CS631: Homework-3 Report

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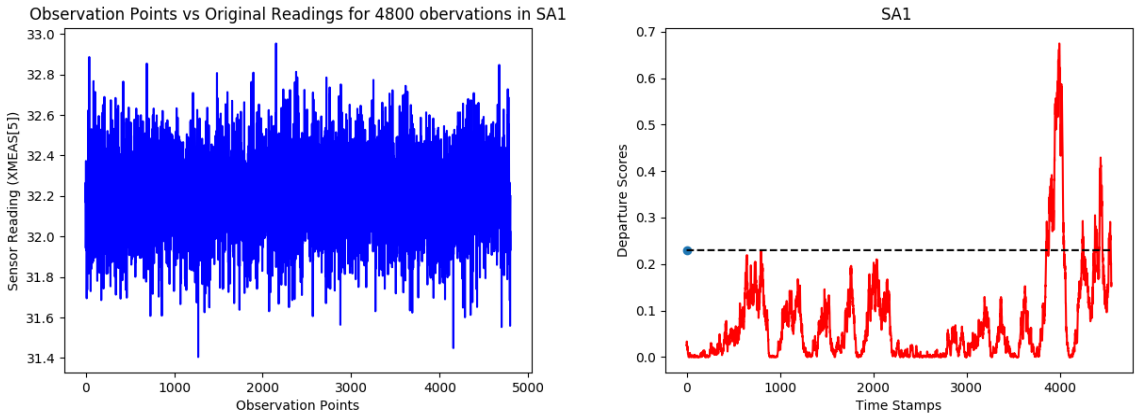
September 15, 2019

Plots

We have chosen the statistical dimension r to be equal to **1** as first eigen-value is three orders of magnitude greater than the second and subsequent eigen-values[Section - **Scree Plots** for details]

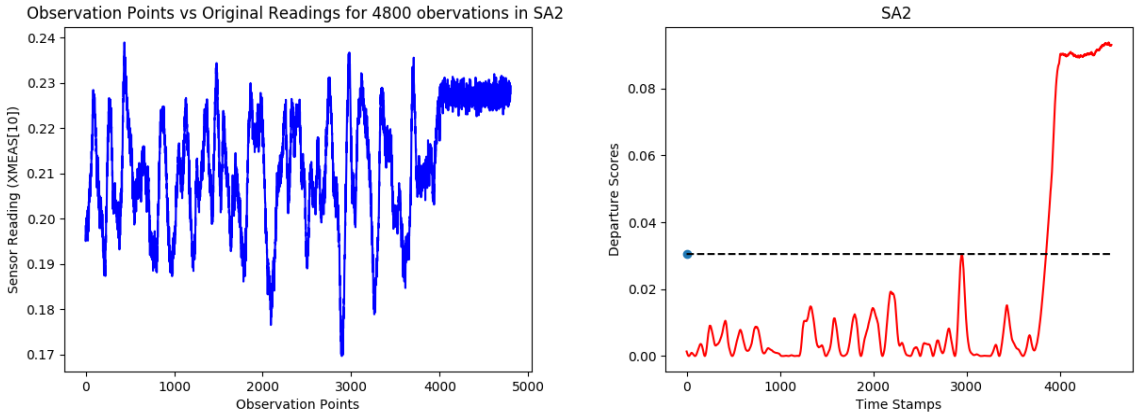
Scenario-1 : SA1



(a) (b)

Figure 1: Fig(a) and (b) shows the original sensor readings and the departure scores for scenario- SA1 respectively

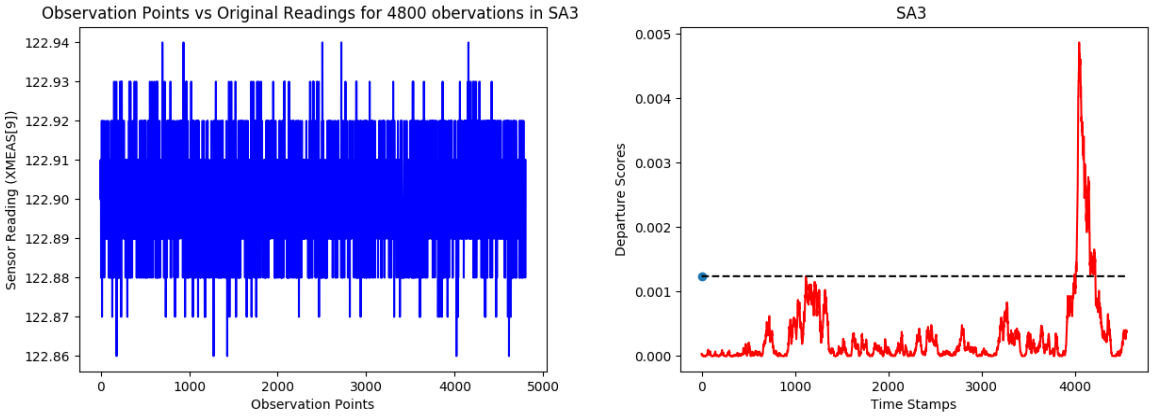
Scenario-2 : SA2



(a) (b)

Figure 2: Fig(a) and (b) shows the original sensor readings and the departure scores for scenario- SA2 respectively

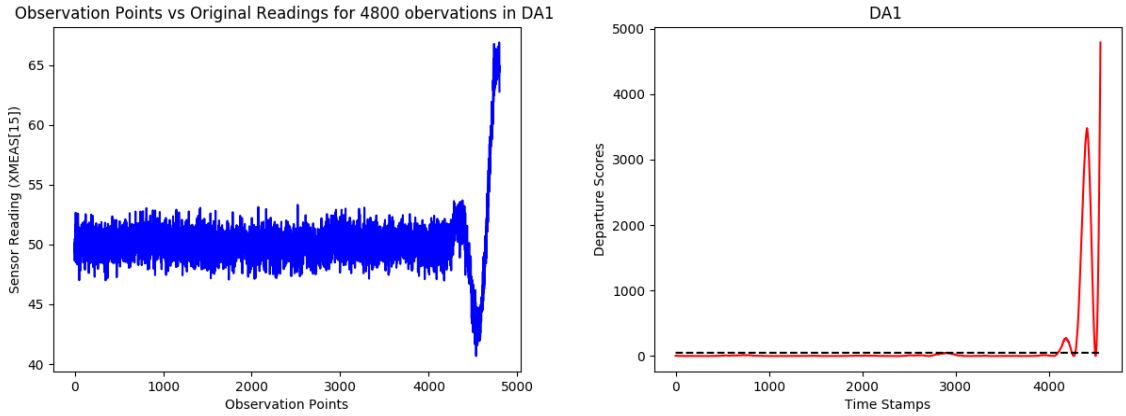
Scenario-3 : SA3



(a) (b)

Figure 3: Fig(a) and (b) shows the original sensor readings and the departure scores for scenario- SA3 respectively

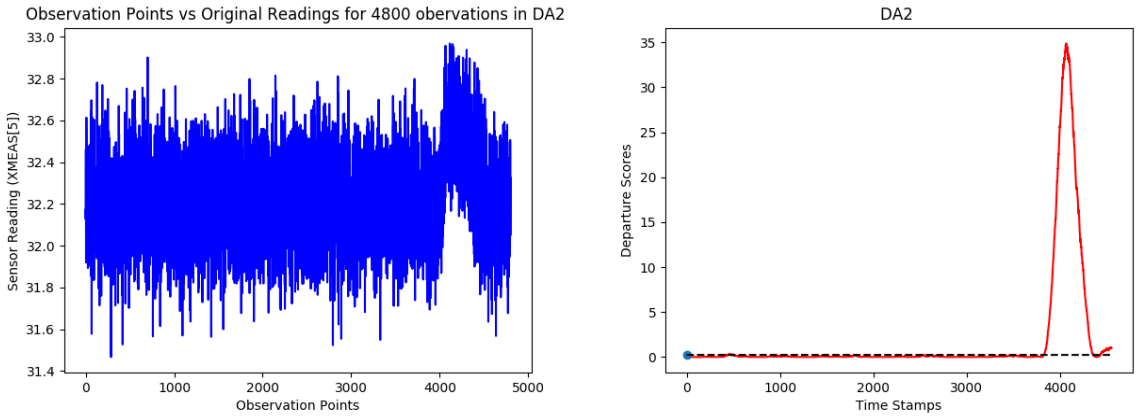
Scenario-4 : DA1



(a) (b)

Figure 4: Fig(a) and (b) shows the original sensor readings and the departure scores for scenario- DA1 respectively

Scenario-5 : DA2



(a) (b)

Figure 5: Fig(a) and (b) shows the original sensor readings and the departure scores for scenario- DA2 respectively

Thresholding

We have chosen the threshold by the following formula :-

$$D = max\|\hat{c} - U^T \mathbf{x}_j\|^2 (1)$$

where $\mathbf{x}$ is taken from the first 4000 points; $\hat{c} = U^T c$ and U is the left singular matrix of X.

We received the following threshold for the five scenarios using the above formula!

Sr.	Scenario	Threshold
1	SA1	0.23
2	SA2	0.03
3	SA3	0.0012
4	DA1	50.14
5	DA2	0.235

Scree Plots

We observe from the scree plots of the five scenarios that the first eigen-value is prominent.

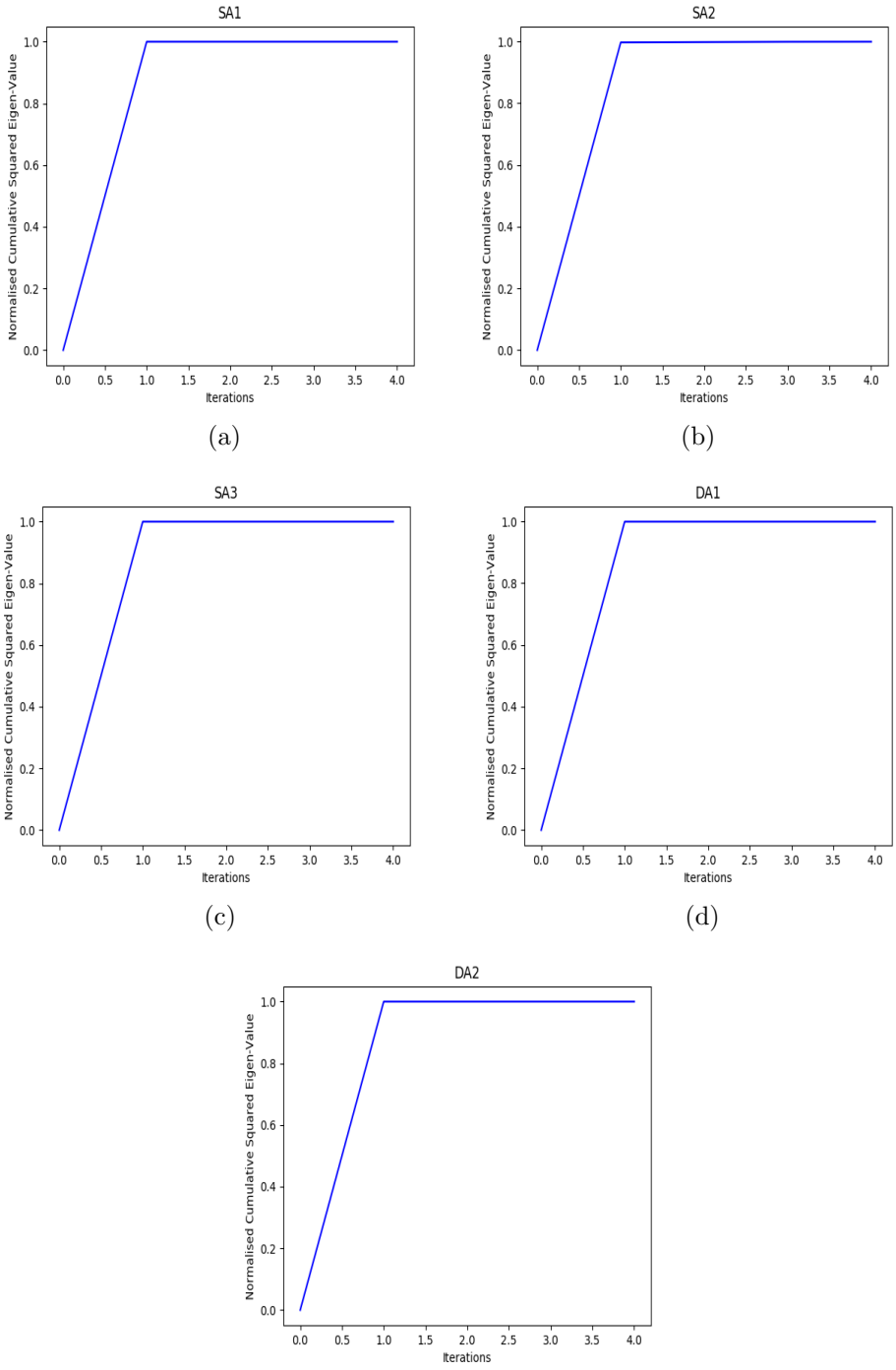


Figure 6: Figure(a-e) show the scree-plots for the five scenarios respectively. Note that for each of the plots, the first eigen-value takes the value of NCSE to around 0.999.. and then it saturates implying the subsequent eigenvalues are not very significant, hence $r = 1$