Method Description

General Information

Type of Entry (*Academic, Practitioner, Researcher, Student*)	**Student**
First Name	**David**
Last Name	**Shaub**
Country	**USA**
Type of Affiliation (*University, Company-Organization, Individual*)	**University**
Affiliation	**Harvard Extension School**

Team Members (*if applicable*):

1st Member	
First Name	David
Last Name	Shaub
Country	USA
Affiliation	Harvard Extension School
2nd Member	
First Name	
Last Name	
Country	
Affiliation	

Information about the method utilized

Name of Method	**THIEF combination**
Type of Method (*Statistical, Machine Learning, Combination, Other*)	**Statistical/combination**
Short Description (up to 200 words)	**This method uses the"thief" package from Hyndman for point forecasts; two THIEF forecasts are produced (one with ARIMA and another with Theta base models). Prediction intervals are estimated using the "foreastHybrid" package from Shaub**

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.

This submission relies on the R packages “thief” and “forecast” from Hyndman and “forecastHybrid” from Shaub.

For all time series except yearly, two THIEF models (one with ARIMA and another with Theta base models) are used to produce point forecasts. The forecasts from these are averaged. For the yearly series, the same models used to produce the prediction intervals is also used to produce the point forecasts.

The prediction intervals are produced using the hybridModel function from the “forecastHybrid” package. The base models used in the ensemble include the Theta and STLM decomposition for monthly series and ARIMA, Theta, and TBATS for all others. Thee prediction intervals produced by all of the base models are averaged for the final result.

Finally, a cleanup step is applied to prevent implausible values; results are rounded, and all results less than zero are replaced with zero. Furthermore, to prevent explosive, exponential growth in the upper prediction intervals, these are cleaned to replace those that grow explosively. In general this involves replacing these prediction intervals where this occurs with linear growth instead. See the code in cleanUpper.R for the exact approach.