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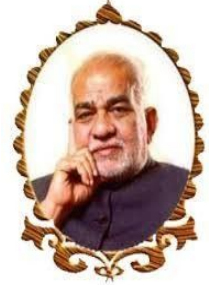
College of Engineering for Women



DEMAND FORECASTING

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Problem Statement

- You are given 5 years of store-item sales data, and asked to predict 3 months of sales for 50 different items at 10 different stores.

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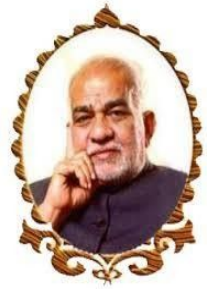
Python Packages Used



- numpy
- pandas
- matplotlib.pyplot
- sklearn

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Algorithms Used

- Linear Regression
- Ridge Regression
- Lasso Regression
- XGBoost

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Linear Regression

- Linear Regression is a machine learning algorithm based on supervised learning. It performs a regression task.
- Simple linear regression is a type of regression analysis where the number of independent variables is one and there is a linear relationship between the independent(x) and dependent(y) variable.

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Ridge Regression

- Ridge regression is a model tuning method that is used to analyse any data that suffers from multicollinearity. This method performs L2 regularization.
- Ridge regression is a type of linear regression technique that is used in machine learning to reduce the overfitting of linear models.

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Lasso Regression

- Lasso regression, also known as L1 regularization, is a type of linear regression that adds a penalty term to the cost function to shrink or eliminate some of the coefficients of the model.
- Least Absolute Shrinkage and Selection Operator is a method that performs both variable selection and regularization in order to improve the prediction accuracy.

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XGBoost

- XGBoost, which stands for Extreme Gradient Boosting, is a scalable, distributed gradient-boosted decision tree (GBDT) machine learning library
- It’s an open-source library that can train and test models on large amounts of data.
- XGBoost is used for faster execution and model performance.

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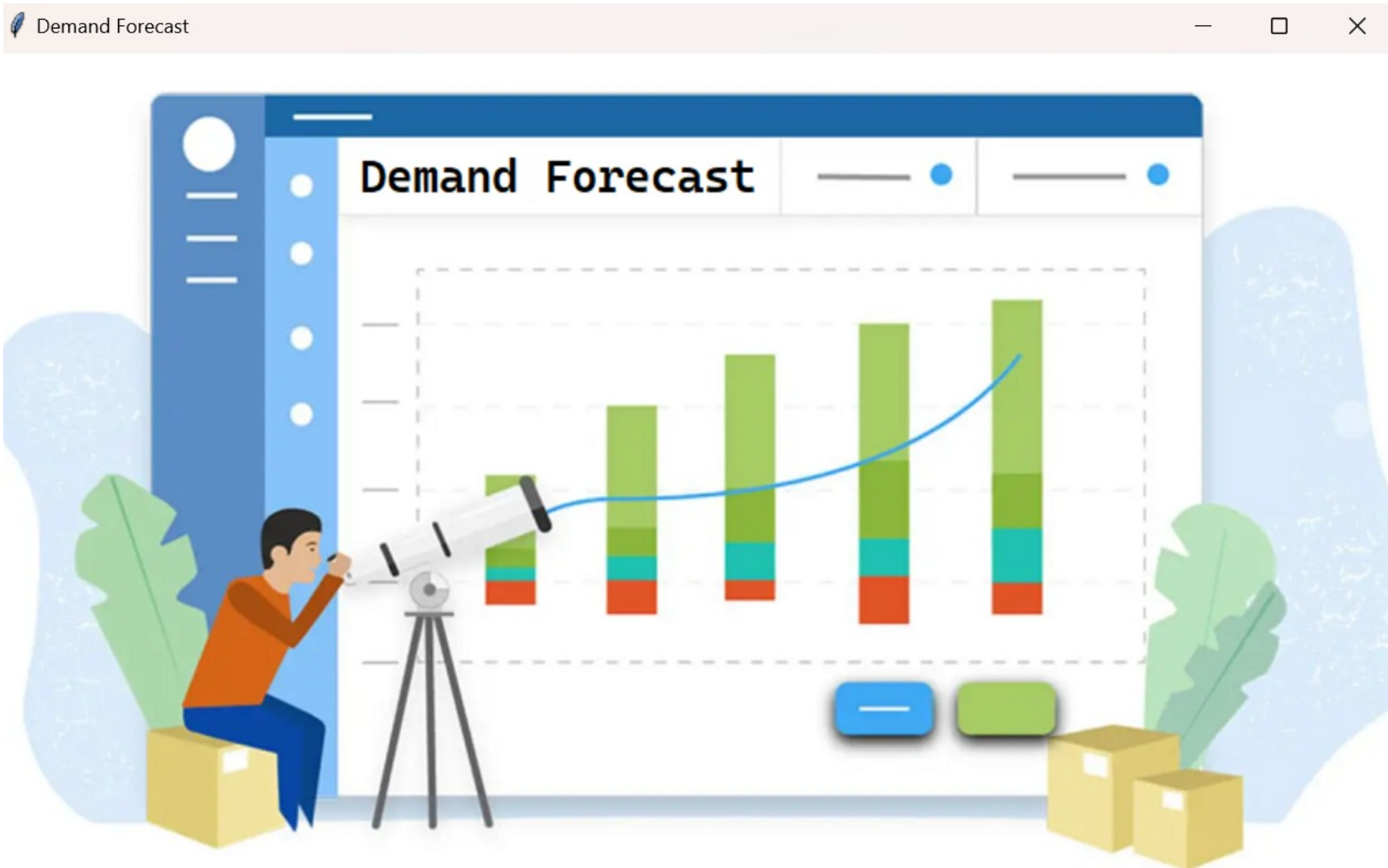
Output



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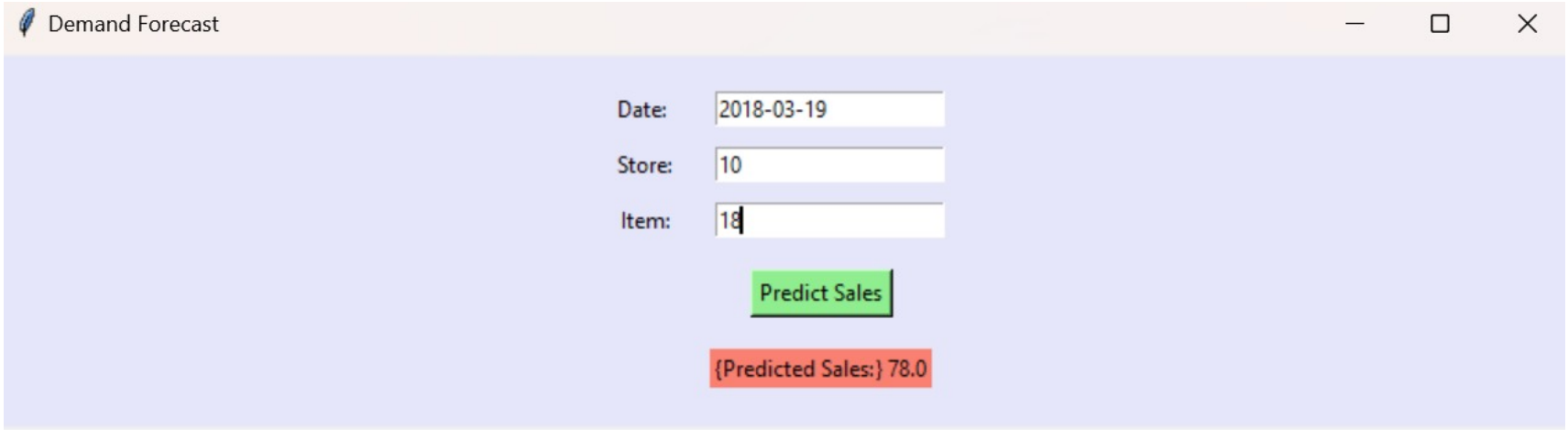
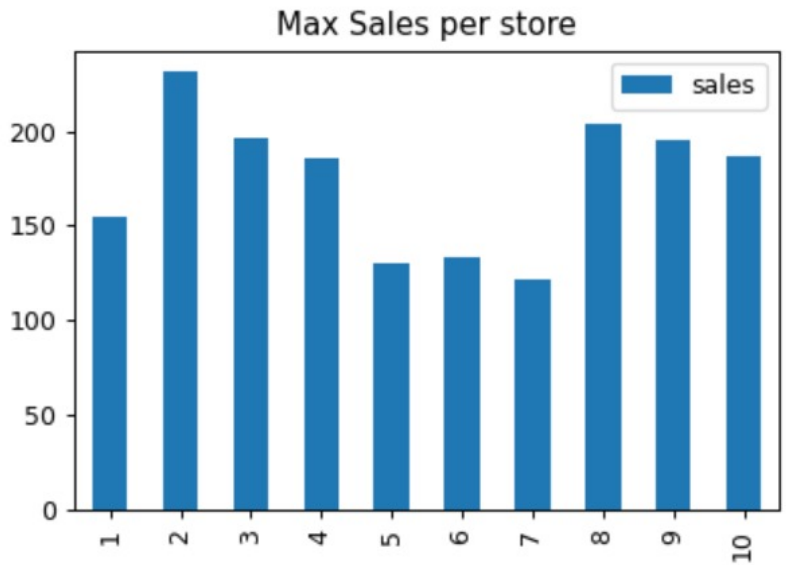
Output





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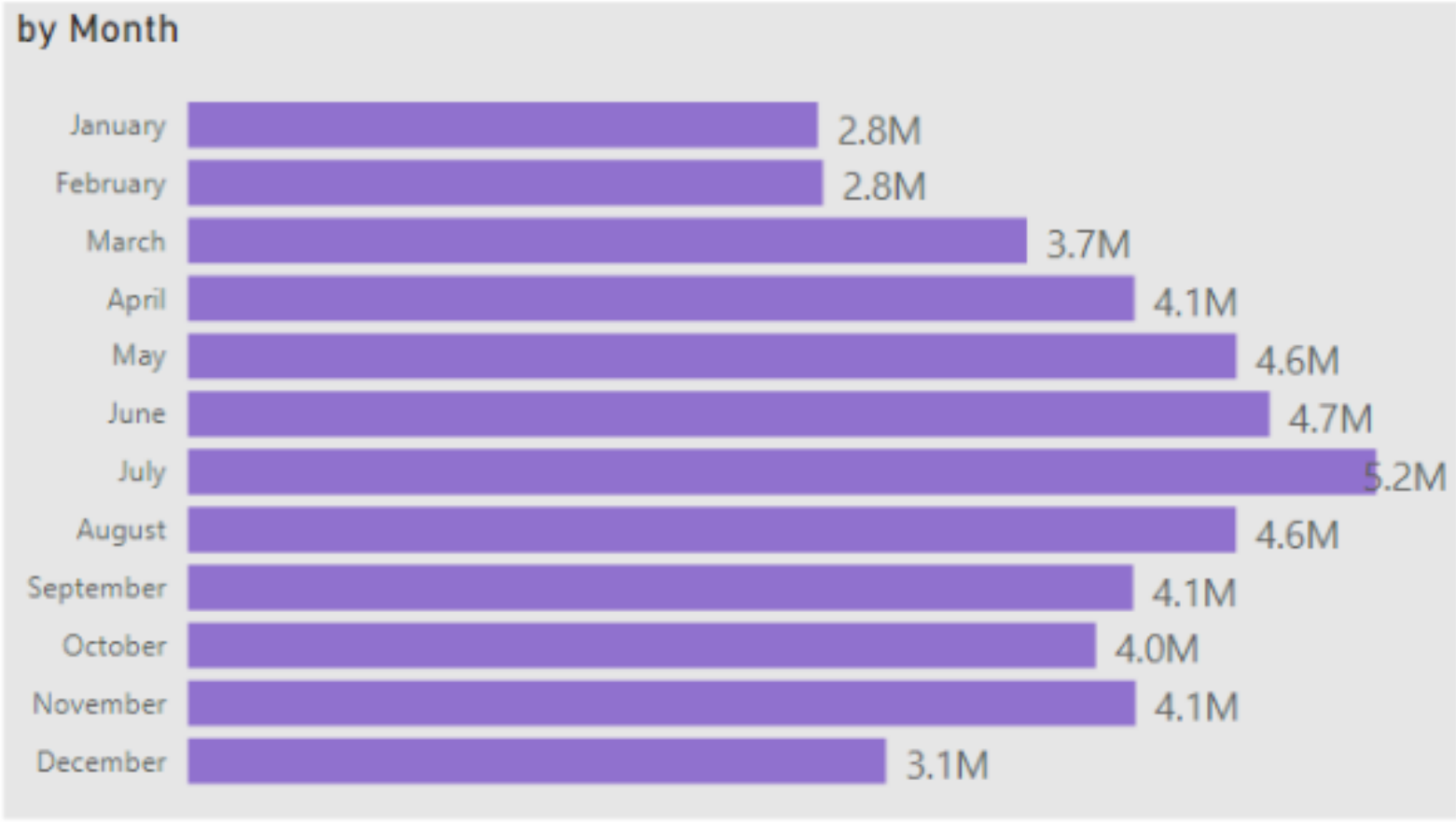
Graphs



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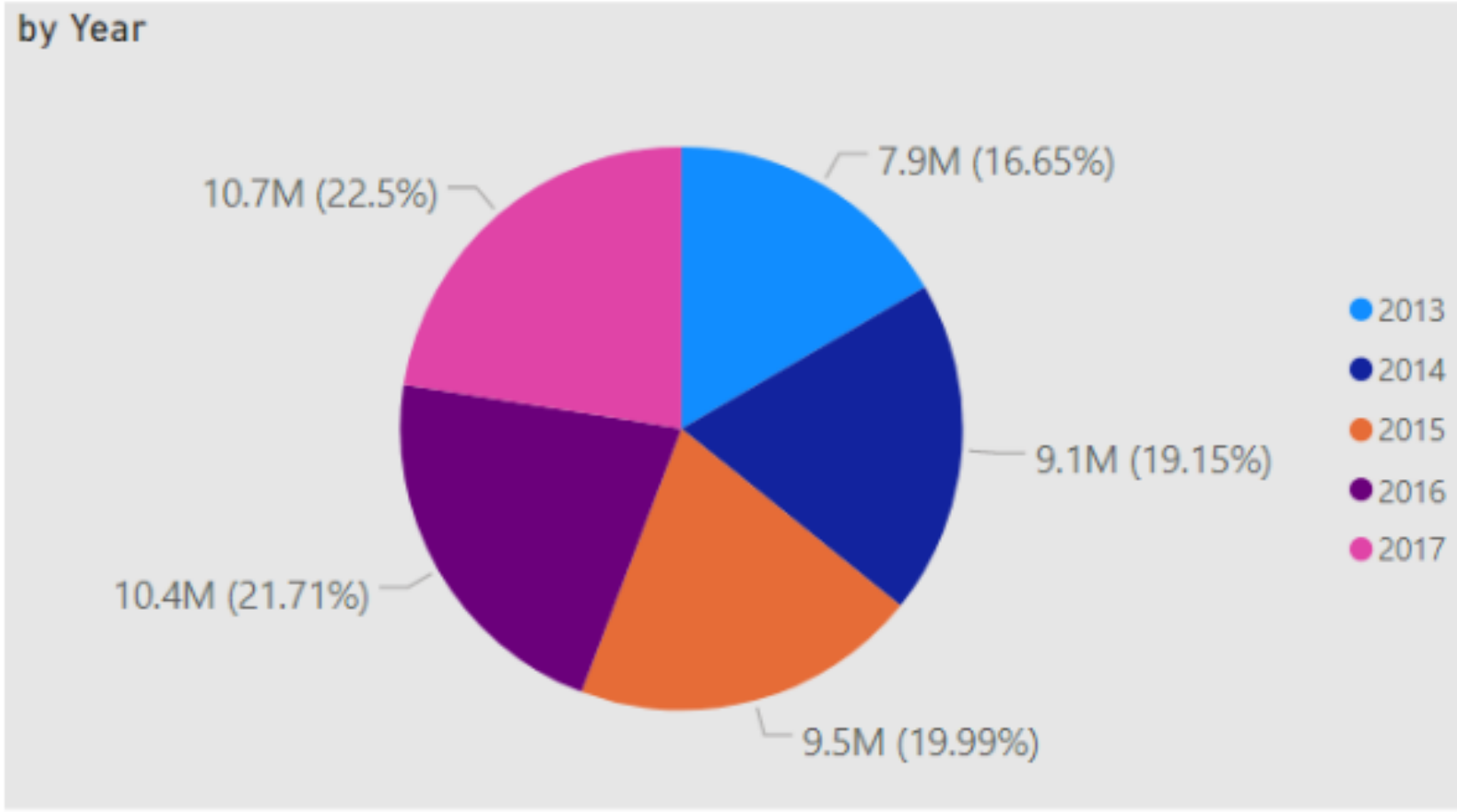
Graphs



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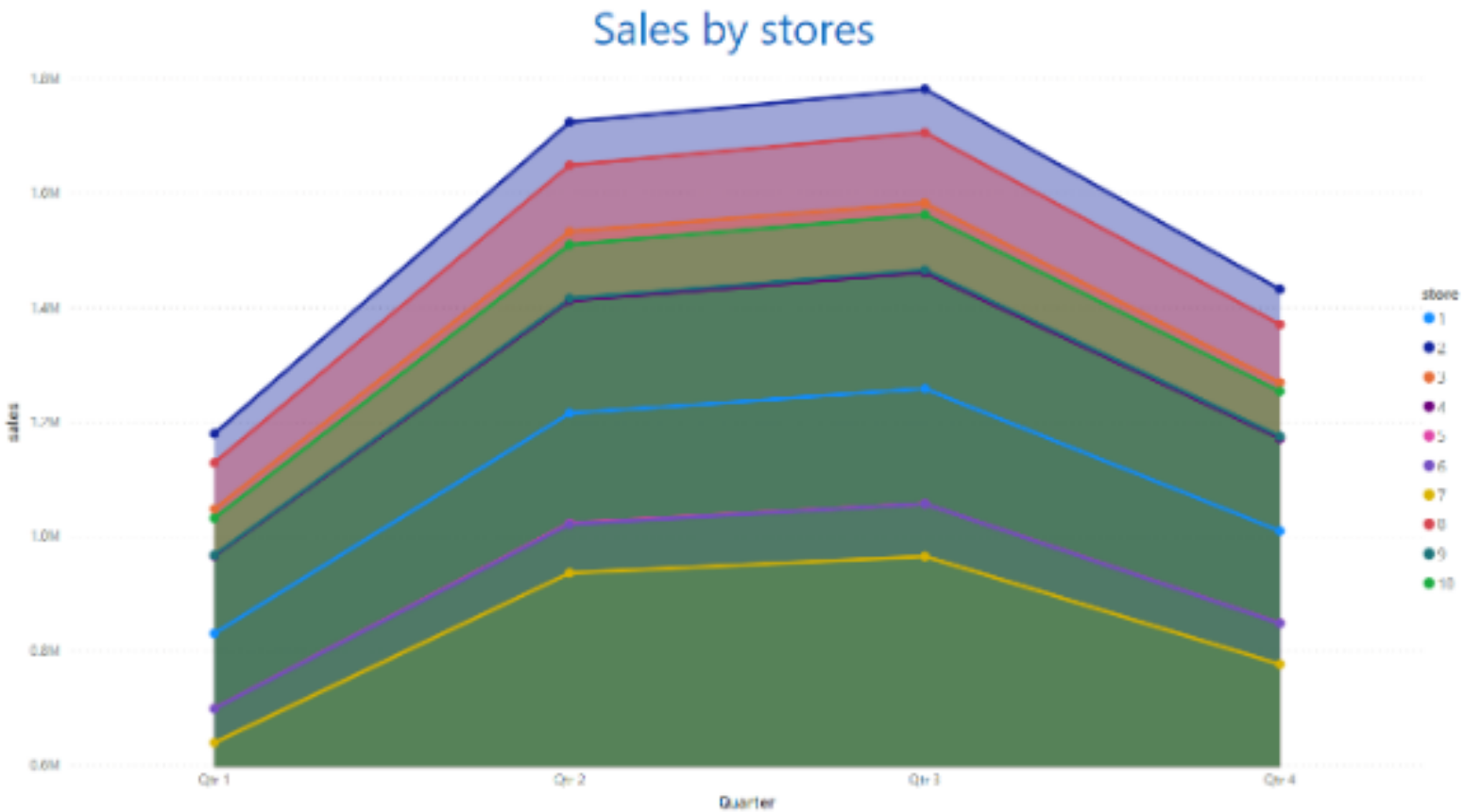
Graphs



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Comparison Table

	Model	Score
0	xgboost	5.580149
2	Ridge Regression	6.848846
1	Linear Regression	6.848846
3	Lasso Regression	6.864288

Figure: Mean Absolute Error

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Comparison Table

	Model	Score
0	xgboost	52.620479
2	Ridge Regression	78.019479
1	Linear Regression	78.019479
3	Lasso Regression	78.572425

Figure: Mean Squared Error

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Comparison Table

	Model	Score
0	xgboost	0.936324
2	Ridge Regression	0.905589
1	Linear Regression	0.905589
3	Lasso Regression	0.904920

Figure: Root Mean Square Error

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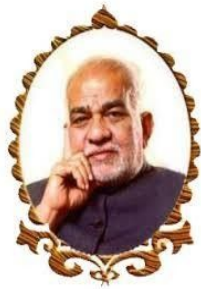

THANK YOU