AUTO AI PROJECT

AutoAI-Based NSAP Scheme Eligibility Predictor

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OUTLINE

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Problem Statement

Problem Statement: The National Social Assistance Programme (NSAP) provides financial assistance to the elderly, widows, and persons with disabilities in India. However, identifying which applicants qualify for which NSAP scheme manually is inefficient and often error-prone. A data-driven approach is required to accurately and automatically determine scheme eligibility based on demographic and socio-economic inputs.

Proposed Solution

Proposed System/Solution: This project proposes an AI-based eligibility prediction system using IBM Watson's AutoAI tool. The approach is structured as follows:

Data Acquisition and Preparation:

Collected a sample dataset resembling NSAP applicant data, including columns like gender, age, disability, income level, marital status, and state.

Data was formatted and cleaned to fit AutoAI requirements, ensuring categorical variables were properly recognized.

Model Building Using AutoAI:

IBM Watson AutoAI was used to automatically analyze the dataset and detect it as a classification problem.

AutoAI generated multiple pipelines with different preprocessing, algorithms, and parameter tuning strategies.

Each pipeline was evaluated using metrics like RMSE, Accuracy, and Feature Importance.

Model Selection:

The pipeline with the best performance (in this case, Linear Regression-based classifier) was selected.

It showed consistent accuracy and interpretability, making it suitable for deployment.

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Proposed Solution

Deployment:

The selected model was saved and deployed to IBM Watson Machine Learning as an online deployment.

A real-time API endpoint was created which allows users to input applicant data and receive predicted eligibility scheme in response.

Interface Testing:

The deployed model was tested through Watson Studio's "Test" tab.

Predictions were validated by feeding test inputs and confirming the expected output scheme (IGNOAPS, IGNDPS, or None).

Output Visualization:

AutoAI provided graphical outputs such as confusion matrices, ROC curves, and feature importance graphs to evaluate model behavior.

These visualizations were used to support the interpretability of the model.

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System Approach

- **Cloud Platform:** IBM Cloud
- **Service Used:** IBM Watson Studio
- **Tool:** AutoAI
- **Language**: No-code (AutoAI interface)
- **Data Source:** AI Kosh (Modified NSAP dataset)
- **Deployment Type:** Online Deployment via Watson Machine Learning
- **Additional Tools:** IBM Watson Machine Learning Deployment space, graphical model evaluation, CUH-based resource tracking

Algorithm & Deployment

Algorithm Selection:

IBM AutoAI selected a regularized linear regression model for multi-class classification after evaluating various candidates including decision trees, logistic regression, and ensemble models. The chosen model had the best cross-validation performance and was most interpretable. AutoAI also managed categorical encodings and class imbalance automatically.

Data Input:

Key features used as input:
- Age
- Gender
- Disability status
- Income level
- Marital status
- State of residence

The target output was eligible_scheme.

Training Process: The AutoAI tool handled the training process by:
- Automatically encoding categorical data
- Splitting data into training and validation sets
- Running multiple pipelines using different algorithms and tuning strategies
- Evaluating models using metrics such as RMSE and accuracy
- Selecting the best-performing pipeline through cross-validation and leaderboard ranking

Prediction Process: After deployment, the model was exposed as a RESTful API that accepts user inputs in real-time. When a new applicant's data is entered (e.g., through a form), the model processes it and returns a prediction such as IGNOAPS, IGNDPS, or None. AutoAI's integrated prediction interface allowed manual testing and validation using test inputs.
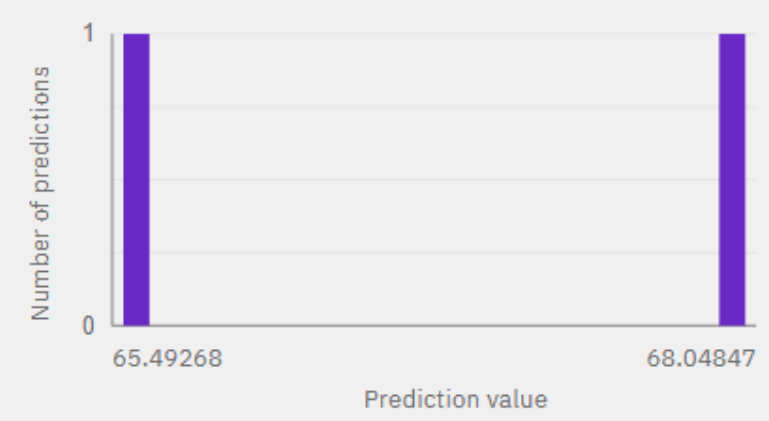
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Result

1. AutoAI Experiment Summary
2. Pipeline Leaderboard
3. Deployment Page (Status: Deployed)
4. Model Testing Page (Input & Output)
5. Relationship Map (AutoAI Pipeline Visual)
6. Prediction Output Example

IBM watsonx.ai Studio

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Prediction results

Prediction type

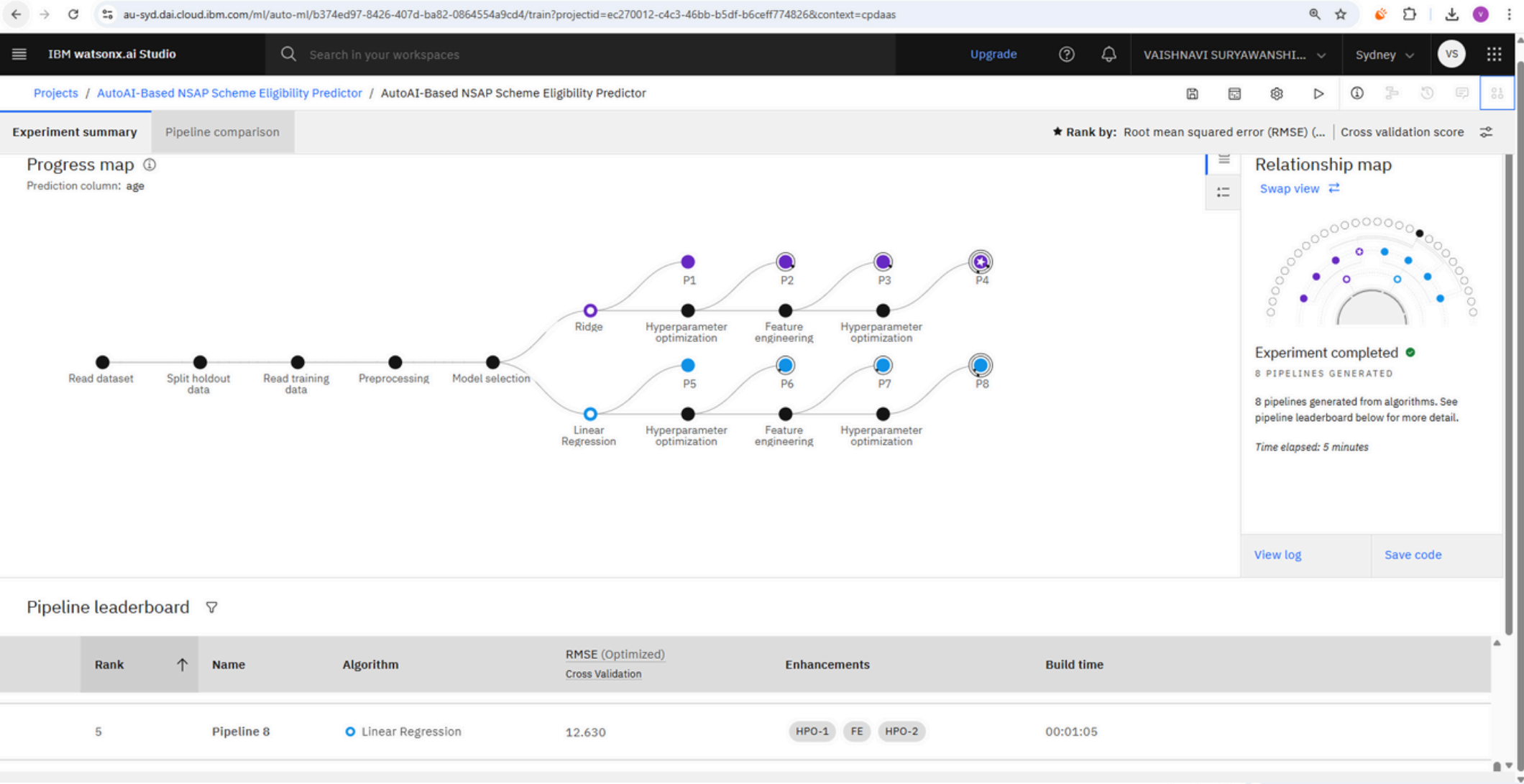# Regression

Prediction distribution

Display format for prediction results

◉ Table view ○ JSON view

Show input data ⓘ

	Prediction	gender	disability	marital_status	income_level	state
1	68.04847717285156	male	yes	married	medium	Tamil Nadu
2	65.49268341064453					
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						

Number of predictions

1

0

65.49268   68.04847

Prediction value

Download JSON file

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Experiment summary   Pipeline comparison

★ Rank by: Root mean squared error (RMSE) (... | Cross validation score

Progress map ⓘ
Prediction column: age

Relationship map
Swap view ⇄

Experiment completed ●
8 PIPELINES GENERATED

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

Time elapsed: 5 minutes

View log   Save code

Pipeline leaderboard ▽

Rank	↑	Name	Algorithm	RMSE (Optimized) Cross Validation	Enhancements	Build time
5		Pipeline 8	○ Linear Regression	12.630	HPO-1 FE HPO-2	00:01:05

Deployment spaces / AutoAI-Based NSAP Scheme Eligibility Predictor2 / P5 - Linear Regression: AutoAI-Based NSAP Scheme Eligibility Predictor

Deployments   Model details

▽   Search   ⟳   New deployment ⟋

Name	Type	Status	Tags	Last modified ↓	
ⓦ AutoAI-Based NSAP Scheme Eligibility Predictor	Online	● Deployed		18 seconds ago VAISHNAVI SURYAWANSHI (You)	⋮

About this asset ✕

Name ✎
P5 - Linear Regression: AutoAI-Based NSAP Scheme Eligibility Predictor

Description ✎
None

Asset Details
Type: wml-hybrid_0.1
Model ID: a79563d0-8367-4c...
Software specification:
hybrid_0.1 ⚙
Hybrid pipeline software specifications:
autoai-kb_rt24.1-py3.11

Tags ✎
Add tags to make assets easier to find.

Source asset details ⌄

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Deployment spaces / AutoAI-Based NSAP Scheme Eligibility Predictor2 / P5 - Linear Regression: AutoAI-Based NSAP Scheme Eligibility Predictor /

AutoAI-Based NSAP Scheme Eligibility Predictor ✓ Deployed   Online

API reference   Test

Endpoints for scoring ⓘ

Private endpoint

`https://private.au-syd.ml.cloud.ibm.com/ml/v4/deployments/e6f8ba7e-115b-42bc-a6cf-cef756baffaf/predictions?version=2021-0` ⧉

Bearer <token> ⓘ

`IAM`

Public endpoint

`https://au-syd.ml.cloud.ibm.com/ml/v4/deployments/e6f8ba7e-115b-42bc-a6cf-cef756baffaf/predictions?version=2021-05-01` ⧉

Learn more about the 2021-05-01 version query parameter

Code snippets

cURL   Java   JavaScript   Python   Scala

```
# NOTE: you must set $API_KEY below using information retrieved from your IBM Cloud account (https://au-syd.dai.cloud.ibm.com/docs/content/wsj/analyze-data/ml-authen
export API_KEY=<your API key>

export IAM_TOKEN=$(curl --insecure -X POST --location "https://iam.cloud.ibm.com/identity/token" \
--header "Content-Type: application/x-www-form-urlencoded" \
--header "Accept: application/json" \
--data-urlencode "grant_type=urn:ibm:params:oauth:grant-type:apikey" \
--data-urlencode "apikey=$API_KEY" | jq -r '.access_token')
```

About this deployment ✕

Name ✎
AutoAI-Based NSAP Scheme Eligibility Predictor

Description ✎
No description provided.

Deployment Details
Deployment ID: e6f8ba7e-115b-42...

Serving name: ✎
No serving name.

Software specification: ✎
hybrid_0.1 ⚙

Hybrid pipeline software specifications:
autoai-kb_rt24.1-py3.11

Copies: ✎
1

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Associated asset ✎
⚙ P5 - Linear Regression: AutoAI-Based NS
a79563d0-8367-4c33-9a6f-339ff72a3597

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Deployments   Model details

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New deployment

Name	Type	Status	Tags	Last modified	
AutoAI-Based NSAP Scheme Eligibility Predictor	Online	✓ Deployed		18 seconds ago VAISHNAVI SURYAWANSHI (You)	⋮

Items per page: 20   1–1 of 1 items   1 of 1 pages

About this asset

Name
P5 - Linear Regression: AutoAI-Based NSAP
Scheme Eligibility Predictor

Description
None

Asset Details
Type: wml-hybrid_0.1
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Software specification:
hybrid_0.1
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Tags
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Conclusion:

The project successfully built and deployed a predictive model that classifies individuals into their eligible NSAP schemes using IBM Watson AutoAI. It demonstrates the power of cloud-based AutoML platforms in solving real-life classification problems with minimal coding effort. The visual results and accuracy provided by AutoAI enhance interpretability and decision-making. The project also highlights the scalability and ease of deployment of AI services using IBM Cloud.

Future scope

- Integrate the deployed model with mobile/web applications for broader access.
- Add more demographic features like education, employment, or region type (urban/rural).
- Train on a larger real-world dataset from official government sources.
- Enable multilingual support for accessibility.
- Build dashboards using IBM Cognos or integrate with visualization platforms.
- Monitor model performance and re-train periodically as data evolves.

Github Repositories Link:

https://github.com/Vaishnavi002-ux/Vaishnabi002-ab

References

1. IBM Watson Studio Documentation: https://www.ibm.com/cloud/watson-studio
2. AutoAI Overview – IBM Docs: https://dataplatform.cloud.ibm.com/docs/content/wsj/autoai/autoai-overview.html
3. NSAP Scheme Dataset – AI Kosh: https://aikosh.indiaai.gov.in/
4. IBM Cloud: https://cloud.ibm.com
5. IBM Watson Machine Learning: https://www.ibm.com/cloud/machine-learning
6. Y. Bengio et al., "Deep Learning," MIT Press, 2016. https://www.deeplearningbook.org/
7. A. Géron, "Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow," O'Reilly Media, 2019.
8. J. Brownlee, "Data Preparation for Machine Learning," Machine Learning Mastery, 2020. https://machinelearningmastery.com/
9. S. Raschka and V. Mirjalili, "Python Machine Learning," Packt Publishing, 2020.
10. IBM AutoAI Best Practices Guide: https://www.ibm.com/docs/en/cloud-paks/cp-data/4.6?topic=autoai-best-practices

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