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Descriptive Data Analysis of Credit Card Transactions

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***Abstract:** In the previous decades there was a lot of usage of cash and that was the only way in which people could buy and sell things then came the system of Bank Accounts , Debit Cards and Credit Cards and people got adapted to this new system in this paper we will analyze what difference did the Credit Cards bring in the lives of people and how the usage of credit cards is in different parts of India we will analyze the data to understand the customer spending patterns for promotional campaigns, such as during festivals or holidays, in order to better target customer segments according to city and gender-based spending habits. Analyzes consumer trends and interests by looking at the type of purchases people make based on their gender and city. Detects potential credit card fraud or malicious activity, such as by analysing changes in spending habits or unusual purchases, by city and gender. Allows you to identify the top merchants based on the number of transactions and the value of the transactions*
***Keywords:** Data Analysis, Spending patterns, Credit Card Transactions, Supervised Machine Learning ,Consumer behaviour.*

I. INTRODUCTION

We live in an international where we will revel in reviews beyond our economic reach even before we're able to have enough money. credit card agencies have accumulated massive wealth from issuing credit score playing cards, and so have banks who offer the monetary liquidity that permits us to enjoy the revel in. but, in order to restrict delinquencies and decrease default charges on payments, agencies need to stage up their sport.

A credit card is a skinny square piece of plastic or metallic issued with the aid of a financial institution or financial services business enterprise that permits cardholders to borrow budget with which to pay for goods and services with traders that take delivery of playing cards for charge. Credit playing cards impose the condition that cardholders pay returned the borrowed money, plus any applicable interest, in addition to any extra agreed-upon fees, either in complete via the billing date or over the years.That is where clever analytics answers take the level.

The capacity to check records from credit score card usage through cardholders is an almighty formulation for handling the debt disaster going through the enterprise. With that, banks will be able to manipulate their liquidity and significantly reduce the superiority of poor facilities by studying facts pulled from cardholders' fee records.We have designed a credit card evaluation reporting device which could assist agencies inclusive of banks, fintech companies and clients to better prepare their periodic reviews in a manner that permits them to without difficulty get right of entry to client credit score facts. while the dashboard lets in users to analyze and overview all records concurrently, it additionally allows customers to drill down greater particularly into every purchaser's records.

This form of evaluation is crucial when you make a decision on the purchaser's credit score software, because it gives insight into the person's spending behavior, fee records, and profits. while not having to look at lengthy rows and columns of customer facts, agencies can effortlessly choose out applicable data from the reviews to facilitate decision-making. Every dashboard is interactive and may be manipulated without problems. An easy evaluation of records collated over time on clients' spending conduct will offer an insight into which segment or category the best.

The entire technique of making a price via the credit card is shown in 4 steps :

1) Cardholder - cardholder can pay the service provider with a credit score card for all purchases made.
2) Merchant - service provider in addition sends this information to the acquirer .
3) Acquirer - are financial establishments that set up and manage merchant debts. Every business that accepts credit and debit card payments has to set up either a merchant account or a sub-service provider account and also who is responsible to forward the credit card info to the credit card community.
4) credit card community.- credit card community requests price authorization from the issuing financial institution.

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So, the cardholder can pay the service provider with a credit score card for the acquisition, then the service provider sends all respective credit card info to the acquirer. Acquirer who acts as intermediate among service providers and the credit card network The acquirer forwards the credit card info to the credit score card community, so that it may forward the credit score card request to the bank to offer charge authorization. In this way transaction of cash includes among the customer/cardholder and merchant.

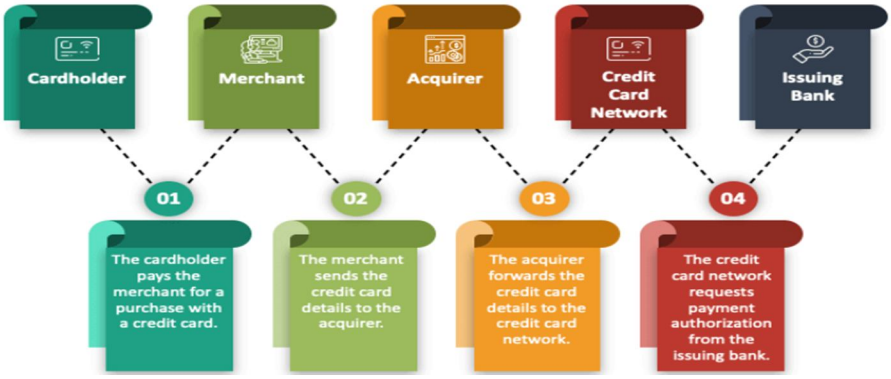


Fig 1 - Card payment cycle

II. MOTIVATION

Credit card analysis uses personal information and facts submitted via credit card applicants to be expecting the opportunity of destiny defaults of fees. Essentially, credit playing cards are primarily based on historical facts. As soon as we encounter big financial fluctuations certainly putting this in records visualization, it's far the manner of translating statistics into easily understood visuals.

1) Those visuals will be inside the form of graphs, charts, maps, plots and animations.
2) Beneficial for highlighting trends, patterns and correlations in statistics, facts visualization is an effective decision-making device that enables key people to make properly-informed selections backed with the aid of records.
3) It's far easier to make sense of big datasets and combine unique datasets from various sources.
4) Maintain the target audience's interest while being easy to understand and interpret.
5) Make it less complicated to reveal crucial metrics..

With the improvement of system mastering algorithms, extra predictive methods which include Random forest and Linear regression were introduced into credit card scoring.However, those methods frequently do not have excellent transparency. it may be difficult to provide clients and regulators with a motive for rejection or attractiveness.

III. RELATED WORKS

A. Globalisation of Credit Card Usage: The Case of a Developing Economy :

The purpose is to investigate the attitudes of Turkish consumers towards credit card usage.Concluded that,the usage and the management of credit cards by the issuers, retailers, and even by the consumers, is very much influenced by the infrastructure of the country where it is used*[9]*.

B. Using Unsupervised Machine Learning Techniques for Behavioural-based Credit Card Users Segmentation in Africa :

It defines and describes the steps that can be taken to build a behavioural-based segmentation model that differentiates African credit cardholders based on their purchases data. And focus on African customers and African financial institutions. The results of credit card customers segmentation revealed that customers are grouped into four distinct segments.

Most customers belong to the ordinary joe, followed by fashion lovers, limited Spenders and last are the prosperous. This was achieved from using the k-Means clustering algorithm*[10]*.

C. A review of credit card literature: perspectives from consumers :

Credit cards have become pervasively held by most consumers. With increasing access to personal credit, households are now relying more and more on electronic payment media, mostly credit cards in the UK and the US. Meanwhile, educators, consumer advocates and public policy administrators have raised concern over the problems of credit card misuse and the massive accumulation of credit card debt.

This paper reviewed the empirical evidence, mostly in the US for the last two decades, on issues related to consumers' behaviour in the use of their credit cards.*[11]*

D. Natarajan and Manohar (1993) Credit Cards–an Analysis

A study has been attempted to know to what extent the credit cards are utilized by the cardholders and the factors influencing them. The study is confined to cards issued by the Canara Bank... Chi square test has been conducted to know the level of utilization by taking into consideration ten components i.e.. numbers of purchases, shops, percentage of purchases, place, frequency, type of product, type of services, cash withdrawal facilities, add on facility, insurance schemes etc. the test reveals that sex, age, educational qualification of card holders has no relationship with utilization of the card rather the occupation, income, employment status of spouse, mode of getting card is related with utilization of credit Cards.

E. Analysis of the use of Plastic Money

highlighted the advantage of Instant transaction as one of the major factors favoring the use of plastic money over real money by the population today. It has already been highlighted by the study that convenience of not carrying cash and ease of transaction is one of the major psychologically influencing factors that encourage the use of plastic money instead of real money. Additionally, the results of the study have also stressed upon the convenience and ease of use while paying or shopping by plastic money. The saving of time and the fact that the plastic money seems to be more portable also seems to further the cause of a possible change in the scenario of money usage in the economy. On the other hand, Security comes forward as a major cause for concern for the population using plastic money. Therefore, it is easy to conclude that the population is ready as ever to use plastic money at a greater level due to its high levels of ease and convenience.

IV. METHODOLOGY

There are four different kinds of Data Analysis they are as follows -



Fig 2-Types of Data Analysis

1) Descriptive Data Analysis - It explains what happened and details about that
2) Diagnostic Data Analysis - It explains why did it happen and what were the causes
3) Predictive Data Analysis - It explains what is likely going to happen in the future based on the present data that we have it is the most commonly used data analysis technique
4) Prescriptive Data Analysis - It explains the steps/procedure that we need to follow in order to perform a action Here we are going to use the Descriptive Data Analysis process to understand the data better .

Methodology explains the different steps that are taken in the process of data analysis and the things that are done under that particular stage in the methodology . It is very important that we follow the methodology so as to work in a systematic way and get accurate results .

Data analysis methodology consists of different stages they are follows -



Fig 3-Data Analysis Methodology

a) *Data* - We need to decide the different attributes that the data must contain and are important for the analysis
b) *Organise*-We need to collect the required data for the analysis from the database or need to conduct a survey in order to collect the data that is required for the analysis.
c) *Prepare*-We need to clean the data that we have collected and make sure it's in the right format , does not contain null values and duplicates this is a very important step in the data analysis process because if the data is clean then we can spend less time in the analyzing phase otherwise we will need to keep shifting between the prepare and analyze phase

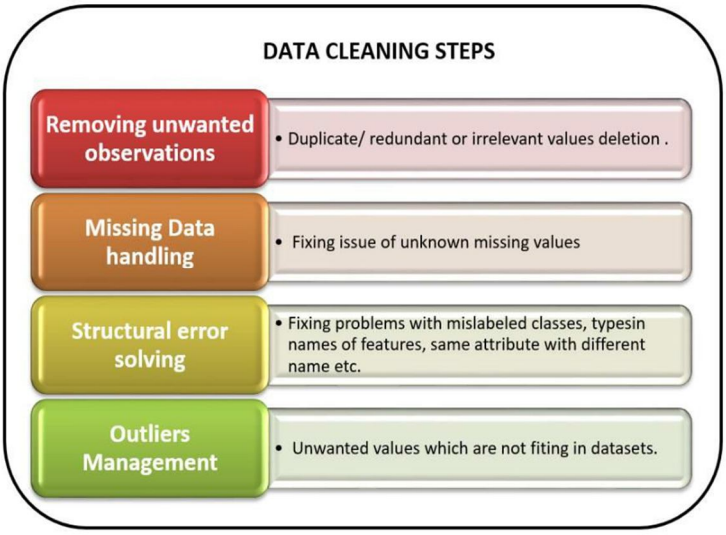


Fig 4-Data Cleaning Steps

d) *Analyze*- In this phase of the process we explore the data and try to understand the relationship between the different attributes in the data set and find the patterns in the data set
e) *Visualize* -To understand the relationship between the attributes in a better way we use different kinds of graphs such as bar graphs , scatter plot , pie chart etc.

Numpy is Python library that is used to work with arrays it also makes performing different operations on the matrices such as Fourier Transform, Linear Algebra easier , Pandas is mainly used to load the data set that might be present in different format such as excel(.exe),csv(.csv) and json(.json) into a dataframe which makes it easier to view the data in the tabular format and perform some basic manipulation operations.

Seaborn and Matplotlib libraries are used to make eye catching graphs which makes visualization better and also there are different charts that we can use such as line graphs , bar charts , pie chart , scatter plot etc .

V. PROPOSED WORK

We describe the data and the different patterns that data shows when we explore the data with the help of different Python libraries such as Numpy,Pandas,Seaborn,Matplotlib and Scikit Learn etc by analyzing this data set we get to know more about the customers who are using credit cards and understand where they spend the money and what are the factors that affect the credit card transactions like Gender , City, Expense Type etc . So based on that we can also understand customer spending patterns and trends . This data is very important for marketing firms who wish to market their product to the right audience and with the help of this data they will know which segment of customers are likely to buy their products .

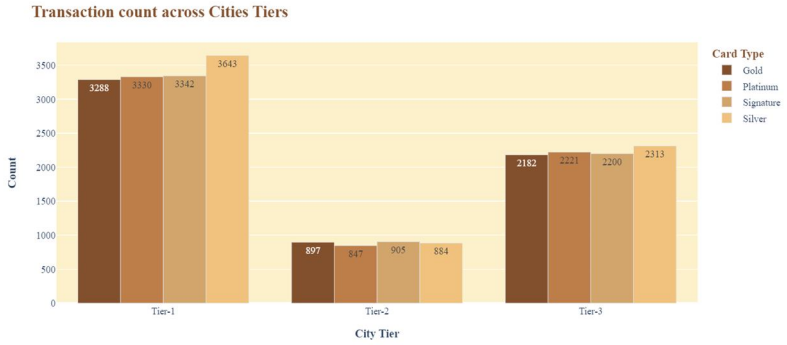
VI. EXPERIMENTAL RESULTS

When we analyze the data that we have got for the analysis we get the following conclusions from the data set -

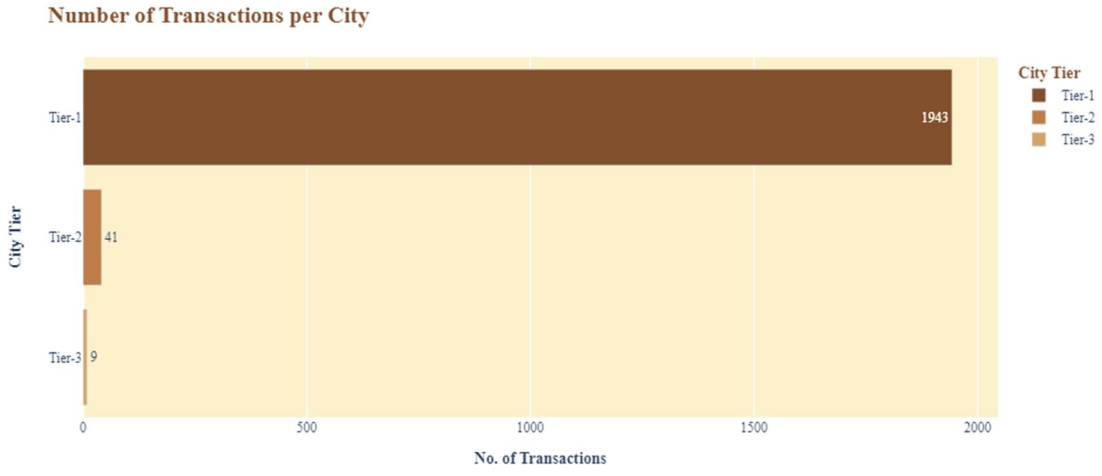
1) We have divided the cities into different tiers like metropolitan cities as Tier -1 and small cities as Tier -2 and so on and from the graph we see that the amount spent through credit card is highest in Tier-1 cities but also there is a abnormality which shows that Tier-3 cities have second largest amount spent in total through credit card which might not be the case which indicates that the data might be biased .



2) We compare the transaction count across Tier - 1,2,3 for the different Credit Card type such as Gold,Platinum,Signature and Silver and we find that there is not much difference between the number of users of Gold,Platinum,Signature and Silver cards .

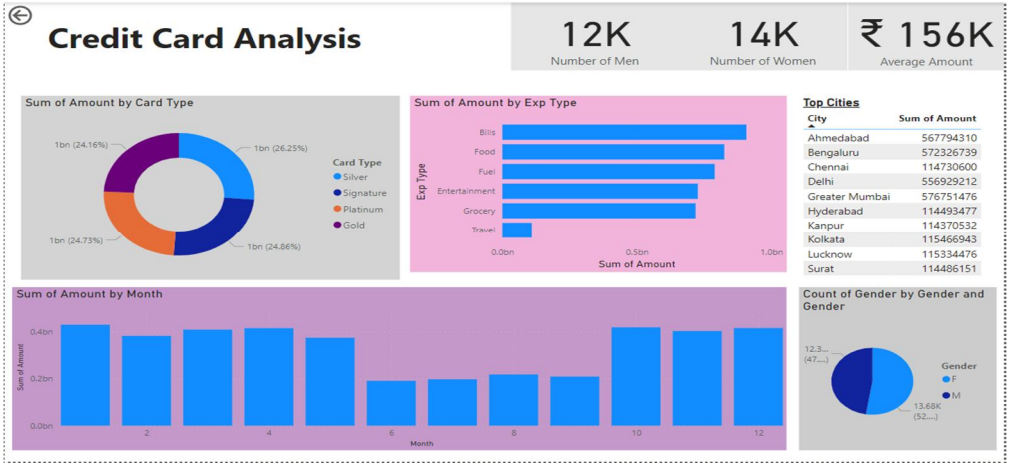


3) The number of credit card transactions is highest in Tier-1 cities and less among Tier- 2 and 3 cities as the people who live in Tier-2 and Tier-3 Cities prefer to perform transactions with cash.



4) Power BI is a powerful tool that is used in the field of Data Analysis that is used to create interactive dashboards that also get reflected with real time data and useful to help the stakeholders understand the insights of the data which would help them take data driven decisions .We created a Power BI dashboard through which the user / client can understand the data in a better manner and also filter the data based on different criteria and it also represents all the important information present in the database

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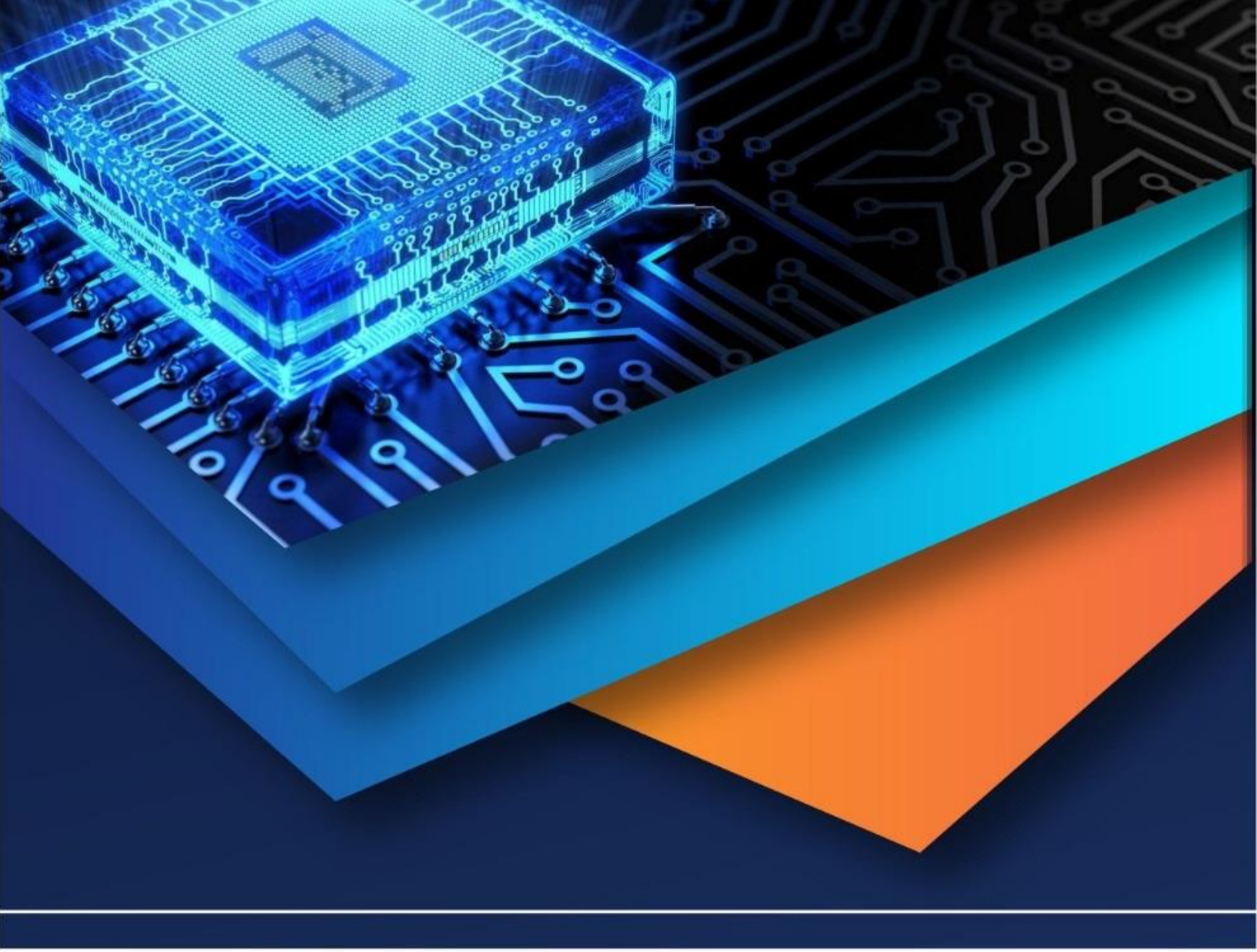


VII. CONCLUSIONS

By analyzing the credit card transaction details we understand how customers use credit cards in different cities such as Tier-1,2 and 3 in India and the different expense types that they spend their money on etc . Nowadays people use UPI and Credit Card to do their transactions but they can't analyze the way they spend their money and the different categories in which they spend their money if the users are able to analyze how and where they spend their money then they can plan their financial goals in the better way and this data is also very helpful for marketing teams who want to advertise their products to the right audience and make sure the reach potential customers who might end up buying their product for that they must know the customer spending patterns and behaviour with the help of Descriptive Data Analysis we can understand the data set in a better manner which would in turn add value to the business as now we know more about our customers.

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