# Method Description

## General Information

| | |
|---|---|
| Type of Entry (*Academic, Practitioner, Researcher, Student*) | **Practitioner** |
| First Name | **Arsa** |
| Last Name | **Nikzad** |
| Country | **Canada** |
| Type of Affiliation (*University, Company-Organization, Individual*) | **Individual** |
| Affiliation | **Individual** |

**Team Members (*if applicable*):**

| **1st Member** | |
|---|---|
| First Name | |
| Last Name | |
| Country | |
| Affiliation | |
| **2nd Member** | |
| First Name | |
| Last Name | |
| Country | |
| Affiliation | |

## Information about the method utilized

| | |
|---|---|
| Name of Method | **Ensemble of Statistical Methods** |
| Type of Method (*Statistical, Machine Learning, Combination, Other*) | **Statistical** |
| Short Description (up to 200 words) | **Please see below** |

**Extended Description:**

*Apart from the textural description, please consider including an informative flowchart to help researchers better understand the exact steps followed for generating the forecasts. Please also try to clarify any assumptions made, the initialization and parameterization process used, etc., to facilitate reproducibility and replicability.*

Yearly Data:

For yearly data, If the length of data is greater than 24 points, I have used 11 standalone statistical and 11 ensemble of those statistical methods. The best method would have the lowest smape over the last 12 data points as long as smape is below 3%. If smape is above 3% for a series, then that series would be examined based on 4 step ahead cross validation of its last 12 data points. The best method is finally selected based on the lowest cross validated RMSE.
If the length of data is less than 24 point, the test partition would be the last 6 points and 4 step ahead cross validation is again has performed over the last 6 data point if smape is above 3%

Quarterly Data:
For quarterly data, 14 standalone statistical methods along with 11 ensembles of those statistical methods have been used. All methods are examined over the last 8 data points of test partition based on smape. The best method would have the lowest smape as long as it is lower than 5%. If the smape of a series is higher than 5% then that series has been examined based on 4 step ahead cross validation of its last 12 data points, on two frequencies of 4 and 1. Method with the lowest average cross validated RMSE will finally be selected as the best method.

Monthly Data:

For monthly data, 14 standalone statistical methods along with 11 ensembles of those statistical methods have been used. All methods are examined over the last 18 data points of test partition based on smape. The best method would have the lowest smape as long as it is lower than 5%. If the smape of a series is higher than 5% then that series has been examined based on 4 step ahead cross validation of its last 18 data points, on two frequencies of 12 and 1. Method with the lowest average cross validated RMSE will finally be selected as the best method.

Weekly Data:
For weekly data, 14 standalone statistical methods along with 12 ensembles of those statistical methods have been used. All methods are examined over the last 26 data points of test partition based on smape. Parallel to this analysis each series will also be examined for dual seasonality of 26 and 52. The best method would have the lowest smape as long as it is below 10%. If smape for a series is above 10%, that series would be examined for 4 step ahead cross validation of its last 13 points and the best method would be selected based on the lowest average RMSE.

Daily Data:

For daily data, I have used 11 standalone statistical and 11 ensembles of those statistical methods. The best method would have the lowest smape over the last 14 data points as long as smape is below 3%. If smape is above 3% for a series, then that series would be examined based on 4 step ahead cross validation of its last 14 data points. The best method is finally selected based on the lowest cross validated RMSE. Frequency of 1 has been used for daily data.

Hourly Data:

For hourly data, 14 standalone statistical methods along with 12 ensembles of those statistical methods have been used. All methods are examined over the last 48 data points of test partition based on smape. Parallel to this analysis each series will also be examined for dual seasonality of 24 and 168. The best method would have the lowest smape over that last 48 data points of test partition.