CAPSTONE PROJECT

PREDICTING NSAP SCHEME ELIGIBILITY USING MACHINE LEARNING

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OUTLINE

- **Problem Statement**
- **Proposed System/Solution**
- **System Development Approach** (Technology Used)
- **Algorithm & Deployment**
- **Result (Output Image)**
- **Conclusion**
- **Future Scope**
- **References**

PROBLEM STATEMENT

- The National Social Assistance Program (NSAP) is a flagship social security and welfare program by the Government of India. It aims to provide financial assistance to the elderly, widows, and persons with disabilities belonging to below-poverty-line (BPL) households. The program consists of several sub-schemes, each with specific eligibility criteria.
- Manually verifying applications and assigning the correct scheme can be a time-consuming and error-prone process. Delays or incorrect allocation can prevent deserving individuals from receiving timely financial aid.
- Your task is to design, build, and evaluate a multi-class classification model that can accurately predict the most appropriate NSAP scheme for an applicant based on their demographic and socio-economic data. The goal is to create a reliable tool that could assist government agencies in quickly and accurately categorizing applicants, ensuring that benefits are delivered to the right people efficiently.

PROPOSED SOLUTION

The proposed system uses machine learning to automate eligibility classification under NSAP, ensuring accurate scheme allocation based on demographic and socio-economic data.

- **Data Collection**
- Using AI Kosh dataset with features like age, gender, caste, disability, BPL, Aadhaar, etc.
- Target variable: schemecode (e.g., IGNOAPS, IGNWPS, IGNDPS)
- **Preprocessing**
- Clean missing values & duplicates
- Encode categorical fields (state, district, gender)
- Scale numerical features if needed
- **Modeling (AutoAI)**
- Train multi-class classifiers (e.g., Random Forest, XGBoost) using IBM AutoAI
- AutoAI handles model selection, tuning, and evaluation
- **Deployment**
- Deploy model via IBM Watson Machine Learning
- **Evaluation**
- Accuracy, F1-score, and confusion matrix used to assess performance
- Continuous monitoring & refinement based on feedback

SYSTEM APPROACH

The "System Approach" section outlines the overall strategy and methodology for developing and implementing the eligibility classification of NSAP, ensuring accurate scheme allocation. Here's a suggested structure for this section:

- System requirements:

  IBM Cloud (Mandatory)

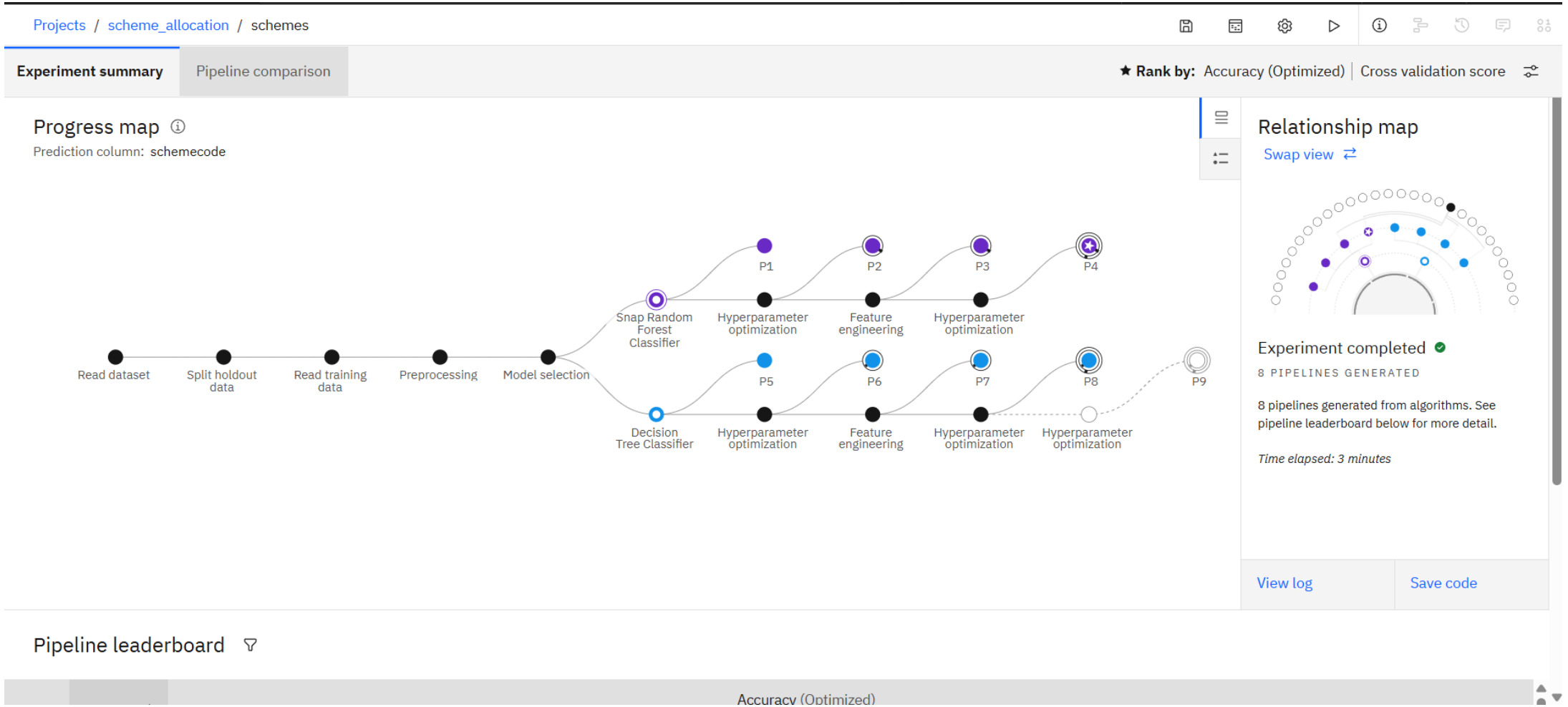
  IBM Watson Studio for Model Development and Deployment

  IBM cloud object Storage for dataset handling

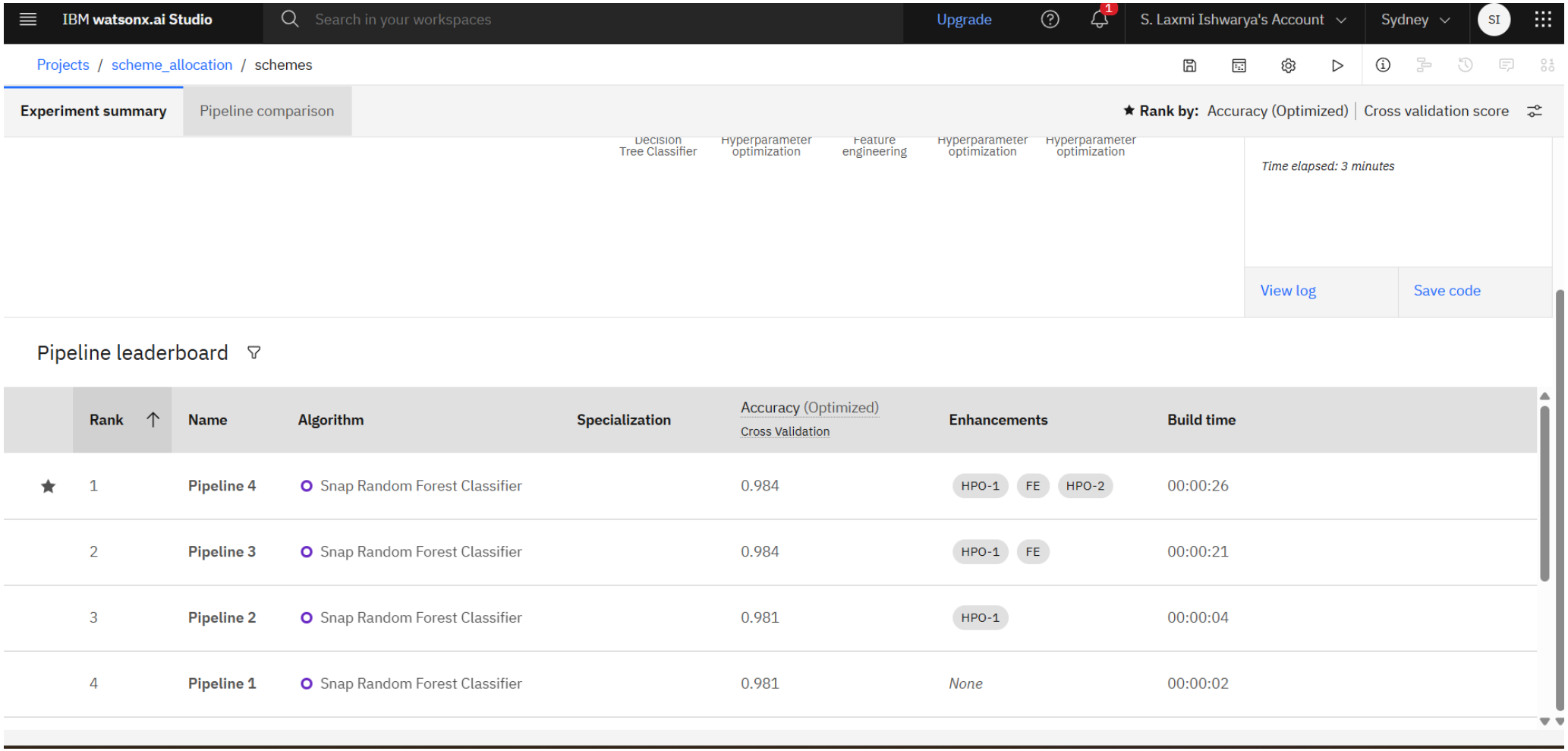
ALGORITHM & DEPLOYMENT

- **Algorithm Selection:**
  - The Random Forest Classifier was chosen by IBM Watson AutoAI as the best model due to its high accuracy and ability to handle multi-class classification effectively. It performed well in predicting the correct NSAP scheme from categorical and numerical data.
- **Data Input:**
  - The model uses features like State , District , Gender-wise population , BPL indicators , Aadhar/mobile availability , and social category (SC , OBC , ST, Gen). The Target variable is SchemeCode.
- **Training Process:**
  - AutoAI automatically handled data cleaning, feature encoding, and train-test splitting. It applied cross-validation and tuned model parameters to build the most accurate and optimized classification pipeline.
- **Prediction Process:**
  - Once deployed, the model predicts the eligible NSAP scheme for new applicants in real-time through a REST API. It returns the predicted scheme code along with a confidence score for each prediction.

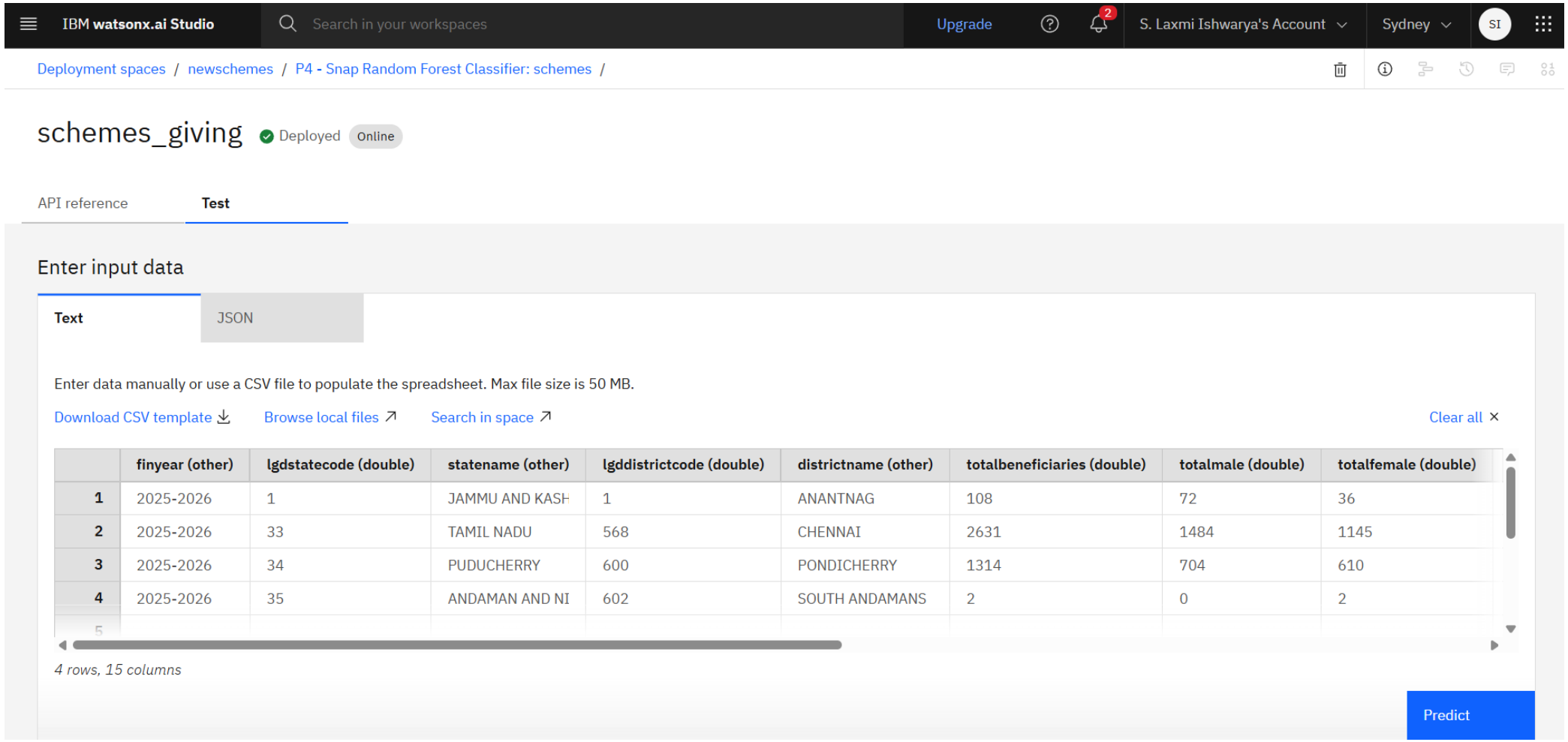
RESULT



RESULT



RESULT



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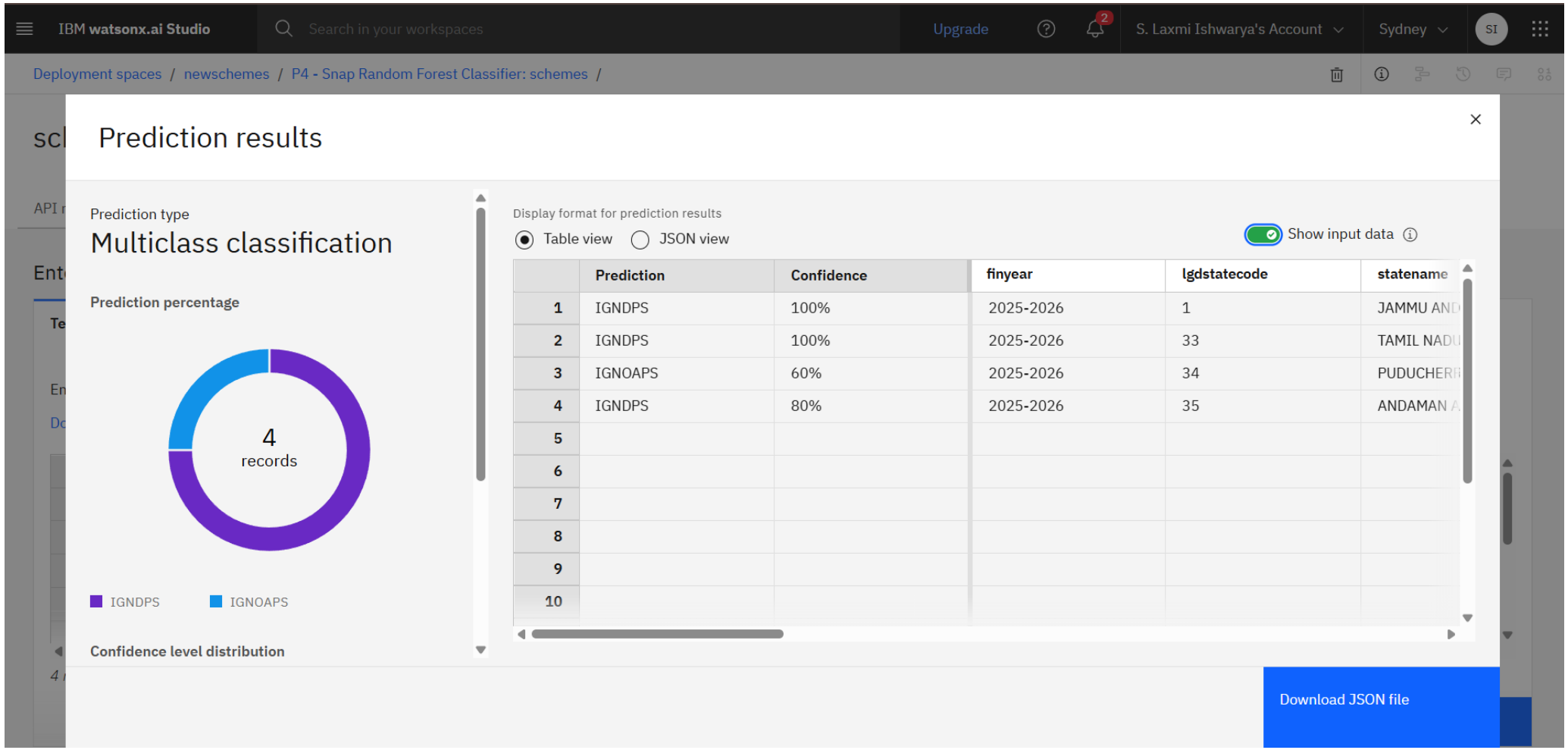
RESULT



	Prediction	Confidence	finyear	lgdstatecode	statename
1	IGNDPS	100%	2025-2026	1	JAMMU AND
2	IGNDPS	100%	2025-2026	33	TAMIL NADU
3	IGNOAPS	60%	2025-2026	34	PUDUCHERR
4	IGNDPS	80%	2025-2026	35	ANDAMAN A
5					
6					
7					
8					
9					
10					

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CONCLUSION

- The developed system successfully leverages machine learning to predict the most suitable NSAP scheme for applicants based on their demographic and socio-economic details. By using IBM Watson AutoAI and deploying the model through Watson Machine Learning, the solution achieves high accuracy and provides real-time predictions via a REST API. This not only simplifies the classification process but also ensures faster and fairer delivery of benefits to the rightful beneficiaries. The project demonstrates how AI can assist in improving government welfare systems through automation and data-driven decision-making

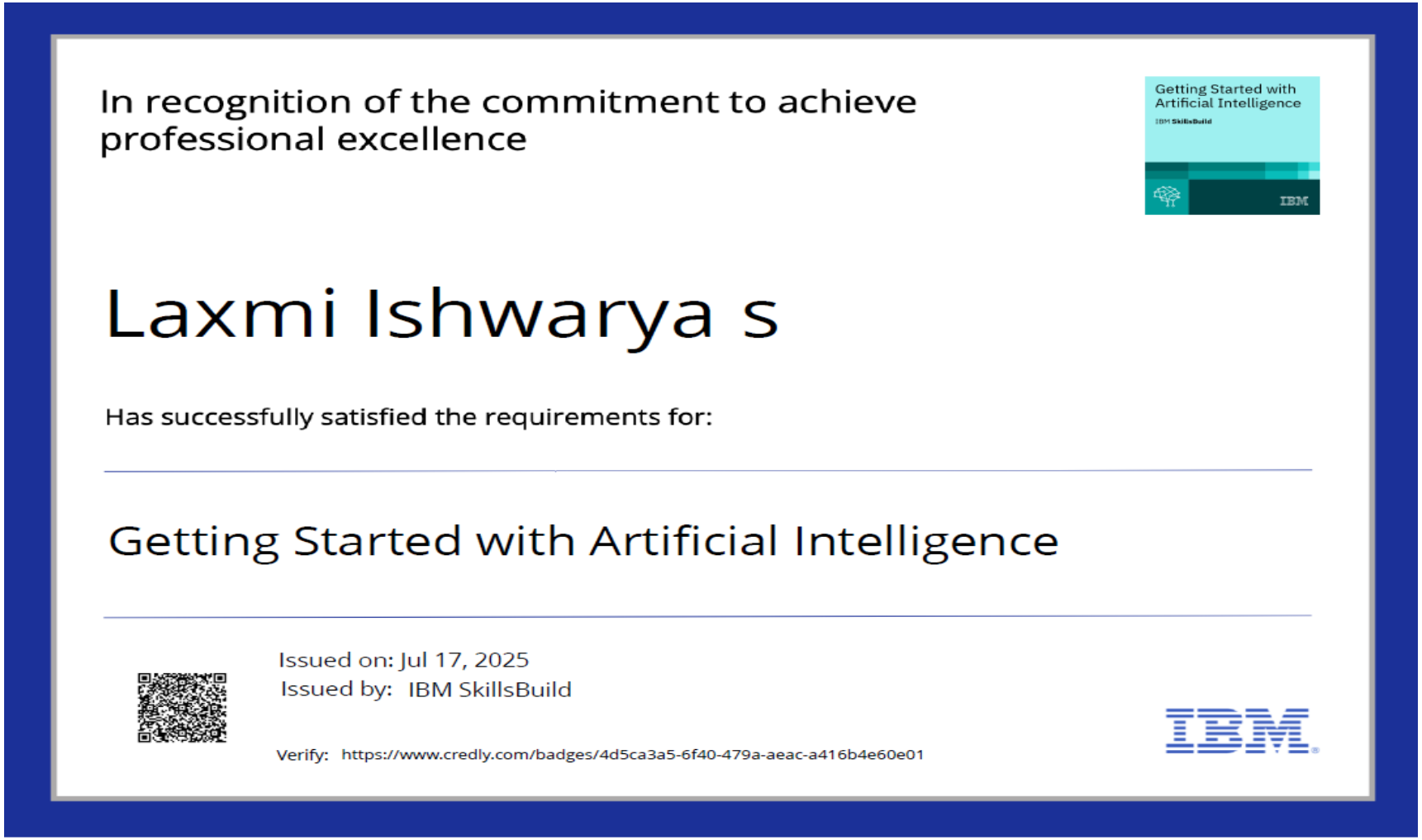
FUTURE SCOPE

- This project can be extended and enhanced in several impactful ways. In the future, the system can integrate **real-time application data** from government portals to allow live eligibility checks. By incorporating **additional features** like income level, education, or disability percentage, the model can improve its accuracy and fairness. The platform could also include **explainable AI (XAI)** techniques to provide transparent justifications for predictions, increasing trust among officials and citizens. Furthermore, a **mobile or web-based interface** can be developed for easy use by rural administrators or applicants. Finally, the model can be scaled to support **other government welfare schemes**, making it a comprehensive eligibility prediction tool for social welfare programs in India.

REFERENCES

- **AI Kosh Dataset Portal**
  District-wise pension data under the National Social Assistance Programme (NSAP).
  https://aikosh.indiaai.gov.in
- **IBM Watson Studio Documentation**
  Used for AutoAI, data visualization, and model development.
  https://www.ibm.com/cloud/watson-studio

IBM CERTIFICATIONS



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THANK YOU

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