



MODERN RETAIL, INC.

REQUEST FOR PROPOSAL

RFP #: TF – F1.H3

TITLE: ARIZONA SALES MODELING PART 2

CLOSING DATE AND TIME: OCTOBER 2, 2016 @ 5:00 PM

Arizona Sales Modeling Part 2: TF – F1.H3

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 3 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; Subject Line: Arizona Sales Modeling Part 2)

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. This proposal is a counter proposal to the previous one where initial modeling of sales was introduced. The proposal includes data from two stores – Phoenix and Tuscan, AZ. The scope of services includes the following:

- Using the results from the previous proposal to make the data stationary, create weekly forecasts for sales in both Phoenix, AZ and Tuscan, AZ from either an Autoregressive (AR) or Moving Average (MA) model; The Store’s analysts know that the data is *not* seasonal and would like models for each store built separately (no aggregation of sale across stores).
- The Store uses Mean Absolute Percentage Error (MAPE) in calculating the accuracy of its forecasts; Report this measure for the validation data set; The Store is open to other measurements in addition to the MAPE as long as they are clearly stated and supported.
- Compare the new model for each city to the previously created ESM for each city developed in the previous proposal using the validation data set MAPE.
- State the final model you recommend for each city.
- Creation of weekly forecasts for the remainder of 2016 sales in both cities. (HINT: Once you decide on a final model in each city, use the entire data set – both training and validation combined – and apply that final model type to get forecasts for the rest of 2016. For example, if you pick an AR(3) for a city, then use your entire data and estimate a new AR(3) to then forecast the rest of 2016 sales.)
- The Store’s analysts recommend testing the residuals from the final ESM’s to check if they are white noise; The p-value(s) should be listed as well as results interpreted.

Data Provided

The following data set is provided for the proposal:

- The data set **AZ_SALES** contains weekly sales of two cities (Phoenix and Tuscan) from September 18, 2011 to September 4, 2016.
 - The data is collected from our sales team and should be relatively clean. However, a validation data set has not been created for you. The Store recommends setting aside 16 weeks for a validation data set before you model or run any analysis.