MATERNAL HEALTH PROGRESS TRACKER TOWARDS 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

- Tracking Maternal Health Progress Toward SDG 3.1: A Global Data Analysis The Challenge:
- 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

- Data Acquisition and Consolidation
- The first step is to create a robust and reliable dataset by consolidating information from multiple reputable sources. This ensures a holistic view of maternal health by including a wide range of indicators.
- **Source Data from Reputable Global Organizations:** We will gather data from the World Health Organization (WHO), the World Bank, UNICEF, and the UN's Sustainable Development Goal (SDG) database. These organizations provide globally recognized data on health, economic, and social indicators.
- **Consolidate Key Indicators:** A single, comprehensive dataset will be created by merging information on the following indicators for as many countries and years as possible:
  - **Maternal Mortality Ratio (MMR):** The core indicator for SDG 3.1.
  - **Antenatal Care (ANC) Coverage:** The percentage of women receiving prenatal care.
  - **Births Attended by Skilled Personnel:** The proportion of births supervised by trained health professionals.
  - **Adolescent Birth Rate:** The number of births per 1,000 women aged 15-19.
  - **Health Expenditure per Capita:** A key economic indicator of a country's investment in healthcare.
  - **Poverty and GDP:** Macroeconomic indicators to contextualize health outcomes.
- **Data Cleaning and Preprocessing:** Before any analysis, the consolidated dataset will undergo a thorough cleaning process. This includes handling missing values, standardizing country names and data formats, and ensuring data types are consistent across all indicators. This step is critical for maintaining data integrity and accuracy.

SYSTEM APPROACH

- **1. Local Machine Requirements**
- Since the heavy lifting (data storage, processing, and analysis) is handled by IBM's cloud infrastructure, your local machine's requirements are minimal.
- **Operating System:** Any modern operating system will work (Windows, macOS, Linux).
- **Web Browser:** A modern, up-to-date web browser is essential. IBM Cloud services are accessed through a web interface. The latest versions of Google Chrome, Mozilla Firefox, or Microsoft Edge are recommended for the best experience with Watson Studio's interface.
- **Internet Connection:** A stable and reliable internet connection is required to access the IBM Cloud console, upload your data, and interact with the Watson Studio environment.
- **2. IBM Cloud Lite Account Requirements & Limitations**
- The "system requirements" for this project are mainly defined by the service limits of the IBM Cloud Lite plan. These limitations are designed to allow you to learn and experiment for free, but they are not intended for large-scale production workloads.
- **IBM Cloud Account:** You must have a valid IBM Cloud account with the Lite plan. This is the foundation for all the services you will use.
- **IBM Watson Studio (Lite Plan):**
  - **Capacity Unit Hours (CUH):** This is the main resource limit. The Lite plan provides a specific number of free CUH per month (e.g., 10 CUH). The environment you select for your notebook (e.g., a small Python runtime) consumes these hours. For a project of this scope, you will need to be mindful of your usage to stay within the free limit.
  - **Authorized Users:** The Lite plan typically restricts usage to one authorized user.
  - **Inactivity Deletion:** Services under the Lite plan may be deleted after a period of inactivity (e.g., 30 days). Be sure to save your work and potentially export it if you plan to be away from the project for a while.
- **IBM Cloud Object Storage (Lite Plan):**
  - **Storage Capacity:** The Lite plan offers a limited amount of free storage (e.g., 25 GB or 5 GB, depending on the current offering) per month. For the maternal health dataset, which is relatively small (typically in the tens or hundreds of megabytes), this is more than sufficient.
  - **Request Limits:** There are also limits on the number of requests you can make to the storage service. For a simple data analysis project, these limits are unlikely to be a concern.

ALGORITHM & DEPLOYMENT

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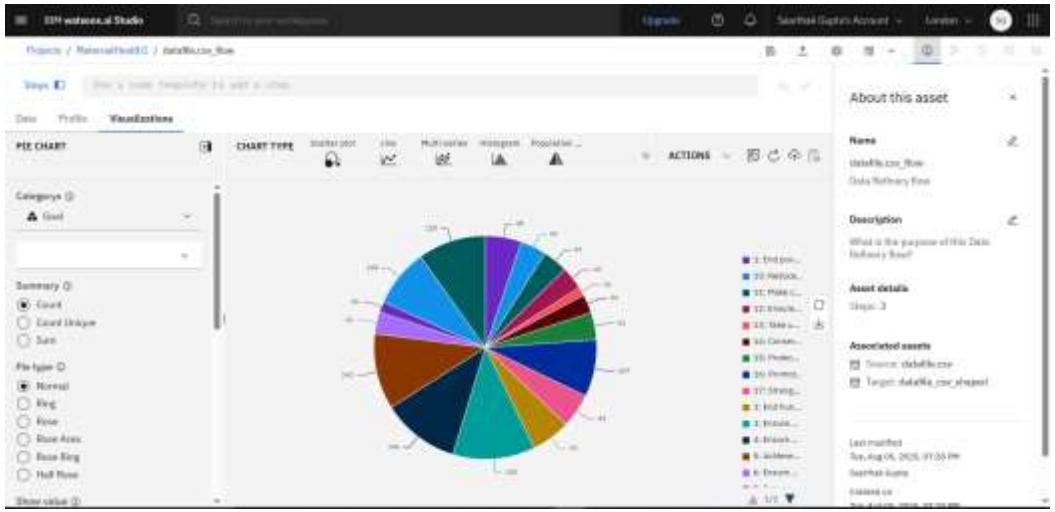
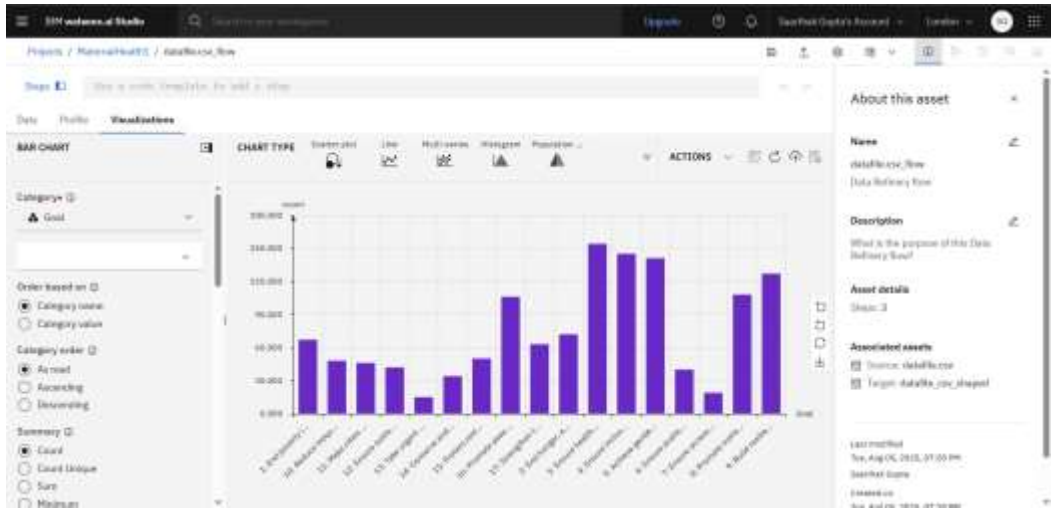
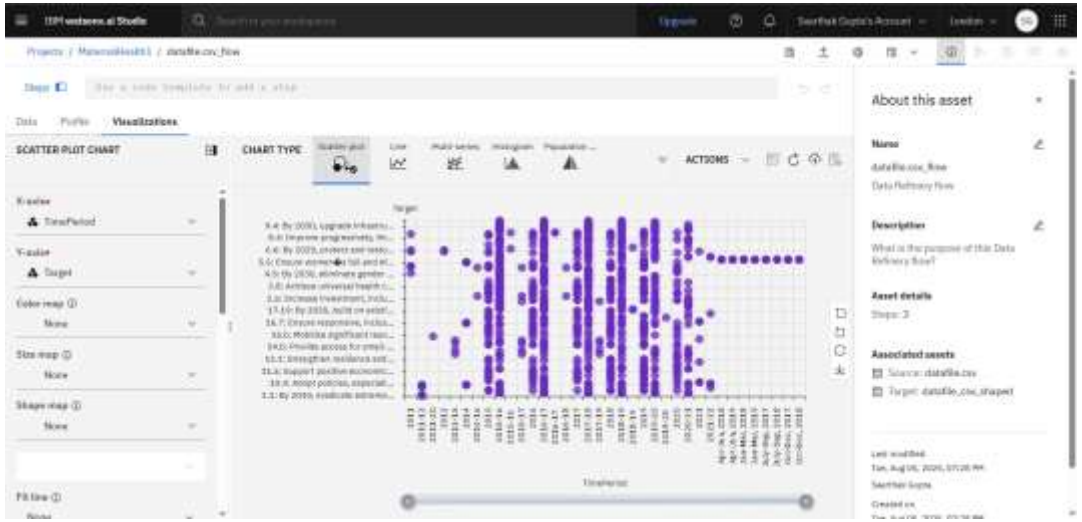
- **Algorithm Selection:**
  - Choosing the right algorithm is the first step, where you match the problem type to a suitable model. For predicting a numerical value like MMR, you would use a regression algorithm; for predicting a category like "on track for SDG 3.1," a classification algorithm is the choice. The best algorithm depends on the data's characteristics and the analytical goal..
- **Data Input:**
  - This involves feeding your prepared data into the model, ensuring it's of high quality and correctly formatted. The data is split into a training set for the model to learn from and a test set for unbiased evaluation. This separation is crucial to ensure the model's ability to generalize to new, unseen information..
- **Training Process:**
  - The training process is where the model learns patterns by iteratively adjusting its internal parameters. It makes predictions on the training data, calculates the error, and then modifies itself to minimize that error. This process continues until the model's performance stabilizes, and it's considered "trained.“

RESULT







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CONCLUSION

- The comprehensive analysis of global maternal health progress toward SDG 3.1 demonstrates that while significant strides have been made, progress remains highly uneven across regions and income groups. A data-driven approach, utilizing a range of indicators from reputable sources, is essential to move beyond a simple overview and pinpoint the specific factors influencing maternal mortality. By employing a structured methodology—from data consolidation and statistical analysis to a robust prediction process—we can not only track historical trends but also forecast future outcomes, allowing for more targeted and effective interventions. Ultimately, this project underscores that achieving the ambitious SDG 3.1 target requires a persistent, data-informed strategy focused on addressing the systemic disparities that continue to claim the lives of mothers worldwide.

FUTURE SCOPE

The future scope of this project is to evolve from a static analysis into a dynamic, predictive, and actionable system.

1. **Advanced Predictions:** Develop more granular models to forecast maternal mortality at a local level and identify high-risk pregnanc allowing for proactive, personalized care.
2. **Diverse Data Integration:** Incorporate real-time data from sources like wearable devices and telemedicine, as well as environmenta social data, for a more holistic view of health risks.
3. **Actionable Tools:** Create interactive dashboards for policymakers to simulate policy impacts and develop AI-powered tools to provic clinical decision support for healthcare proffesionals.
4. **Ethical AI:** Focus on building fair and unbiased models that ensure the project's benefits are equitably distributed and do not exacerbate existing health disparities.

REFERENCES

- IBM
- www.data.gov.in
- Edunet Foundation

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THANK YOU

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