PREDICTING ELIGIBILITY FOR NSAP SCHEMES USING MACHINE LEARNING

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OUTLINE

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PROBLEM STATEMENT

The National Social Assistance Program (NSAP) provides financial assistance to the elderly, widows, and persons with disabilities from below-poverty-line households. Manually verifying applications and assigning appropriate schemes is time-consuming and error-prone, delaying support to eligible individuals. The challenge is to build a machine learning system that can accurately predict the most appropriate NSAP scheme based on demographic and socio-economic data.

PROPOSED SOLUTION

1. Data Collection

Dataset Source: AIKosh (Govt. of India open data portal)
Time Range: 2025–2026
Target Variable: schemecode (which NSAP scheme a person qualifies for)
Input Features:
finyear, lgdstatecode, statename, lgddistrictcode, districtname,totalbeneficiaries, totalmale, totalfemale, totaltransgender,totalsc, totalst, totalgen, totalobc,totalaadhaar, totalmpbilenumber

2. Data Preprocessing

Used IBM AutoAI for automatic:
Missing value handling
Outlier treatment
Feature selection and scaling
Features with low impact were dropped automatically
Encoding applied where needed (e.g., categorical state or gender features)

PROPOSED SOLUTION

3. Machine Learning Algorithm

IBM AutoAI ran several models including Decision Trees, Logistic Regression, and XGBoost
The best performing model selected was:
"Random Forest Classifier"
Classification task: Multi-class prediction of scheme codes based on applicant details
Model Accuracy Achieved**: 98.4%**

4. Deployment

Deployed using **IBM Cloud Lite's Watson Studio Deployment Space**
A REST API was generated for integration into government portals or mobile apps
No-code deployment interface was used for simplified testing

5. Evaluation

Model evaluated using:
Accuracy: **98.4%**
AutoAI Leaderboard for performance comparison Cross-validation ensured robust predictions

SYSTEM APPROACH

- **System Requirements:-**
  IBM Cloud Lite Account
  IBM Watson Studio
  AutoAI enabled
  NSAP Dataset (.csv)

- **Libraries Used:-**
  AutoAI (in-built)
  pandas, scikit-learn (optional for local testing)

- **Development Tools:-**
  IBM Watson Studio (for AutoAI)
  Deployment Space (for REST API)
  Cloud Object Storage (for dataset)

ALGORITHM & DEPLOYMENT

- **Algorithm Selection:**
  AutoAI automatically selects from algorithms like XGBoost, Random Forest, and Logistic Regression based

  on dataset characteristics. The best performing model selected was ***Random Forest Classifier***

- **Data Input:**
  Demographic & socio-economic features like age, gender, disability status, income level, state, district , etc.

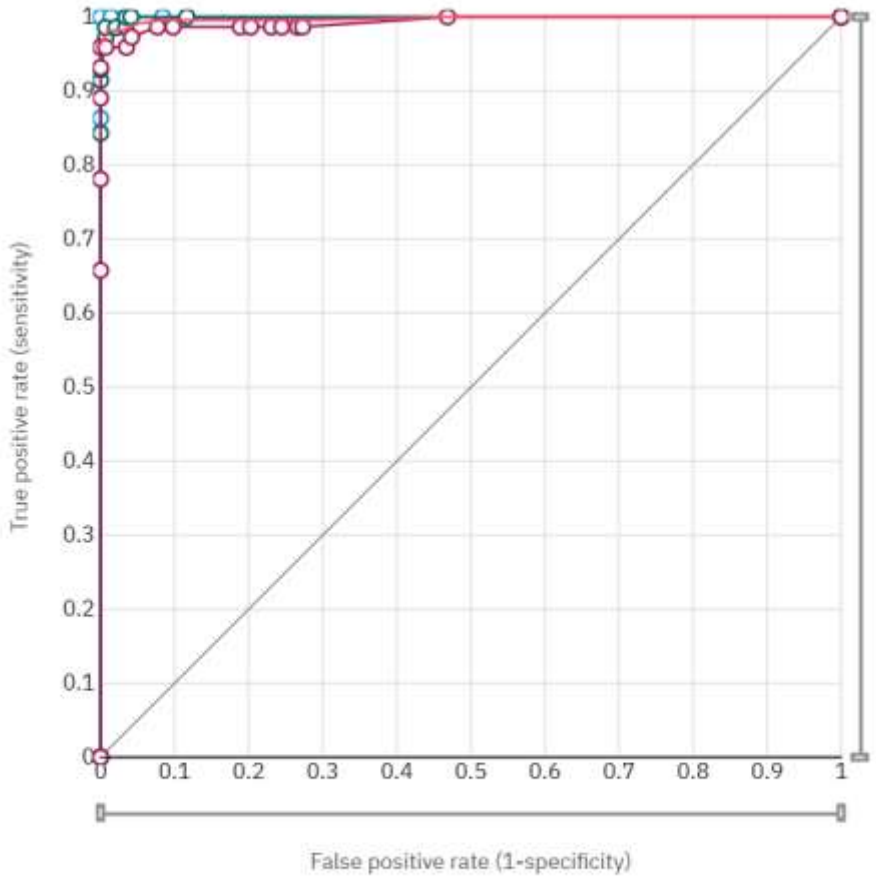
- **Training Process:**
  AutoAI pipeline trained on uploaded dataset, validated using cross-validation, and ranked by performance (e.g., F1-score or accuracy).

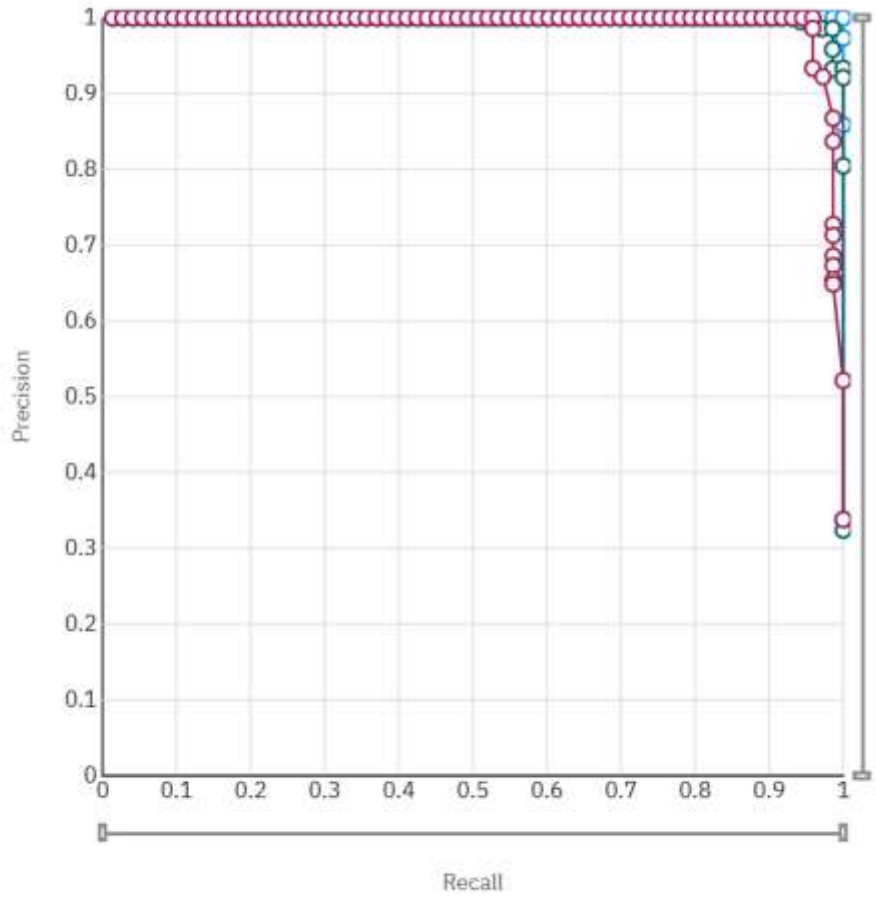
- **Deployment:**
  Best performing model is deployed as an online REST API in IBM Watson Studio deployment space.

RESULT

Accuracy of the model is **98.4%** using **Random forest classifier**

ROC Curve and Precision vs Recall curve





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RESULT

Prediction results

Prediction type

Multiclass classification

Prediction percentage

IGNDPS IGNOAPS

Confidence level distribution

Display format for prediction results

(•) Table view ( ) JSON view

Show input data

	Prediction	Confidence
1	IGNDPS	100%
2	IGNOAPS	100%
3	IGNDPS	100%
4		
5		
6		
7		
8		
9		
10		
11		

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CONCLUSION

- Machine Learning brings a smart, automated way of assigning NSAP benefits
- IBM AutoAI significantly reduced development time
- Model can be easily retrained and improved with future data
- High Prediction Accuracy

With an accuracy of **98.4%,** the model demonstrates high reliability in real-world applications, ensuring that the majority of eligible applicants are correctly classified.

- Scalable & Adaptable Solution :

The solution is built using IBM Cloud Lite, making it lightweight, cost-effective, and scalable across states or even nationwide for broader adoption.

- No-Code Model Development :

IBM AutoAI enabled model training and deployment without requiring extensive coding knowledge, making it .

FUTURE SCOPE

- Integrate with Aadhaar and ration card verification APIs
- Add explainability layer to show “why” a scheme was assigned
- Build a chatbot assistant using Watson Assistant for real-time help

REFERENCES

- **AI Kosh Dataset Portal**

Government of India – AI Kosh. District-wise Pension Data under the National Social Assistance Programme (NSAP).
URL:*https://aikosh.indiaai.gov.in/web/datasets/details/district_wise_pension_data_under_the_national_social_assistance_programme_nsap_1.html*

- **IBM Cloud Documentation**

IBM Knowledge Center. Getting started with IBM Cloud Lite Account.
URL: *https://cloud.ibm.com/docs*

- **IBM Watson AutoAI Documentation**

IBM Watson Studio. AutoAI – Automate your AI lifecycle.
URL: *https://cloud.ibm.com/docs/watsonx?topic=watsonx-autoai-overview*

- **Scikit-Learn Documentation** (For understanding Random Forest Classifier)

Pedregosa, F., et al. Scikit-learn: Machine Learning in Python.
URL: *https://scikit-learn.org/stable/modules/generated/sklearn.ensemble.RandomForestClassifier.html*

- **National Social Assistance Programme** (NSAP)

Ministry of Rural Development, Government of India. Overview of NSAP Schemes.
URL: *https://nsap.nic.in*

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This certificate is presented to

Bhanu Sharma

for the completion of

Lab: Retrieval Augmented Generation with LangChain

(ALM-COURSE_3824998)

According to the Adobe Learning Manager system of record

Completion date: 17 Jul 2025 (GMT) **Learning hours:** 20 mins

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GITHUB LINK:-

https://github.com/BHANUSHARMA8319/Edunet_Skillbuild_IBM

THANK YOU

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