Project Initialization and Planning Phase

Date	09 JULY 2024
Team ID	SWTID1720111029
Project Title	Unveiling Climate Change Dynamics through Earth Surface Temperature Analysis
Maximum Marks	3 Marks

Project Proposal:

Project Overview	
Objective	To develop a deep learning model that analyzes Earth surface temperature data to reveal climate change patterns and predict future trends.
Scope	• Translate the model's findings into clear visualizations and reports for scientific community and policymakers to inform climate change mitigation strategies. • Couple the deep learning model with Earth observation systems for real-time monitoring. This could trigger early warnings for extreme weather events like heatwaves or droughts based on predicted temperature deviations. • Train the model to simulate the potential effects of theoretical large-scale climate engineering solutions (e.g., stratospheric aerosol injection) on future Earth surface temperatures. This would inform discussions on the feasibility and risks of such interventions.
Problem Statement: Current climate models struggle to efficiently process vast amounts of temperature data and accurately predict regional climate changes, hindering our understanding of climate change dynamics and future temperature trends.	
Description	Climate researchers face challenges in analyzing massive, complex datasets of global surface temperatures. This project aims to address the limitations of current models in handling regional variations and processing large-scale data.
Impact	Improved understanding of climate change patterns, more accurate temperature predictions, and better-informed climate policy decisions and adaptation strategies

Proposed Solution: A deep learning model that can efficiently process large-scale temperature data, identify patterns, and generate accurate predictions while accounting for regional variations.	
Approach	Recurrent neural networks (RNNs) or LSTM networks for temporal analysis.
Key Features	• Ability to handle large-scale, complex temperature datasets • Incorporation of both spatial and temporal aspects of climate data • Improved accuracy in regional climate predictions • Visualization tools for identified patterns and trends • Scalable architecture for integration of additional climate variables

Resource Requirements

Resource Type	Description	Specification/Allocation
Hardware		
Computing Resources	CPU/GPU specifications, number of cores	1 x NVIDIA GeForce RTX 3050 Ti
Memory	RAM specifications	16 GB
Storage	Disk space for data, models, and logs	1 TB SSD
Software		
Frameworks	Python frameworks	Flask, Tensorflow
Libraries	Additional libraries	Pandas, Numpy, Matplotlib…etc.
Development Environment	IDE, version control	Jupyter Notebook, Git
Data		
Data	Source, size, format	Kaggle dataset, 3192, CSV