**LITERATURE SURVEY**

# “Machine Learning in Python for Weather Forecast based on Freely Available Weather Data,”.

**AUTHORS: E. Abrahamsen, O. M. Brastein, and B. Lie**

# Forecasting weather conditions is important for, e.g., operation of hydro power plants and for flood management. Mechanistic models are known to be computationally demanding. Hence, it is of interest to develop models that can predict weather conditions faster than traditional meteorological models. The field of machine learning has received much interest from the scientific community. Due to its applicability in a variety of fields, it is of interest to study whether an artificial neural network can be a good candidate for prediction of weather conditions in combination with large data sets. The availability of meteorological data from multiple online sources is an advantage. In order to simplify the retrieval of data, a Python API to read meteorological data has been developed, and ANN models have been developed using TensorFlow.

# 2)“Machine Learning Applied to Weather Forecasting,”

# AUTHORS: M. Holmstrom, D. Liu, and C. Vo.

# Weather forecasting has traditionally been done by physical models of the atmosphere, which are unstable to perturbations, and thus are inaccurate for large periods of time. Since machine learning techniques are more robust to perturbations, in this paper we explore their application to weather forecasting to potentially generate more accurate weather forecasts for large periods of time. The scope of this paper was restricted to forecasting the maximum temperature and the minimum temperature for seven days, given weather data for the past two days. A linear regression model and a variation on a functional regression model were used, with the latter able to capture trends in the weather. Both of our models were outperformed by professional weather forecasting services, although the discrepancy between our models and the professional ones diminished rapidly for forecasts of later days, and perhaps for even longer time scales our models could outperform professional ones. The linear regression model outperformed the functional regression model, suggesting that two days were too short for the latter to capture significant weather trends, and perhaps basing our forecasts on weather data for four or five days would allow the functional regression model to outperform the linear regression model.

# 3 Rainfall Prediction using Regression Model .

# AUTHORS : J. Refonaa, M. Lakshmi, R. Abbas, and M. Raziullha.

# The spatial interpolation comparison 97 is concerned with predicting the daily rainfall at 367 locations based on the daily rainfall at nearby 100 locations in Switzerland. We propose a divide -and-conquer approach where the whole region is divided into four sub-areas and each is modeled with a different method. Predictions in two larger areas were made by RBF networks based on the locational information only. The two smaller areas were assumed to be implemented by the Orographic Effect which dictates that precipitation is proportional to elevation. Thus, predictions in these two areas were made using a simple linear regression model based on the elevation information only. Comparison with the observed data revealed that RBF networks produced good predictions while the linear models poor predictions. The relatively large prediction errors from the small areas seem to indicate that the Orographic Effect did not exist.

# 4 Weather Prediction Using Normal Equation Method and Linear regression Techniques.

**AUTHORS:** **S. Gupta, I. K, and G. Singhal.**

# The burgeoning research in the fields of Artificial Intelligence and machine learning has given rise to numerous weather prediction models. But the problem of accurately predicting or forecasting the weather still persists. Numerical weather prediction is taking the existing numerical data on weather conditions and applying machine learning algorithms on it to forecast the weather. This paper is the application of machine learning algorithms, linear regression model from statistics, and two optimization techniques, Normal equation method and Gradient descent method to predict the weather on the basis of few parameters. Two optimization techniques have been used to compare the performance of the algorithms. The obtained results demonstrated that the normal equation method forecasts the weather with high precision, whereas the gradient descent method forecasts the weather with very little precision.

# 5) Pattern recognition and machine learning.

# AUTHORS: C.Bishop.

Pattern recognition has its origins in engineering, whereas machine learning grew out of computer science. However, these activities can be viewed as two facets of the same field, and together they have undergone substantial development over the past ten years. In particular, Bayesian methods have grown from a specialist niche to become mainstream, while graphical models have emerged as a general framework for describing and applying probabilistic models. Also, the practical applicability of Bayesian methods has been greatly enhanced through the development of a range of approximate inference algorithms such as variational Bayes and expectation propagation. Similarly, new models based on kernels have had significant impact on both algorithms and applications.