

## Project Initialization and Planning Phase

Date	15 April 2024
Team ID	Team-738164
Project Title	Rainfall Prediction Using Machine Learning
Maximum Marks	3 Marks

### Project Proposal (Proposed Solution):

This proposal addresses inaccurate next-day rain prediction in Australia. Our machine learning model, trained on 10 years of weather data, will predict rain occurrence for specific locations. By leveraging this data-driven approach, we aim to improve forecasting accuracy and benefit sectors like agriculture, water management, and public safety.

Project Overview	
Objective	<p>Leverage 10 years of historical daily weather data from multiple locations in Australia.</p> <p>Train a machine learning model to identify relationships between weather variables and rainfall occurrence.</p> <p>Predict whether or not rain will occur for the following day at a specific location.</p> <p>Evaluate the model's performance using relevant metrics to assess its accuracy and reliability</p>
Scope	This project will develop a machine learning model to predict rainfall for the next day in various locations across Australia.
Problem Statement	
Description	Current weather forecasting methods in Australia struggle to accurately predict rainfall, especially for short-term timeframes like the next day. This lack of precise rain prediction has significant negative consequences for various stakeholders across the country.
Impact	<p>Solving the problem of inaccurate next-day rain prediction in Australia offers a multitude of benefits across various sectors:</p> <p><i>Agriculture:</i> Improved crop yields, reduced risk of crop failure, and efficient water management.</p> <p><i>Water Management:</i> Optimized water allocation, reduced water waste, and mitigated flood risks.</p>

	<p>Public Safety and Planning: Enhanced public safety through flood warnings, improved infrastructure management, and reduced project delays.</p> <p><i>Daily Life and Business Operations:</i> Informed decision-making for individuals and businesses, leading to reduced disruptions, improved planning, and potential economic gains.</p> <p>Overall, this project has the potential to significantly improve efficiency, economic security, and public safety in Australia.</p>
<b>Proposed Solution</b>	
Approach	<p>Train machine learning models (e.g., Logistic Regression, Decision Trees, Random Forests, XGBoost) on 10 years of preprocessed Australian weather data.</p> <p>Evaluate and select the best model for predicting next-day rain occurrence.</p> <p>(Optional) Fine-tune the chosen model for optimal accuracy.</p>
Key Features	<p>Here's a short highlight of the unique aspects of your proposed solution:</p> <p>Focuses on next-day prediction: Targets a specific challenge often overlooked.</p> <p>Leverages historical data: Utilizes a rich dataset for potentially more accurate predictions.</p> <p>Machine learning approach: Learns complex relationships for better results.</p> <p>Scalable and customizable: Adaptable for future expansion and specific needs.</p>

## Resource Requirements

Resource Type	Description	Specification/Allocation
<b>Hardware</b>		
Computing Resources	CPU/GPU specifications, number of cores	T4 GPU
Memory	RAM specifications	8 GB
Storage	Disk space for data, models, and logs	1 TB SSD
<b>Software</b>		
Frameworks	Python frameworks	Flask
Libraries	Additional libraries	scikit-learn, pandas, numpy
Development Environment	IDE, version control	Jupyter Notebook
<b>Data</b>		
Data	Source, size, format	Kaggle Dataset. This dataset contains about 10 years of daily weather observations from many locations across Australia. 14.09MB CSV file.