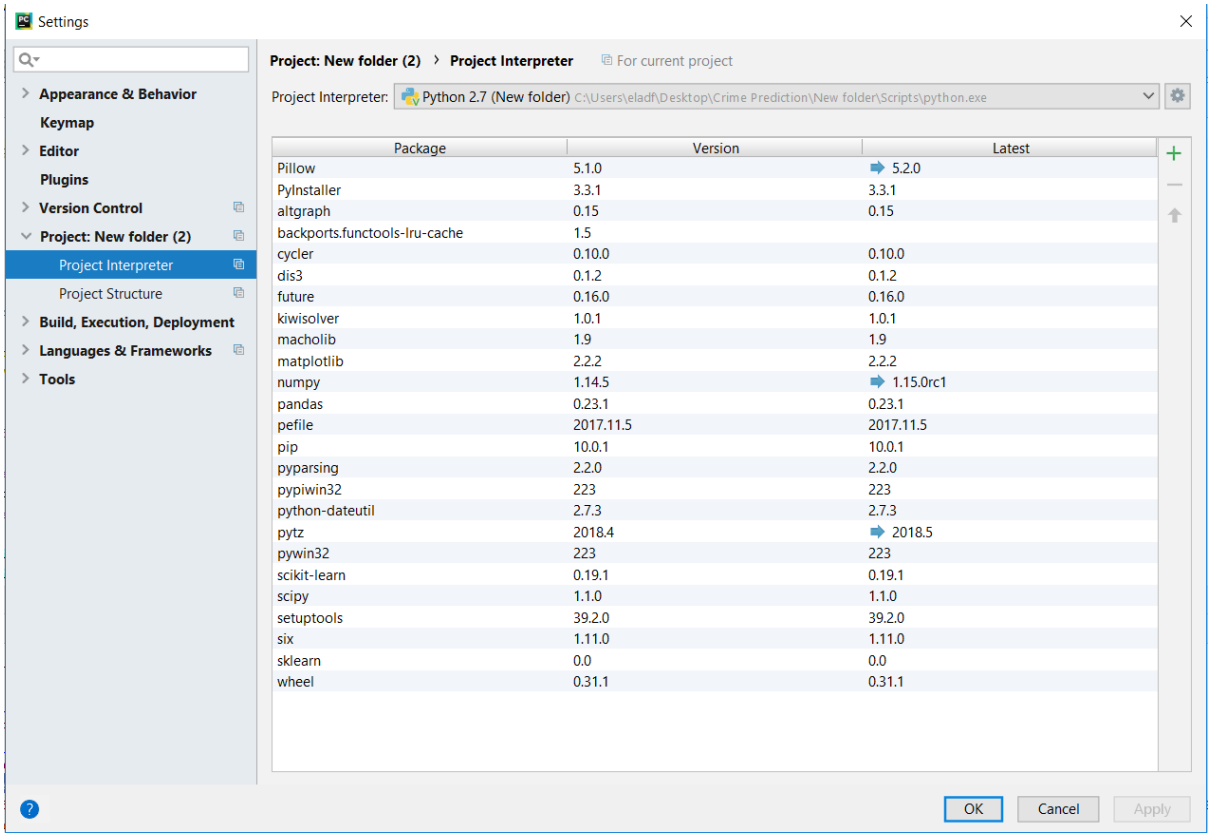
Setting for project Forecasting Crime Rates with Gaussian Processes

Tools Used

We have used python 2.7 interpreter with the main packages ”Matplotlib” for the graphs, “TKinter” for the GUI, and “Sklearn” (http://scikit-learn.org/stable/modules/gaussian_process.html) Python’s peerless machine learning library. It provides a comprehensive set of supervised and unsupervised learning algorithms, implemented under a consistent, simple API that makes the entire modeling pipeline as frictionless as possible, a GaussianProcessRegressor is applied by specifying an appropriate covariance function. and applied by specifying an appropriate covariance function it does not allow for the specification of the mean function, always assuming it to be the zero function, highlighting the diminished role of the mean function in calculating the posterior.

Need to install on the project interpreter these packages to use our code.



User manual

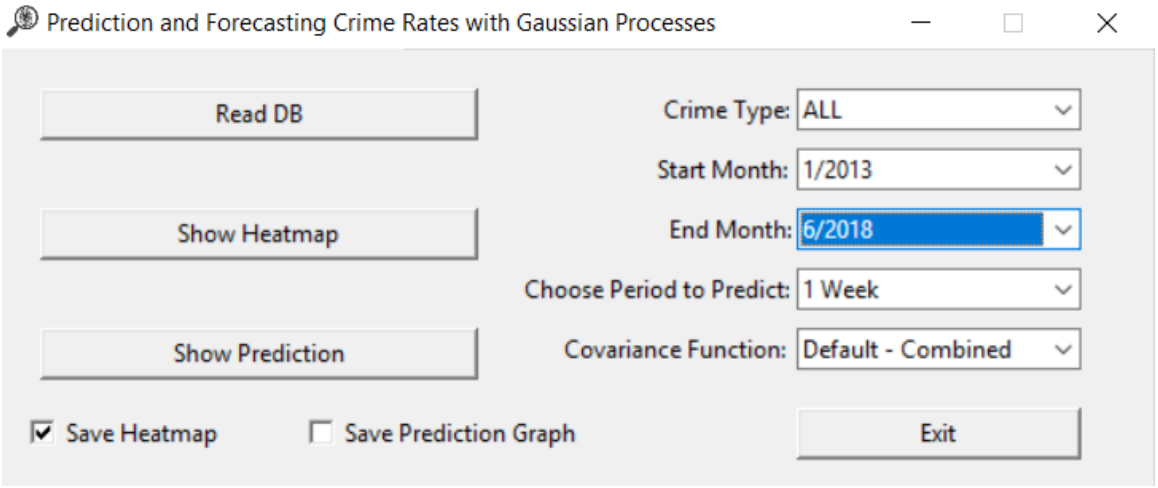


Figure 10: Main GUI, choose preference to analyze

Main Window:

Read DB button - Use load the updated database. Load DB before using the other options.

After choosing all the preferences of the prediction in the combobox use this buttons:
Show Heatmap button - show the prediction results on heatmap of Chicago.
Show Prediction button - show the prediction results on graph.
Save Heatmap/Save Prediction Graph - use this checkboxes to save the results as pictures in folder Image at the project folder.

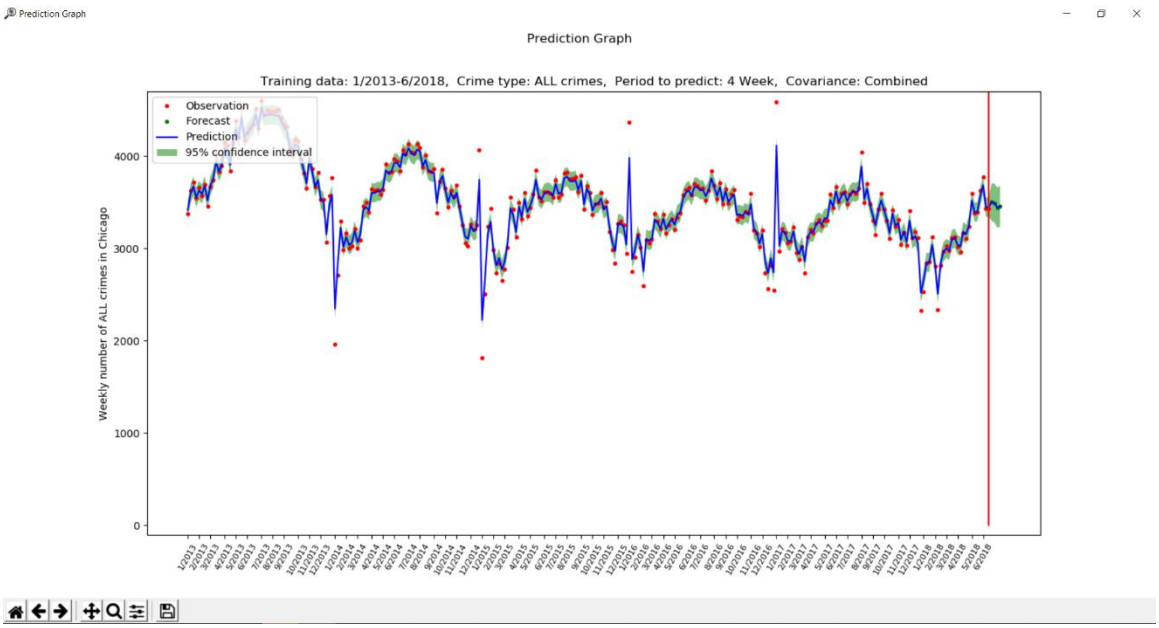


Figure 11: GUI of the Prediction

Prediction Graph:

All the selected preferences show above the graph. Axis X represent the week in the year, and axis Y represent the weekly number of crimes in Chicago. The red dots are the observations of the crime rates. The forecast is to the left of the red vertical line. The green dots are the forecast of the amount of crime rates. The blue line represents the prediction line that the Gaussian process generated. 95% uncertainty intervals are shown in green.

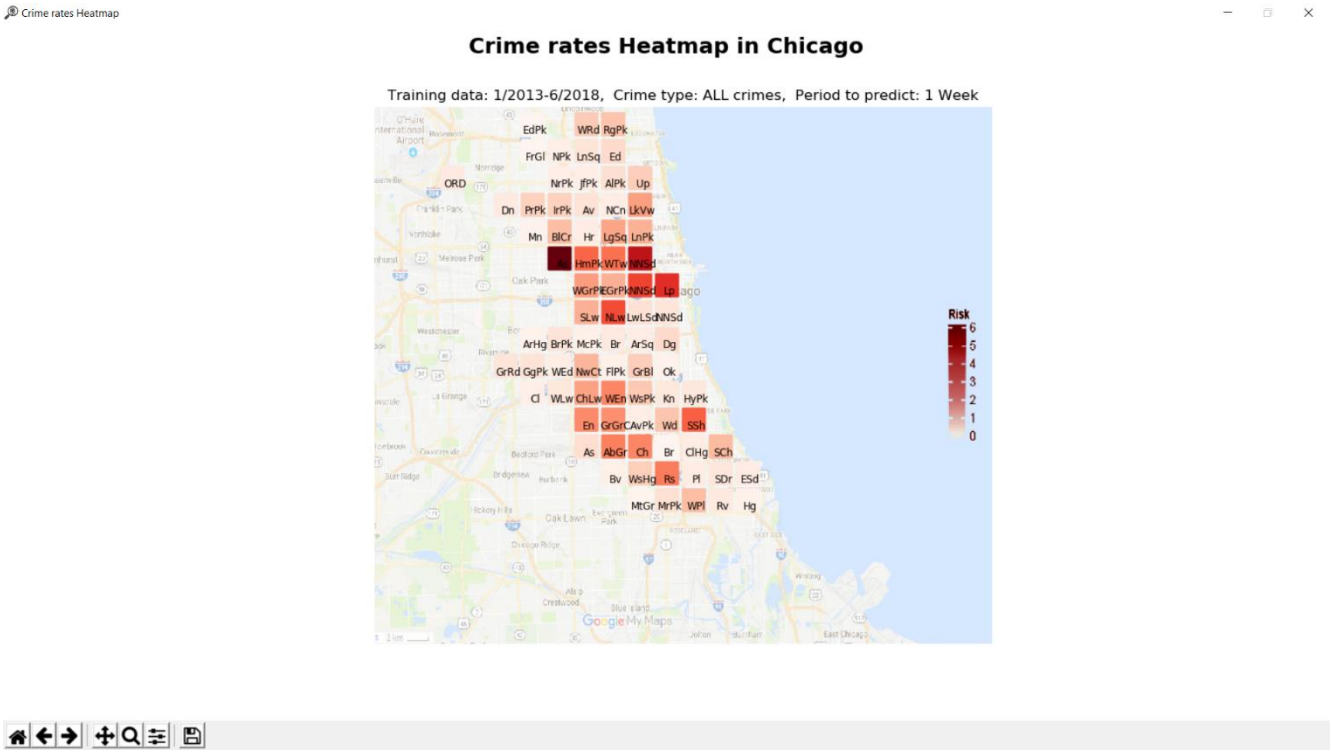


Figure 12: GUI of the Heatmap, representing the prediction results

Heatmap:

All the selected preferences show above the heatmap.
Each square represent community area, and the intense of the color representing the risk of the crimes amount in every one of them.