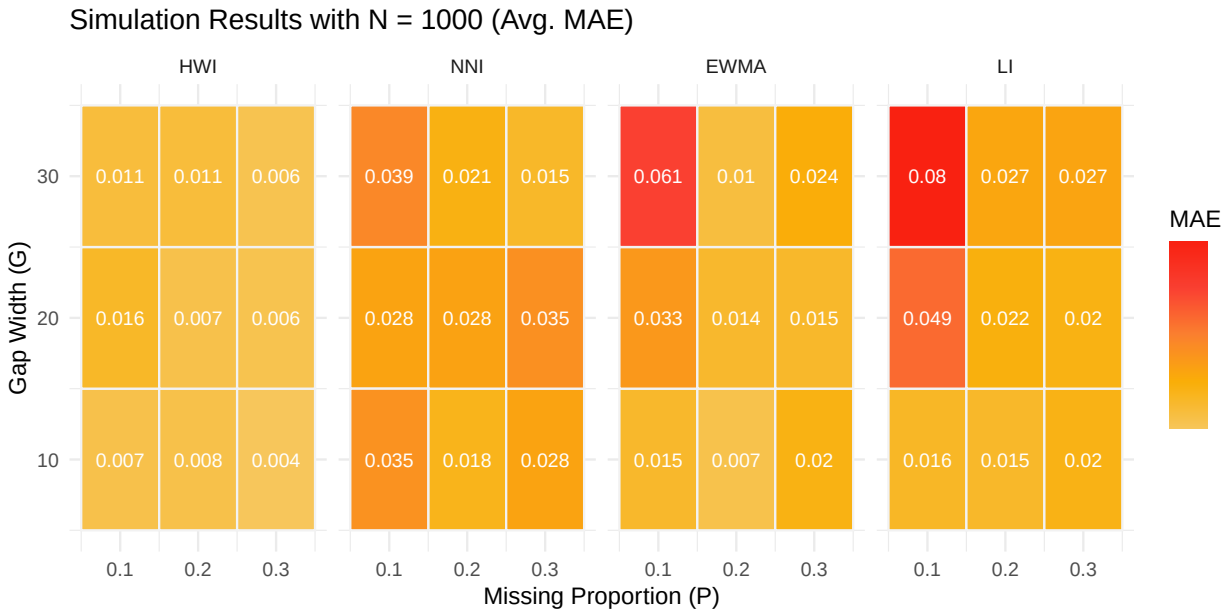
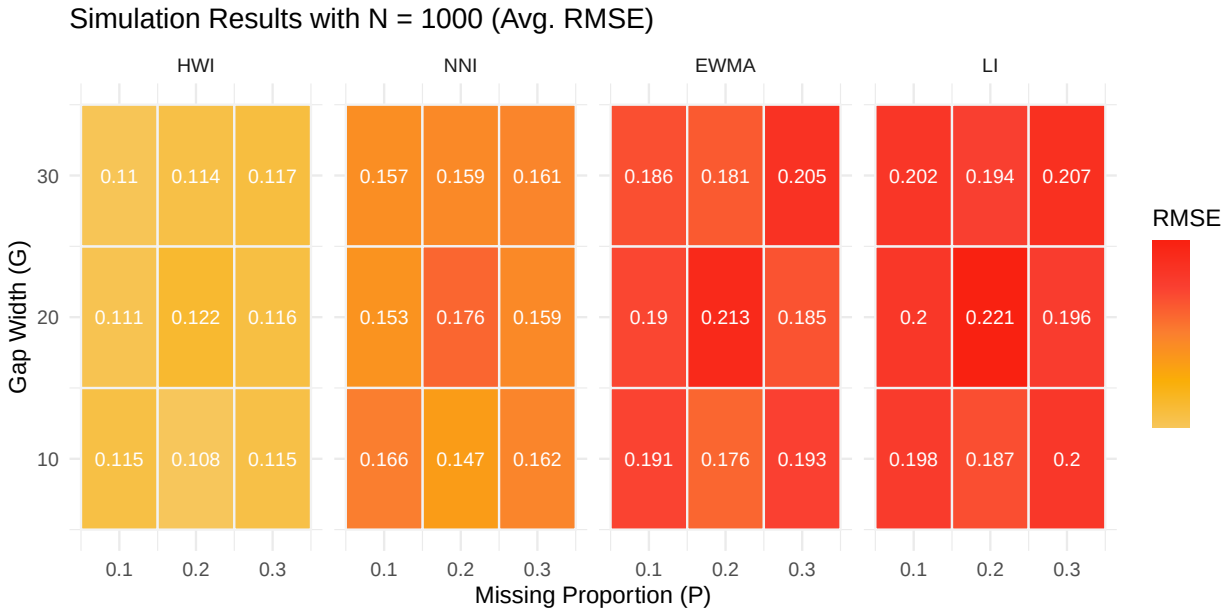
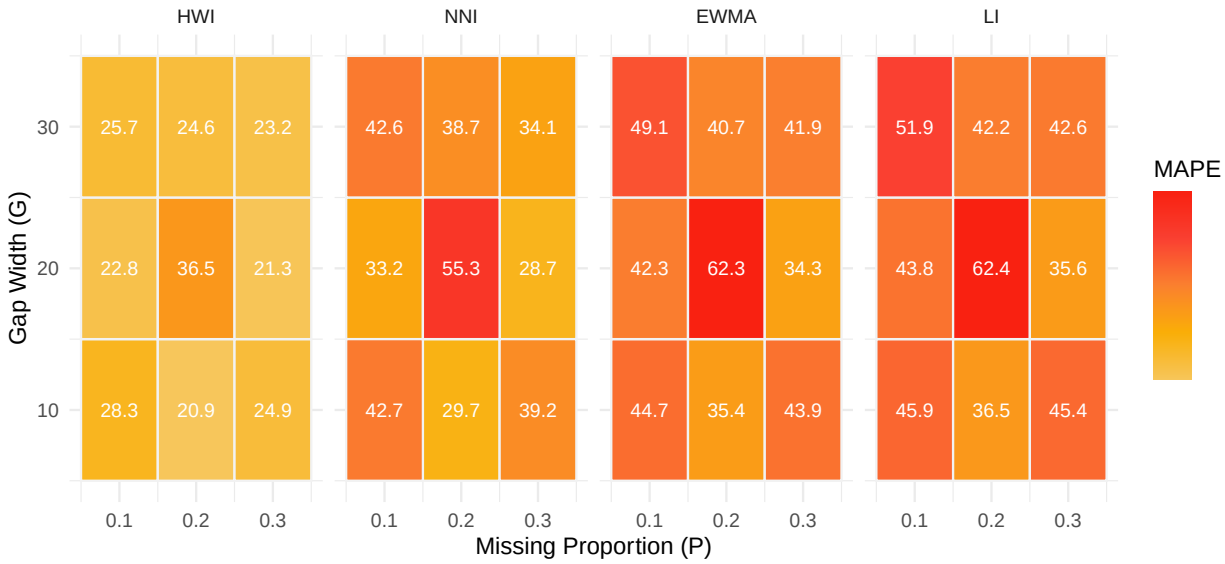
Simulation Results

First Set of Simulations:

- All time series of length $N = 1000$.
- Five iterations with each combination of (P, G).
- Comparison of average RMSE, MAE, and MAPE across each Method, P, and G combination.
- Used several different parameter combinations for the NNI method. For results, extracted the highest performing NNI model on average within each (P, G) combination.
- Issues with plotting in 'interpTools' so I wrote my own aggregations and plotting formats.

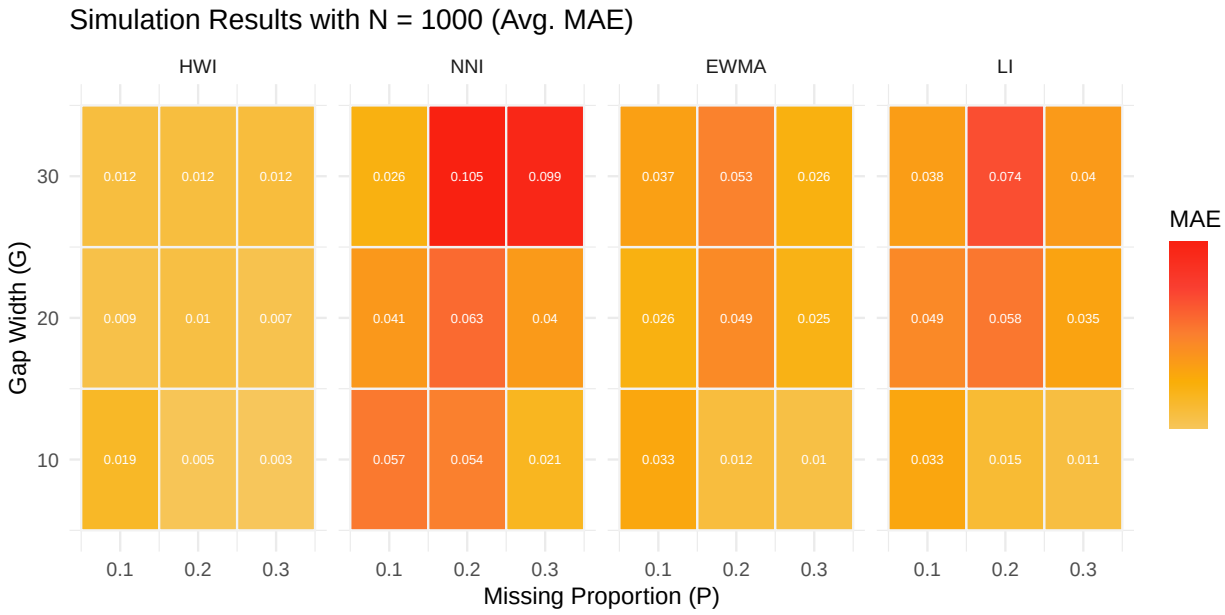


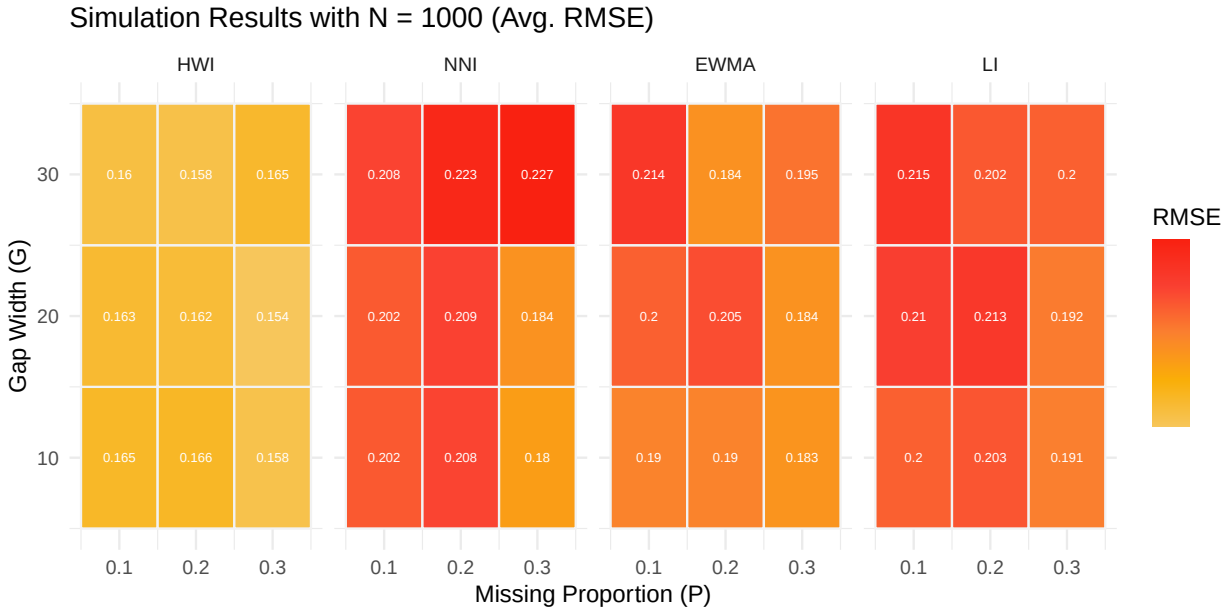

Simulation Results with N = 1000 (Avg. RMSE)
HWI
NNI
EWMA
LI
Gap Width (G)
30
20
10
0.11
0.114
0.117
0.157
0.159
0.161
0.186
0.181
0.205
0.202
0.194
0.207
0.111
0.122
0.116
0.153
0.176
0.159
0.19
0.213
0.185
0.2
0.221
0.196
0.115
0.108
0.115
0.166
0.147
0.162
0.191
0.176
0.193
0.198
0.187
0.2
0.1
0.2
0.3
Missing Proportion (P)
RMSE

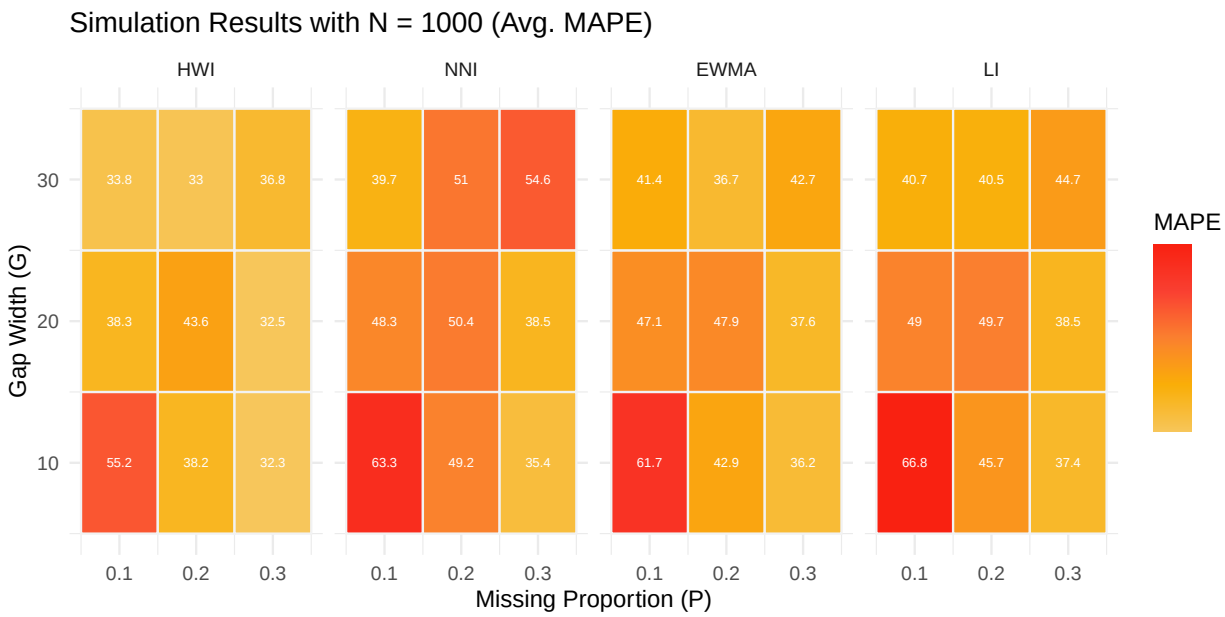

Simulation Results with N = 1000 (Avg. MAPE)
HWI
NNI
EWMA
LI
Gap Width (G)
30
20
10
25.7
24.6
23.2
42.6
38.7
34.1
49.1
40.7
41.9
51.9
42.2
42.6
22.8
36.5
21.3
33.2
55.3
28.7
42.3
62.3
34.3
43.8
62.4
35.6
28.3
20.9
24.9
42.7
29.7
39.2
44.7
35.4
43.9
45.9
36.5
45.4
0.1
0.2
0.3
Missing Proportion (P)
MAPE

Second Set of Simulations:

- All time series of length $N = 1000$.
- Instead of simulating time series with periodic components, only using the 'simWt' function from interpTools which uses 'arima.sim' to generate stationary noise.
- 10 iterations with each combination of (P, G) and more options for P and G.
- Comparison of average RMSE, MAE, and MAPE across each Method, P, and G combination.
- Used a single set of parameters for the NNI based on the dominant parameters in the first set of simulations (Standouts: 'random' == FALSE, 'method' == noise, larger amount of training data).

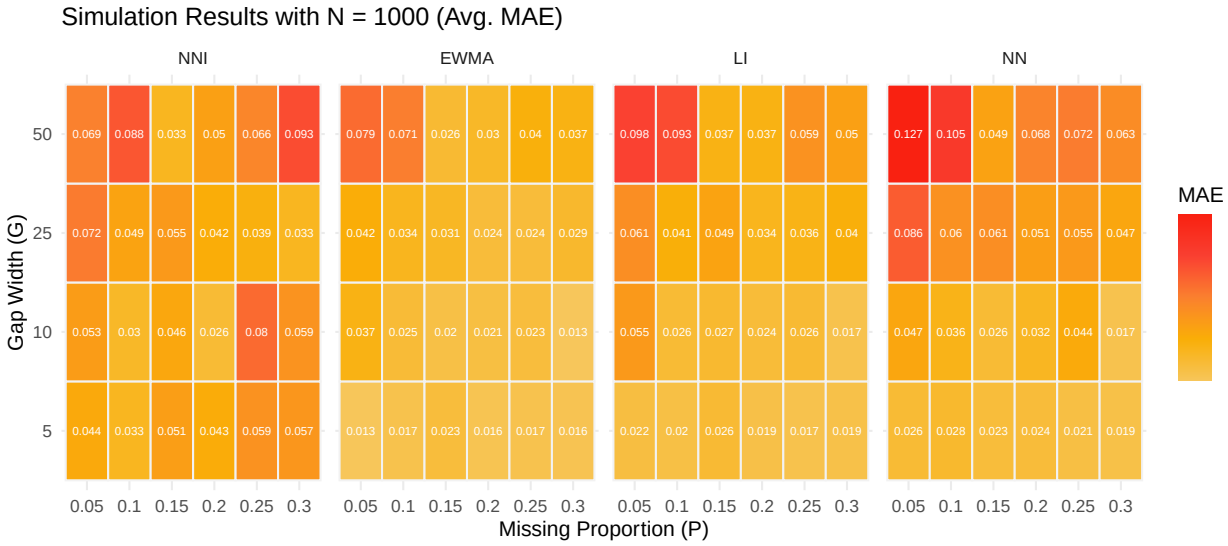


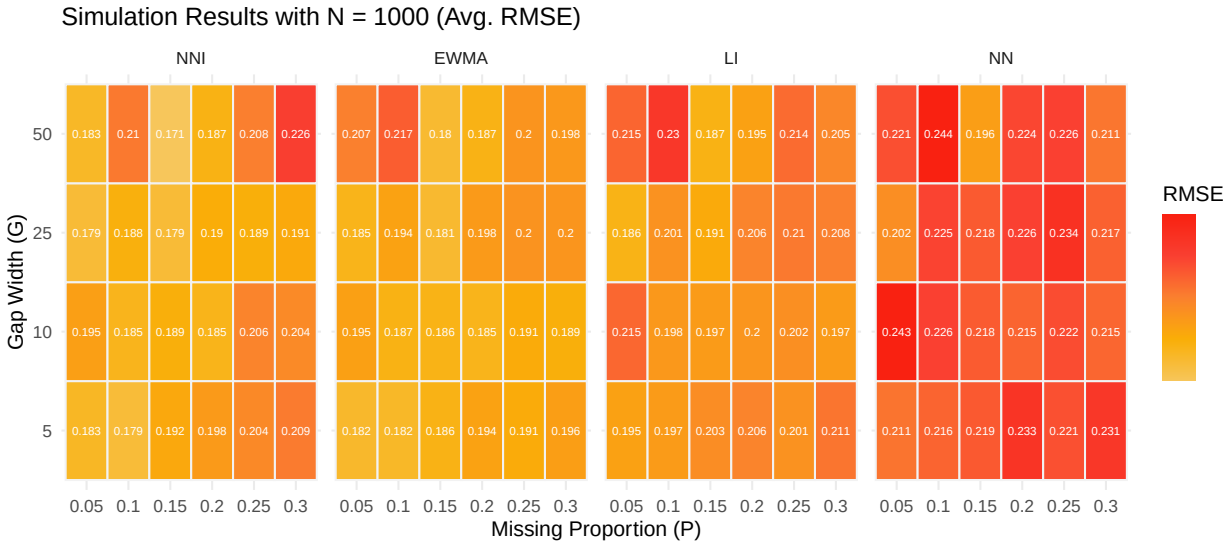


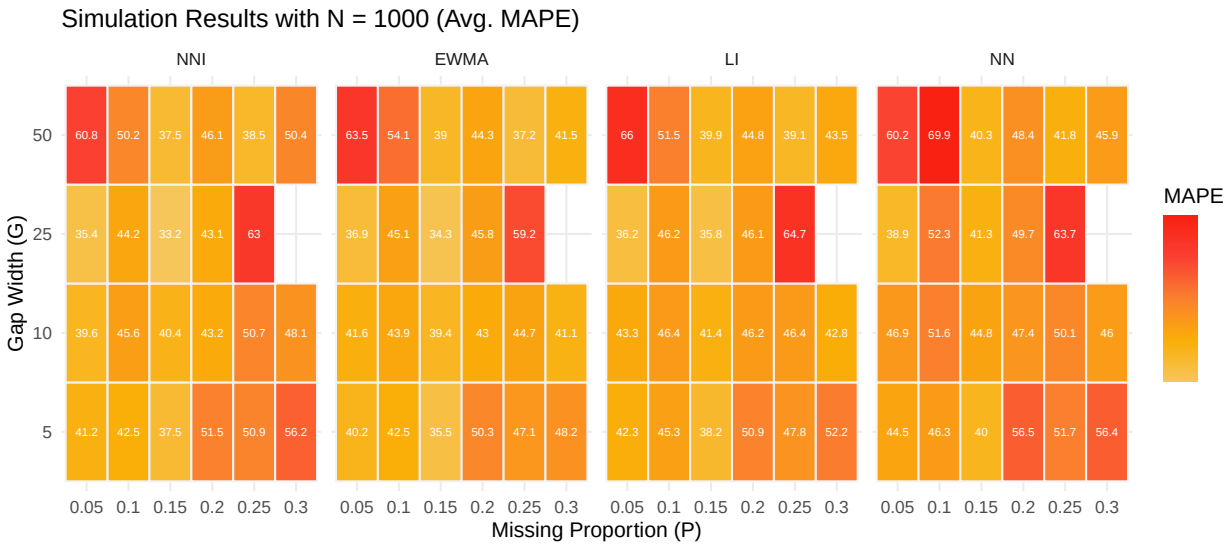

Simulation Results with N = 1000 (Avg. MAPE)
HWI
NNI
EWMA
LI
Gap Width (G)
30
20
10
33.8
33
36.8
39.7
51
54.6
41.4
36.7
42.7
40.7
40.5
44.7
38.3
43.6
32.5
48.3
50.4
38.5
47.1
47.9
37.6
49
49.7
38.5
55.2
38.2
32.3
63.3
49.2
35.4
61.7
42.9
36.2
66.8
45.7
37.4
0.1
0.2
0.3
Missing Proportion (P)
MAPE

Third Set of Simulations:

- All time series of length $N = 1000$.
- 10 iterations with each combination of (P, G) and more options for P and G.
- Comparison of average RMSE, MAE, and MAPE across each Method, P, and G combination.
- Too many issues with the HWI error (same one as last week) so I had to omit it from this set of simulations.
- Used a single set of parameters for the NNI based on the dominant parameters in the first set of simulations (Standouts: 'random' == FALSE, 'method' == noise, larger amount of training data).






Simulation Results with N = 1000 (Avg. MAPE)
NNI
EWMA
LI
NN
Gap Width (G)
50
25
10
5
60.8 50.2 37.5 46.1 38.5 50.4
35.4 44.2 33.2 43.1 63
39.6 45.6 40.4 43.2 50.7 48.1
41.2 42.5 37.5 51.5 50.9 56.2
63.5 54.1 39 44.3 37.2 41.5
36.9 45.1 34.3 45.8 59.2
41.6 43.9 39.4 43 44.7 41.1
40.2 42.5 35.5 50.3 47.1 48.2
66 51.5 39.9 44.8 39.1 43.5
36.2 46.2 35.8 46.1 64.7
43.3 46.4 41.4 46.2 46.4 42.8
42.3 45.3 38.2 50.9 47.8 52.2
60.2 69.9 40.3 48.4 41.8 45.9
38.9 52.3 41.3 49.7 63.7
46.9 51.6 44.8 47.4 50.1 46
44.5 46.3 40 56.5 51.7 56.4
0.05 0.1 0.15 0.2 0.25 0.3
Missing Proportion (P)
MAPE

Currently working on:

- Running an experiment with different Tensorflow architectures for the neural networks.
- Implementing a function to generate modulated frequency data for testing.
- Implemented a function to perturb any input time series (will work for stationary noise or a modulated signal for example).
- Need to fix the HWI bug.
- Obtained some real-world time series data from the UCI data repository that could be used for testing.