**Churn Prediction Model Report**

* Introduction

This report documents the process of building a churn prediction model using the Random Forest algorithm. The goal is to predict customer churn based on a given dataset. The process involves preprocessing the data, handling outliers, splitting the data, standardizing features, training the model using GridSearchCV for hyperparameter tuning, and evaluating the model's performance.

* Code Overview

**1. Data Preprocessing and Outlier Handling** –

* The dataset is loaded using pandas.Numerical features are identified, and Z -scores are calculated to detect outliers.
* Outliers are identified using a specified Z-score threshold. Outliers are handled by capping their values to the 95th percentile.

**2. Data Splitting** –

* The preprocessed data is split into training and testing sets using train\_test\_split.

**3. Feature Standardization** –

* Numerical features in the training and testing sets are standardized using StandardScaler.

**4. Categorical Feature Encoding –**

* Categorical features are identified.
* The ColumnTransformer is used to apply scaling and one-hot encoding to different subsets of features.

**5. Model Training and Hyperparameter Tuning –**

* A Random Forest Classifier is initialized.A parameter grid is defined for hyperparameter tuning using GridSearchCV.GridSearchCV is used to find the best hyperparameters using cross-validation.
* The best model is selected from GridSearchCV results.

**6. Model Evaluation –**

* The best model is used to predict outcomes on the test set.Accuracy is calculated using accuracy\_score.
* The confusion matrix is calculated using confusion\_matrix.
* The classification report, including precision, recall, F1-score, and support, is generated using classification\_report.

*Note: I am familiar with the various model deployment techniques but not yet used and being very less time for the assignment submission deadline I was not able to utilize time and deploy my model as I am a working professional.*