Final Team Exam

The Goal

This final exam is designed to give you and your teammates another chance to create a solution to a real-world problem using the tools from this class, and is inteded to allow you to make use of any or all of the tools taught throughout the semester. The intent of the examination is to allow you to demonstrate your ability to choose an appropriate solution from your forecasting toolkit, and present your solution to the rest of the class.

What to Prepare

Your team is expected to prepare the following items:

1. An executive summary of the problem and your *prototyped* solution
   (a) Should be clear and concise
   (b) Needs to be readable by non-specialists
2. A 10-15 minute presentation of your solution (each team will present to the class!)
   (a) ALL team members should be part of the presentation
   (b) State findings first, then detail the why and the how
   (c) May use whatever presentation technology you want
3. Your code, as well as the data file that you used (we share both in order to enable replication, since this is a critical component of analysis)
   (a) Please comment all code, to make it clear to new readers
   (b) I should be able to run the code without errors on my computer
   (c) Provide the data **as you formatted it to work with your code**

Tools

A list of tools and useful documentation.

- Least Squares Regressions - `http://www.statsmodels.org/stable/regression.html`
- ARIMA Models - `http://www.statsmodels.org/stable/generated/statsmodels.tsa.arima_model.ARIMA.html?highlight=arima`
- VAR Models - `http://www.statsmodels.org/0.6.1/generated/statsmodels.tsa.vector_ar.var_model.VAR.html`
- Generalized Additive Models - `https://github.com/dswah/pyGAM`
- Fixed-Effect Panel Models - See Least Squares Regressions with cluster-robust standard errors

- Logistic Regression - http://www.statsmodels.org/stable/generated/statsmodels.discrete.discrete_model.Logit.html OR http://scikit-learn.org/stable/modules/generated/sklearn.linear_model.LogisticRegression.html
- Decision Trees - http://scikit-learn.org/stable/modules/generated/sklearn.tree.DecisionTreeClassifier.html
  - For visualizing a decision tree, see also http://scikit-learn.org/stable/modules/generated/sklearn.tree.export_graphviz.html
- Random Forests - http://scikit-learn.org/stable/modules/generated/sklearn.ensemble.RandomForestClassifier.html
- Support Vector Machines - http://scikit-learn.org/stable/modules/generated/sklearn.svm.SVC.html
- k-Nearest Neighbors - http://scikit-learn.org/stable/modules/generated/sklearn.neighbors.KNeighborsClassifier.html

The Rubric

Category	Full Points	Half Credit	No Credit	Points Possible
Executive Summary	The summary is clear and concise, discussing major points of the presentation	Does not discuss all essential points, or would not be clear to non-specialist	No summary provided	50 points
Presentation	Presentation is clear, and all group members involved	Presentation lacks clarity, or some group members are not involved	Presentation poorly planned, few group members participate	50 points
Diagnosis of Data	Group provides clear justification for proposed analysis and model	Justification for proposed analysis and model is somewhat unclear	No clear justification for proposed analysis and model	50 points
Plan of Action	Group identifies method of analysis to pursue, method is justified by the problem and data	Flawed method of analysis proposed, or method is only partially justified by the problem and data	Group provides no plan for analysis	50 points
Prototype Model	Group presents a working model based on their plan, includes forecasts/analysis	Model has errors (does not successfully run), or does not include forecasts/analysis	No working model presented	50 points
Overall				250 points

Note on Grading

Even though this is a group project, I reserve the right to grade each individual, and will not hesitate to award a higher grade to team members who contribute more to the project than to those team members who choose not to contribute to the progress of their team.