POST COVID UPI EXPENDITURE

A Project Report submitted in partial fulfilment of the requirements for the award of the degree of

BACHELOR OF TECHNOLOGY
IN
COMPUTER SCIENCE AND ENGINEERING

Submitted by

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DEPARTMENT OF COMPUTER SCIENCE &ENGINEERING

GITAM

(Deemed to be University)

VISAKHAPATNAM

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

GITAM SCHOOL OF TECHNOLOGY

GITAM

(Deemed to be University)

DECLARATION

I/We, hereby declare that the project report entitled "**POST COVID UPI EXPENDITURE**" is an original work done in the Department of Computer Science and Engineering, GITAM School of Technology, GITAM (Deemed to be University) submitted in partial fulfilment of the requirements for the award of the degree of B.Tech. in Computer Science and Engineering. The work has not been submitted to any other college or University for the award of any degree or diploma.

Date:28-10-22

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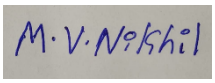
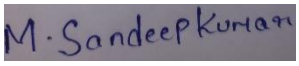
121910312016	MEDISETTY VENKATA NIKHIL	
121910312023	MAREMALLA SANDEEP KUMAR	
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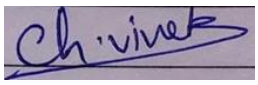
121910312046	VIVEK CHADARAM	

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

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GITAM

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BONAFIDE CERTIFICATE

This is to certify that the project report entitled "**POST COVID UPI EXPENDITURE**" is a Bonafide record of work carried out **by MEDISETTY VENKATA NIKHIL(121910312016), MAREMALLA SANDEEP KUMAR (121910312023), SAGI LAKSHMI PASYANTHI(121910312035), VIVEK CHADARAM(121910312046)** students submitted in partial fulfilment of requirements for the award of the degree of Bachelors of Technology in Computer Science and Engineering.

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ABSTRACT

The Indian government has made significant efforts to promote digitization and the Go Cashless initiative to regulate and streamline cash transactions following demonetization. The effects of demonetization have led to a phenomenal increase in digital payment methods including e-banking, mobile banking, card transactions, etc. Since 2016, the UPI (Unified Payment Interface) platform has been used primarily in India. A user can send and receive money via UPI, one of the fastest-growing digital payment systems, by using a Virtual Payment Address (VPA). Customers in the service sector are drawn to UPI because it stands out from other digital payment methods thanks to its availability around-the-clock, 365 days a year, ease of use, and secure gateway. This study aims to determine how UPI usage rates have changed among people before and after covid. Additionally, it tries to understand how UPI boosted spending when dealing with COVID. To better understand the expanding use and problems with these apps, the research compares the top-rated bank-based UPI apps with the official BHIM app.

The primary goal of this study was to examine post-COVID UPI system uptake and awareness. Primary data for this study came from the service industry, and secondary data came from government reports, websites, and other sources. This study's conclusion compares many characteristics of UPI usage throughout time. The findings of this study broaden our understanding of UPI acceptability and its value in fast and cashless transactions.

INTRODUCTION

Technology development has altered India's payment system. After November 8, 2016, the post-Demonetization period played a significant influence in the expansion of digital payments in India. As part of his government reforms, Prime Minister Mr Narendra Modi has also heavily promoted cashless transactions. Calculations based on information from the Reserve Bank of India and the National Payments Corporation of India show that for the first half of the government's budget year, there were around 11.8 billion digital transactions.

The present era of digitalization has permeated the core of our human ecosystem, into our personal space, and has alarmed industries into innovating and building technological systems around us. As the transactions between various parties ensued, tertiary industries, in particular, banks and other financial institutions were entrusted with the details of these transactions. The banks and other institutions have gone past their traditional methods of doing business and have adopted technology to effectively assist them in the dissemination of their products and services.

A developing nation like India, where there is a potential for increasing the use of smartphones and universal access to banking via phones, presents unique opportunities as well as potential challenges to the banks and the customers. With digitalization taking over the banking industry, banks are coming up with innovative services for their customers to compete and sustain themselves in the market. Through digitalization, customers can access bank facilities at a finger touch at any time and location according to their convenience.

The biggest roadblocks faced by India on its journey to a cashless society are the slow growth of digital infrastructure across the country, network security concerns and lack of digital literacy.

The UPA-led government has come up with various innovative initiatives, keen on bringing about a digital transformation in the country thus spreading awareness about digitalization in banking services post-demonetization. Unified Payment Interface(UPI), launched by the National Payments Corporation of India (NPCI), is an initiative that focuses on encouraging the implementation of a cashless economy and smoothening the transition towards a digital society.

As of now, as many as two dozen banks have currently implemented UP1 apps to facilitate easy and quick transfer of money between parties.

By using our study of POST COVID UPI EXPENDITURE, the world receives immediate information about the current UPI market and industry and would assist banks, UPI companies, and many others in getting insights and scaling their market growth and predicting their futures to sustain themselves in the market and to keep up with the most recent technological developments in the nation. By producing more precise and significant research that will assist us shortly for any research, our analysis of the before and post covid UPI expenditure is a means to encourage people to go cashless and to help improve the economy. The main objectives of the study are: 1) to assess the impact of covid on UPI on financial literacy and 2.) to predict the future trends of UPI.

The rest of the paper is divided into several sections. The second section after the Introduction section dwells upon a literature survey on the topic and its constructs. The third section is a detailed discussion of the model to be tested. The fourth section is a brief related to the source of data, period and main methodology used for the empirical testing of the proposed model. The next section is the Discussion which compares the results of the study with the previous studies and established the contribution and novelty of the results for reasonable implication. The last and seventh section concludes the study with a discussion on limitation and the future scope of the study.

LITERATURE REVIEW

Somanjoli Mohapatra (2017), In their study, reported that the single interface across all NPCI systems besides creating interoperability and superior customer experience. The UPI seeks to make money transfers easy, quick and hassle-free. The proliferation of smartphones, the availability of an online verifiable identity, universal access to banking and the introduction of biometric sensors in phones will proactively encourage electronic payment systems for ushering in a less-cash society in India.

Radhika Basavaraj Kakade and Prof. Nupur A. Veshne (2017), In their study, reported that the UPI has made digital transactions for individuals as easy as sending text messages. Service is available 24X7, not like RTGS or NEFT which don't work on holidays or during non-banking hours. This will bring enormous efficiency to the system and help India become a truly cashless economy.

Roshna Thomas, and Dr Abhijeet Chatterjee (2017), The study reported that UPI is a tool with compatible features that can make monetary transactions easy and affordable to customers though it is difficult to sideline the challenges. A strong Aadhar platform (UID) combined with statistics for the country about increased financial inclusion, Smartphone adoption and telecom subscription indicates positive prospects for UPI whereas competition from mobile wallets and possible cases of failure from banks to overcome technical errors, especially relating to the front-end platform designed by them may negatively impact the scope of this innovative payment tool.

Ravish Rana (2017), In their study, reported that the adoption of digital payment is influenced by the education level of the customer. If a person has studied beyond matriculation and is internet savvy, he or she will be inclined to use the digital payment mode. It was also found that in the areas/region where the education level is high such as Delhi(NCR) and other metropolitan areas, the possibility of acceptance of digital payment is much higher. The growth of users of smartphones and internet penetration in the such area also facilitated the adoption of digital payment.

PROBLEM IDENTIFICATION AND OBJECTIVES

People appear to have become more aware of contactless payments in daily life as a result of the Covid pandemic. While many people began using contactless payment methods like UPI (Unified Payment Interface) even before the pandemic, its use has substantially increased since the lockdown. The development is significant because it not only indicates that digital payments are gaining ground in India but also that economic activity has picked up since the lockdowns brought on by the outbreak in May. Today, three billion UPI transactions a month—an average of 100 million daily—could soon become a reality as analysts anticipate transaction growth to continue.

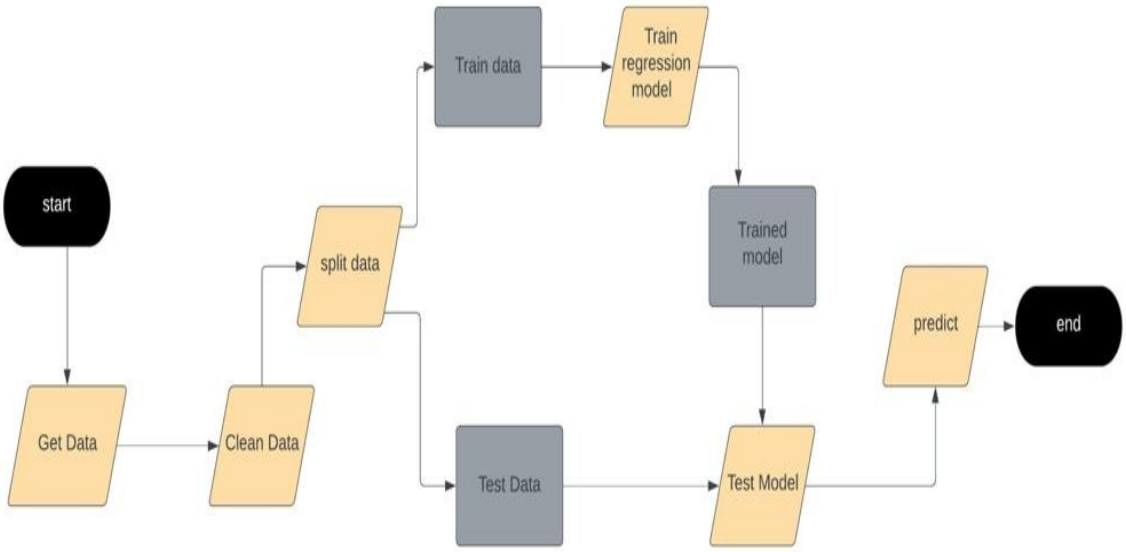
The existing systems in place are not sufficient for the future to convey the requirements of the population and are not efficient for banks and UPI companies to maintain the requirements of the population. They will not be able to help a large number of people in their transactions with the fewer resources they currently have. This results in payment difficulties and time wastage and a loss to the development of the nation.

This prompts us to consider a thorough examination of the UPI data as the problem's solution, since gathering information is always the initial stage in any problem-solving process. We can find the path to the solution towards the abovementioned dilemma by using data visualization and linear regression on the collected data. Since there are few lessons learned regarding the aforementioned issue due to the short amount of data, this has the effect of providing more assistance to the research on UPI for other academics as well.

OBJECTIVES OF THE PAPER:

- To study the concept of UPI.
- To know the impact of UPI.
- To study the growth of UPIs due to covid pandemic.

RESEARCH METHODOLOGY



- The study is based on secondary sources of data/information. Different books, journals, newspapers and relevant websites such as NPCI and Kaggle etc. have been consulted to make the study an effective one.
- This fetched data from various sources is cleaned first, ie. duplicate or irrelevant observations are removed. Unwanted observations from the dataset, including duplicate observations or irrelevant observations, are also removed. Along with that filtering unwanted outliers and handling missing data are also done.

- Next, the data is split. Data visualization is done, Data visualization is a way to represent information graphically, highlighting patterns and trends in data and helping the reader to achieve quick insights. ie. The analysis of data is done using pie charts, bar graphs and scatterplots on the data which is from 2017 to 2022.

- Then the observation of the analysis takes place and then linear regression is performed on the observations. Linear regression helps create models to make predictions, such as predicting the UPI expenditure in future using the current data that is from 2017 to 2022.

OVERVIEW OF TECHNOLOGIES

Various technologies are used for this research work ie. For data visualization and linear regression. This chapter will give us insights into all the technologies and frameworks we used here. Data must be sorted, structured, and visually displayed in a way that makes sense because it is difficult to grasp and make sense of data in its raw form. Data visualization is useful in situations like this. The practice of analyzing data through the use of maps, graphs, sparklines, infographics, heat maps, or other visual representations is known as data visualization. This makes it simpler to understand and use data.

Tools for converting data into visual representations are known as data visualization tools. Jupyter is the one utilized here. One of the most popular web-based applications for data visualization, JupyteR, enables users to create and share documents with visualizations, equations, narrative prose, and live code. Statistical modelling, numerical simulation, interactive computing, and machine learning are all excellent uses for JupyteR. Data visualizations using scatterplots, bar charts, pie charts, histograms, etc. are the most popular.

The popular library that is used for visualization is Matplotlib. Matplotlib is a comprehensive library for creating static, animated, and interactive visualizations in Python. Matplotlib is a popular Python 2-D charting library known for its incredibly high level of customization. With the help of matplotlib, interactive 2D graphs may be created, including line, scatter, and bar graphs. The language used is Python. A high-level, all-purpose programming language is Python. Code readability is prioritized in its design philosophy, which makes heavy use of indentation.

Using dots to depict the link between variables, scatter plots are used to observe the relationship between them. To create a scatter plot, use the matplotlib library's scatter() method. A circular statistical graphic called a pie chart can only show one series of data at a time. The overall

percentage of the provided data is represented by the chart's area. The percentage of the data pieces is represented by the area of the pie slices. A bar plot, often known as a bar chart, is a graph that uses rectangular bars with lengths and heights that are proportional to the values to represent a category of data. Both horizontal and vertical graphs of the bars are possible. The comparisons between the distinct categories are shown in a bar chart.

One of the simplest and most widely used Machine Learning techniques is linear regression. It is a statistical technique for performing predictive analysis. For real, numerical, or continuous data, linear regression makes predictions. It executes a regression operation.

IMPLEMENTATION

```
[ ] import pandas as pd
    import matplotlib.pyplot as plt
    import datetime
    import calendar
    import tensorflow as tf
    import numpy as np
    from tensorflow.keras.models import Sequential
    from tensorflow.keras.layers import Dropout,Dense,GRU
    from sklearn.model_selection import train_test_split
    from keras import Input
    from sklearn import linear_model
```

```
[ ] from google.colab import drive
    drive.mount('/content/drive')
```

```
Drive already mounted at /content/drive; to attempt to forcibly remount, call drive.mount("/content/drive", force_remount=True).
```

```
[ ] df1=pd.read_excel("/content/drive/MyDrive/2017_2022.xlsx")
    df2021=pd.read_csv("/content/drive/MyDrive/2021.csv")
    df2022=pd.read_csv("/content/drive/MyDrive/2022.csv")
```

```
[ ] df2021
```

```
[ ] df1=df1.iloc[::-1]
```

```
[ ] df1
```

	Month	No. of Banks live on UPI	Volume (in Mn)	Value (in Cr.)
77	2016-04-01	21	0.00	0
76	2016-05-01	21	0.00	0
75	2016-06-01	21	0.00	0
74	2016-07-01	21	0.09	0.38
73	2016-08-01	21	0.09	3.09
...	...	...	...	...
4	2022-05-01	323	5955.20	10,41,506
3	2022-06-01	330	5862.75	10,14,384
2	2022-07-01	338	6288.40	10,62,747
1	2022-08-01	346	6579.63	10,72,792.68
0	2022-09-01	358	6780.80	11,16,438.10

78 rows × 4 columns

```
df1["year"]=pd.DatetimeIndex(df1["Month"]).year
df1["Month"]=pd.DatetimeIndex(df1["Month"]).month
```

```
[ ] df1["Month"]

    77    4
    76    5
    75    6
    74    7
    73    8
         ..
    4     5
    3     6
    2     7
    1     8
    0     9
    Name: Month, Length: 78, dtype: int64
```

```
[ ] x=dict((index,month) for index, month in enumerate(calendar.month_abbr) if month)
    x

    {1: 'Jan',
     2: 'Feb',
     3: 'Mar',
     4: 'Apr',
     5: 'May',
     6: 'Jun',
     7: 'Jul',
     8: 'Aug',
     9: 'Sep',
     10: 'Oct',
     11: 'Nov',
     12: 'Dec'}
```

```
[ ] df1['Value (in Cr.)'] = df1['Value (in Cr.)'].str.replace(',', '').astype(float)

[ ] # df1["Value (in Cr.)"][i]=int(df1["Value (in Cr.)"])

[ ] plt.bar(df1["Month"], (df1["Value (in Cr.)"]), color ='maroon',width = 0.4)
```

```
[ ] plt.scatter(x["year"],x["Value (in Cr.)"])
```

```
plt.pie(x["Value (in Cr.)"],labels=x["year"])
```

```
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  <matplotlib.patches.Wedge at 0x7f6f00e76650>,
  <matplotlib.patches.Wedge at 0x7f6f00ed5dd0>,
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  <matplotlib.patches.Wedge at 0x7f6f00a021d0>],
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  Text(1.1, 0.0, '2018'),
  Text(1.1, 0.0, '2019'),
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  Text(-0.485550998444395, 0.9870360823747283, '2021'),
  Text(0.058217534032060356, -1.0984583372760326, '2022')])
```

```
[ ]  plt.scatter(df1["Month"],df1["Value (in Cr.)"])
```

```
[ ]  y=df2021.groupby(["UPI Banks"],as_index=False).sum()

[ ]  y=y.sort_values("Value (Cr)").iloc[::-1]

[ ]  y=y.drop(["Month"],axis=1)
     y=y.drop(["Year"],axis=1)

[ ]  y
```

```
[ ]  plt.pie(x["Value (in Cr.)"],labels=x["year"])
```

```
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  Text(1.0113505415027548, 0.43263157790675044, '2020'),
  Text(-0.485550998444395, 0.9870360823747283, '2021'),
  Text(0.058217534032060356, -1.0984583372760326, '2022')])
```

```
[ ]  Banks=df2021.get("UPI Banks")
     Value=df2021.get("Value (Cr)")
```

```
[ ]  plt.bar(df2021["Month"], (df2021["Value (Cr)"]), color ='maroon',width = 0.4)
```

```
[ ]  x=df2021.groupby(["Month"],as_index=False).sum()
```

```
[ ]
     plt.pie(x["Value (Cr)"],labels=x["Month"])
```

```
[ ]  z=df2021.drop(df2021.index[(df2021["Value (Cr)"] <= df2021["Value (Cr)"].mean())],axis=0)
```

```
[ ]  z=z.drop(["Year"],axis=1)
```

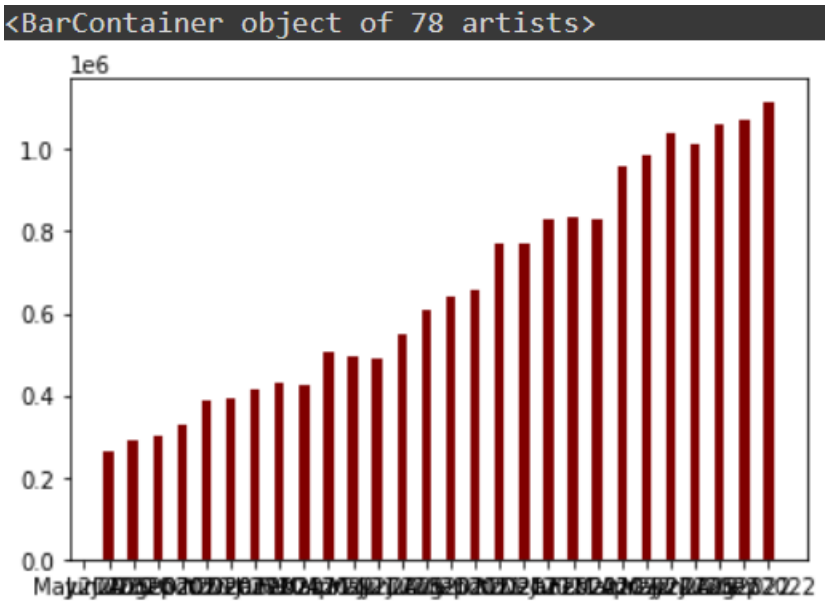
```
[ ]  plt.bar(z["UPI Banks"], (z["Value (Cr)"]), color ='maroon',width = 0.4)
```

```
[ ]  Banks=df2022.get("UPI Banks")
     Value=df2022.get("Value (Cr)")

[ ]  plt.bar(df2022["Month"], (df2022["Value (Cr)"]), color ='maroon',width = 0.4)
```

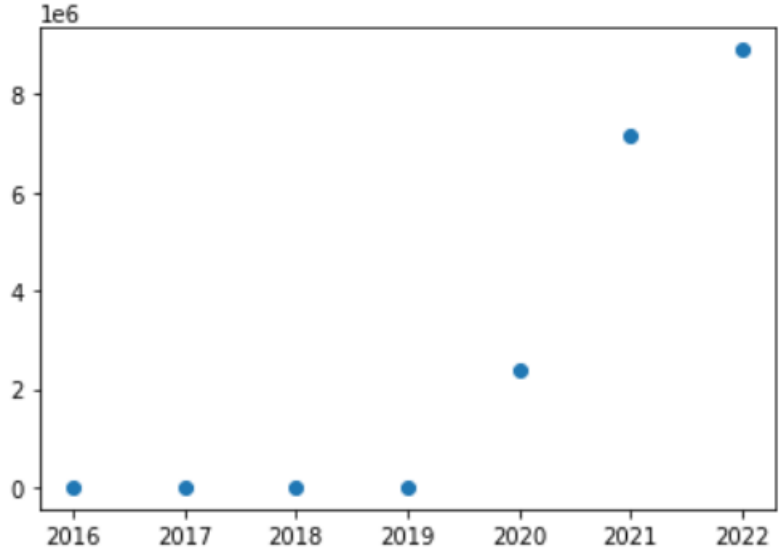
```
[ ]  newdf=df1.dropna(subset=["Value (in Cr.)"])

[ ]  reg = linear_model.LinearRegression()

[ ]  ind=pd.DataFrame([i for i in range(1,29)])

[ ]  reg.fit(ind,newdf["Value (in Cr.)"])

     LinearRegression()

[ ]  test=pd.DataFrame([29,30,31,32,33,34,40,41,42,43,44])

[ ]  reg.predict(test)

     array([1140783.86261905, 1174032.83873563, 1207281.81485222,
            1240530.7909688 , 1273779.76708539, 1307028.74320197,
            1506522.59990148, 1539771.57601806, 1573020.55213465,
            1606269.52825123, 1639518.50436782])

[ ]  z=df2022.drop(df2022.index[(df2022["Value (Cr)"] <= df2022["Value (Cr)"].mean())],axis=0)
```

```
[ ]  z=z.drop(["Year"],axis=1)

[ ]  z

[ ]  plt.bar(df2022["UPI Banks\n"], (df2022["Value (Cr)"]), color ='maroon',width = 0.4)

[ ]  x2=df2022.groupby(["Month"],as_index=False).sum()

[ ]  x2

[ ]  plt.pie(x2["Value (Cr)"],labels=x2["Month"])

[ ]  x=df1.dropna(subset="Value (in Cr.)")
```

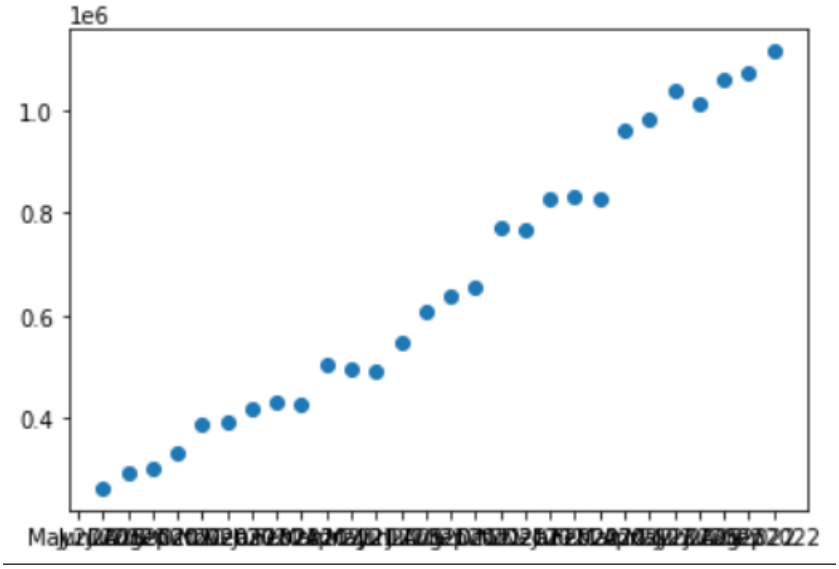
RESULT



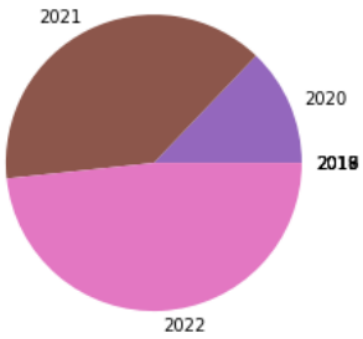
PLOT 1.1 – The above bar graph depicts the monthly growth of UPI over the years 2020-2022



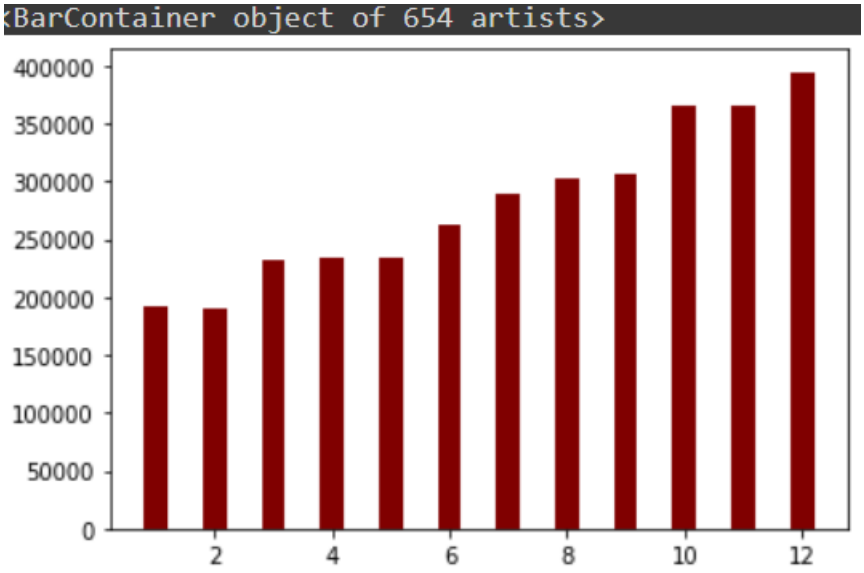
PLOT 1.2 – The above scatter plot depicts the growth of UPI over the years 2016-2022



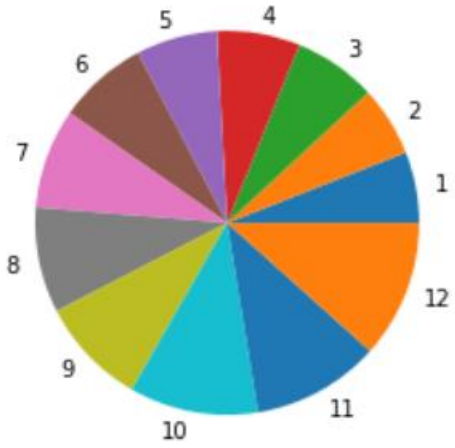
PLOT 1.3 – The above scatter plot depicts the monthly growth of UPI over the years 2020-2022



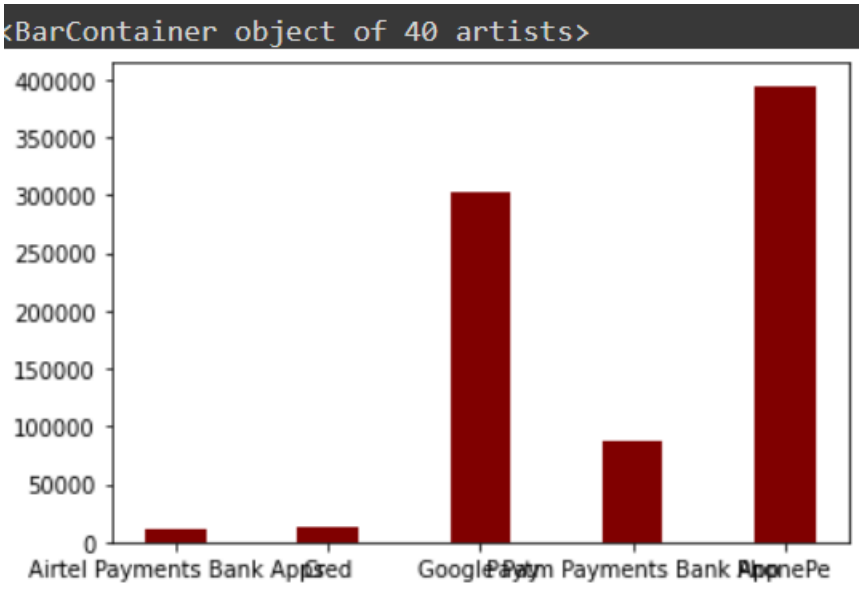
PLOT 1.4 – The above Pie chart depicts the monthly growth of UPI over the years 2020-2022



PLOT 1.5 – The above bar graph depicts the monthly growth of UPI in 2021



PLOT 1.6 – The above pie chart depicts the monthly contribution of UPI in 2021



PLOT 1.7 – The above bar graph depicts major contributors in the year 2021

CONCLUSION AND FUTURE SCOPE

UPI created m-payment technology by making it possible for mobile phones to be utilised as the primary means of making and receiving payments. UPI is arguably the most sophisticated payment system in the world when compared to all others. The UPI payment system enables mobile money transfers between any two bank accounts. It enables customers to make payments straight from their bank accounts to various retailers, both online and off, without having to type their net banking or wallet passwords or credit card numbers or IFSC codes.

It seeks to streamline the process and offer a single interface that makes money transfers simple, fast, and hassle-free. The adoption of smartphones, the availability of an online verifiable identity, widespread banking access, and the integration of biometric sensors into phones would actively promote UPI Transactions, and the findings indicated that the responder has a positive attitude toward the UPI transaction for ushering in a society in India with less currency.

Since the limited learnings result from the tiny amount of data, this research also focuses on the future scope. The response would have been more accurate if there had been more information. This study may aid the banking and financial industries, as well as the government, in regulating legislation as an indicator of India's progress.

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