CS398 - Seminar

Weather Prediction using machine learning

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Sep 27, 2021

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1 Introduction

Weather forecasting is the science of predicting weather using past data by using technology to predict the future.This is being done from very long time by using various statistical methods ,weather sensors etc.People have attempted to predict the weather informally for millennia and formally since the 19th century. Weather forecasts are made by collecting quantitative data about the current state of the atmosphere, land, and ocean and using meteorology to project how the atmosphere will change at a given place.

1.1 Ancient Forecasting

From a long time people have tried to predict weather by using cloud and astronomical patterns.In about 350 BC, Aristotle described weather patterns in Meteorologica.Chinese weather prediction lore extends at least as far back as 300 BC, which was also around the same time ancient Indian astronomers developed weather-prediction methods.Ancient weather forecasting methods usually relied on observed patterns of events, also termed pattern recognition. For example, it was observed that if the sunset was particularly red, the following day often brought fair weather.

1.2 Modern Methods

It wasn't until the telegraph age the modern methods of weather forecasting were discovered.By the late 1840s, the telegraph allowed reports of weather conditions from a wide area to be received almost instantaneously, allowing forecasts to be made from knowledge of weather conditions further upwind.So now the researchers had data of a wide area instantaneously so they could try to predict the weather of an area much more accurately.

The two men credited with the birth of forecasting as a science were an officer of the Royal Navy Francis Beaufort and his protégé Robert FitzRoy. Both were influential men in British naval and governmental circles, and though ridiculed in the press at the time, their work gained scientific credence, was accepted by the Royal Navy, and formed the basis for all of today's weather forecasting knowledge

1.3 Numerical Prediction

the advances in the understanding of atmospheric physics led to the foundation of modern numerical weather prediction in the early 20th century. In 1922, English scientist Lewis Fry Richardson published "Weather Prediction By Numerical Process",[21] after finding notes and derivations he worked on as an ambulance driver in World War I. He described therein how small terms in the prognostic fluid dynamics equations governing atmospheric flow could

be neglected, and a finite differencing scheme in time and space could be devised, to allow numerical prediction solutions to be found.

2 Prediction using ML model

we can use weather data from any dataset of any place to predict the temperature of that place for a given time period.We would be using ARIMA model to do this job.

2.1 ARIMA model

An ARIMA model is a class of statistical models for analyzing and forecasting time series data. ARIMA is an acronym that stands for AutoRegressive Integrated Moving Average.

Time series forecasting is a technique of datascience which is used to predict future events by using historical activities.

3 Discussion and Conclusions

References