

Bayesian Network with Temporal and Spatial Correlation among Sensors

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Abstract

The goal of this Phase is to encode the temporal and spatial correlation among sensors. The mean of a sensor at a timestamp is given by :

$$\mu_{ij} = \beta_0^{(i)} + \sum_{i=1}^{50} \beta_1^{(i)} S_{ij}, \text{ where}$$

- i is the sensor id
- j is the timestamp id
- β_x^y is the y th lasso regressed coefficients of sensor x

The variance of a sensor at a timestamp is given by :

$$\sigma_{ij} = \sigma_i + \sum_{q=1}^{50} \beta_q^{(i)^2} \sigma_{q-2,j-1}$$

- σ_i is the conditional variance
- $\beta_q^{(i)}$ is the q th regressed coefficient of i th sensor
- σ_{ij} is the variance at j th timestamp of i th sensor

Phase III :Results and Discussion:

For the Window Inference, below Mean Absolute Errors were obtained for the different datasets:

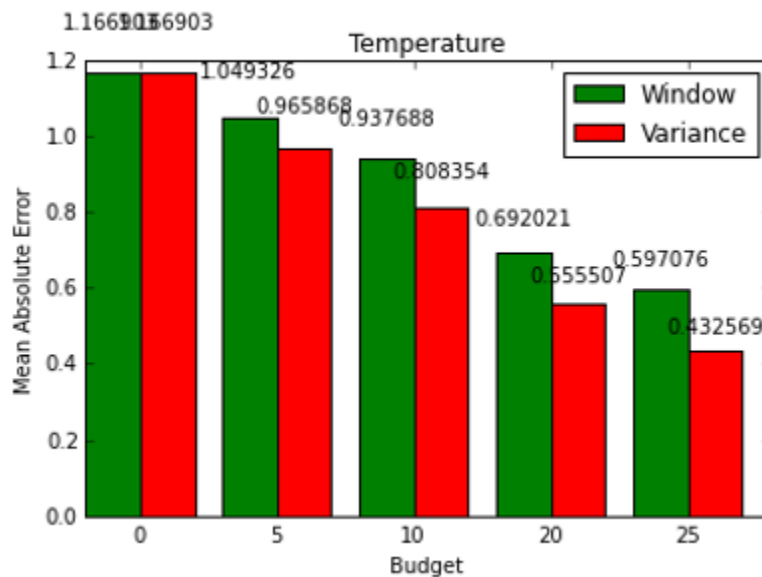
	Budgets				
	0	5	10	20	25
Temperature	2.3580 283488	1.40551284707	0.963139344009	0.507008480598	0.388757264106
Humidity	5.2040 073568 4	2.91873540345	1.71199837154	0.823603812128	0.563036486245

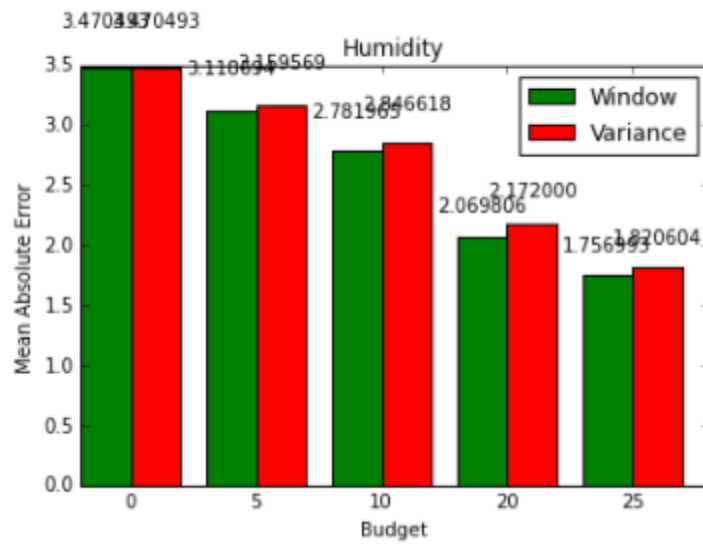
For the Variance Inference, below Mean Absolute Errors were obtained for the different datasets:

	Budgets				
	0	5	10	20	25
Temperature	2.3580283488	0.776612864088	0.632531210788	0.406946347889	0.330723961793
Humidity	5.20400735684	2.09154217564	1.4122045059	0.842476668095	0.633271897529

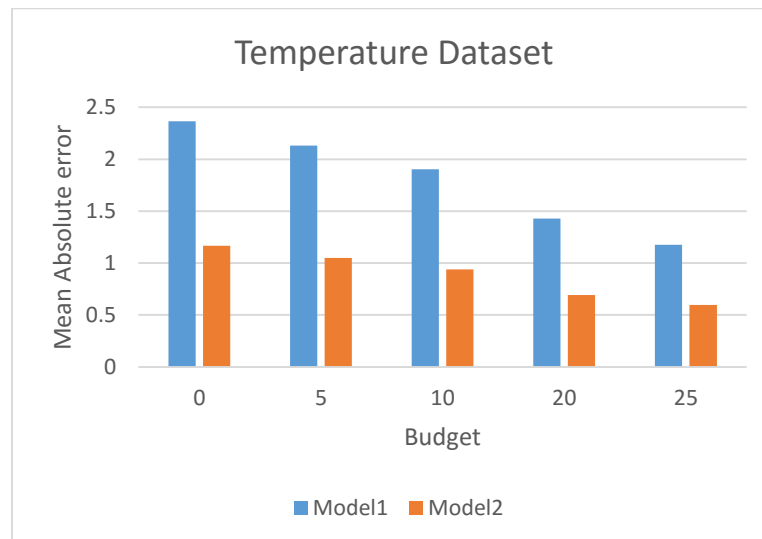
Comparison of the results of Phase I, Phase II and Phase III:

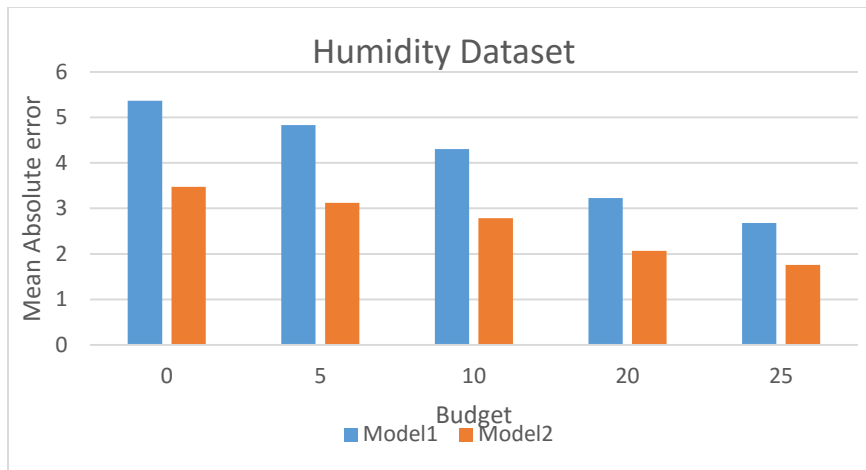
- Phase I:





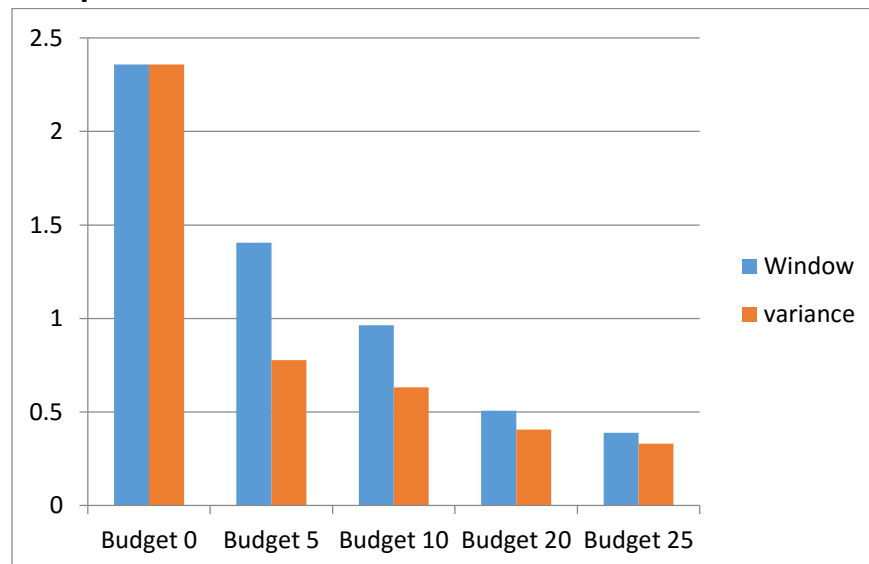
- Phase II :
 - Window:





- **Phase III :**

- **Temperature:**



Humidity:

