Classification of PMGSY Infrastructure Projects Using IBM Watsonx.ai AutoAI

Using AutoAI to Predict PMGSY Scheme Types

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Problem Statement

- Deploy a machine learning classifier using IBM Watsonx.ai's AutoAI to automate PMGSY scheme assignment.
- Train on AI Kosh PMGSY dataset, utilizing features like number, length, and cost of roads/bridges sanctioned/completed.
- Output: For any given new project, the model predicts which PMGSY scheme it best fits—with a confidence score.
- Solution integrates model deployment, online testing, and API access for real-time monitoring.

Proposed Solution

- Environment:
- The solution leverages IBM Cloud Lite, utilizing Watsonx.ai Studio for no-code machine learning development and IBM Cloud Object Storage for secure, scalable data asset storage.
- Data Pipeline:
- The PMGSY project dataset is uploaded, thoroughly cleaned, and preprocessed. The target column, PMGSY_SCHEME, is assigned and verified. Quality checks are performed to ensure readiness for automated model training.
- AutoAI Setup:
- An AutoAI experiment is launched, with the task set to multi-class classification. Compute resources (such as CPUs and RAM) are provisioned in line with project requirements to ensure efficient, reproducible model development.
- Workflow:
- IBM AutoAI automates data preprocessing, intelligent feature transformation, model selection, hyperparameter tuning, and validation—optimizing for accuracy, robustness, and interpretability of scheme predictions.
- Deployment:
- The best-performing classification model is saved and promoted to a Watsonx.ai deployment space. It is deployed as an online REST API endpoint—ready for instant, scalable integration with reporting dashboards, monitoring applications, or direct query interfaces.

System Approach

- Environment: IBM Cloud Lite with Watsonx.ai Studio and Cloud Object Storage.
- Data Pipeline: Upload and clean PMGSY CSV dataset, assign target column (PMGSY_SCHEME).
- AutoAI Setup: Launch AutoAI experiment, set task as classification, and configure environment (CPU/RAM).
- Workflow: Automated data preprocessing, model selection, and validation handled by AutoAI pipelines.
- Deployment: Save and promote best model to deployment space; deploy as online REST API for integration.
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Algorithm & Deployment

- Algorithm: AutoAI tests multiple algorithms (e.g., Random Forest, XGBoost, Logistic Regression) to find the best classifier for the multi-class PMGSY_SCHEME prediction task.
- Inputs: All project attributes (sanctioned/completed/balance counts and lengths, bridge data, costs, expenditures).
- Training: Data is split automatically; best pipeline selected by F1-score/accuracy on validation/test data.
- Deployment: Save the final pipeline, promote to Deployment Space in Watsonx.ai, deploy as an online prediction service with live REST API endpoint.
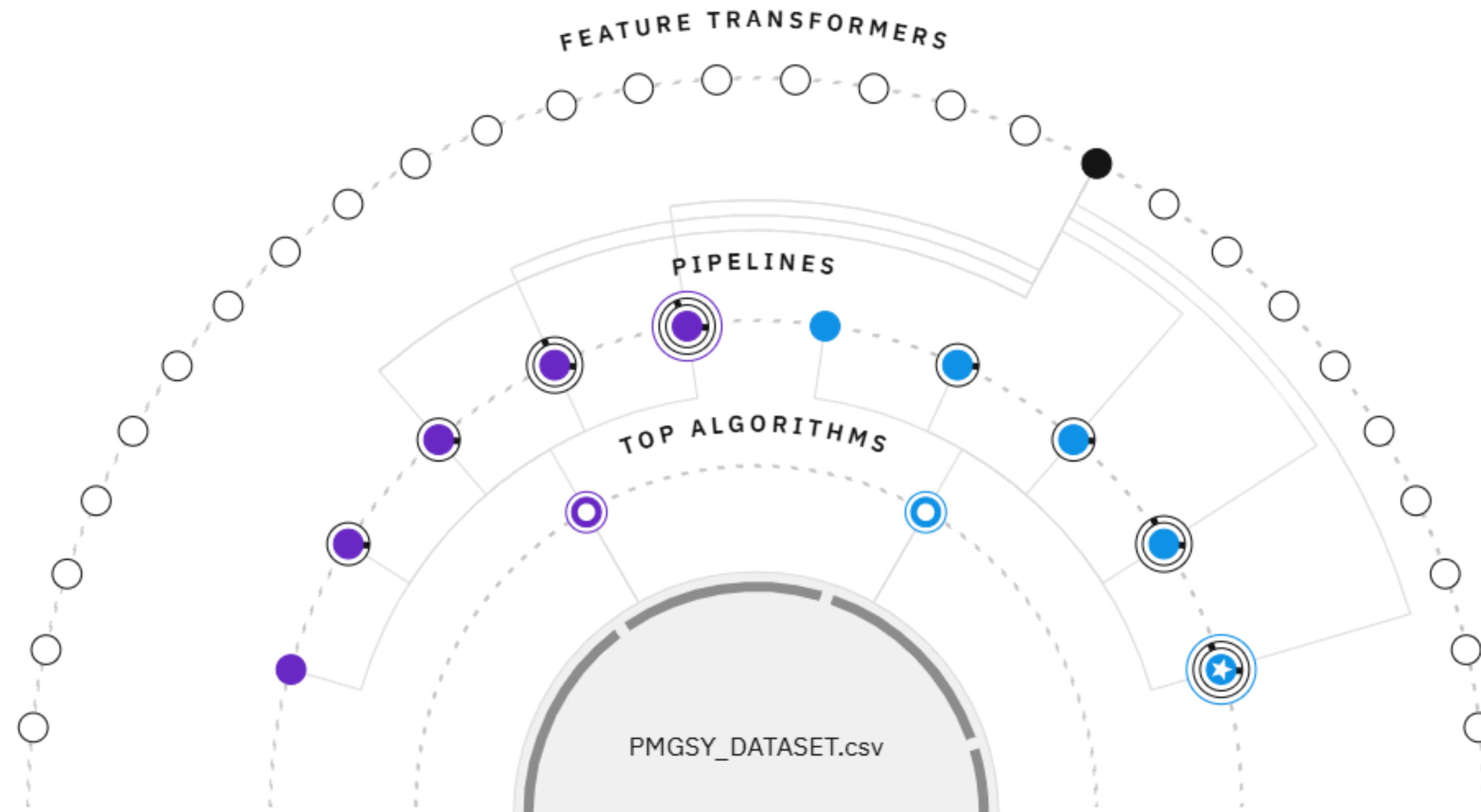
Result

Present the results of the machine learning model in terms of its accuracy and effectiveness in predicting bike counts. Include visualizations and comparisons between predicted and actual counts to highlight the model's performance.
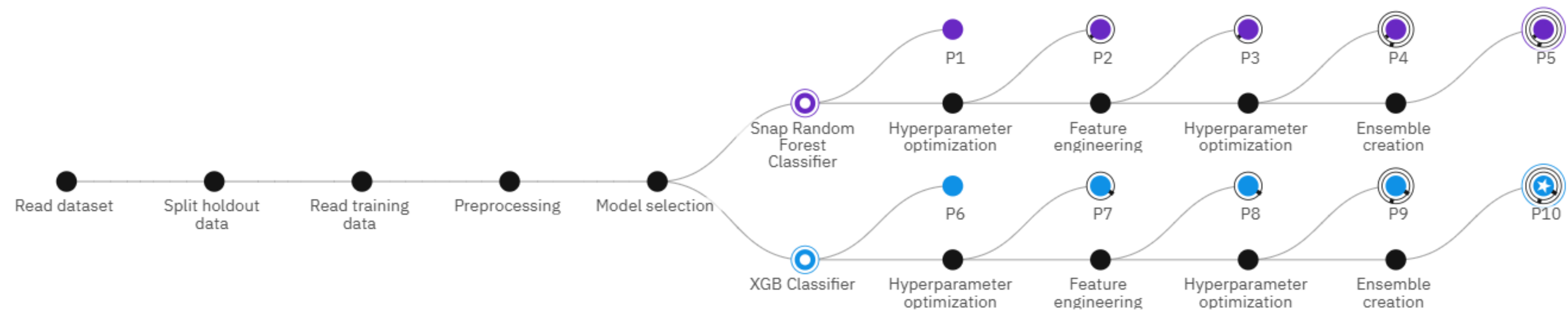
Result

Relationship map ⓘ

Prediction column: PMGSY_SCHEME

Result

Result

Prediction results

Display format for prediction results

◉ Table view   ○ JSON view

[toggle] Show input data ⓘ

	prediction	probability
1	PMGSY-I	[0.0018736355705186725,0.5045124292373657,0.26550695300102234,0.19963815808296204,...
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		

Close ✕

Download JSON file

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Conclusion

- Automated classification enables PMGSY program managers and planners to process high project volumes accurately and efficiently.
- The model provides data-driven, consistent assignments—improving transparency, planning accuracy, and speed.
- Cloud deployment allows integration into monitoring dashboards or e-Government apps.
- Limitations include class imbalance (rare schemes like RCPLWEA) and the need for continued model retraining with new data

Future scope

- Improvements: Address class imbalance with sampling techniques or advanced tuning; regular model updating as new data arrives.
- Extension: Build UI dashboard for non-technical users; integrate feedback loop for human validation and corrections.
- Expansion: Generalize the workflow for other government infrastructure project types or state-level schemes.
- Explainable AI: Incorporate features that explain "why" a scheme was predicted.

References

- AI Kosh PMGSY Dataset: [official AI Kosh link—insert here]
- IBM Watsonx.ai / AutoAI official documentation
- Relevant academic papers on multi-class classification and AutoML
- Your own experimental GitHub repository:
  https://github.com/mehulvish13/IBM-project-PMGSY-Scheme-Classifier
- Any additional ML/data science resources or guides used

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THANK YOU

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