CAPSTONE PROJECT

Tracking Maternal Health Progress Toward SDG 3.1

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OUTLINE

- **Problem Statement** (Should not include solution)
- **Proposed System/Solution**
- **System Development Approach** (Technology Used)
- **Algorithm & Deployment**
- **Result (Output Image)**
- **Conclusion**
- **Future Scope**
- **References**

PROBLEM STATEMENT

The Sustainable Development Goal 3.1 aims to reduce the global maternal mortality ratio to less than 70 per 100,000 live births by 2030. Monitoring progress towards this goal requires analyzing country-wise data on maternal mortality and associated health indicators such as antenatal care coverage, births attended by skilled personnel, adolescent birth rates, and healthcare expenditures. Despite global efforts, maternal health outcomes vary drastically between regions and income groups, raising the need for data-driven insights into the factors influencing maternal health.

PROPOSED SOLUTION

The proposed system aims to analyze country-wise maternal health data to track progress toward **SDG 3.1** using **IBM Data Refinery**. It identifies trends and disparities in maternal mortality and related health indicators. The system includes the following components:

- **Data Collection:**
  - **Import datasets on maternal mortality, antenatal care, adolescent birth rates, skilled birth attendance, and health expenditure from WHO and World Bank.**
- **Data Preprocessing:**
  - **Clean and join datasets using IBM Data Refinery. Handle missing values, filter by year and region, and create new calculated fields..**
- **Visualization:**
  - **Generate line charts, bar graphs, and pie charts to reveal trends, comparisons, and disparities using built-in Data Refinery tools.**
- **Deployment:**
  - **Entire workflow developed and saved in IBM Watson Studio using Data Refinery. Outputs exported for reporting..**
- **Evaluation:**

  Visual results assessed for clarity and effectiveness in representing progress toward reducing maternal mortality.
- Result:

  Charts show country-wise trends, income group comparisons, and health factor correlations influencing maternal health.

SYSTEM APPROACH

The "System Approach" outlines the overall strategy and tools used to design and implement the data-driven analysis system for tracking progress toward SDG 3.1. The approach ensures data cleaning, transformation, visualization, and insight extraction without requiring code.

System requirements

Platform: IBM Cloud (Lite Tier)

- **Workspace**: IBM Watson Studio
- **Tool Used**: IBM Data Refinery
- **Data Format**: CSV datasets (e.g., MMR, ANC coverage, adolescent birth rate)
- **Output Format**: Visual charts (bar, line, pie) and refined datasets

Library required to build the model

IBM Data Refinery (no external Python libraries required)

- Built-in operations: Join, Filter, Clean, Derive Columns, Format
- Built-in visualizations: Line Charts, Bar Charts, Pie Charts, Heatmaps

ALGORITHM & DEPLOYMENT

- **Algorithm Selection:**

  No machine learning was used. The project followed a **data analysis approach** using IBM Data Refinery to identify patterns in maternal health indicators

- **Data Input:**

Used features include:

- Maternal Mortality Ratio
- Antenatal Care Coverage
- Adolescent Birth Rate
- Skilled Birth Attendance
- Health Expenditure
- Country and Year

Processing

Data was cleaned, filtered, and joined in IBM Data Refinery. Derived columns and grouped summaries were created for better insights.

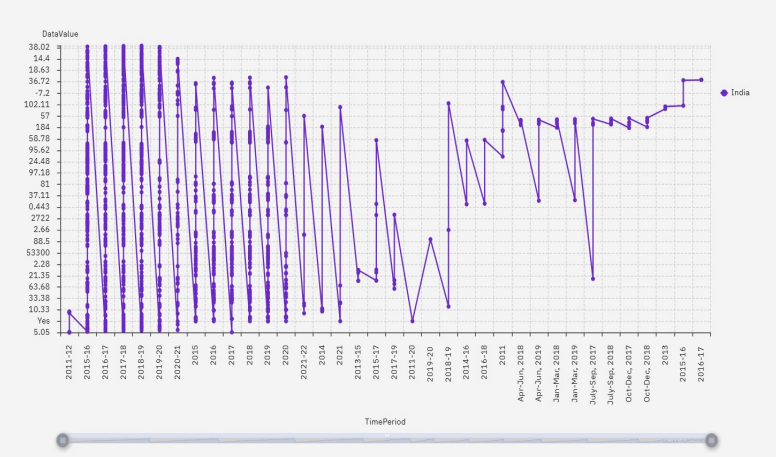
Visualization:

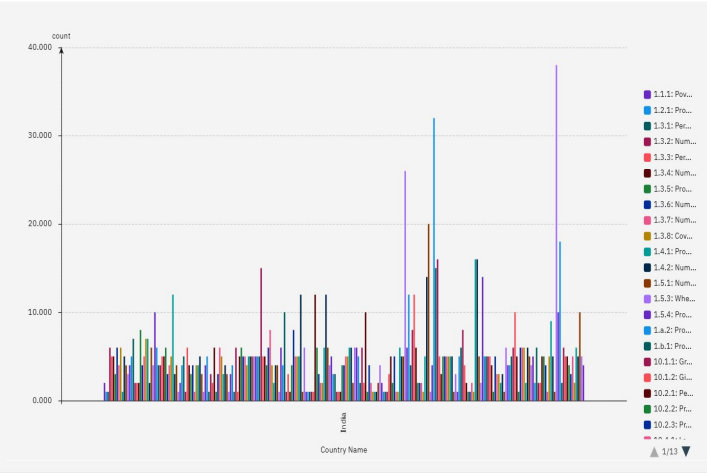
Charts such as line graphs, bar charts, and pie charts were created using built-in tools to show trends and comparisons.

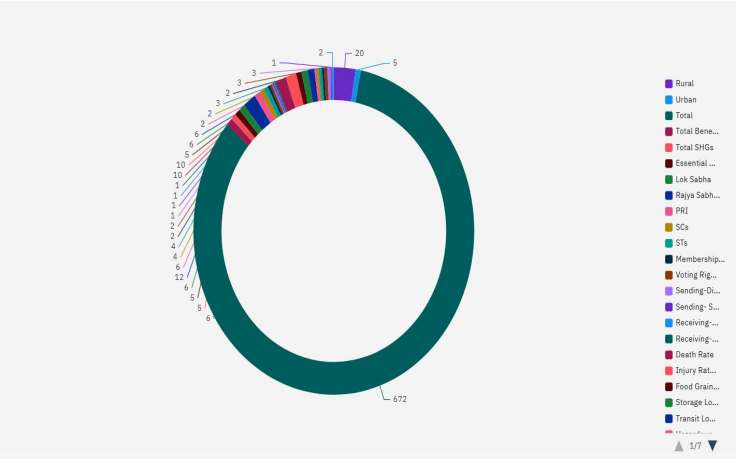
- **Deployment:**

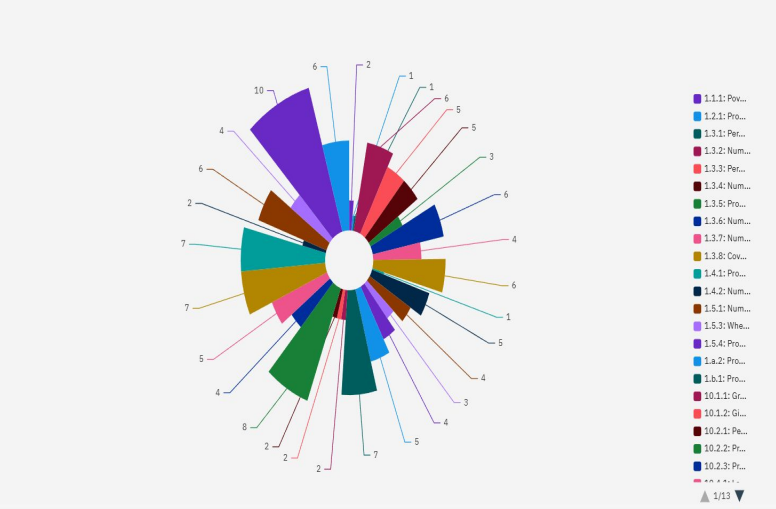
The entire workflow was saved and deployed in **IBM Watson Studio's Data Refinery**, with outputs exported as images for reporting.

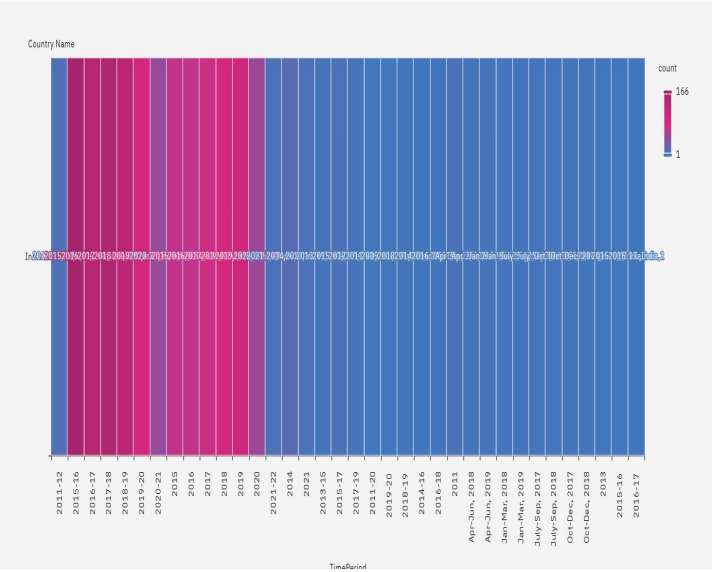
RESULT











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CONCLUSION

- The project successfully analyzed global maternal health data using IBM Data Refinery, aligning with Sustainable Development Goal 3.1. The visualizations revealed significant disparities in maternal mortality rates across regions and income groups. Countries with higher antenatal care, skilled birth attendance, and healthcare spending showed better maternal outcomes. The system provides a clear, data-driven view of where improvements are needed, helping guide policy decisions and global health interventions.

FUTURE SCOPE

- Integrate **real-time or yearly updated data** to continuously monitor progress toward SDG 3.1.
- Expand the system to include **predictive analytics** using machine learning for future trend forecasting.
- Add **more health indicators** such as neonatal mortality and maternal age for deeper insights.
- Develop an **interactive dashboard** using IBM Cognos or Power BI for better user access and exploration.
- Support **policy planning** by generating automated reports for specific countries or regions.

REFERENCES

- World Health Organization (WHO) – Global Health Observatory Data
  https://www.who.int/data/gho

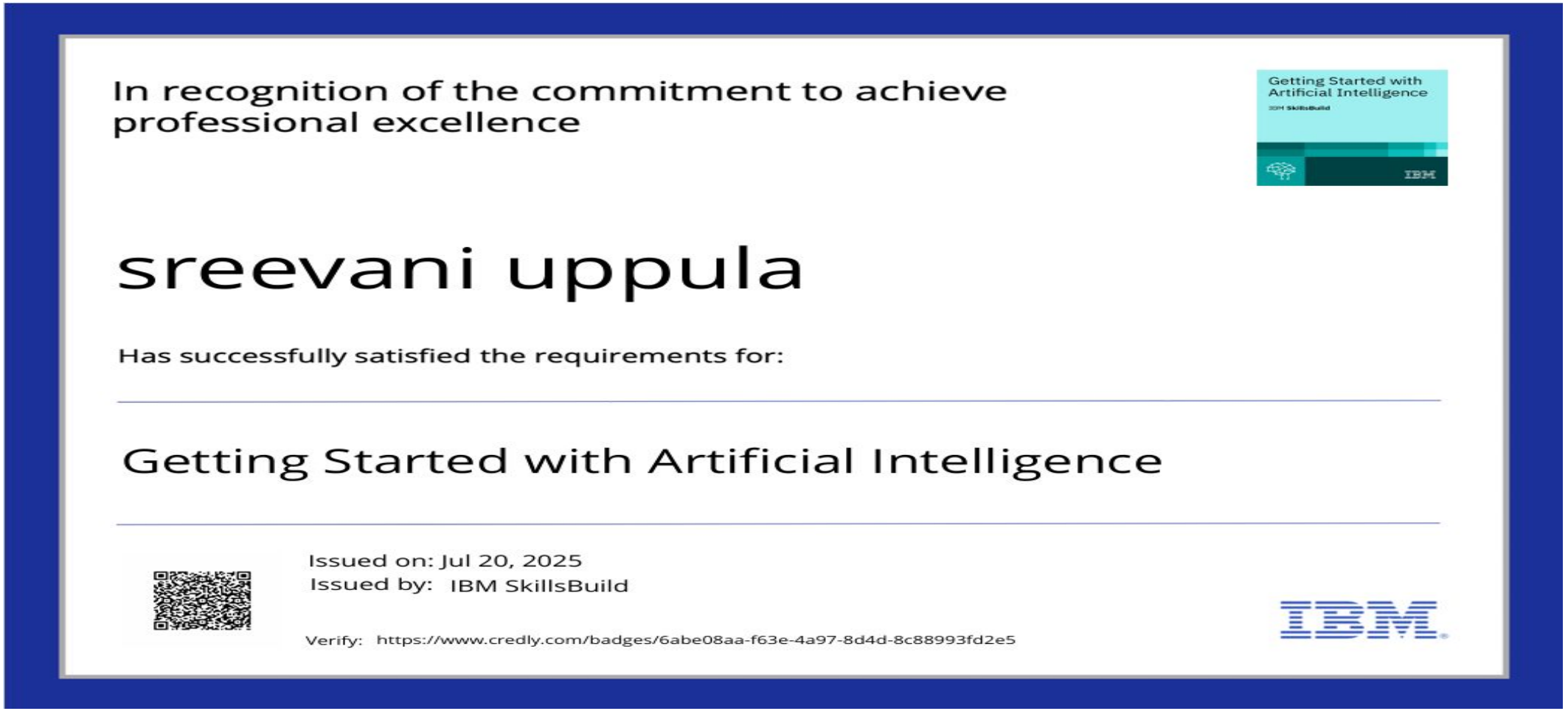
- World Bank Open Data – Maternal Health Indicators
  https://data.worldbank.org

- United Nations – Sustainable Development Goals (SDG 3.1)
  https://sdgs.un.org/goals/goal3

- UNICEF – Maternal and Newborn Health Reports
  https://www.unicef.org/health/maternal-newborn-health

- IBM Cloud – Data Refinery Documentation
  https://www.ibm.com/docs/en/cloud-paks/cp-data/4.0?topic=refinery-data

IBM CERTIFICATIONS



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IBM **SkillsBuild** Completion Certificate

This certificate is presented to

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According to the Adobe Learning Manager system of record

Completion date: 23 Jul 2025 (GMT) **Learning hours:** 20 mins

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