



AICP Internship Task

Anomaly detection in transactions means identifying unusual or unexpected patterns within transactions or related activities. These patterns, known as anomalies or outliers, deviate significantly from the expected norm and could indicate irregular or fraudulent behavior.

Anomaly detection plays a crucial role in various businesses, especially those dealing with financial transactions, online activities, and security-sensitive operations.

We can follow a systematic process to address the challenge of anomaly detection. We can begin by collecting and preparing transaction data, ensuring its accuracy and consistency. Then, we can find patterns in the data to find anomalies and use specialized anomaly detection algorithms like isolation forest to detect anomalies.

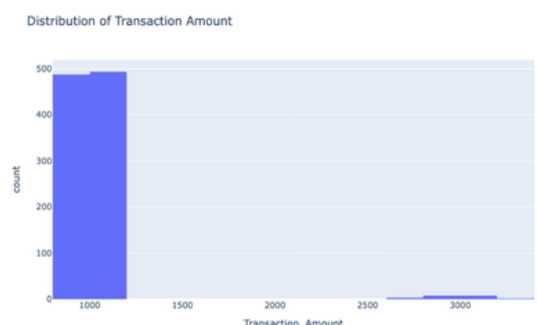
Find the Dataset "**transaction_anomalies_dataset.csv**".

The dataset contains information about various financial transactions, each represented by several features:

- **Transaction_ID:** Unique identifier for each transaction.
- **Transaction_Amount:** The monetary value of the transaction.
- **Transaction_Volume:** The quantity or number of items/actions involved in the transaction.
- **Average_Transaction_Amount:** The historical average transaction amount for the account.
- **Frequency_of_Transactions:** How often transactions are typically performed by the account.
- **Time_Since_Last_Transaction:** Time elapsed since the last transaction.
- **Day_of_Week:** The day of the week when the transaction occurred.
- **Time_of_Day:** The time of day when the transaction occurred.
- **Age:** Age of the account holder.
- **Gender:** Gender of the account holder.
- **Income:** Income of the account holder.
- **Account_Type:** Type of account (e.g., personal, business).

Q.1: Import data and check null values, check column info and the descriptive statistics of the data.

Q.2: Check distribution of transactions amount in the data



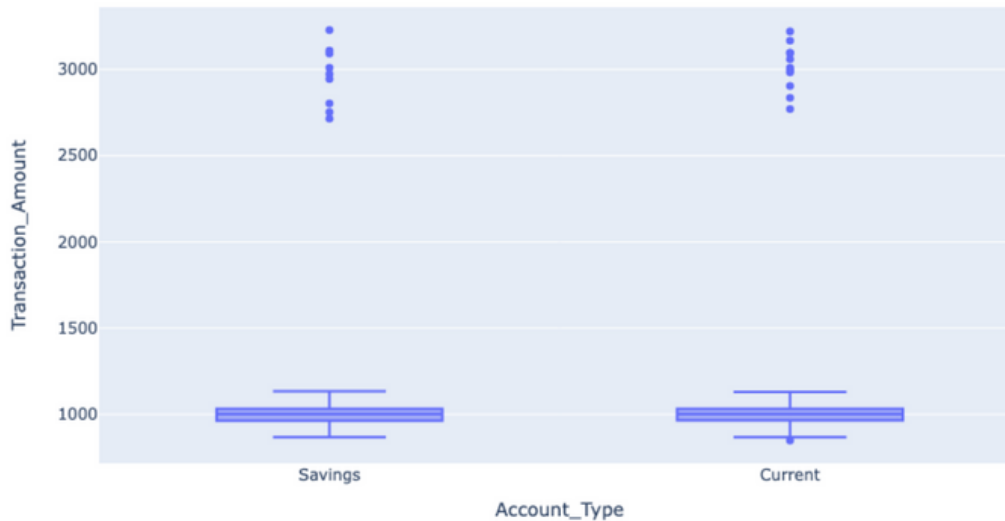


Artificial Intelligence Community of Pakistan

--Evolution to Revolution--

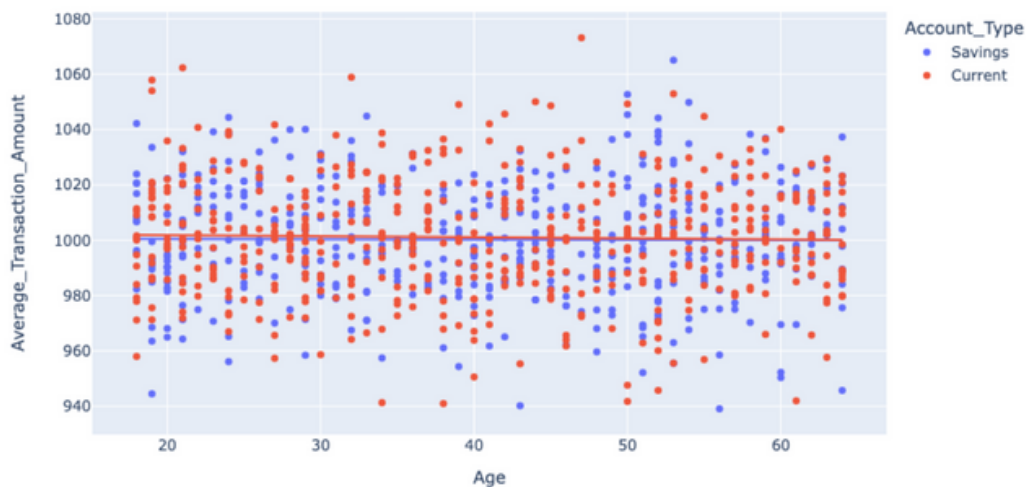
Q.3: Check distribution of transactions amount by account type

Transaction Amount by Account Type



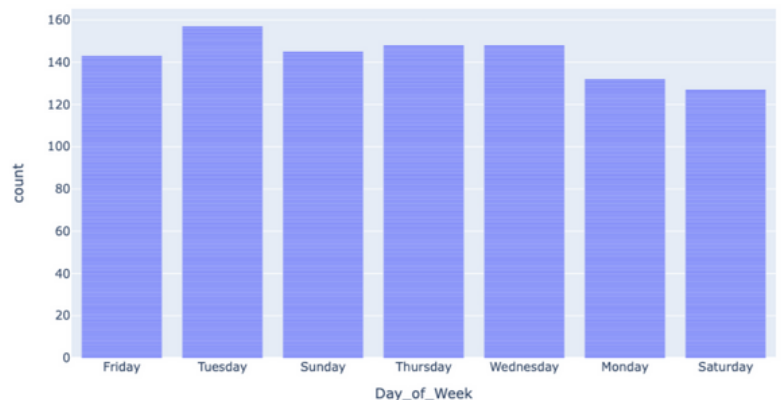
Q.4: Check the average transaction amount by age.

Average Transaction Amount vs. Age



Q.5: Check the count of transactions by day of the week

Count of Transactions by Day of the Week



📍 G-141 Second Floor Commercial Area, DHA Phase 1, Lahore

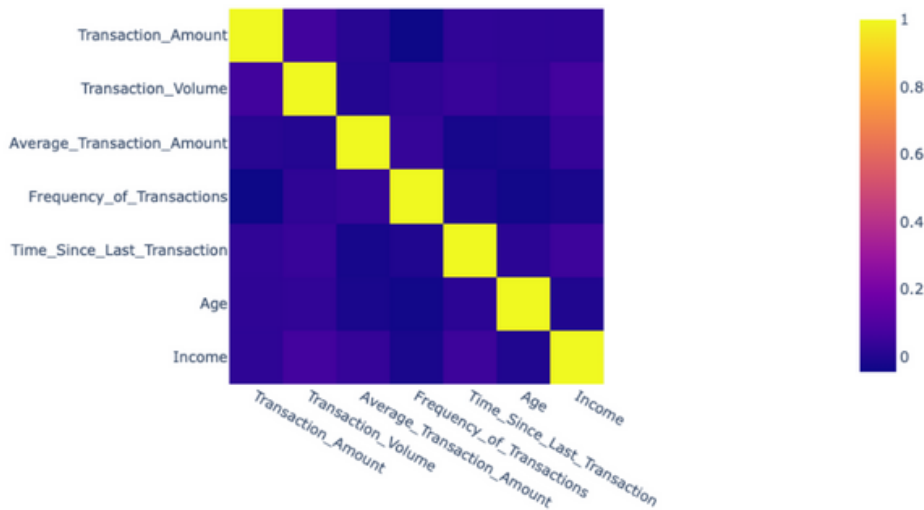


Artificial Intelligence Community of Pakistan

--Evolution to Revolution--

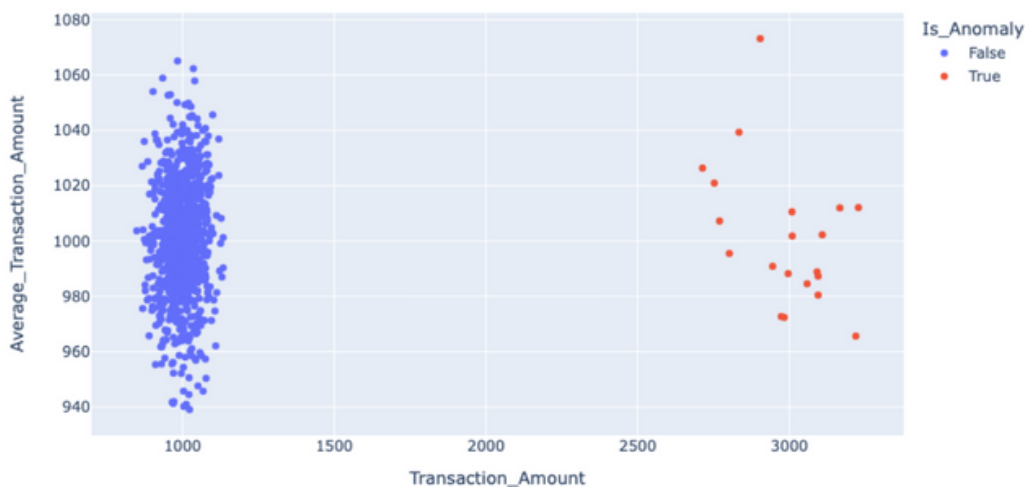
Q.6: Check the correlation between all the columns in the data

Correlation Heatmap



Q.7: Visualize anomalies in the data

Anomalies in Transaction Amount



Q.8: Calculate the number of anomalies in the data to find the ratio of anomalies in the data, which will be useful while using anomaly detection algorithms like isolation forest.

Q.9: Select the relevant features and fit them into the Machine Learning model “**isolation forest**” for detecting anomalies. Now get the prediction and convert into binary values.



Q.10: Show the classification report

	precision	recall	f1-score	support
Normal	1.00	1.00	1.00	196
Anomaly	1.00	1.00	1.00	4
accuracy			1.00	200
macro avg	1.00	1.00	1.00	200
weighted avg	1.00	1.00	1.00	200

Q.11: Use the trained model to detect anomalies to bring following result.

```
Enter the value for 'Transaction_Amount': 10000
Enter the value for 'Average_Transaction_Amount': 900
Enter the value for 'Frequency_of_Transactions': 6
Anomaly detected: This transaction is flagged as an anomaly.
```