Auto ML Prediction Report

Project Overview

This report summarizes the outcomes of an automated machine learning process using a custom Streamlit web app. The application allows business users to:

- Upload any structured dataset (CSV format)
- Automatically clean and preprocess data
- Select a target variable and appropriate ML model
- Train and evaluate predictive models with no code required

Data Handling & Cleaning

- Columns with over 50% missing values are removed
- Continuous features with missing values are filled with the mean
- Categorical features are filled with the mode
- All categorical variables are one-hot encoded

Target Variable

The user selects a target column which the model is trained to predict. The app automatically detects whether the prediction is a regression (numeric target) or classification (categorical target) problem.

Models Available

Classification Models

- Logistic Regression
- Random Forest Classifier
- Gradient Boosting Classifier
- AdaBoost Classifier

- KNeighbors Classifier
- Gaussian Naive Bayes
- Decision Tree Classifier

Regression Models

- Linear Regression
- Random Forest Regressor
- Gradient Boosting Regressor
- AdaBoost Regressor
- KNeighbors Regressor
- Decision Tree Regressor

Evaluation Metrics

Classification

- Accuracy, Precision, Recall, F1-Score per class
- Macro and Weighted Averages

Regression

- R^2 Score
- Mean Squared Error (MSE)
- Root Mean Squared Error (RMSE)

Test Set Predictions

The application also displays side-by-side comparisons of actual vs. predicted values on the test set.

Business Implications

- Speed: Reduces time-to-insight by enabling fast prototyping and model training without needing a

data scientist.

- Accessibility: Empowers non-technical stakeholders to explore predictive analytics.
- Scalability: Can be reused across departments for different datasets and use cases (e.g. churn prediction, sales forecasting, credit scoring).

Conclusion

The Auto ML Prediction App provides an efficient and user-friendly solution for applying machine learning to business data. By automating key steps-such as data cleaning, model selection, training, and evaluation-the app makes predictive analytics accessible to a wider range of users, including those without technical expertise.

With just a few clicks, decision-makers can uncover patterns in their data, forecast future outcomes, and support strategic initiatives with data-driven insights. Whether used for classification tasks like customer churn prediction or regression use cases such as sales forecasting, this tool streamlines the workflow from raw data to actionable intelligence.

As organizations increasingly adopt data-driven strategies, tools like this empower teams to innovate faster, reduce dependency on technical resources, and make smarter decisions with confidence.