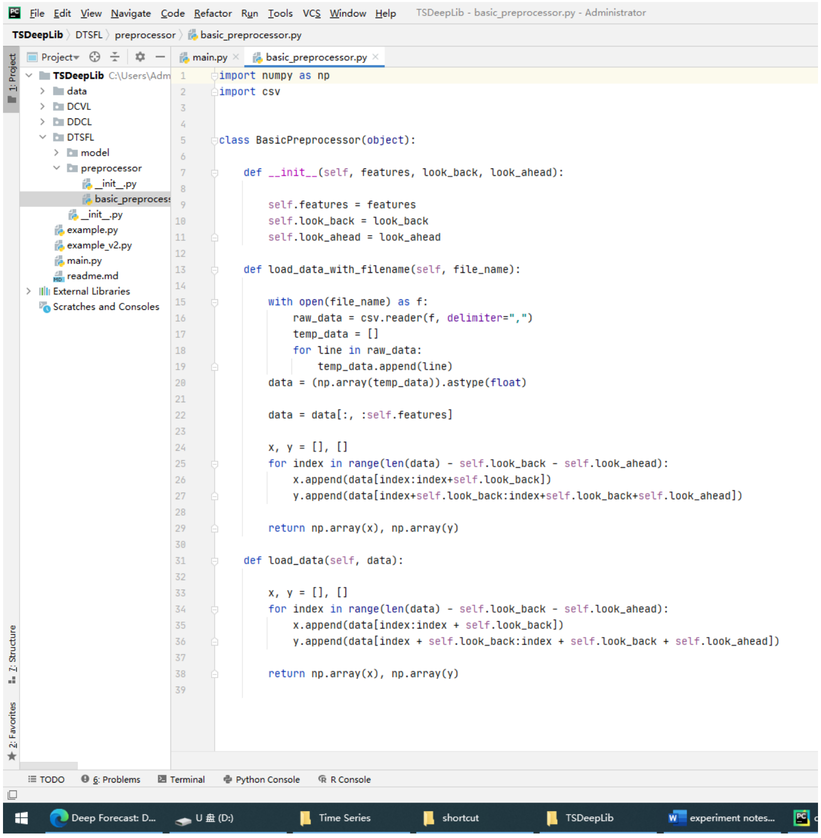
Based on the paper, *Deep Forecast: Deep Learning-based Spatio-Temporal Forecasting*, we analyze the source code and update it to Tensorflow 2.X. The following will show the estimated results of 57 stations with one-step-ahead forecasting. The blue line is ground truth while the red line is estimated.



The errors of the first stations are listed below.

station 1 : MAE = 1.66447	RMSE = 2.25033	nrmse_maxMin = 13.3875	nrmse_mean = 37.4013
station 2 : MAE = 0.73270	RMSE = 0.98935	nrmse_maxMin = 13.8319	nrmse_mean = 37.6449
station 3 : MAE = 1.25285	RMSE = 1.76266	nrmse_maxMin = 15.0499	nrmse_mean = 49.5203
station 4 : MAE = 1.14340	RMSE = 1.53388	nrmse_maxMin = 17.6855	nrmse_mean = 43.6363
station 5 : MAE = 0.95194	RMSE = 1.33948	nrmse_maxMin = 14.6166	nrmse_mean = 38.4311
station 6 : MAE = 1.12947	RMSE = 1.55682	nrmse_maxMin = 15.2748	nrmse_mean = 43.0250
station 7 : MAE = 1.04663	RMSE = 1.43145	nrmse_maxMin = 14.7556	nrmse_mean = 39.3542
station 8 : MAE = 1.41807	RMSE = 1.79599	nrmse_maxMin = 15.3345	nrmse_mean = 45.3454
station 9 : MAE = 0.90828	RMSE = 1.28148	nrmse_maxMin = 10.9415	nrmse_mean = 37.0791
station 10 : MAE = 0.79990	RMSE = 1.14006	nrmse_maxMin = 20.2400	nrmse_mean = 42.6894
station 11 : MAE = 1.19067	RMSE = 1.58106	nrmse_maxMin = 11.0865	nrmse_mean = 30.7594
station 12 : MAE = 1.11359	RMSE = 1.56493	nrmse_maxMin = 13.9463	nrmse_mean = 38.7529
station 13 : MAE = 1.31593	RMSE = 1.69584	nrmse_maxMin = 15.1140	nrmse_mean = 52.3930
station 14 : MAE = 1.26702	RMSE = 1.85482	nrmse_maxMin = 18.1986	nrmse_mean = 53.0058
station 15 : MAE = 1.31790	RMSE = 1.80501	nrmse_maxMin = 19.6965	nrmse_mean = 50.3734
station 16 : MAE = 1.03461	RMSE = 1.46363	nrmse_maxMin = 17.8909	nrmse_mean = 43.8047

We are going to rebuild a library of time series forecasting, *Deep Time Series Forecasting Library* (DTSFL).

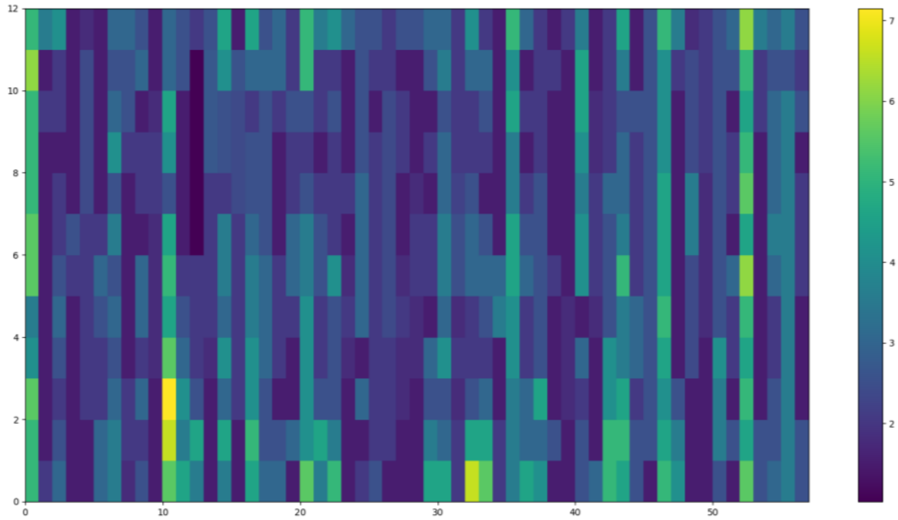


Data preprocessor

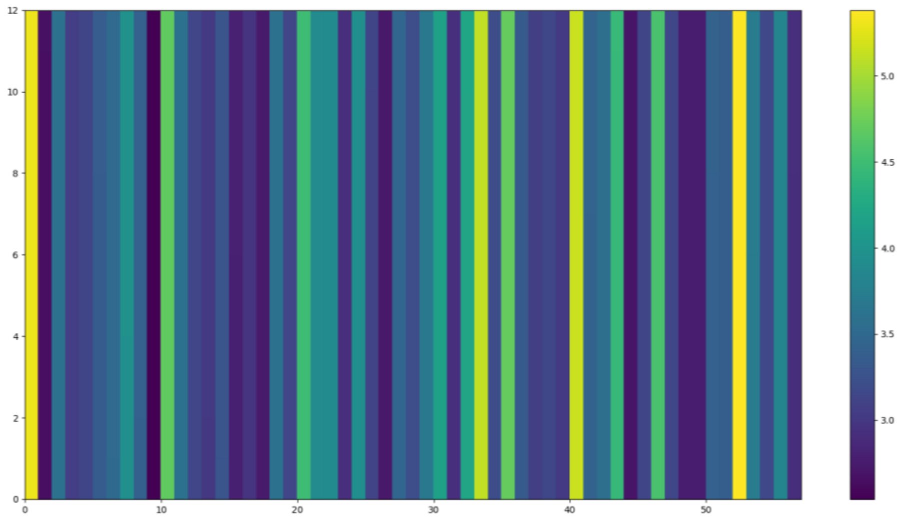
We organize the data in a matrix format. The data shape will be (-1, 12, 57). We randomly pick one matrix, say X[0].

X, Y = BasicPreprocessor(57, 12, 6).load_data_with_filename(file_dataset)

plt.figure(1)
plt.pcolormesh(X[0])
plt.colorbar()
plt.show()



Then we plot the mean of the data along with axis 0. The data shape will change from (-1, 12, 57) to (12, 57). Interestingly, values in the same column are almost equal. We may think of this as a multi-variate stationary signal.



Based on this paper, we come up with some new ideas such as architecture exploration, sparse representation, and computation acceleration.