CAPSTONE PROJECT

TRACKING MATERNAL HEALTH PROGRESS TOWARD SDG 3.1: A GLOBAL DATA ANALYSIS

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OUTLINE

- Problem Statement
- Proposed System/Solution
- System Development Approach
- Algorithm & Deployment
- Result
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PROBLEM STATEMENT

Despite global commitments to maternal health, the **maternal mortality ratio (MMR)** still exceeds the **Sustainable Development Goal 3.1** target of **70 deaths per 100,000 live births by 2030** in many countries.

Progress monitoring is difficult due to disparities in:

- Health infrastructure
- Antenatal care coverage
- Adolescent birth rates
- Skilled birth assistance

A robust data analysis is essential to understand trends and guide policy.

PROPOSED SOLUTION

To track maternal health progress and identify influencing factors, we propose a **data-driven analytical system** that:

- Ingests multi-country health data from the AI Kosh SDG dataset
- Analyzes key indicators affecting maternal mortality
- Builds predictive models for future projections
- Visualizes trends and highlights at-risk regions
- Uses **IBM Cloud Lite** tools for end-to-end development

SYSTEM APPROACH

- **Technologies Used:**
- **IBM Cloud Lite Services:**
  - Watson Studio (for EDA & ML)
  - IBM Cloud Object Storage (data storage)
  - Watson Machine Learning (deployment)
- **Python Libraries:** pandas, seaborn, matplotlib, scikit-learn, plotly

ALGORITHM & DEPLOYMENT

Algorithm:

- **Linear Regression / Random Forest / XGBoost** for predictive modeling
- **K-Means Clustering** for country grouping

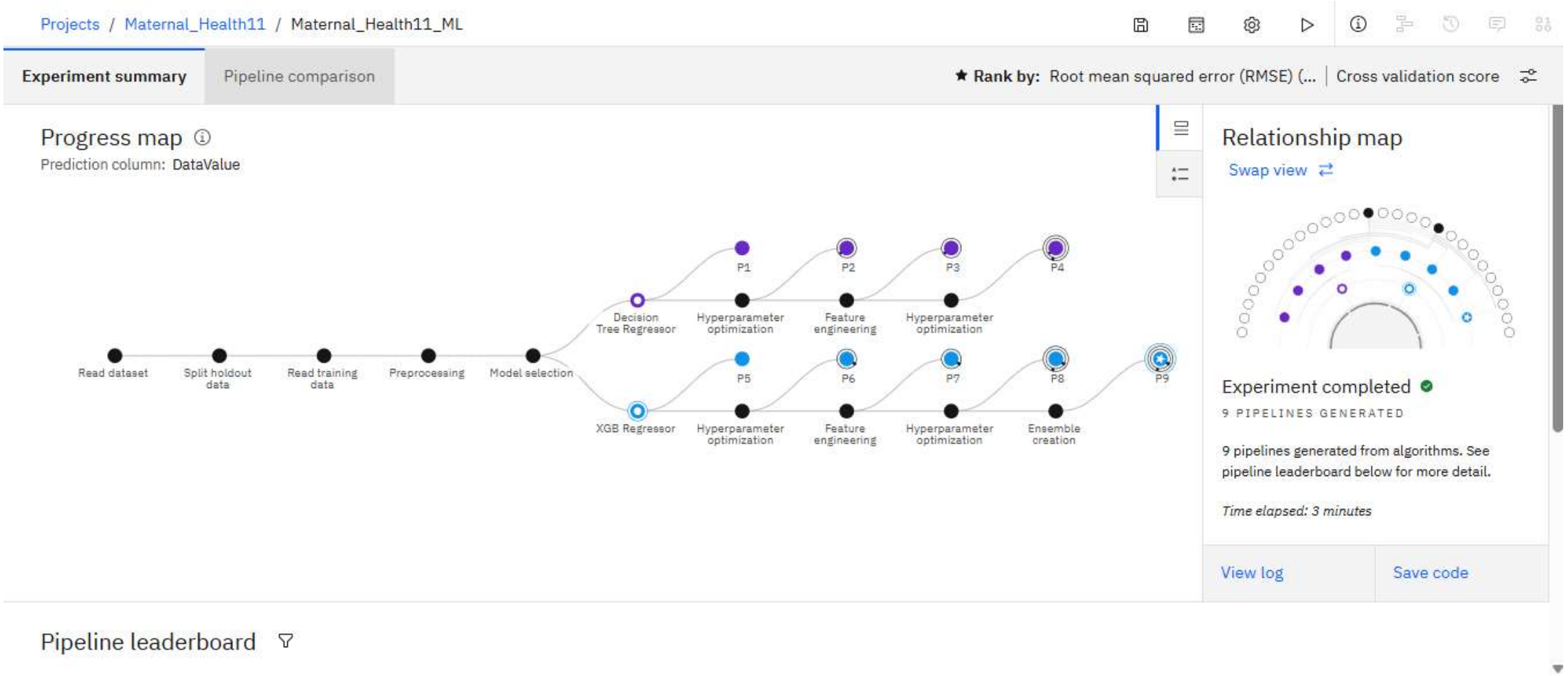
Training Inputs:

- Antenatal care (%)
- Births attended by skilled personnel (%)
- Adolescent birth rate
- Healthcare expenditure
- Historical MMR data

Deployment:

- Trained models deployed via **Watson Machine Learning**
- Interactive dashboard hosted using **IBM Cloud Foundry**.

RESULT



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Pipeline details

Pipeline 9

Ra...	RMSE (Optimiz...	Algorithm	Specializati...	Enhancements
1	26.665 (Holdout)	Batched Tree Ensemble Regressor (XGB Regre...	INCR	TFE HPO-1 FE +2

Save as

Model viewer

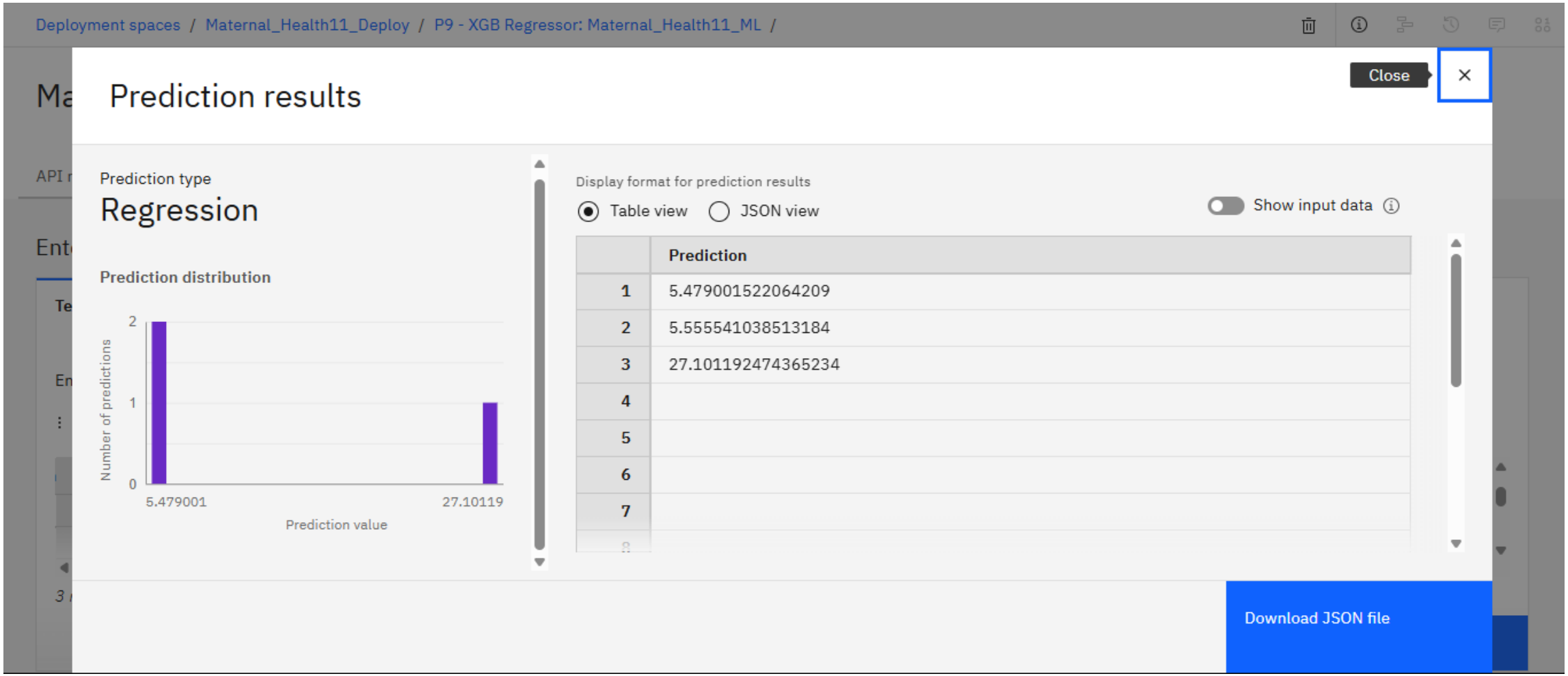
Model information

Feature summary

Evaluation

Model evaluation

Measures	Holdout score	Cross validation score
Root mean squared error	26.665	84.564
R squared	0.981	0.858
Explained variance	0.981	0.858
Mean squared error	711.030	7642.721
Mean absolute error	14.343	26.763
Median absolute error	8.759	9.174



CONCLUSION

- Maternal health varies widely between regions, income levels, and service coverage.
- Countries with low antenatal care and high adolescent birth rates tend to have higher MMR.
- The proposed system helps monitor progress and highlights gaps for intervention.
- **Data-driven insights** are essential for meeting the 2030 SDG target.

FUTURE SCOPE

- Integrate real-time health surveillance data and population growth rates
- Expand analysis to include **education**, **nutrition**, and **infrastructure**
- Apply **deep learning** for better forecasting
- Develop **mobile/web dashboards** for policymakers
- Scale to include other SDG targets (child mortality, infectious disease, etc.)

REFERENCES

- Maternal health care in India: a reflection of 10 years of national health mission on the Indian maternal health scenario
- https://www.who.int/news-room/fact-sheets/detail/maternal-mortality
- https://www.who.int/data/gho/indicator-metadata-registry/imr-details/4622

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