Chapter 5

Nowcasting Various Forms of Precipitation Using Improvised Random Forest Classifier

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ABSTRACT

Weather forecasting is the utilization of science and technology to foresee the conditions of the atmosphere for a given location and time. Weather forecasting is high priority since it helps to settle future climate changes and provides information on critical weather conditions. As the weather has a great impact on various aspects of human life, aquatic life, aviation industry, and others, efforts have been made for decades to improve the efficiency of weather forecasting to ensure a better life and to reduce economic loss, but the result is not more precise than expected. The present research focuses on improving the efficiency of weather forecasting, focusing on various forms of precipitation such as rain, snow, hailstorms, and snowflakes by making use of historical numerical weather datasets across the globe. The efficiency in terms of performance measures has been compared with existing models.

1. INTRODUCTION

Objectives:

Research Problem: Analyzing on Nowcasting various forms of Precipitation using different Methods.

Significance: Helps to determine future climate changes.

Objectives: This research aims to achieve maximum percentage of performance measures and to find best model to predict the weather .

In the most recent century, weather forecasting has been one of the world's most experimentally and technologically frustrating problems. Because of the abrupt changes that occur, environmental change has long sought a good amount of thought. There are various limitations on better weather forecasting, thus it ends up being reliable for accurately predicting the weather right now. In meteorology, weather forecasting plays a crucial role. Making an accurate prediction is one of the major frustrations facing meteorologists anywhere in the world. Because they are used to protect property and human life, weather warnings are crucial. Farming depends on forecasts that take into account the temperature, outlook, humidity, and wind.

As this technology can conceal a lot of climatic data and improve itself the more it is used for more precise forecasts, the display of machine learning-based replication will substantially support weather models. With the huge volumes of raw data meteorologists collect daily, weather forecasting and machine learning are a perfect match. Few models can analyze past forecasts and observations, compare them to weather conditions noticed in reality and helps to eliminate errors in new forecasts. Machine learning helps to provide the best-in-class forecasts and hyper local now casts (Minseok, 2023).

Estimates can be used to plan activities around these times and to prepare for as well as survive them because heavy rain, wind cold, and snow significantly reduce outdoor activities. Without accurate weather forecasts people might find themselves in dangerous conditions for which they were unprepared and suffer hurt or worse. Among other issues, learning weather representation from a sizable amount of weather datasets is a concern in weather forecasting.

Precipitation is the term for the different ways that water falls from the air. They are all created by troposphere clouds, which are located between 8 and 16 kilometers (4 and 11 miles) above sea level. Any type of water particle that descends to the earth's surface from the upper atmosphere is known as precipitation. The drop is moved to the ground by gravity and surface frictional drag. A stormy wake is left behind after a particle leaves the cloud, encouraging quicker and more frequent drops. The crystallized ice may reach the ground as ice pellets or snow, or it may melt and change into raindrops before it reaches the earth's surface depending on the atmospheric circumstances.

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