

## TECHNICAL CLUB

The **Department of Data Science and Artificial Intelligence, Himachal Pradesh University, Shimla** conducted a **Hackathon** titled “**Weather AI: Smart Forecasting with ML & DL**”, an event designed to encourage hands-on innovation and real-world problem-solving in the domain of weather intelligence. This initiative was made possible thanks to the support and opportunity provided by **Prof. Manu Sood Sir, Chairman, Department of Data Science and AI**, whose guidance played a key role in its successful execution.

The hackathon aimed to inspire students to apply advanced machine learning and deep learning techniques to critical challenges related to weather prediction, environmental monitoring, and climate analytics. Students from the **MSc Data Science and AI** program participated enthusiastically, showcasing creativity, teamwork, and strong technical skills.

The event featured **four major project tracks**, each focusing on an essential component of weather forecasting:

### **(i) Rainfall Prediction Model**

Teams developed ML/DL models using historical meteorological datasets and sensor-driven insights to accurately predict rainfall patterns. Several groups explored hybrid architectures and advanced ensemble techniques.

### **(ii) Temperature Forecasting**

Participants built temperature forecasting systems leveraging models such as LSTM networks, ARIMA variants, and regression approaches. Their projects aimed at generating reliable short-term and long-term temperature predictions.

### **(iii) Air Quality Forecasting**

Students worked on forecasting Air Quality Index (AQI) values using diverse environmental parameters, including pollutant concentration, wind speed, and humidity. Many implemented models such as Random Forest, XGBoost, and CNN-LSTM hybrids.

### **(iv) Real-Time Weather Dashboard**

Some groups designed interactive weather dashboards integrating real-time APIs, forecasting models, and visual analytics. These dashboards offered

comprehensive insights into present conditions, historical trends, and predictive outcomes.

Throughout the hackathon, participants utilized a wide range of **emerging technologies**, including Python-based ML libraries, cloud computing tools, IoT-driven datasets, and modern visualization platforms. The final projects were showcased to the entire MSc Data Science and AI community, highlighting the participants' strong analytical thinking and technical innovation.

The event significantly enhanced students learning experience by strengthening their technical expertise, collaborative skills, and research-oriented approach. With enthusiastic participation and valuable support from the department, the hackathon concluded as a remarkable and enriching success.