**Airplane Crash and Fatalities in India – Final Report**

**Introduction**

This report analyzes airplane crash data in India from 1938 to 2025. The objective is to identify major causes of crashes, examine the types of aircraft and engines most involved, highlight contributing environmental and operational factors, and suggest data-backed preventive solutions. The data fields include details such as date, time, aircraft type, engine type, fatalities, survivors, crash type, weather, wind, speed, altitude, and more.

**Descriptive Analysis**

* Crash Types: The most frequent causes of crashes are:
  + Pilot Error and Failure
  + Loss of Control
  + Mid-Air Collisions
  + Hijacks
  + Mechanical/Electrical Failures
* Manufacturer Trends:
  + Boeing aircraft are involved in the highest number of crashes.
  + Other involved manufacturers include Airbus, ATR, and Pratt & Whitney.
* Fatalities Trend by Year: Major spikes in fatalities occurred during:
  + 1976
  + 1981
  + 1996
  + 2020
* Passenger Impact:
  + Crashes with higher passenger loads (329–349) saw significantly higher fatalities.

**Diagnostic Analysis**

* Crash Types with Survivors vs Fatalities:
  + Crashes due to pilot error and hijacks often result in fewer survivors.
  + Mechanical/electrical failures show mixed outcomes.

Aircraft Types Involved:

* + Boeing 737 variants (200, 2A8, 8HG) are frequently present.
  + Airbus A300 and A320 also show high fatality associations.
* Losses & Altitude: Fatal crashes have occurred across all altitudes, with no singular pattern, indicating multiple failure points (e.g., takeoff, mid-flight, landing).

**Predictive Analysis**

* Engine Types:
  + Engine models like CFM56 and CF6-50C are recurring in incidents.
  + Crashes involving older engine builds contribute to higher fatality rates.
* Weather Impact:
  + High fatalities occurred during partly cloudy, monsoon, and foggy weather conditions.
  + Clear weather still contributed to significant crashes, implying operational/human error.
* Aircraft Build Year:
  + Older aircraft (pre-1990s) are more frequently associated with severe crashes and higher fatalities.

**Prescriptive Analysis**

* Fatalities by Aircraft Type**:**
  + Boeing 747 and 737 models show the **highest average fatalities**.
  + Airbus A300 and A320 follow closely.
* Crash Types by Weather**:**
  + **Rain, fog, thunderstorm, and monsoon** weather conditions are critical factors.
  + Recommending improved pre-flight weather assessments and in-flight navigation systems.

**Conclusion**

The dashboard insights highlight that:

* **Pilot-related errors** and **adverse weather conditions** are the dominant causes.
* **Boeing aircraft**, especially older models, have the **highest fatality records**.
* **Modernizing fleets**, enhancing **pilot training**, and **upgrading ATC and landing systems** can reduce fatalities.
* **Strict enforcement** of **weather protocols** and **routine maintenance checks** for older aircraft are crucial.
* Targeted safety improvements in **high-risk regions** can minimize recurrence.