**Project Ideas**

1. **AI-Based Scenario Planning for Climate Change Adaptation**

**Dataset: {can be accessed using API}**

[**https://cds.climate.copernicus.eu/cdsapp#!/dataset/reanalysis-era5-single-levels?tab=form**](https://cds.climate.copernicus.eu/cdsapp#!/dataset/reanalysis-era5-single-levels?tab=form)

**What we can do with dataset?**

Exploratory Data Analysis (EDA):

Visualization: Use heatmaps, time series plots, and correlation matrices to explore relationships between variables.

1. **Application based approach:**

* Backend – logic + flask
* Frontend – html + css + js

1. **Comparative based approach:**

* LSTM (predictive ml model)
* Monte Carlo Simulation (mathematical model based on random sampling)

**Problem statement:**

Web app to predict the likelihood of extreme weather events, such as heatwaves or heavy rainfall for any specified geographic location. The app will use time series forecasting model LSTM, to analyse historical climate data, and Monte Carlo simulations to assess the uncertainty and potential variability in the predictions. The goal is to provide users with accurate and actionable insights into upcoming extreme weather conditions.

**Problem statement:**

Comparative analysis of LSTM and Monte Carlo simulations. This study aims to evaluate the accuracy, reliability, and computational efficiency of these two methods in predicting temperature over a certain period. By comparing the performance of LSTM, a deep learning approach, with Monte Carlo simulations, a probabilistic method, the research will provide insights into the strengths and weaknesses of each technique.

**Research paper:**

[**https://link.springer.com/chapter/10.1007/978-3-031-49333-1\_1**](https://link.springer.com/chapter/10.1007/978-3-031-49333-1_1)

[**https://link.springer.com/article/10.1007/s00477-022-02378-w**](https://link.springer.com/article/10.1007/s00477-022-02378-w)

[**https://journals.plos.org/plosone/article%3Fid%3D10.1371/journal.pone.0194889**](https://journals.plos.org/plosone/article%3Fid%3D10.1371/journal.pone.0194889)