**Project tittle: TEXT SUMMARIZATION FOR WEATHER FORECASTING USING MACHINE LEARNING**

**Abstract:**

Although previous weather predictions researches have been effective in fulfilling their intended goal, they frequently present accessibility difficulties as a result of their intricate technological nature and overwhelming amount of information. This study presents a firm methodology, that distinguishes itself by prioritizing the democratization of weather information access, improving public safety, promoting weather literacy through trends and patterns, and employing cutting-edge machine learning techniques. Consequently, this thesis offers a unique contribution to the field.

**1. Accessibility and Inclusivity**: Unlike many existing weather forecasting systems, which are designed solely for meteorological experts, our effort places a larger emphasis on accessibility for a wider audience. Our main goal is to make weather forecasts easier to understand for people of all educational levels and cultural backgrounds. Our technique is more accessible to a wider audience since we condense complex meteorological data into digestible summaries.

**2. Public Safety Enhancement:** While studying weather patterns from the past can provide useful information, it may not be immediately actionable enough to motivate people to take preventative measures during inclement weather. Our summary tool goes beyond simple data presentation to deliver digestible summaries that aid in preparation for and recovery from extreme weather events. The system uses past information, current conditions, and alerts to put security first.

**3. Time series and Understanding:** Users sometimes have a limited grasp of meteorology and climate science due to the lack of educational elements in weather reports. Our research aims to fill a vacuum in understanding by providing detailed explanations of weather patterns, forecasts, and their broader climatic impacts. This will improve weather literacy through the use of time series data and regression analysis so that users may make educated decisions based on a deeper understanding of meteorology unlike other previous researches.

**4. Machine Learning and Innovation:** Our research helps advance weather forecasting by using cutting-edge machine learning techniques and natural language processing (NLP). With the goal of simplifying complex meteorological data for end users, we explore a wide range of cutting-edge strategies, from extractive to abstractive summarization techniques. We investigate how transfer learning from existing language models might be applied to NLP studies. Our summarization tool's precision and efficiency are improved by employing specialized machine learning approaches, such as deep learning models like recurrent neural networks (RNNs) and convolutional neural networks (CNNs) making it distictive from previous studies

Our study will help to answer the following **Research Questions:**

1. What are the practical applications of machine learning and natural language processing (NLP) approaches in simplifying complex meteorological data for the purpose of weather forecasting?

2. What are the primary obstacles and potential advantages associated with the democratization of weather information access, the improvement of public safety, and the promotion of weather literacy through the utilization of text summarizing techniques?

3. In what ways may the amalgamation of time series data and regression techniques enhance the comprehension of weather patterns, forecasts, and climate science within the broader public sphere?

4. What is the influence of novel machine learning methodologies, encompassing extractive and abstractive summarization techniques, as well as transfer learning from pre-trained language models, on the precision and efficacy of weather summaries?