

Project Proposal (Proposed Solution)

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	<p>This project will develop a machine learning model to predict rainfall for the next day in various locations across Australia.</p>
Problem Statement:	
Description	<p>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.</p>

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>
Proposed Solution:	
Approach	<p>Train machine learning models (e.g., Logistic Regression, Decision Trees, Random Forests, XG-Boost) 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
Hardware:		
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
Software:		
Frameworks	Python frameworks	Flask
Libraries	Additional libraries	scikit-learn, pandas, numpy
Development Environment	IDE, version control	Jupyter Notebook
Data:		
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.