School of Engineering and Applied Science (SEAS), Ahmedabad University

B.Tech (CSE Semester VI):
Machine Learning (CSE 523)

Project Abstract Submission #1

Submission Deadline: January 26, 2020 (11:59 PM)

- **Group No.: S_ECC7**
- **Project Area: Environment and Climate Change**
- **Project Title: Estimating the effect of climate change on sea level using Machine Learning**
- **Name of the group members :**
  1. Rajvi Patel (AU1741078)

Abstract

Climate change has certainly become one of the greatest threats to the humanity. It is defined as the change in global or regional patterns in climate. The average surface temperature is increasing rapidly due to release of greenhouse gases in air. Sea levels have also arisen as a result of increased global temperatures. This led to greater than average summer melting of glaciers as well as diminished snowfall due to later winters and earlier springs. That creates an imbalance between runoff and ocean evaporation, causing sea levels to rise [1].

Most researches explored the global sea level rise predictions using yearly data of sea level. In the article, they relate annual global sea level rise to temperature and predicted sea level for year 2020, having features from 2013 [2]. In order to achieve best prediction they have worked on three machine learning algorithms: random forest, support vector regression and neural network and analyzed that the best performing algorithms were support vector regression for the San Francisco sea level and neural network for the global sea level. As almost half of the world's population lives in coastal regions, the climate change due to increase in sea level is most concerning problem. Having knowledge about increase in sea level can help governments and other interested entities in disaster prevention, real estate evaluation and public safety. For example beach erosion, inundation of low lying areas, salt water intrusion into aquifers and increased flooding [3].

Basic idea of future work in my project is to predict Sea level rise for local area(San Fransico) and Global area by applying machine learning algorithms on collected data. Firstly, I will use regression algorithms like random forest, support vector regression and neural network in MATLAB to generate output. After that, I will apply new algorithm in order to predict better result and will compare my results with the output of above mentioned algorithms. My Goal is to analyze difference among these results and conclude the better algorithm to be used for better prediction. Initially for the local prediction, I am considering the following features: Local precipitation, Local temperature, Local population, Local CO_2 concentration and for the global prediction, I am looking at a different set of features:Global precipitation, Global temperature index, Global population, Global CO_2 concentration. In addition I will try to figure out and apply more features which could affect the prediction.

References

[1] M. Masson-Delmotte, V., a. Schulz, J. Abe-Ouchi, a. Beer, J.F. Ganopolski, E. Gonzalez Rouco, K. Jansen, J. Lambeck, T. Luterbacher, T. Naish, B. Osborn, T. Otto-Bliesner, R. Quinn, M. Ramesh, X. Shao Rojas, and a. Timmermann. Information from Paleoclimate Archives. Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, pages 383-464, 2013.

[2] Alahmadi, M. and Kolmas, J. (2015). Estimating the effect of climate change on global and local sea level rise. Stanford University.

[3] Nicholls, Robert Cazenave, Anny. (2010). Sea-Level Rise and Its Impact on Coastal Zones. Science (New York, N..Y.).