IBM AICTE PROJECT

PREDICTING ELIGIBILITY FOR NSAP USING MACHINE LEARNING

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OUTLINE

- Problem Statement
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PROBLEM STATEMENT

The National Social Assistance Programme (NSAP) provides financial aid to elderly, widows, and persons with disabilities under Below Poverty Line (BPL) households.

Manual allocation of the correct scheme is error-prone and delays timely benefits.

This project focuses on using AI to automate and optimize this classification process.

PROPOSED SOLUTION

- Used IBM **Watsonx.ai Studio** with **AutoAI** to build a machine learning model.
- Goal: Predict the correct **NSAP scheme** (IGNDPS, IGNOAPS, IGNWPS) for each district.
- Dataset: Taken from **AI Kosh**, containing district-wise scheme data like gender, caste, and Aadhaar details.
- **Data Collection:**
  - Collected district-level data on beneficiaries from the AI Kosh platform.
  - Features include gender, caste, Aadhaar, and mobile number availability.
- **Data Preprocessing:**
  - AutoAI handled:
  - Data cleaning, Missing values, Splitting data into training and testing parts.
- **Model Building:**
  - AutoAI tested various ML models (e.g., Logistic Regression, Random Forest).
  - It automatically selected the **best model** based on accuracy.
  - Used features like `totalmale`, `totalfemale`, `totalsc`, `totalaadhaar`, etc and Target column: `schemecode`.
- **Deployment:**
  - The trained model was deployed as an **API** using IBM Watson Machine Learning.
  - API tested using **Postman** with JSON input and received predicted scheme.

SYSTEM APPROACH

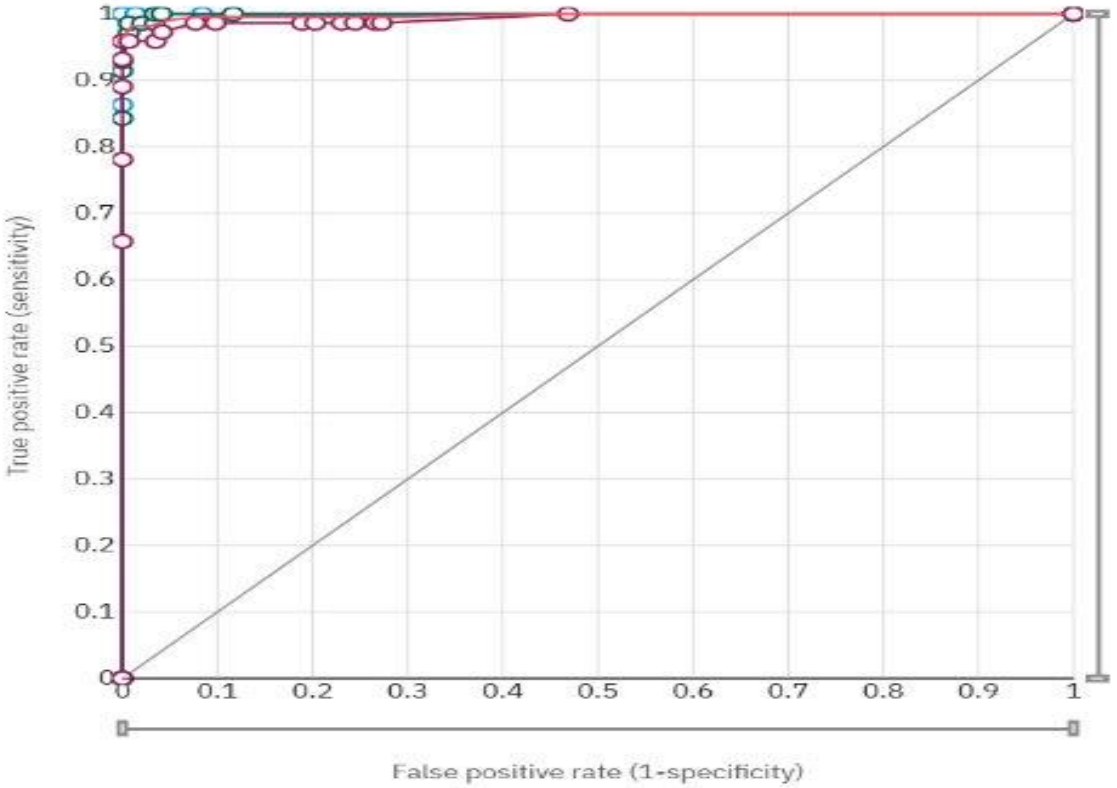
- **Platform:** IBM Watsonx.ai Studio
- **Tool:** AutoAI pipeline (no-code ML development)
- **Steps followed:**
- Uploaded `.csv` file directly
- AutoAI explored, cleaned, and split data
- It tried multiple algorithms (Random Forest, XGBoost, etc.)
- Best pipeline was selected based on accuracy
- **Deployment:** Model deployed as REST API via IBM Machine Learning service.

ALGORITHM & DEPLOYMENT

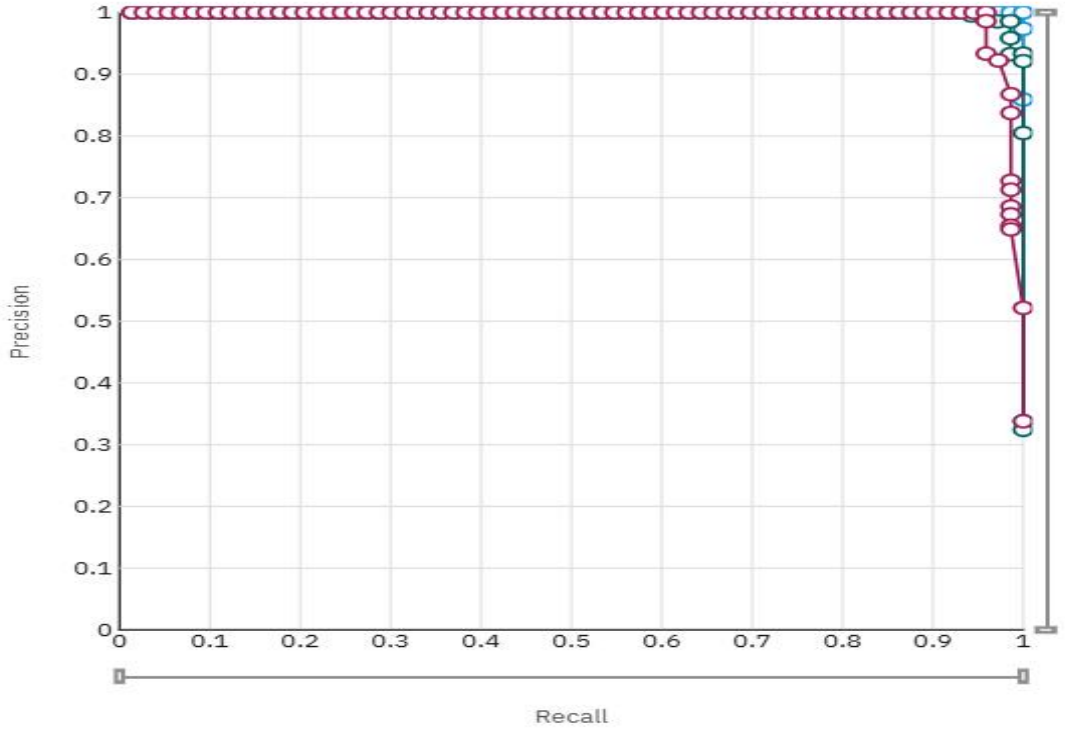
- **Algorithm Selection:**
  - **Snap Random Forest Classifier** (selected automatically by IBM AutoAI)
  - It is an optimized version of the traditional Random Forest algorithm.
  - Chosen based on **highest accuracy** during model comparison.
- **Data Input:**
  - `totalmale`
  - `totalfemale`
  - `totaltransgender`
  - `totalsc`, `totalst`, `totalgen`, `totalobc`
  - `totalaadhaar`, `totalmobilenumber`
- **Target Variable:**
- `schemecode`
  → `Predicts one of: IGNDPS, IGNOAPS, IGNWPS`
- **Deployment Details:**
- Model deployed using **IBM Watson Machine Learning**.
- Generated a **REST API** endpoint for real-time predictions.
- API tested using **Postman** with JSON input and received predicted scheme as output.

RESULT

- Accuracy : 90%
- ROC curve



Precision recall curve



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RESULT

- Confusion Matrix

Pipeline details

Pipeline 4

Rank	Accuracy (Optimized)	Algorithm	Enhancements
1	0.977 (Holdout)	Snap Random Forest Classifier	HPO-1 +2

Model viewer

- Model information
- Feature summary

Evaluation

- Model evaluation
- **Confusion matrix**
- Precision recall
- Threshold

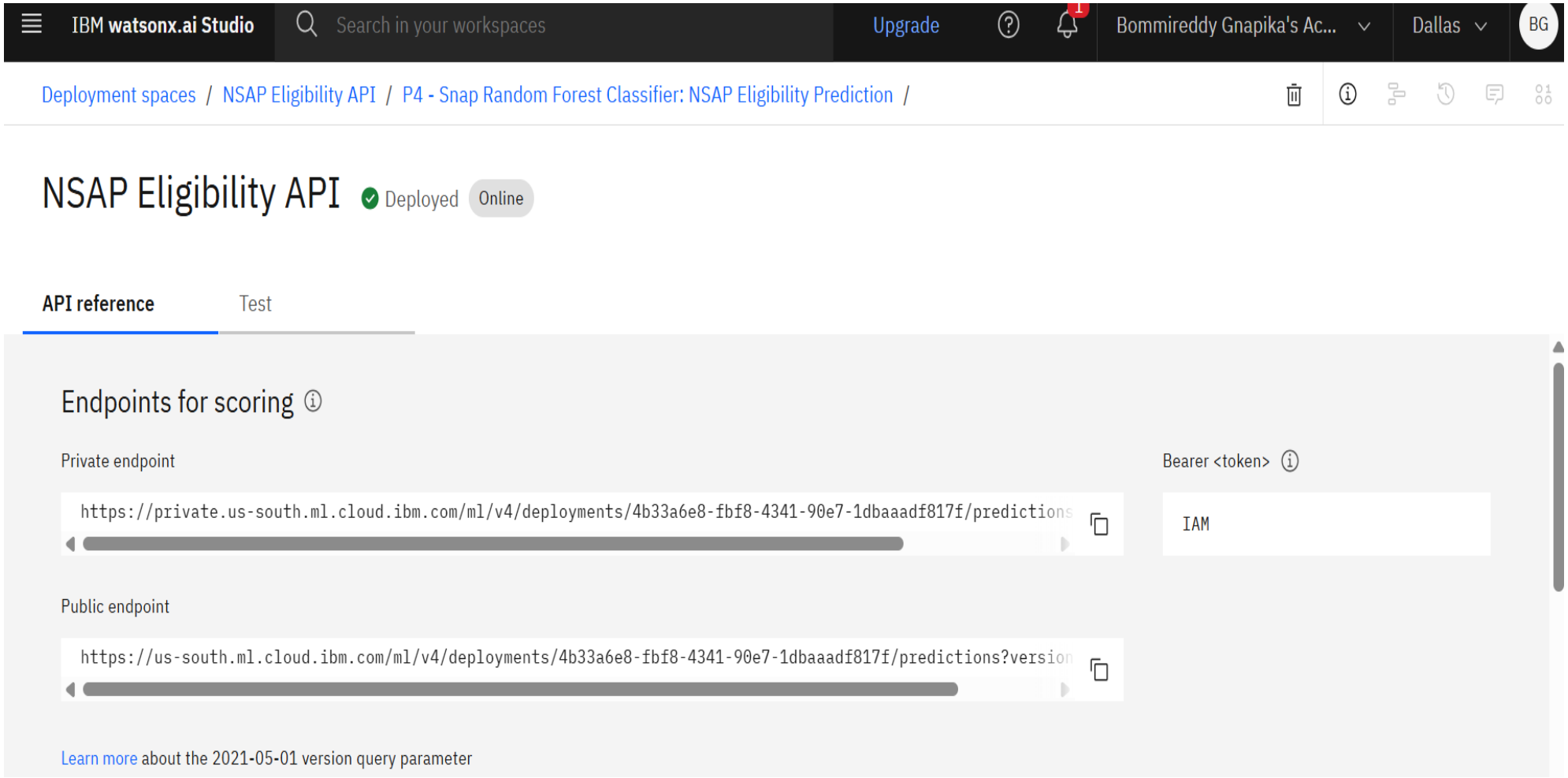
View

Multi-class

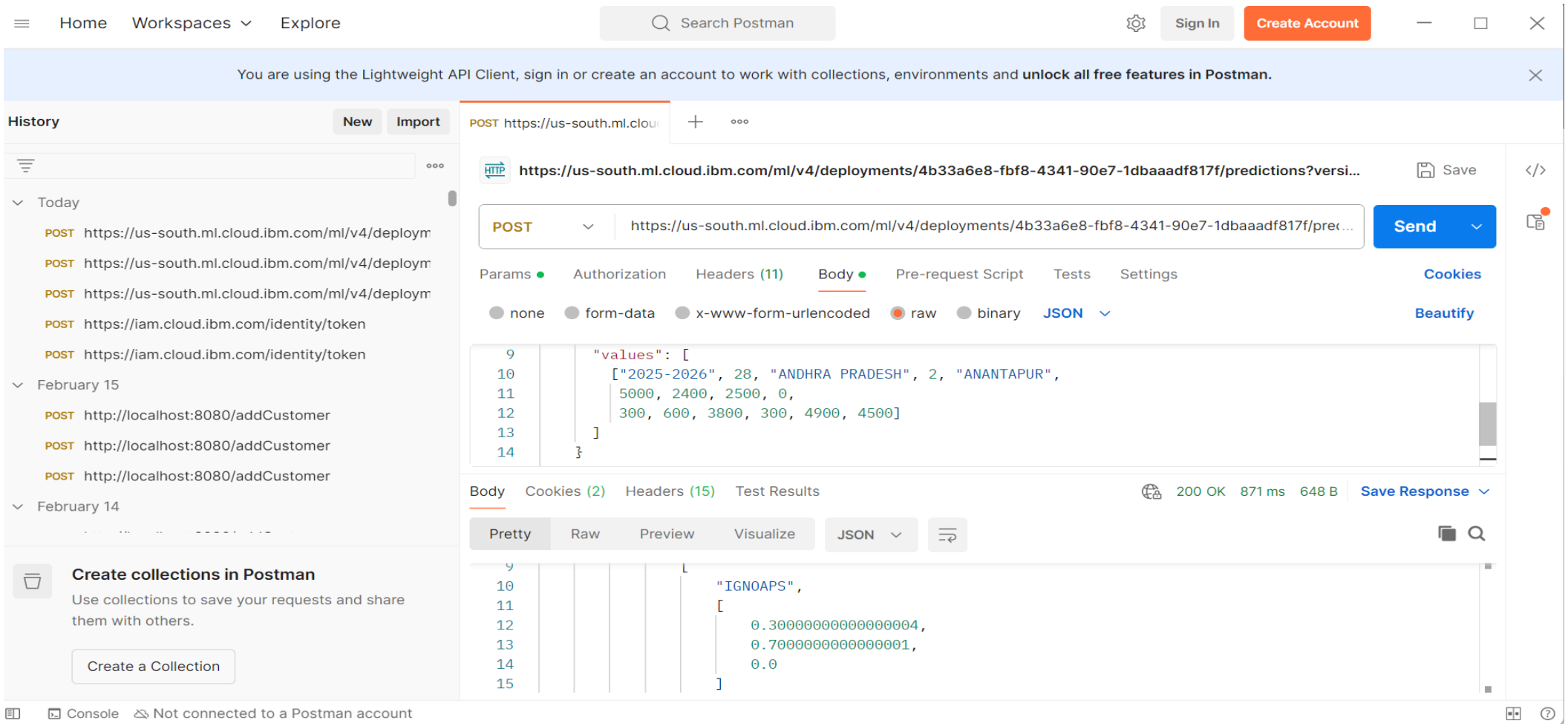
Observed	Predicted			
	IGNDPS	IGNOAPS	IGNWPS	Percent correct
IGNDPS	68	2	0	97.1%
IGNOAPS	2	70	1	95.9%
IGNWPS	0	0	73	100.0%
Percent correct	97.1%	97.2%	98.6%	97.7%

Less correct — More correct

RESULT & DEPLOYMENT



RESULT & DEPLOYMENT



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CONCLUSION

- The Watsonx.ai AutoAI tool simplified the ML lifecycle.
- Achieved high classification accuracy without coding.
- The tool can assist the government in faster scheme eligibility verification.

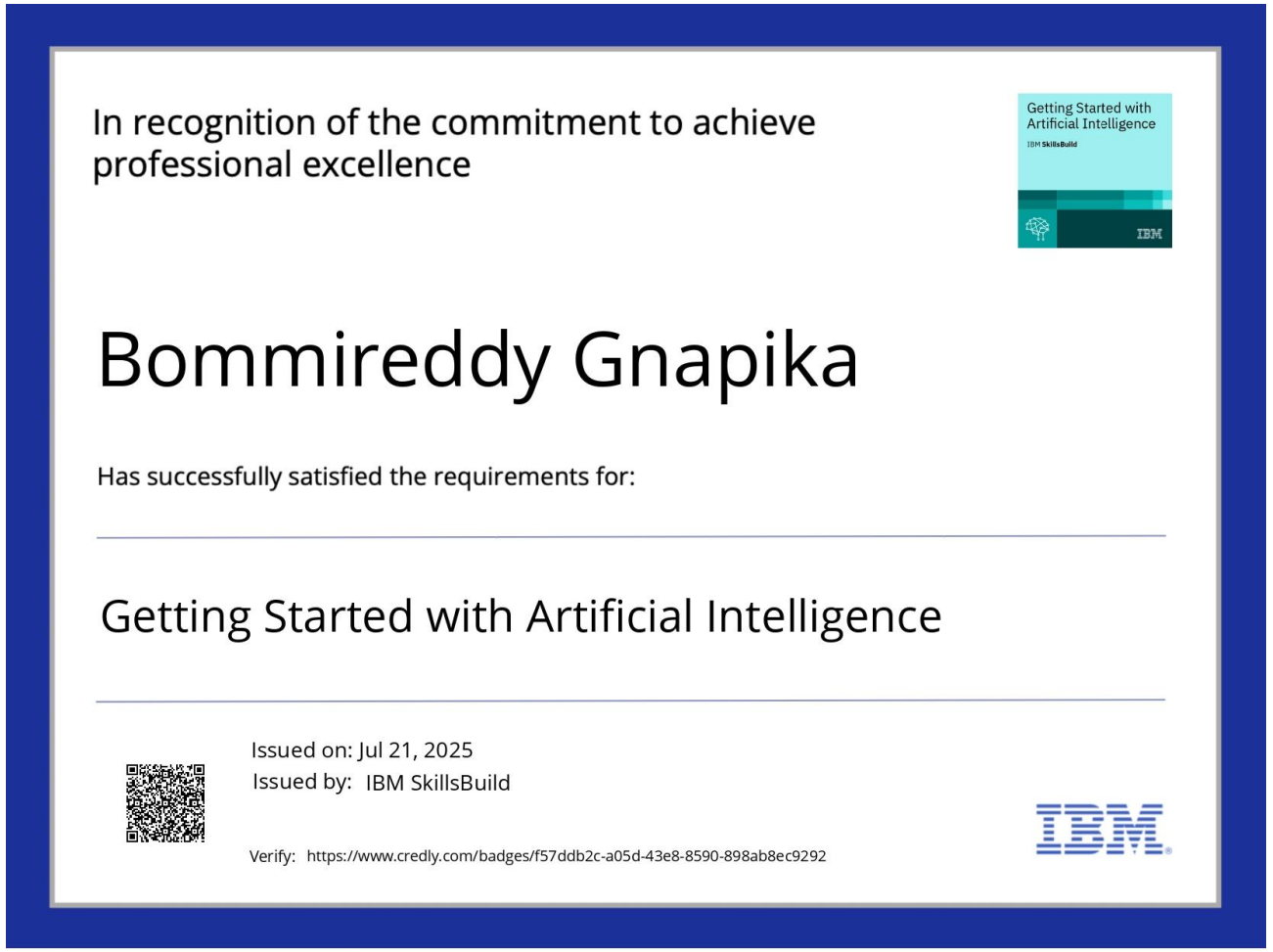
FUTURE SCOPE

- Extend to real-time applicant-level data
- Integrate Aadhaar, income proofs, and documents
- Build dashboards using IBM Cognos or Streamlit
- Incorporate feedback loop for continuous learning

REFERENCES

- AI Kosh Dataset: https://aikosh.indiaai.gov.in
- IBM Watsonx.ai Documentation
- IBM Cloud Machine Learning Docs
- AutoAI: https://www.ibm.com/cloud/watson-studio/autoai

IBM CERTIFICATIONS



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