



# MODERN RETAIL, INC.

REQUEST FOR PROPOSAL

RFP #: TF – F1.H1

TITLE: PHOENIX TEMPERATURE FORECAST

CLOSING DATE AND TIME: SEPTEMBER 16. 2016 @ 5:00 PM

# Temperature Forecast: TF – F1.H1

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## Background and Purpose

By responding to this Request for Proposal (RFP), the Proposer agrees that s/he has read and understood all documents within this RFP package.

## Submission Details

Responders to this RFP should supply:

- A business report up to 5 pages (not including cover page or table of contents), including any supporting plots and tables.
- The commented code used to produce the results.

The report should address **all points described in the “Objective” section** below.

The report should be returned in the following way:

- Electronic (mailto: [Aric\\_LaBarr@ncsu.edu](mailto:Aric_LaBarr@ncsu.edu); Subject Line: Phoenix Temperature Forecast)

## Objective

Modern Retail Incorporated (hereafter the “Store”), acting by and through its department of *Marketing and Sales Analysis* is seeking proposals for retail analytics services. The scope of services includes the following:

- Creation of an hourly forecast for temperature in Phoenix, AZ for September 1, 2016 from an Exponential Smoothing Model (ESM), to be used for evaluating consumer behavior; The Store’s analysts believe that extreme outdoor temperatures may affect the sales of the main retail location in Phoenix, AZ; They want a forecast of these temperatures to help them further evaluate this claim.
- Creation of easy to read and interpret visualizations of the following:
  - Actual temperatures overlaid with the trend/cycle for the training set.
  - Actual temperatures overlaid with the seasonally adjusted temperatures for the training set.
  - For the trend/cycle and seasonal breakdown, the current team uses classical decomposition; The Store is open to other techniques as long as the reasons are clearly stated and supported.
  - Forecasted temperature values overlaid with the actual temperature values on September 1, 2016 (validation set).
- The Store’s analysts are open to either additive or multiplicative ESM’s; However, the reasons for choosing either must be clearly stated and supported.
- The Store uses Mean Absolute Percentage Error (MAPE) in calculating the accuracy of its forecasts; Report this measure for the 24 hourly forecasted temperatures on September 1, 2016; The Store is open to other measurements in addition to the MAPE as long as they are clearly stated and supported.
- The Store’s analysts recommend testing the residuals from the final ESM to check if they are white noise; The p-value and test statistic should be listed as well as results interpreted.

## Data Provided

The following two sets of data are provided for the proposal:

- The data set **AUGUST\_TRAIN** contains hourly observations from August 1, 2016 to August 31, 2016 and 44 variables. The variable **DryBulbFarenheit** is the temperature of interest.
  - The data is collected directly from the National Climatic Data Center and is not previously cleaned. Check to make sure you have 24 hourly readings a day. If not, you will have to adjust your data set accordingly.
- The data set **SEPTEMBER\_VALID** contains the same data for September 1, 2016.