REPORT ON PROJECT

**Ozone Predictor: Deep learning Ozone hole prediction**

**Objective:**

To build a reliable time-series model using LSTM that predicts the mean area of the ozone hole using historical data on the primary drivers: ozone-depleting gases (ODGs).

**Data Source:**

1. antarctic-ozone-hole-area.csv – Historical annual ozone hole area data (Year, Mean Ozone Hole Area).
2. NasaOzoneWatch\_1.csv – NASA ozone monitoring dataset (part 1).
3. NasaOzoneWatch\_2.csv – NASA ozone monitoring dataset (part 2).
4. odgi\_table1.csv – Ozone-depleting gases index data (part 1).
5. odgi\_table2.csv – Ozone-depleting gases index data (part 2).

**Model:**

* Pre-trained regression model (ozone\_model.pkl)
* Data standardized using scaler.pkl for accurate predictions.

**Implementation Flow:**

1. User enters a **year** (min historical year to 2100).
2. Model predicts the scaled ozone hole area.
3. Scaler inverse-transforms to obtain actual km².
4. Prediction displayed in the interface.

**Technology Stack:**

* Python, Streamlit, Pandas, NumPy, Matplotlib, Pickle

**Example:**  
For year **2025**, the app might predict:  
*Predicted Mean Ozone Hole Area: 20,345.67 km²*

**Potential Improvements:**

* Integrate NASA datasets directly for live updates
* Display historical + forecast trends in interactive charts
* Use ODGI (ozone-depleting gases index) as additional model features