
CAPSTONE PROJECT

PREDICTING ELIGIBILITY FOR NSAP SCHEMES USING MACHINE LEARNING

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OUTLINE

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

PROBLEM STATEMENT

The National Social Assistance Program (NSAP) is a major welfare initiative by the Government of India that provides financial assistance to BPL households. It includes various sub-schemes with different eligibility criteria.

Manually verifying applications and assigning schemes is time-consuming and error-prone, often leading to delays or misallocation of aid. There is a need to automate this classification process to ensure timely and accurate delivery of benefits.

PROPOSED SOLUTION

The solution aims to build a machine learning model that can:

- Analyze applicant data
- Predict the most suitable NSAP sub-scheme
- Improve accuracy, speed, and fairness in benefit allocation
- The system will use multi-class classification and will be deployed on IBM Cloud.

SYSTEM APPROACH

- AI_KOSH NSAP dataset

Technologies:

- IBM Watson Studio / IBM Cloud

Steps:

- Data Cleaning and Preprocessing
- EDA (Exploratory Data Analysis)
- Model Training & Testing
- Deployment on IBM Cloud

ALGORITHM & DEPLOYMENT

- Snap SVM Classifier (Selected based on best performance) **Input Features:** Age, gender, income, disability status, employment, etc. **Training Process:**
- Data preprocessing
- Train-test split
- Hyper parameter tuning
- Feature engineering **Deployment:**
- IBM Watson Machine Learning
- Promoted successfully to deployment space for API access

RESULT

- **Best Model:** Pipeline 4 - Snap SVM Classifier
- **Accuracy (Cross Validation):** 62.2%
- **Enhancements Used:** Hyper parameter Optimization, Feature Engineering
- **Experiment Summary:**
 - 8 pipelines tested
 - Snap SVM performed best (Rank 1)
- **Prediction Example:**
 - Input:** Age: 45, Gender: Male, Disability: No, Marital Status: Unmarried, State: Tamil Nadu
 - Prediction Output:** Low Income Category

Build machine learning models automatically

Define the details to create an AutoAI experiment asset and open it in the AutoAI tool.

+ New

Sample

Define details

Name

NSAP Eligibility Predictor

Description (optional)

None

Tags (optional)

Add tags to make assets easier to find.

Start typing to add tags

Define configuration

watsonx.ai Runtime service instance

watsonx.ai Runtime-tv

Environment definition ⓘ

Large: 8 CPU and 32 GB RAM

This environment definition consumes 20 capacity units per hour for training. For details, see [watsonx.ai Runtime plans](#).

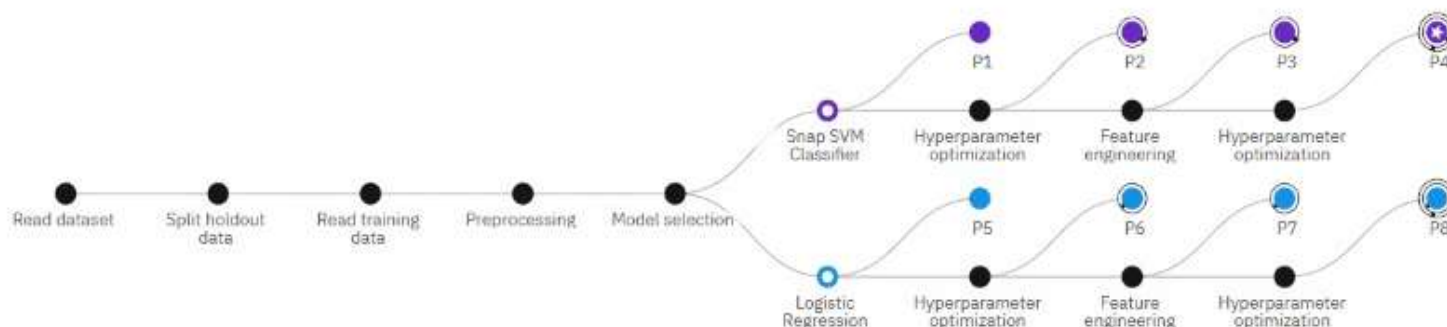
Cancel

Back

Create

Progress map ⓘ

Prediction column: income_level



Relationship map

[Swap view](#)



Experiment completed ✓

8 PIPELINES GENERATED





8 pipelines generated from algorithms. See pipeline leaderboard below for more detail.

Time elapsed: 10 minutes

[View log](#)

[Save code](#)

Pipeline leaderboard

	Rank	↑	Name	Algorithm	Accuracy (Optimized) Cross Validation	Enhancements	Build time
★	1		Pipeline 4	 Snap SVM Classifier	0.622	HP0-1 FE HP0-2	00:02:12
	2		Pipeline 3	 Snap SVM Classifier	0.622	HP0-1 FE	00:01:15
	3		Pipeline 2	 Snap SVM Classifier	0.622	HP0-1	00:00:58
	4		Pipeline 1	 Snap SVM Classifier	0.622	None	00:00:03

Prediction results

Prediction type
Multiclass classification

Prediction percentage



■ Low

Display format for prediction results

☒ Table view ☐ JSON view

☒ Show input data ⓘ

	Prediction	age	gender	disability	marital_status	state
1	Low	45	male	no	unmarried	Tamil Nadu
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						

Download JSON file

CONCLUSION

- The system automates eligibility prediction for NSAP schemes
- Reduces manual workload and errors
- Ensures efficient and fair allocation of welfare benefits
- Model shows reliable performance on real-world data

FUTURE SCOPE

- Add more data sources (e.g., Census, Geographic info)
- Build a citizen-facing web/mobile portal
- Expand to other government schemes
- Use reinforcement learning for continuous improvement

REFERENCES

- https://aikosh.indiaai.gov.in/web/datasets/details/district_wise_pension_data_under_the_national_social_assistance_programme_nsap_1.html
- IBM Cloud & Watson Documentation
- ibm.cloud.com
- Academic literature on multi-class classification

GITHUB LINK

https://github.com/Samruddhi-Jagdale/IBM_Project1

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According to the IBM Learning Patterns system of record

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THANK YOU