# CUSTOMER CHURN PREDICTION

Using ML in Dataiku

# WHAT IS THE NEED OF A CUSTOMER CHURN PREDICTION MODEL ?

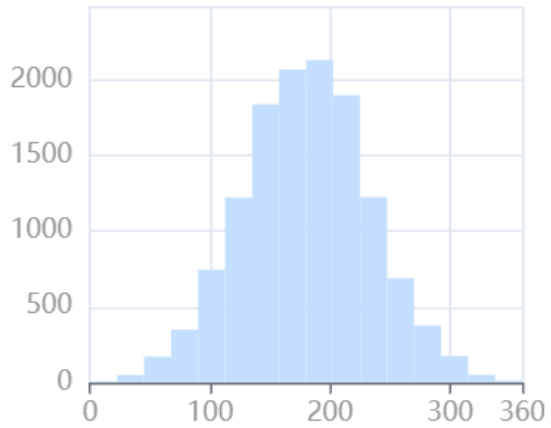
- Identify At-Risk Customers
- Reduce Revenue Loss
- Improve Customer Retention
- Enhance Customer Experience
- Gain Competitive Advantage

# OBJECTIVES FOR THE CUSTOMER CHURN PREDICTION PROJECT

- Analyzing customer data and identifying behavioral patterns through Exploratory Data Analysis (EDA).
- To clean, preprocess, and engineer features from the raw dataset for optimal machine learning model performance.
- To apply K-Means Clustering for customer segmentation, enabling targeted retention strategies.
- To use a Random Forest model to predict which customers are likely to leave, based on patterns in the data.
- To visualize churn insights and customer trends within the Dataiku platform using charts, dashboards, and flow views.

## # 80_day_minutes

### Histogram

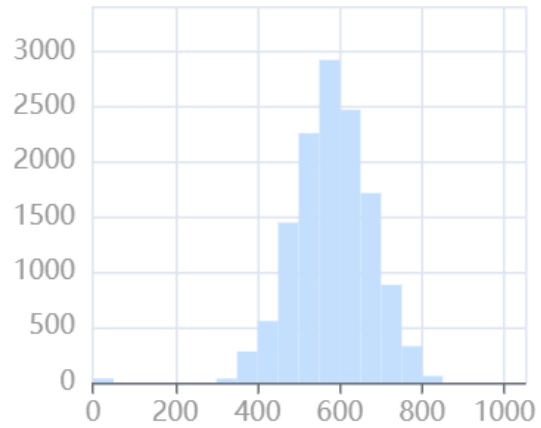



### Summary stats

| | |
|---|---|
| N values | 13009 |
| N distinct | 1442 |
| N finite | 13009 |
| Mean | 180.35645322 |
| Median | 180.5 |
| Std Dev | 52.955271659 |

## # 80_total_minutes

### Histogram

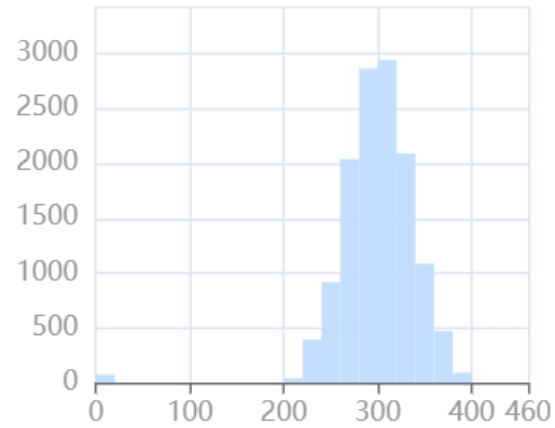



### Summary stats

| | |
|---|---|
| N values | 13009 |
| N distinct | 1747 |
| N finite | 13009 |
| Mean | 581.00103774 |
| Median | 583.2 |
| Std Dev | 93.992305867 |

## # 80_total_calls

### Histogram

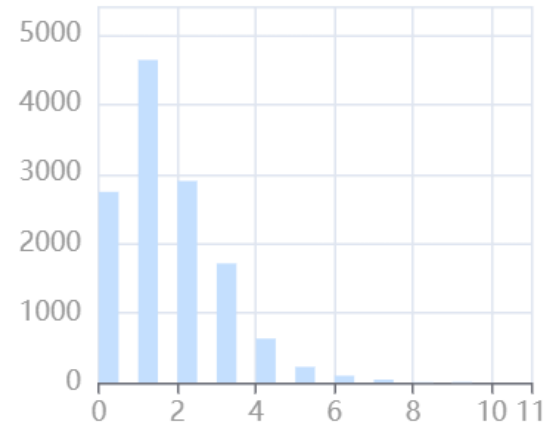



### Summary stats

| | |
|---|---|
| N values | 13009 |
| N distinct | 175 |
| N finite | 13009 |
| Mean | 299.37220386 |
| Median | 301 |
| Std Dev | 39.715642269 |

## # 80_Customer_ser...

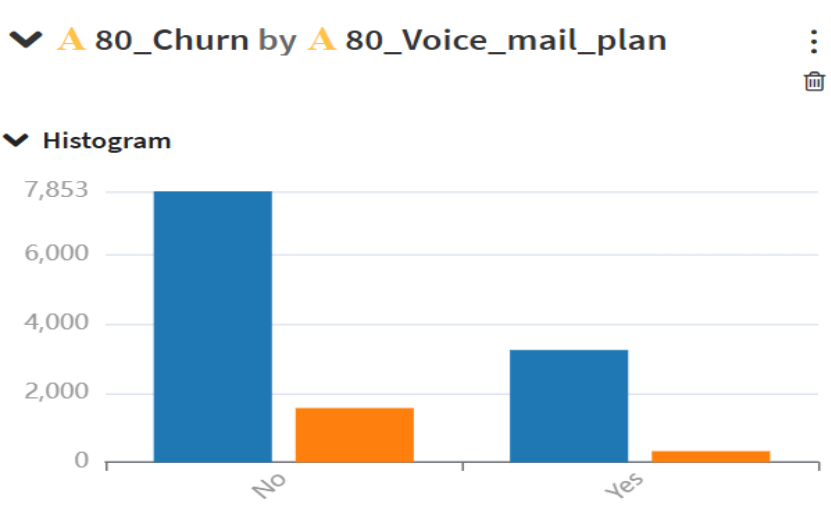
### Histogram

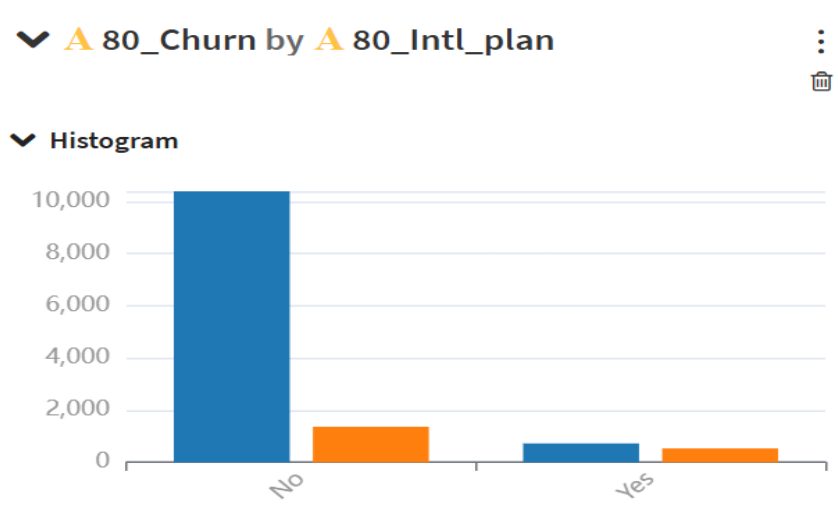


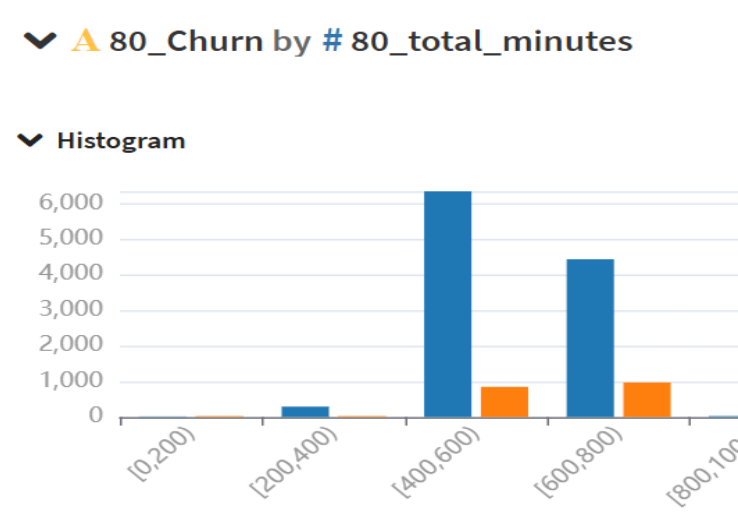

### Summary stats

| | |
|---|---|
| N values | 13009 |
| N distinct | 10 |
| N finite | 13009 |
| Mean | 1.5572296103 |
| Median | 1 |
| Std Dev | 1.3206551263 |

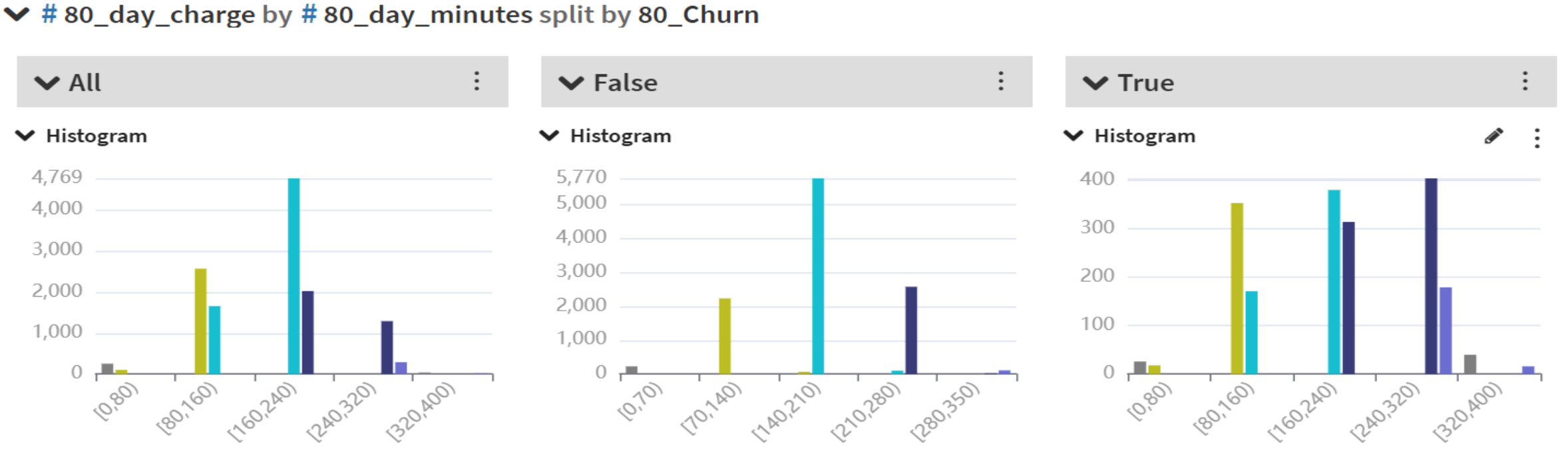
**UNIVARIATE ANALYSIS ON NUMERIC FIELDS USING STATISTICS TAB**



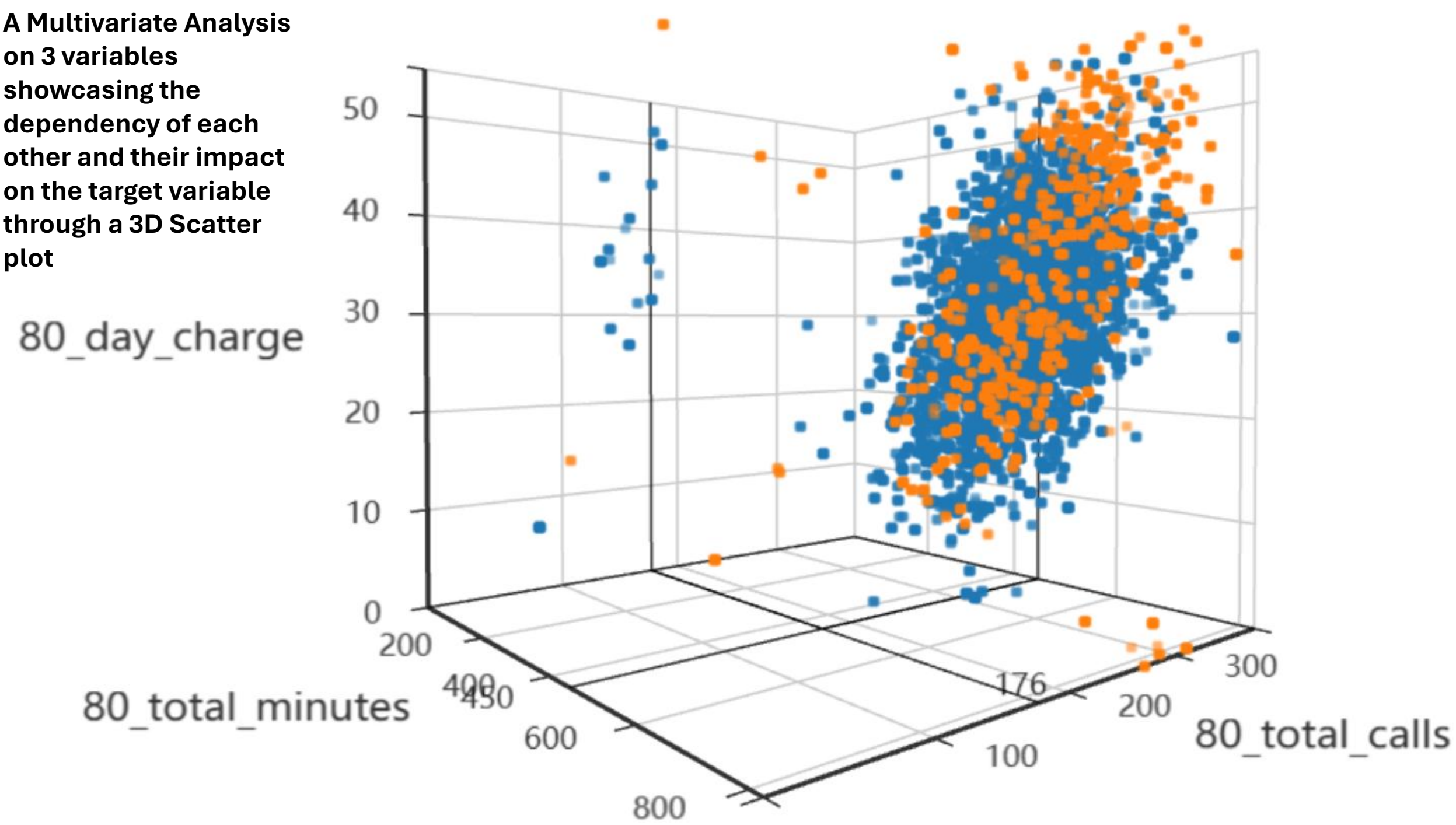




## BIVARIATE ANALYSIS BETWEEN CATEGORICAL AND NUMERICAL FIELDS USING STATISTICS TAB

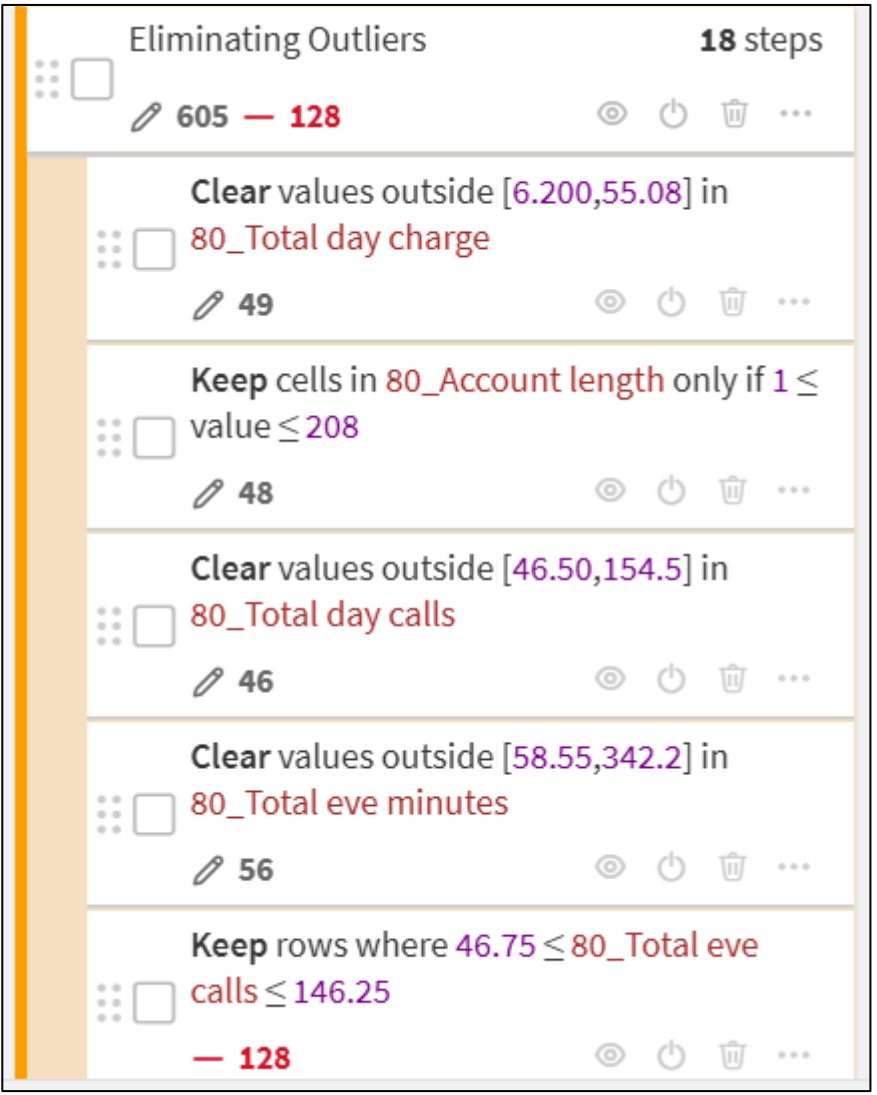



## BIVARIATE ANALYSIS BETWEEN NUMERICAL FIELDS USING TARGET VARIABLE AS A SPLITTING FACTOR

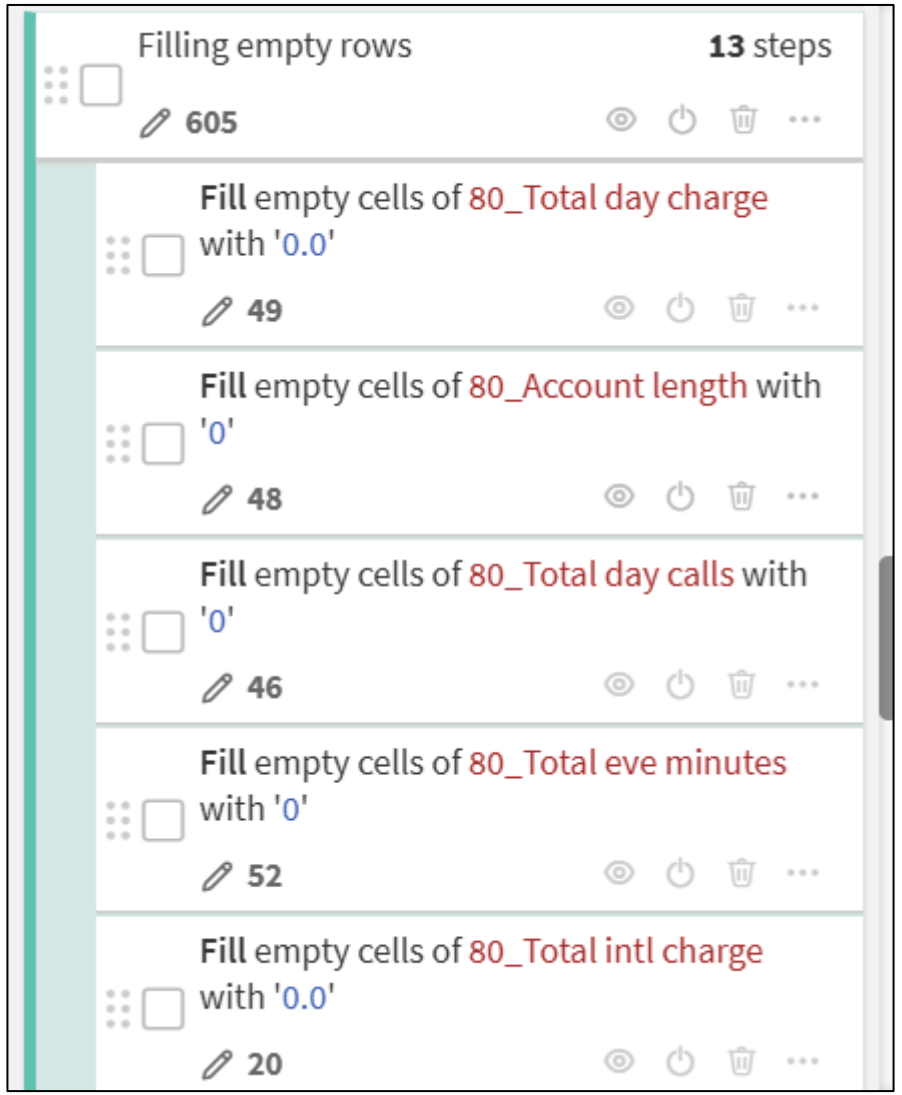
**A Multivariate Analysis on 3 variables showcasing the dependency of each other and their impact on the target variable through a 3D Scatter plot**



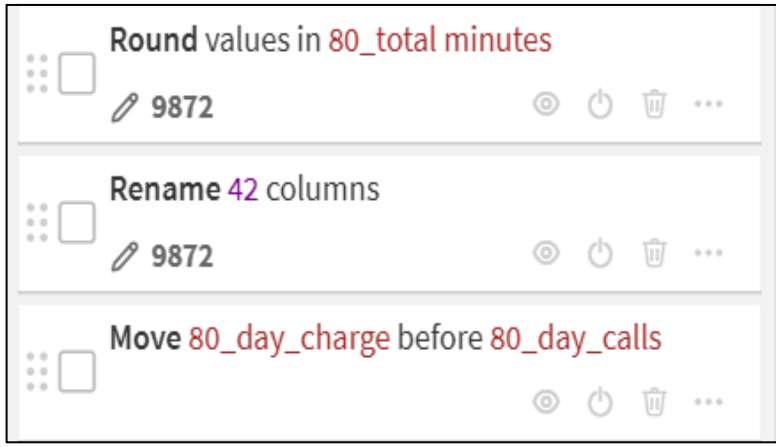
# Using Prepare Recipe for Data Cleaning



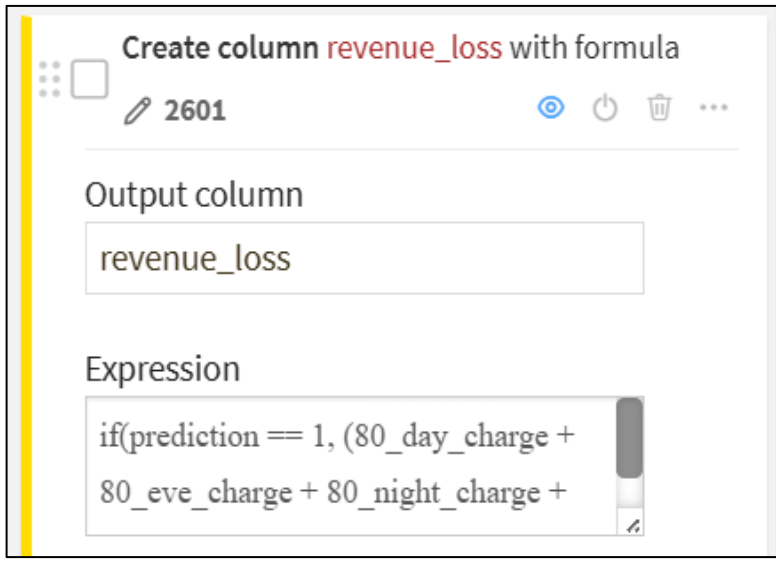

Removing Outliers




Filling Empty Rows




Renaming Columns

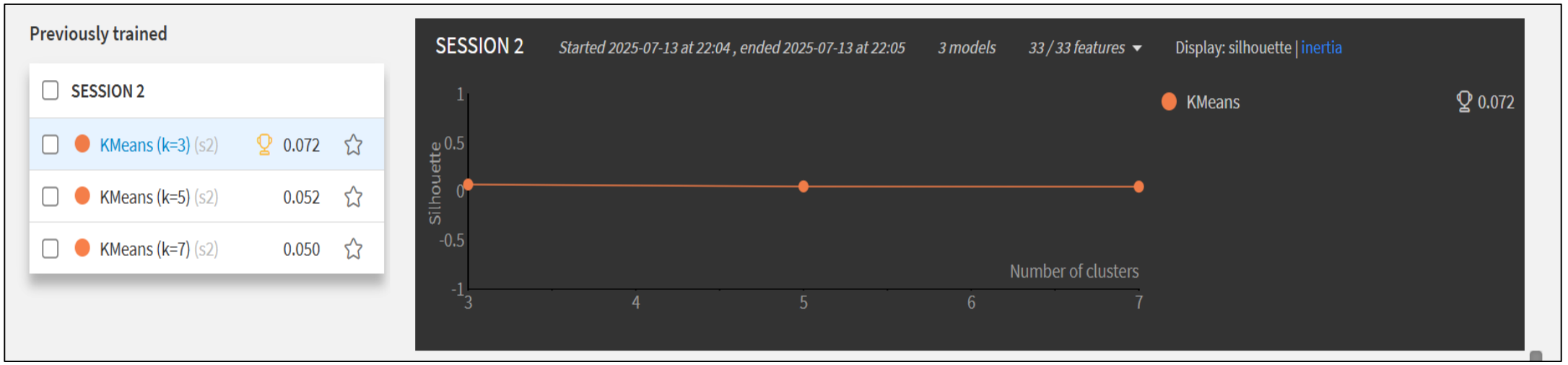



Feature Engineering

# Using Python Recipe for K-Means Clustering Model building

```
import dataiku
import pandas as pd, numpy as np
from dataiku import pandasutils as pdu
from sklearn.cluster import KMeans
from sklearn.preprocessing import StandardScaler

ip_dataset = dataiku.Dataset("churn_bigml_80_joined_prepared_prepared_filtered_cols")
ip_df = ip_dataset.get_dataframe()
n = 3
clustering_df = ip_df.copy()

scaler = StandardScaler()
scaled_clustering_data = scaler.fit_transform(clustering_df)
scaled_clustering_df = pd.DataFrame(scaled_clustering_data, columns = clustering_df.columns, index = cluste

kmeans = KMeans(n_clusters = n, random_state = 42, n_init = 10)
kmeans.fit(scaled_clustering_df)

cluster_labels = pd.Series(kmeans.labels_, index=scaled_clustering_df.index)
op_df = ip_df.copy()
op_df['Cluster_id'] = cluster_labels.reindex(op_df.index)

op_dataset = dataiku.Dataset("Kmeans")
op_dataset.write_with_schema(op_df)
```

# K-MEANS CLUSTERING




KMeans (k=3)

Cluster outliers

Trained in 30 seconds on 13009 records

| | | |
|---|---|---|
| **cluster_0** | | **5511 (42.36%)** |
| cluster_1 | | 5221 (40.13%) |
| cluster_2 | | 2277 (17.50%) |

- The model with **k=3** has the highest silhouette score (**0.072**), indicating it's the best clustering option among the three tested.

**Observations**

- **80_total_minutes** is in average 12.28% greater : mean of 652 against 581 globally
- **80_eve_minutes** is in average 13.34% greater : mean of 226 against 200 globally
- **80_eve_charge** is in average 13.36% greater : mean of 19.23 against 16.96 globally

**The observations indicate heavy usage customers**