CAPSTONE PROJECT

IMPROVED SOURCE OF DRINKING WATER

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OUTLINE

- Problem Statement
- Proposed System/Solution
- System Development Approach
- Algorithm & Deployment
- Result (Output Image)
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PROBLEM STATEMENT

- Access to safe and improved sources of drinking water remains a pressing issue in India, particularly in rural and marginalized regions. Despite initiatives under the Sustainable Development Goals (SDGs), stark disparities persist in water accessibility across states, communities, and socio-economic groups.
- This project seeks to analyze data from the 78th Round of the Multiple Indicator Survey (MIS) to:
- Assess the percentage of population with access to improved drinking water sources.
- Examine associated factors like use of clean cooking fuel and migration patterns.
- Identify regional and demographic inequalities.
- Provide data-driven insights for shaping inclusive and effective water policies.
- The ultimate goal is to support equitable access to clean water and accelerate India's progress toward SDG 6 – *Clean Water and Sanitation for All*.

PROPOSED SOLUTION

- This project will analyze data from the 78th Round of the MIS survey to identify gaps in access to improved drinking water. The key steps include:
- Data Collection: Use AI Kosh dataset with indicators like water access, clean fuel use, and migration.
- Data Cleaning: Handle missing data, filter useful features, and prepare it for analysis.
- Analysis: Find patterns and inequalities across regions and groups.
- Visualization: Build interactive dashboards using IBM Cloud Lite for easy insight access.
- Outcome: Provide clear, actionable insights to support policy decisions for clean water access.

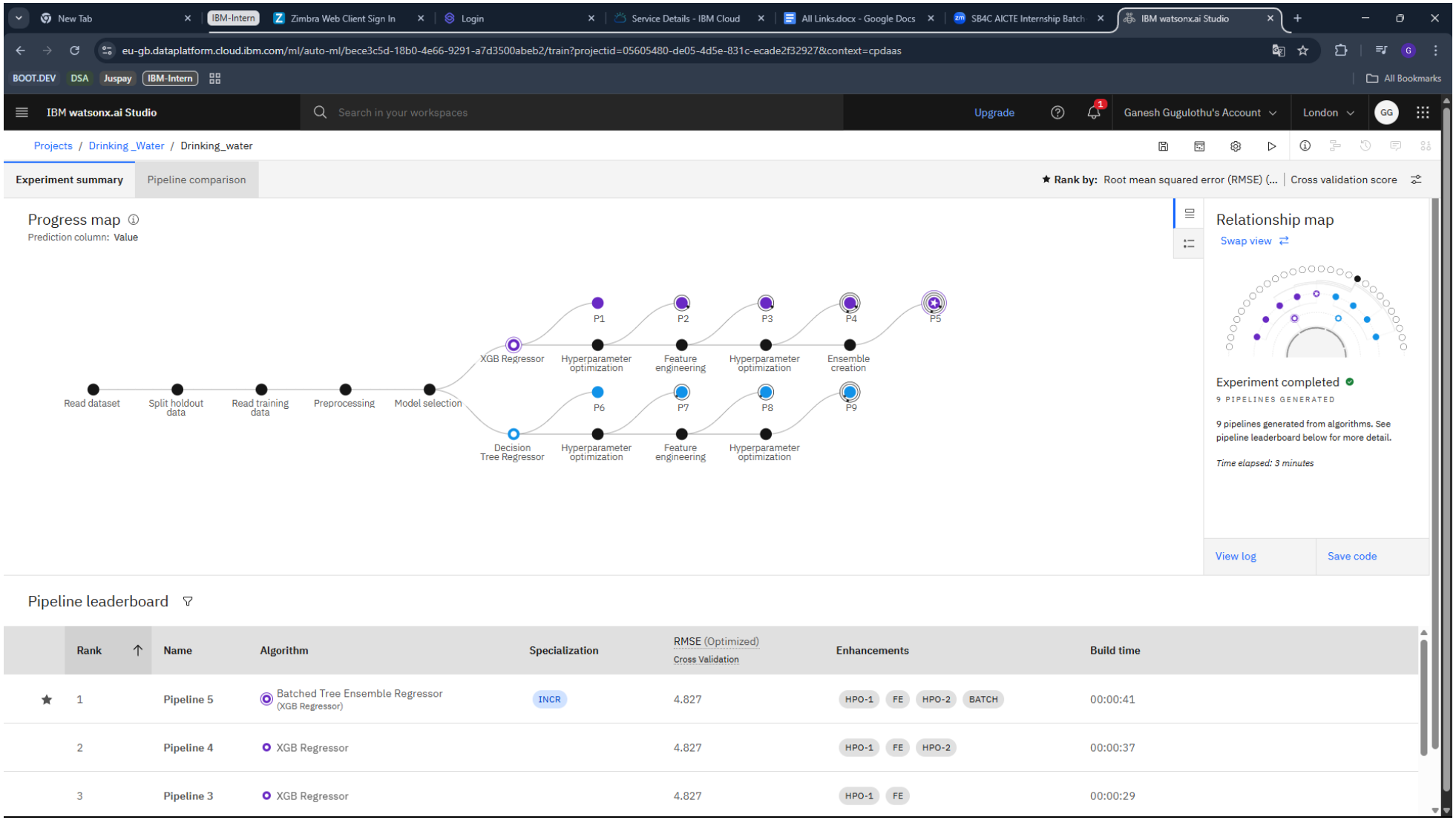
SYSTEM APPROACH

- ✅ System Requirements :-
- IBM Watsonx.ai Studio (Cloud-based)
- Web browser (Chrome/Edge)
- IBM Cloud Lite account (free tier)
- Internet-enabled laptop or PC
- IBM Cloud Object Storage for dataset handling
- 🧰 Tools & Libraries Used :-
- IBM Watsonx.ai AutoAI – to build and train ML models automatically
- Built-in Data Refinery – for data cleaning and transformation
- Watson Studio Dashboard – for visual insights and reporting
- No external coding libraries needed due to inbuilt automation features

ALGORITHM & DEPLOYMENT

- **Algorithm Section (Using IBM Watsonx.ai)**
- **Algorithm Used:-** Regression.
- IBM **AutoAI** Provides the best ML model based on data (e.g., Decision Tree, Random Forest, Regression).
- **Input Data:**
  - Access to drinking water
  - Use of clean cooking fuel
  - Migration status
  - Region type, income level, household size
- **Training Process:**
  AutoAI handles data splitting, preprocessing, feature selection, model testing, and optimization.
- **Prediction Output:**
  Predicts which areas lack improved water sources and shows results in dashboards for policymakers.

RESULT



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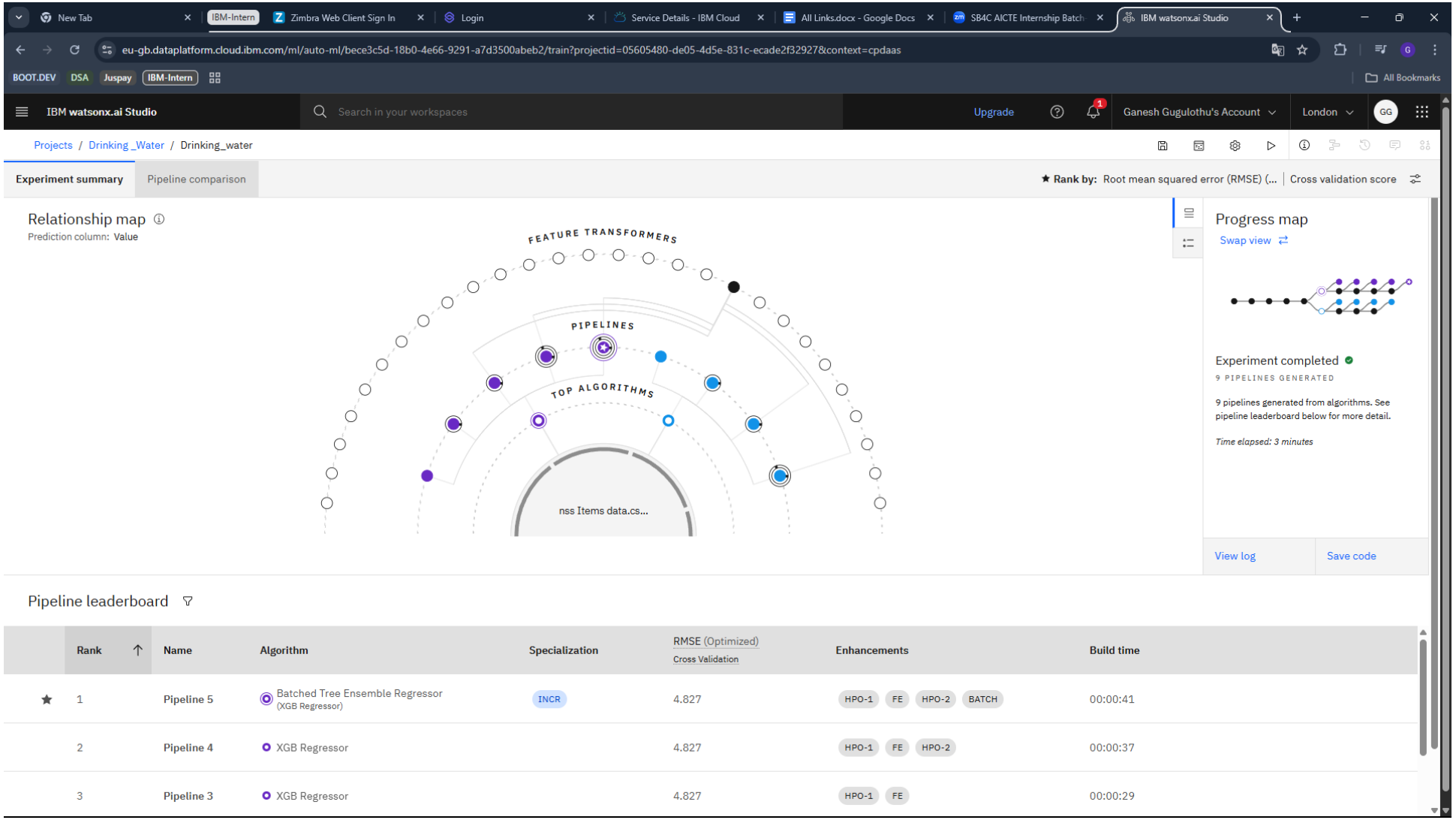
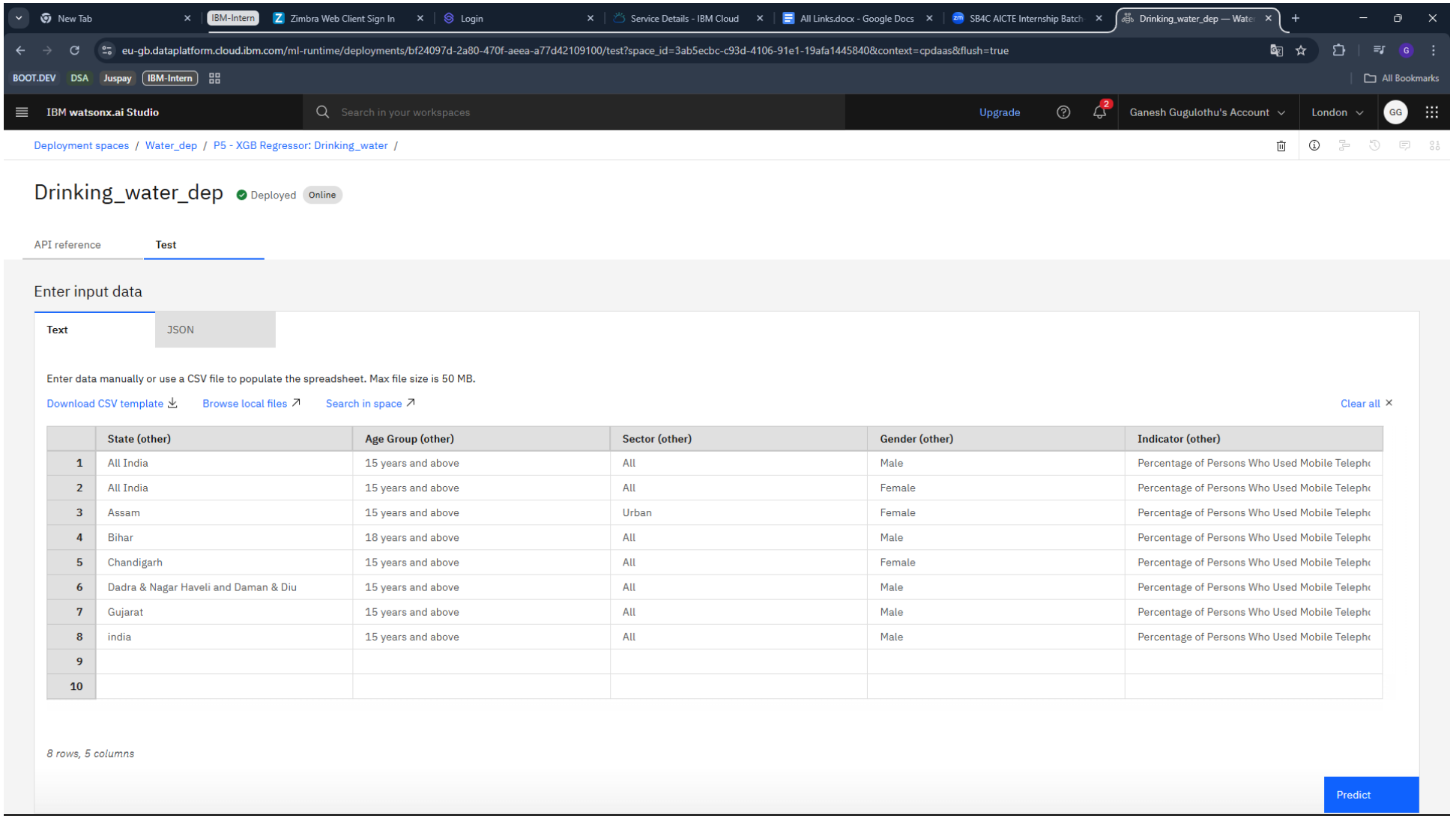
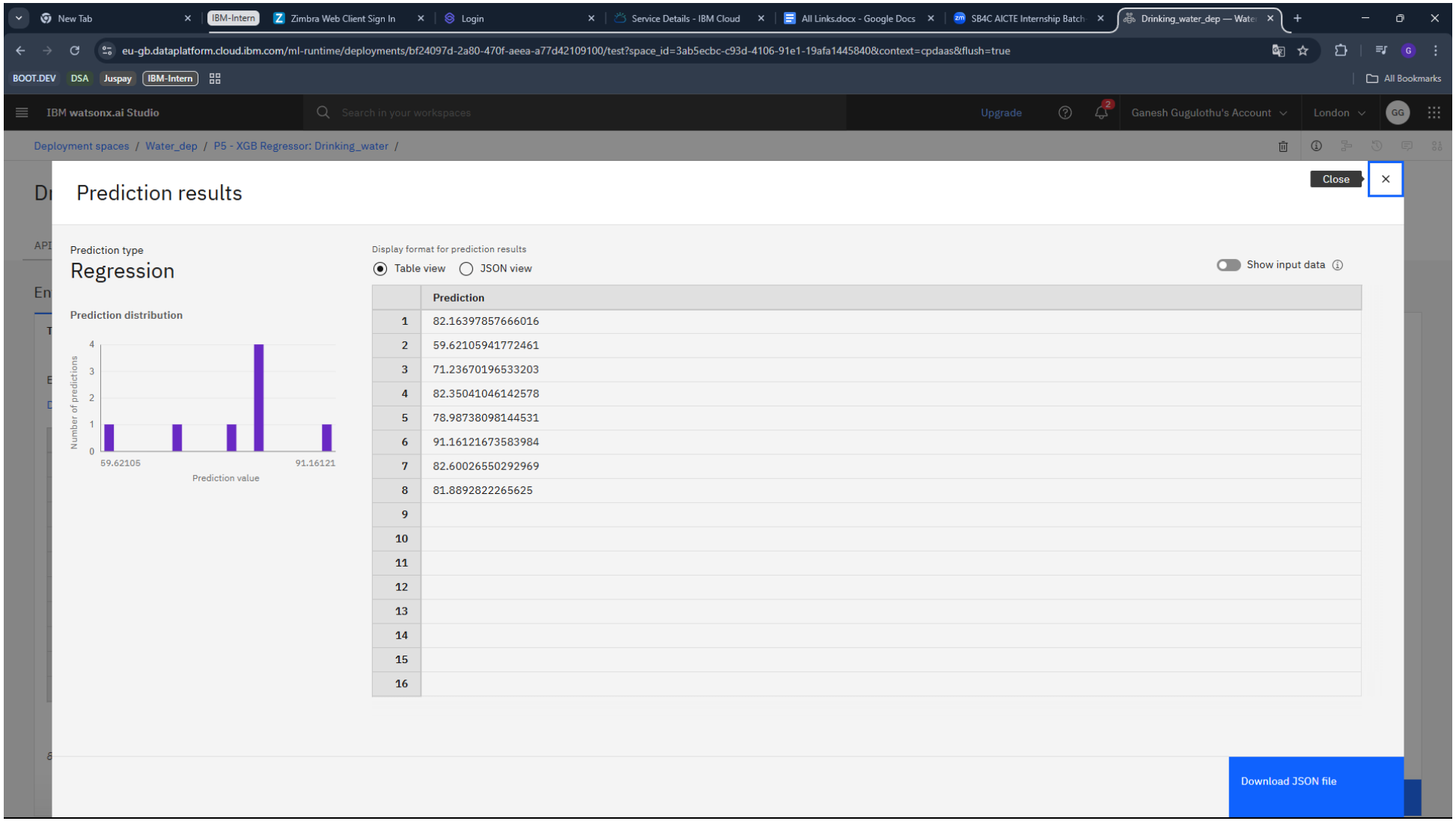




	State (other)	Age Group (other)	Sector (other)	Gender (other)	Indicator (other)
1	All India	15 years and above	All	Male	Percentage of Persons Who Used Mobile Telephc
2	All India	15 years and above	All	Female	Percentage of Persons Who Used Mobile Telephc
3	Assam	15 years and above	Urban	Female	Percentage of Persons Who Used Mobile Telephc
4	Bihar	18 years and above	All	Male	Percentage of Persons Who Used Mobile Telephc
5	Chandigarh	15 years and above	All	Female	Percentage of Persons Who Used Mobile Telephc
6	Dadra & Nagar Haveli and Daman & Diu	15 years and above	All	Male	Percentage of Persons Who Used Mobile Telephc
7	Gujarat	15 years and above	All	Male	Percentage of Persons Who Used Mobile Telephc
8	india	15 years and above	All	Male	Percentage of Persons Who Used Mobile Telephc
9					
10					



	Prediction
1	82.16397857666016
2	59.62105941772461
3	71.23670196533203
4	82.35041046142578
5	78.98738098144531
6	91.16121673583984
7	82.60026550292969
8	81.8892822265625
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CONCLUSION

- Using IBM Watsonx.ai, we successfully built an automated model to identify regions with inadequate drinking water sources. The solution effectively highlights disparities and supports data-driven planning. While handling missing data posed minor challenges, the insights gained are valuable for ensuring equitable water access and improving rural health outcomes.

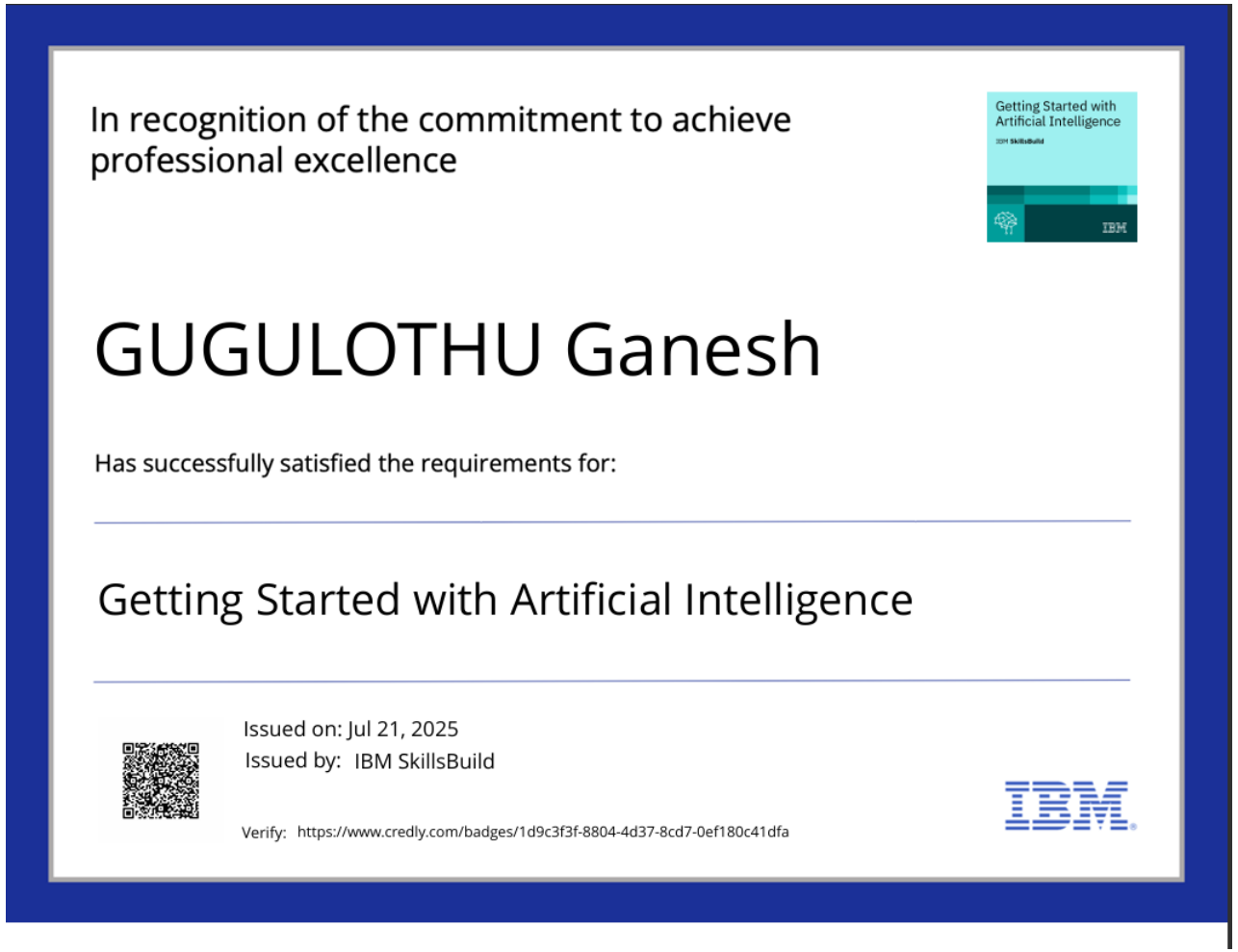
FUTURE SCOPE

- Discuss potential enhancements and expansions for the system. This could include incorporating additional data sources, optimizing the algorithm for better performance, and expanding the system to cover multiple cities or regions. Consider the integration of emerging technologies such as edge computing or advanced machine learning techniques.

REFERENCES

- National Sample Survey Office (NSSO) – MIS 78th Round Data
- IBM Cloud Documentation – watsonx.ai
- World Health Organization – Drinking Water Guidelines
- Research Article: *Machine Learning for Water Quality Monitoring*, Springer, 2020

IBM CERTIFICATIONS



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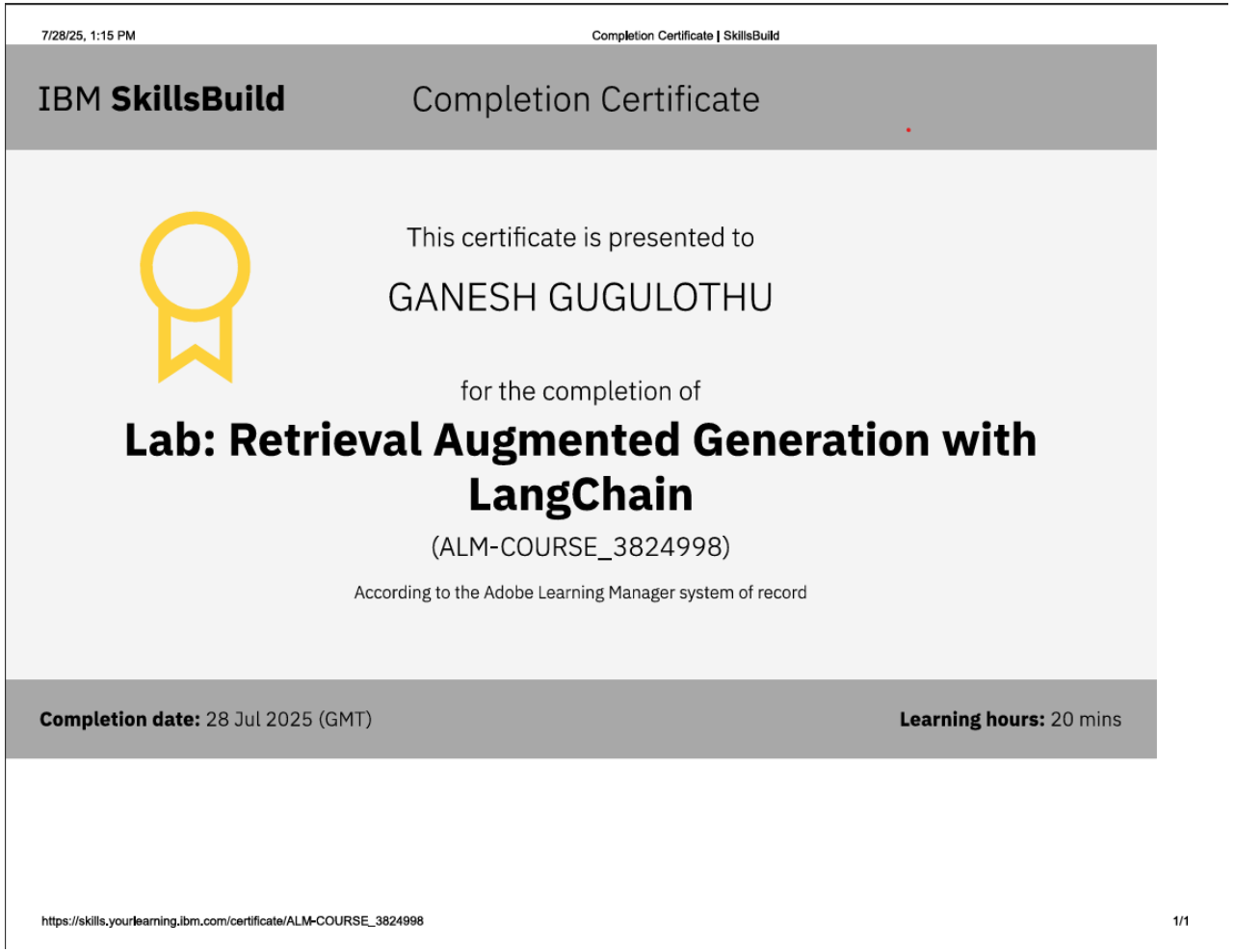

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