

A Project/Dissertation Review-1 Report

on

WEATHER FORECASTING APP USING PYTHON

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Abstract

Weather forecasting is one of the most important and challenging field for scientists and engineers. The advent of technology has enabled us to obtain forecasts using complex mathematical models. For the last three decades, artificial intelligent based learning models like neural networks, genetic algorithms and neuro-fuzzy logic have shown much better results as compared to Box-Cox modeling approaches. Further accuracy is expectable by constructing a consortium of statistical and artificial intelligent methods. For weather forecasting, researcher's trend is also towards the hybrid models. The accuracy of forecasting models can be made using different measures of assessments. In this paper, some hybrid methods are discussed with their merits and de-merits. The purpose of developing weather app is to fetch the data in the need of taking information about weather worldwide. Another purpose for developing this software is to generate the report automatically at the end of the session or in the between of the session.

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CHAPTER-1

1.1 Introduction

We look at weather data and the future predicted the weather to plan our days accordingly. Having visualizations helps us understand that data better.

Developing this project using the Streamlit library we can create a responsive front-end which gives us more time to work on the actual back-end and the services we aim to provide.

1.2 EXISTING PROBLEM:

Actually weather forecasting was and is a big arrangement of time, funds, talent and absolute use of technology. It involves computing complex mathematical calculations. That was not entertained previously by the old age computer. As a result the models were made simple, to at least provide some valuable information. With the newly advanced technology today's weather forecasting models are more accurate.

PROPOSED SOLUTION:

The purpose of developing weather app is to fetch the data in the need of taking information about weather world wide. Another purpose for developing this software is to generate the report automatically at the end of the session or in the between of the session . The scope of the project is the system on which the software is installed, i.e. the project is developed as a desktop application, and it will work for a particular institute or organization. But later on the project can be modified to operate it online.

1.2.1 TOOLS AND TECHNOLOGIES USED:

Hardware Required :

Standard computer with at least i3 processor
Standard computer with 4GB of RAM
Standard computer with 100GB of free space
Active Internet Connectivity with good bandwidth

Software Required :

PYCHARM □ PYTHON 3.9 □ VS CODE

- **Streamlit** is an open-source Python library that makes it easy to create and share beautiful, custom web apps for machine learning and

data science.

- **PyOWM** is a client Python wrapper library for OpenWeatherMap web APIs. It allows quick and easy consumption of OWM data from Python applications via a simple object model and in a human-friendly fashion.
- **Matplotlib** is a plotting library for the Python programming language. It provides an object-oriented API for embedding plots into applications.
- **DateTime** provides a `DateTime` data type . `DateTime` objects represent instants in time and provide interfaces for controlling its representation without affecting the absolute value of the object.

RESULTS AND OUTPUT:

The result will be of three phased i.e, Frontend - Backend - Deployment .

This system has advantages over other techniques. In this approach non-linear relationship that exists between the historical data (temperature, wind speed, humidity, etc.,) supplied to the system during the training phase. On this basis, make a prediction of what the temperature would be in future. It gives good performance over other existing methods.

The frontend will look like this after completion :



CONCLUSION AND FUTURE SCOPE :

It has been observed from study that there is no such model exists that can forecast accurately in all situations. This is because the distinct nature of the model. Almost all linear models adopt statistical form, and nonlinear models fit in to AI techniques. Also these models would attain accuracy in linear and nonlinear data respectively. But it is a challenge to determine the linearity or non-linearity of the time series data under consideration; particularly with a problem containing real world data. In forecasting models, the major concern is with accuracy not the processing time. More and more complex models have been introduced to gain accuracy. In future, various efficient hybrid algorithms/model should be substituted in place of complex models to decrease the execution time of the model too.

Researchers ought to implement a single measurement criterion for a distinct domain to compare their result.

CHAPTER - 2

LITERATURE SURVEY / PROJECT DESIGN

The researchers all over the world are working to improve the accuracy and reduce the complexity of the pattern forecasting models. Invention of fuzzy logic in 1965 by Zadeh has given new directions to study patchy datasets with noise and imprecision.

With the development of fast computers, learning models like neural network got their position to enrich the field of forecasting with more accurate forecasts. With all these methods and techniques to handle impressions and vagueness, even today the field of forecasting has very much interest of scientist in developing new models. Despite of time consuming and efforts required for developing a hybrid model, they outperform in most cases. Not a single forecasting model can forecast with 100% accuracy, but they can reduce the forecast error by various techniques. Where forecast error is the difference between actual and predicted value of a time series. In forecasting models, the major concern is with accuracy not the processing time. More and more complex models have been introduced to gain accuracy. In future, various efficient hybrid algorithms/model should be substituted in place of complex models to decrease the execution time of the model too. Researchers ought to implement a single measurement criterion for a distinct domain to compare their result.