Final Project Proposal

Group: Michael Gleyzer, Harishkarthik Kurmaran Pillai, and Mathew Witek

Topic: Bayesian Statistics, primarily on Regression using the MCMC Method; Markov Chain Monte Carlo Method.

Datasets of Interest:

- Federal Reserve delinquency rates date (https://www.federalreserve.gov/releases/chargeoff/delallsa.htm)
- Delinquency rates on mortgages(https://www.statista.com/statistics/205959/us-mortage-delinquency-rates-since-1990/)

Break down of Project:

- We plan to do a Bayesian time series Regression using an MCMC method on a financial dataset
- The intended package we want to use is the **Brms** package to conduct the relevant analysis

Purpose:

For this project we decided to explore the fascinating field of Bayesian statistics and apply it to time series data. Despite the fact that we may not be the most knowledgeable in this area of statistics, we felt that doing an R project involving Bayesian Data Science would allow us to immerse ourselves in this highly important and vibrant area of machine learning. To accomplish this we decided upon the popular MCMC(Markov Chain Monte Carlo) method. For our actual project we decided to delve deeper into the financial crisis of 2008 by seeing whether Bayesian Methods could have been used to successfully predict the crisis. We plan to do this by analyzing time dependent variables such as delinquency rates on subprime and non-subprime mortgages leading up to the crash in 2008. To determine the predictive accuracy of the models in question we plan to compare our predictions based on pre-crash data with the figures that were there during the crash. In addition, we are also considering doing standard time series analysis and then comparing its with the predictive accuracy of the Bayesian approach.