

Consulting Report

Telecom – Maharashtra

Group - 1002

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Context Setting



INSAID Telecom

- Customer Centric, leading Telecom Service Provider



Goals

- To remain leading Telecom service provider
- To innovate and differentiate themselves from competitor by having laser focus on customer needs and launching customer segment targeted marketing campaigns



Strategic Initiative

- To launch data-driven marketing efforts

Problem Statement & Approach

Problem Statement

How can Insaid Telecom leverage historical mobile usage data to achieve its business goals.

Approach

Analyze the given active mobile user to understand user's demographic characteristics based on their mobile usage, geolocation, and mobile device properties for Maharashtra State

Outcome

- Patterns in usage data
- Analysis based on Customer Segmentation that will help Business leaders launch data-driven marketing efforts and offerings

Data Set Summary

Device Owner Table
74645 Records

Column	Null Count
device_id	0
gender	0
age	0
group	0

Device Brand Table
87726 Records

Column	Null Count
device_id	0
phone_brand	0
device_model	0

Events Table
3252950 Records

Column	Null Count
event_id	0
device_id	453
timestamp	0
longitude	423
latitude	423
city	0
state	377

- Loaded Events data from : [events_data.csv](#)
- Loaded Owner & Device Brand data using MySQL Connector based on given credentials.

Data Mining

Our consulting team focused on the priority markets of Maharashtra (out of 32 states for which data is available) to study the user's behavior based on :

- ✓ Mobile usage
- ✓ Geolocation
- ✓ Demographic profiling
- ✓ Mobile device

As per initial profiling, data cleansing is required to extract useful insights and to identify the business opportunities in the focused markets.

Observations:

- Event Data imputation/correction required for device_id, latitude, longitude & state, no missing values in Owner and Brand Data
- Timestamp is of object datatype
- In phone brand translation of non-English data to English is required

Solution

To understand Customer Segmentation and Usage pattern, we propose to do following analysis after Data profiling and cleansing

1. Distribution of Users(device_id) across States.
2. Distribution of Users across Phone Brands(Consider only 10 Most used Phone Brands).
3. Distribution of Users across Gender.
4. Distribution of Users across Age Segments.
5. Distribution of Phone Brands(Consider only 10 Most used Phone Brands) for each Age Segment, State, Gender.
6. Distribution of Gender for each State, Age Segment and Phone Brand(Consider only 10 Most used Phone Brands).
7. Distribution of Age Segments for each State, Gender and Phone Brand(Consider only 10 Most used Phone Brands).
8. Note: While doing analysis for the above points, consider only one instance of a particular User(device_id) as a User can do multiple phone calls and considering every instance of the same User can give misleading numbers.
9. Hourly distribution of Phone Calls.
10. Plot the Users on the Map using any suitable package.

Data Analysis

- Loading
- Profiling
- Pre-Processing
- Profiling post Pre-Processing

Importing & Loading

- Imported required numpy, pandas, mysql.connector, matplotlib, seaborn library
- Loaded Events Data from csv file, Owner and Brand data from mysql

Profiling

- Performed Pandas Profiling before preprocessing. Output generated in Event_Pre_Processing.html
- Preliminary analysis using pandas commands like .info(), .shape, describe(), head(), columns, unique(), nunique() and Pandas profiling
- Observed missing values data

Pre-Processing

- Performed Data imputation for missing data

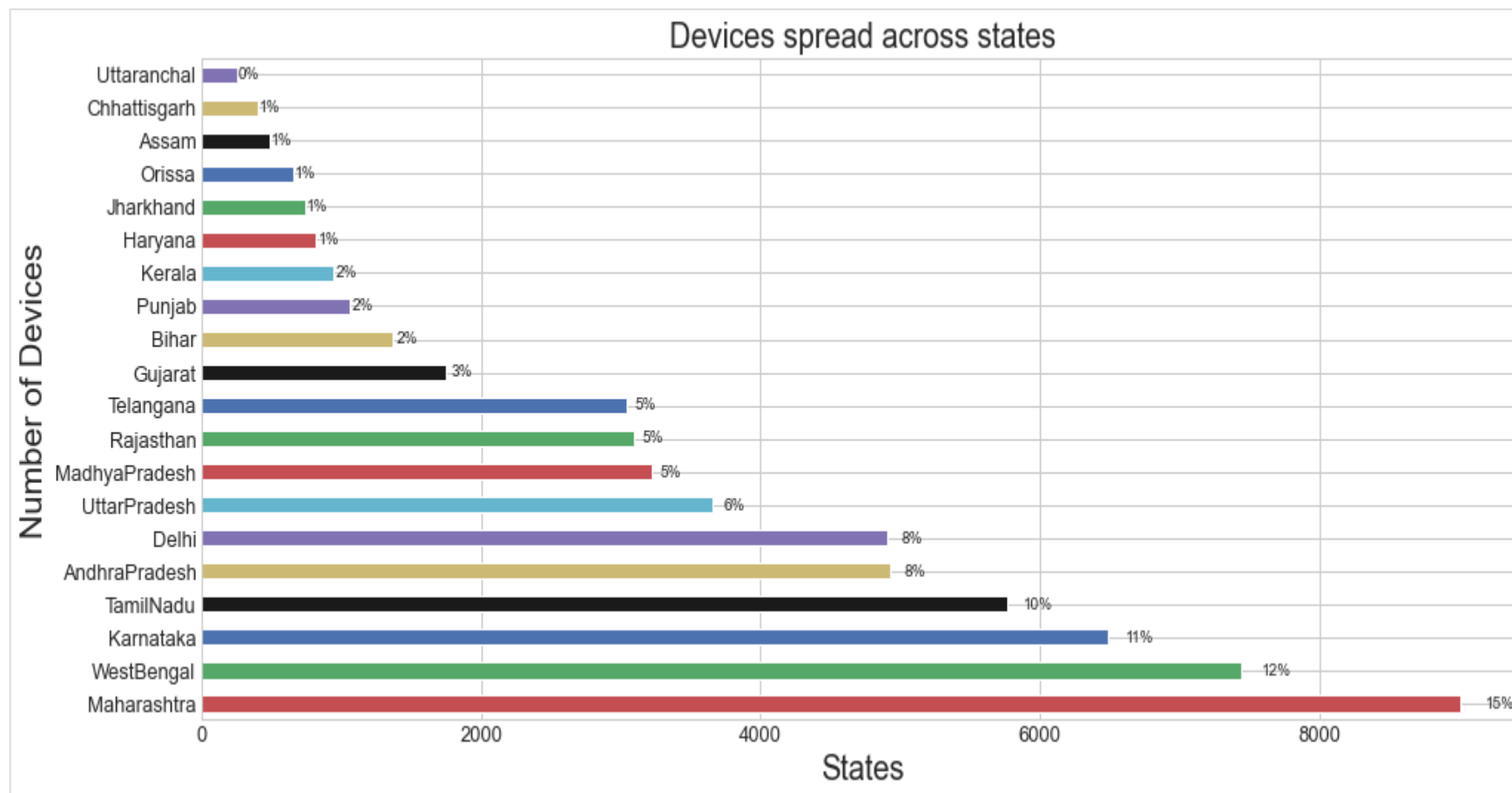
Profiling post Pre-Processing

- Performed Pandas Profiling before preprocessing. Output generated in Event_Post_Processing.html

EDA

1

Distribution of Users(device_id) across States.

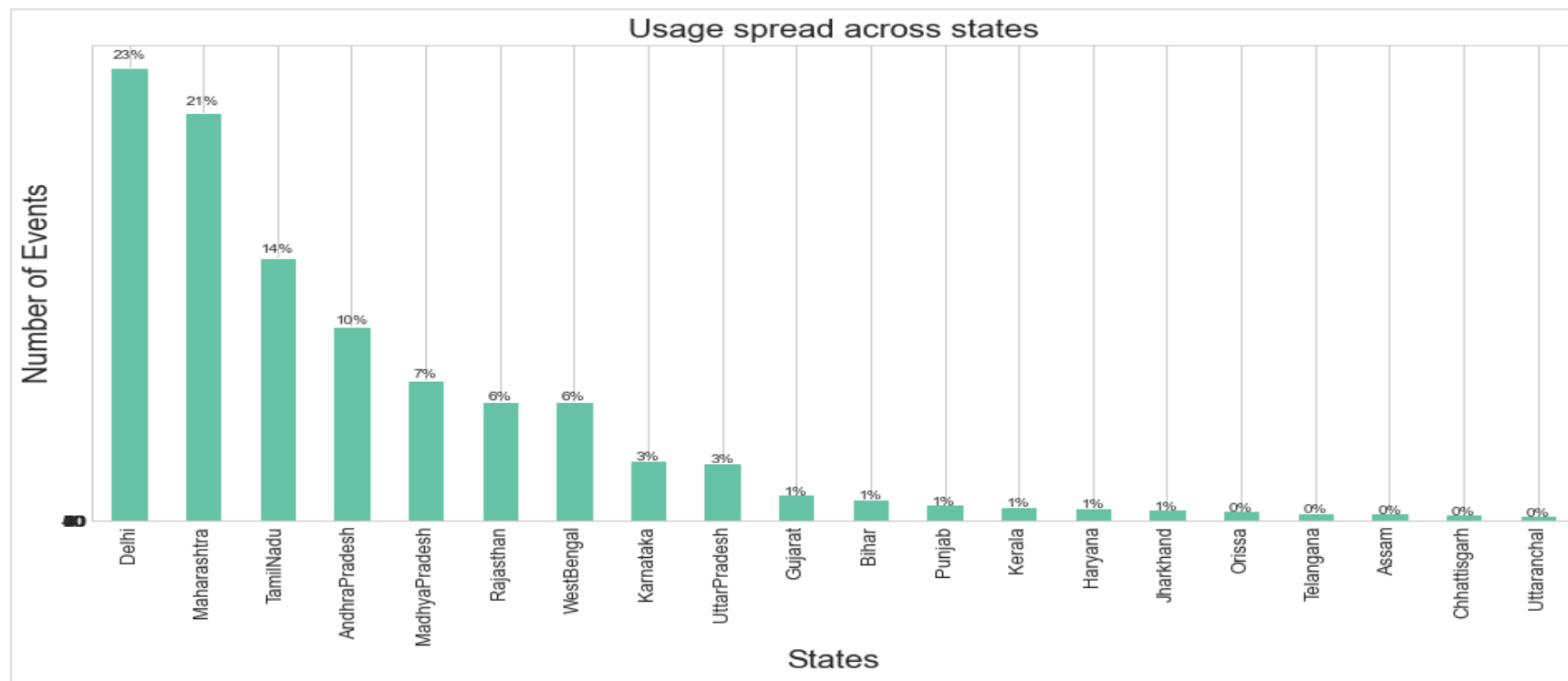


Maharashtra state has maximum no. of mobile users followed by West Bengal, Karnataka and Tamil Nadu

EDA

2

Mobile Usage spread across States

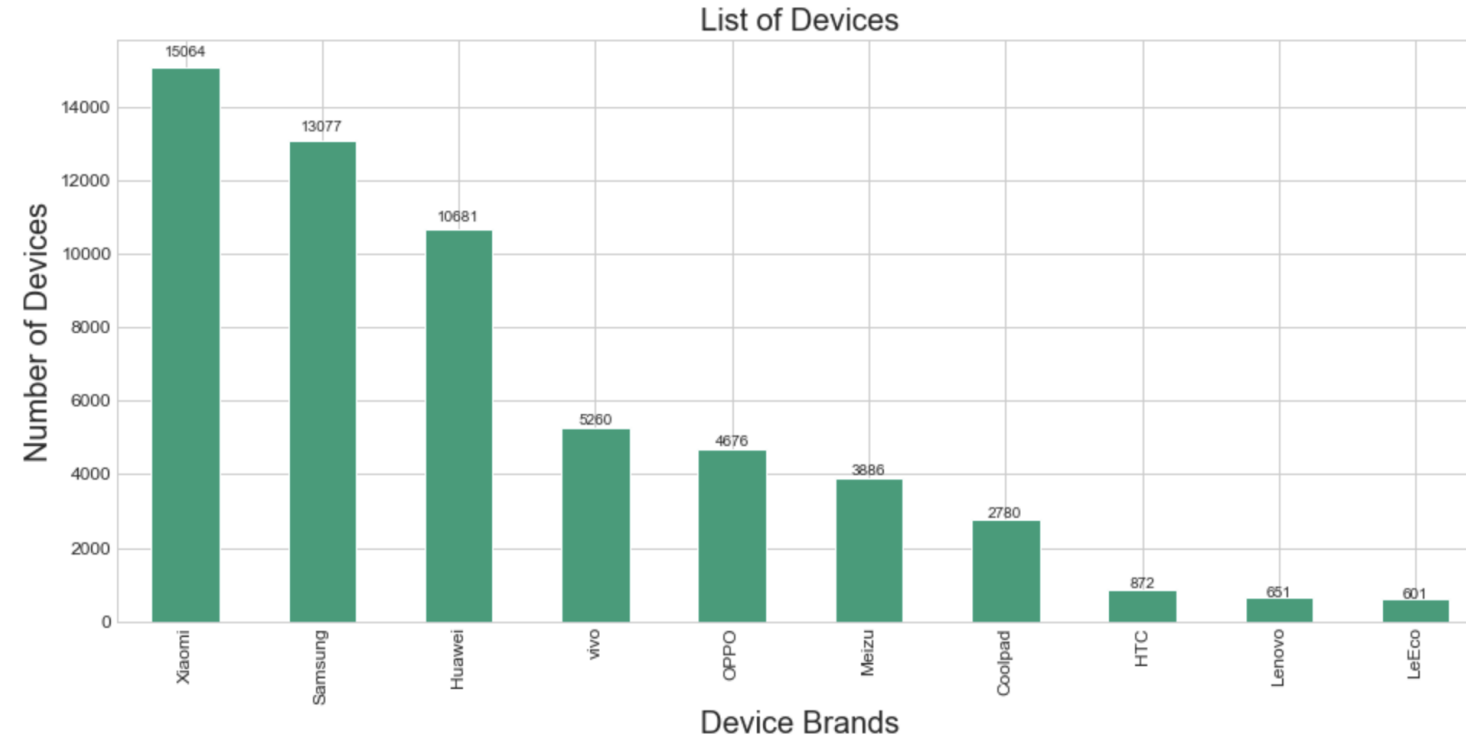


Maharashtra has 7% more users than Delhi but usage is 2% less than Delhi

EDA

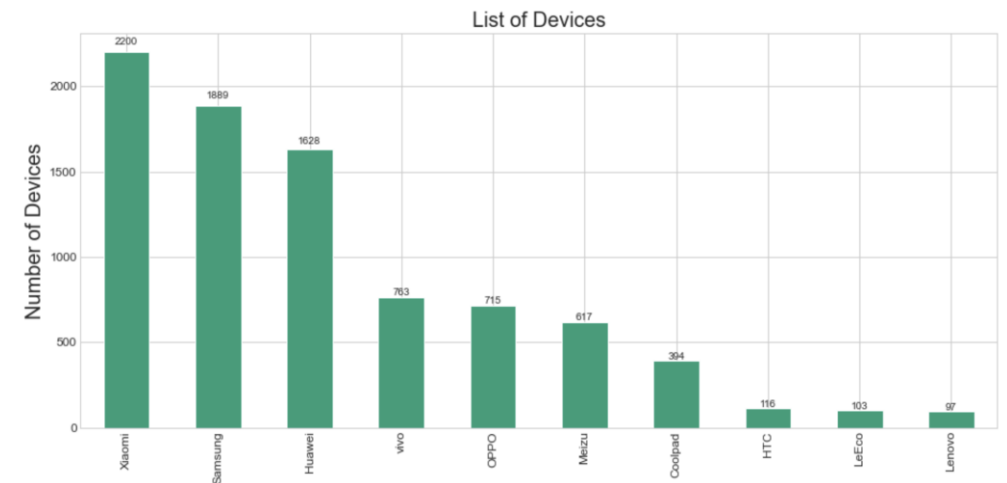
3

Distribution of Users across Phone Brands



Most popular brands across Maharashtra and other states are Xiaomi, Samsung, Huawei.

High-end Iphone are not in top 10 phone brands



EDA

4

Distribution of Users across Gender



Male users are 2 times compared to female users

Users comprise of 34% females in Maharashtra compared to 35.8% across India

EDA

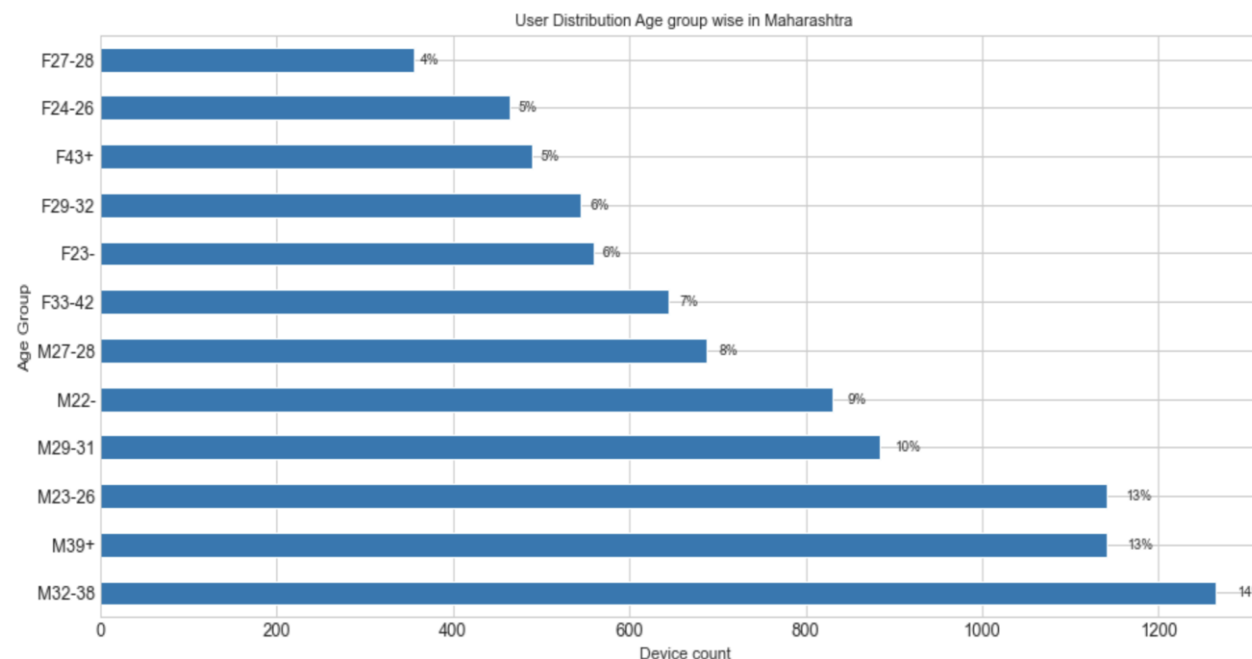
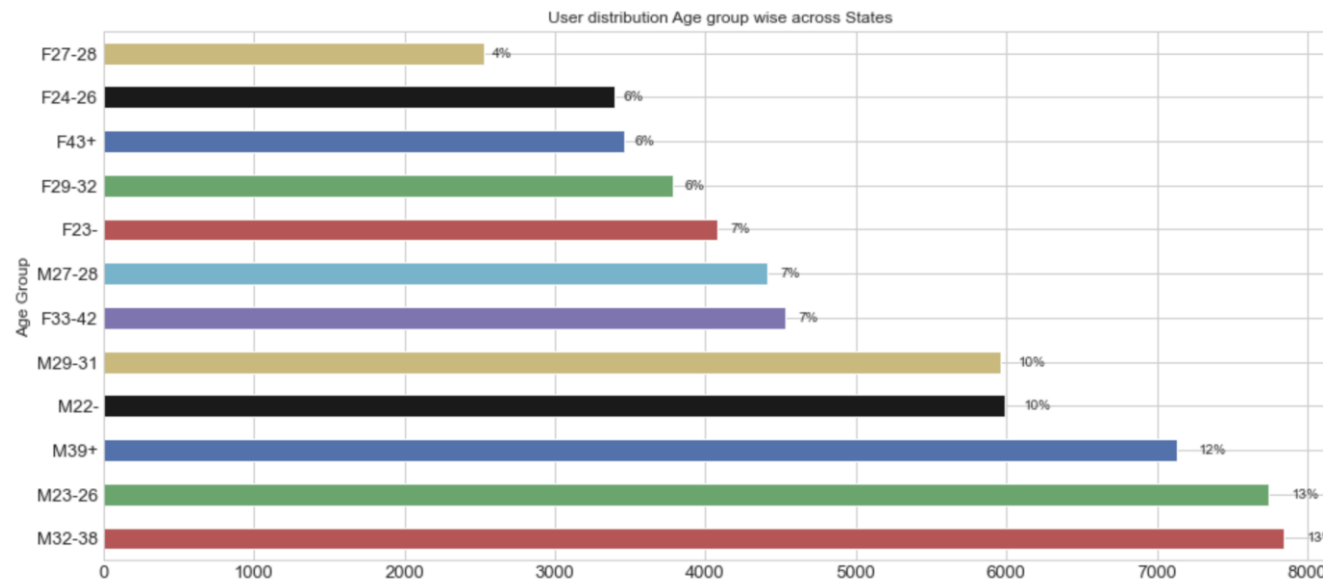
5

Distribution of Users across Age Segments.

Male and female users of age group 27-28 is less compared to other age groups

Plots indicate more Male users of group of higher age groups

Insaidthelecom is popular with female users of age <23 and >33 across states and MH

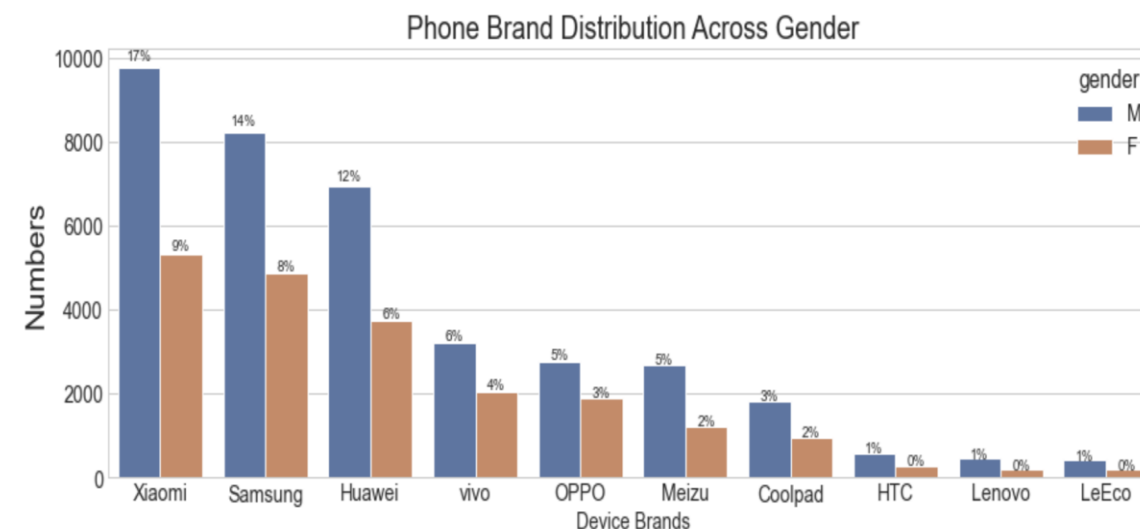
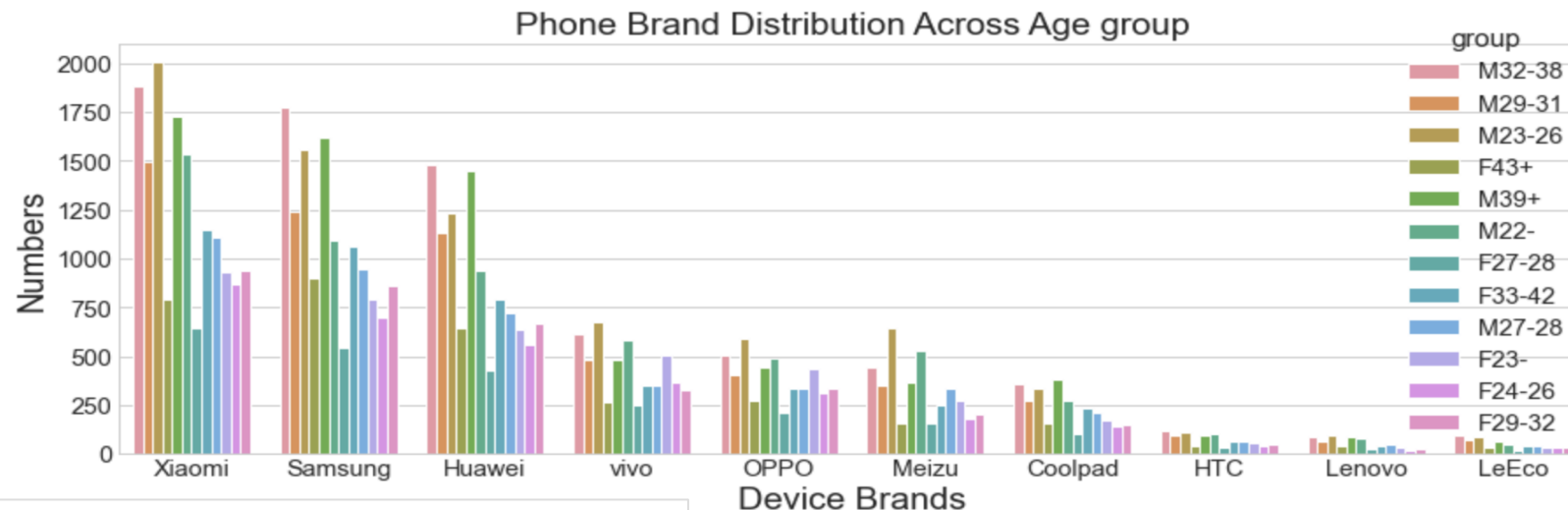


EDA

6

Distribution of Phone Brands(Consider only 10 Most used Phone Brands) for each Age Segment, State, Gender.

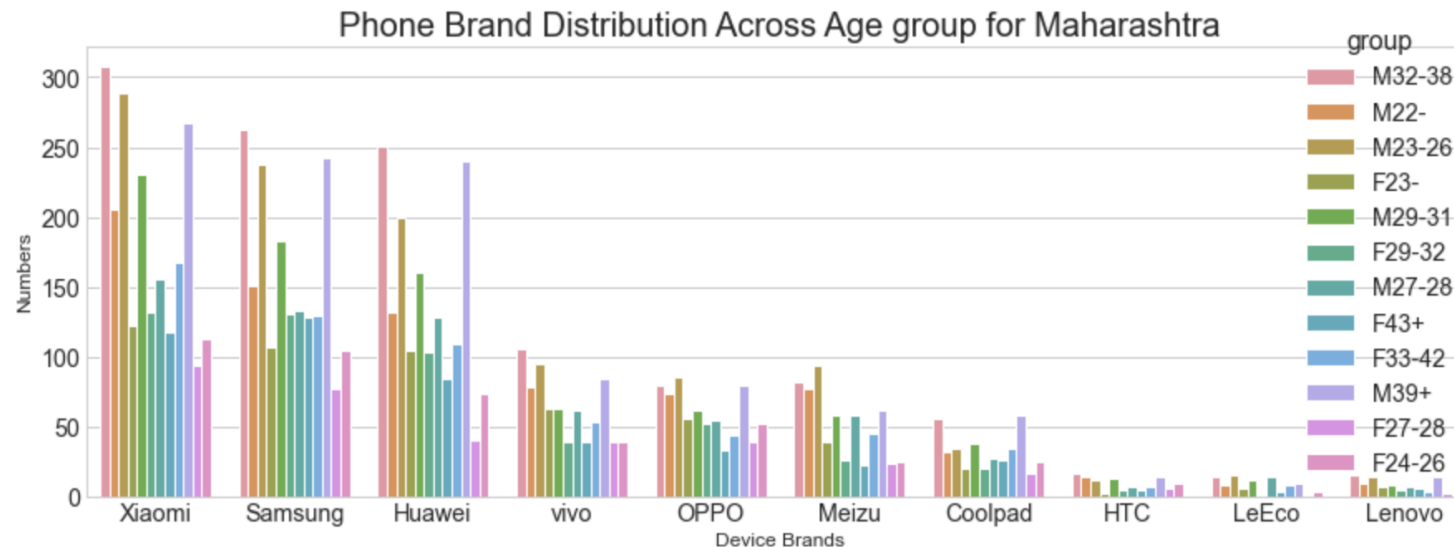
- Top brand is Xiaomi followed by Samsung across males and females
- Amongst males, Xiaomi is the Top brand in age group 32-38 followed by age group 23-26
- Amongst females also, Xiaomi is the top brand in age group 33-42 followed by Samsung in group 29-32



EDA

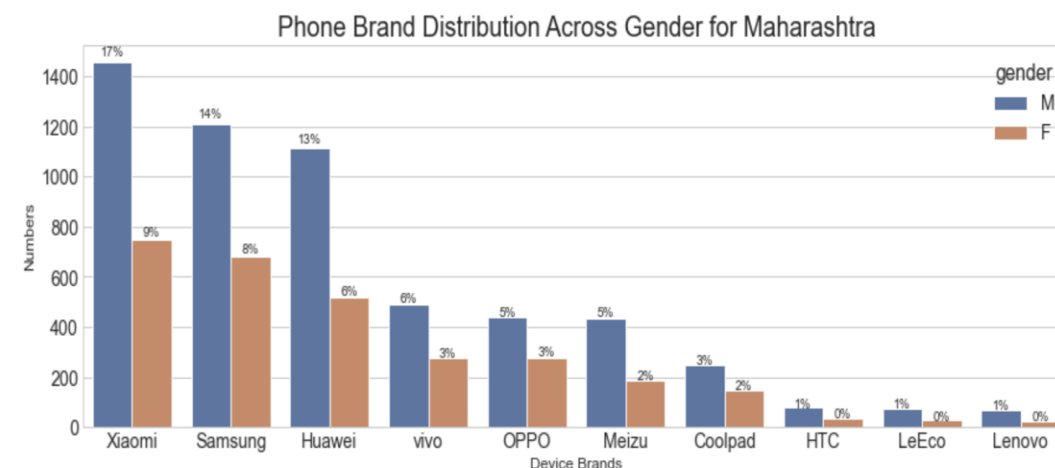
7

Distribution of Phone Brands(Consider only 10 Most used Phone Brands) for each Age Segment, State, Gender for Maharashtra



In Maharashtra

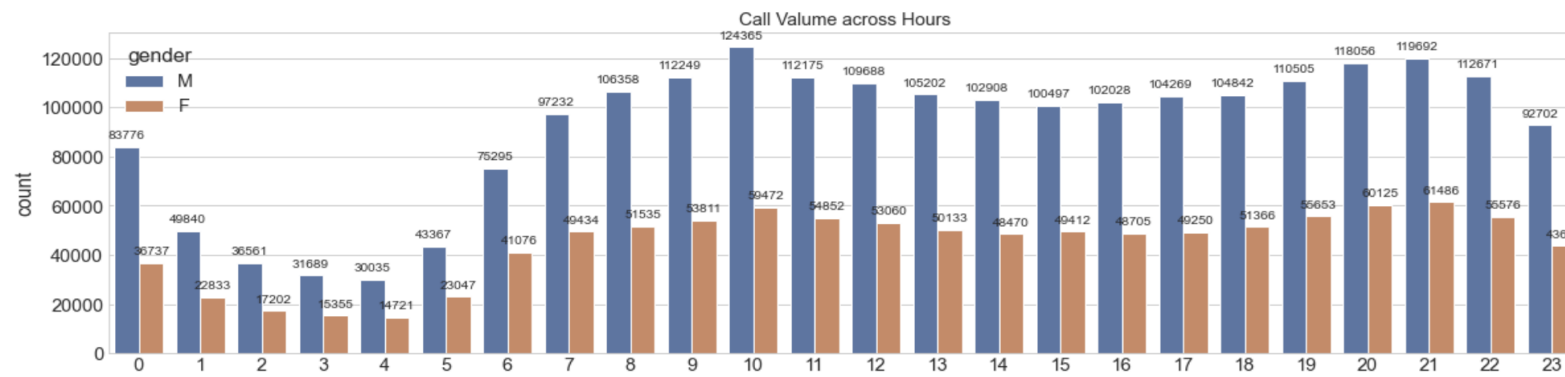
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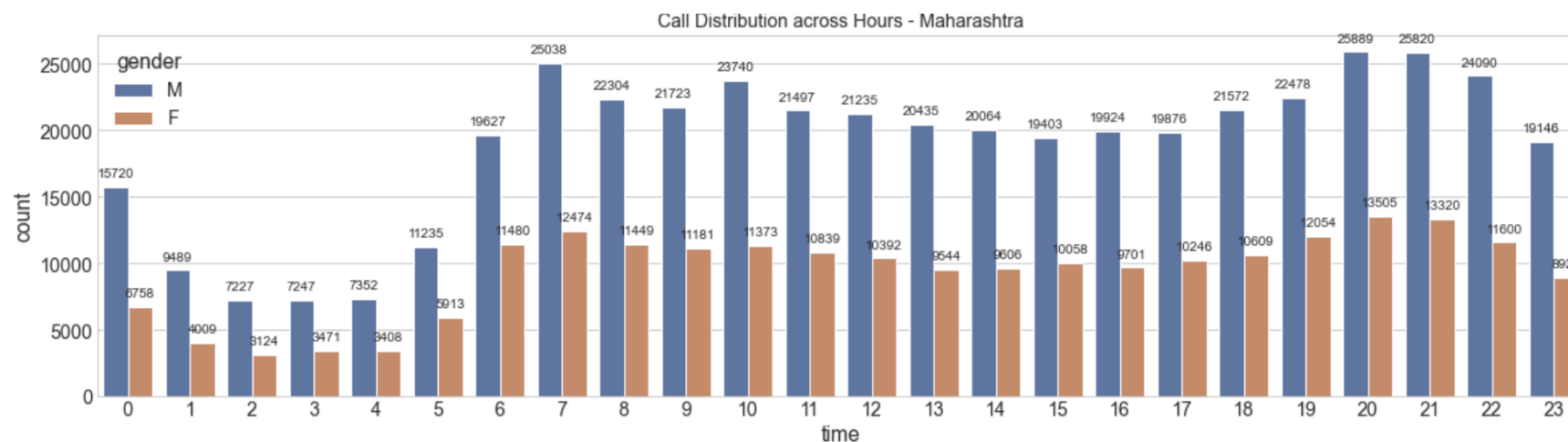
EDA

9

Call volume analysis



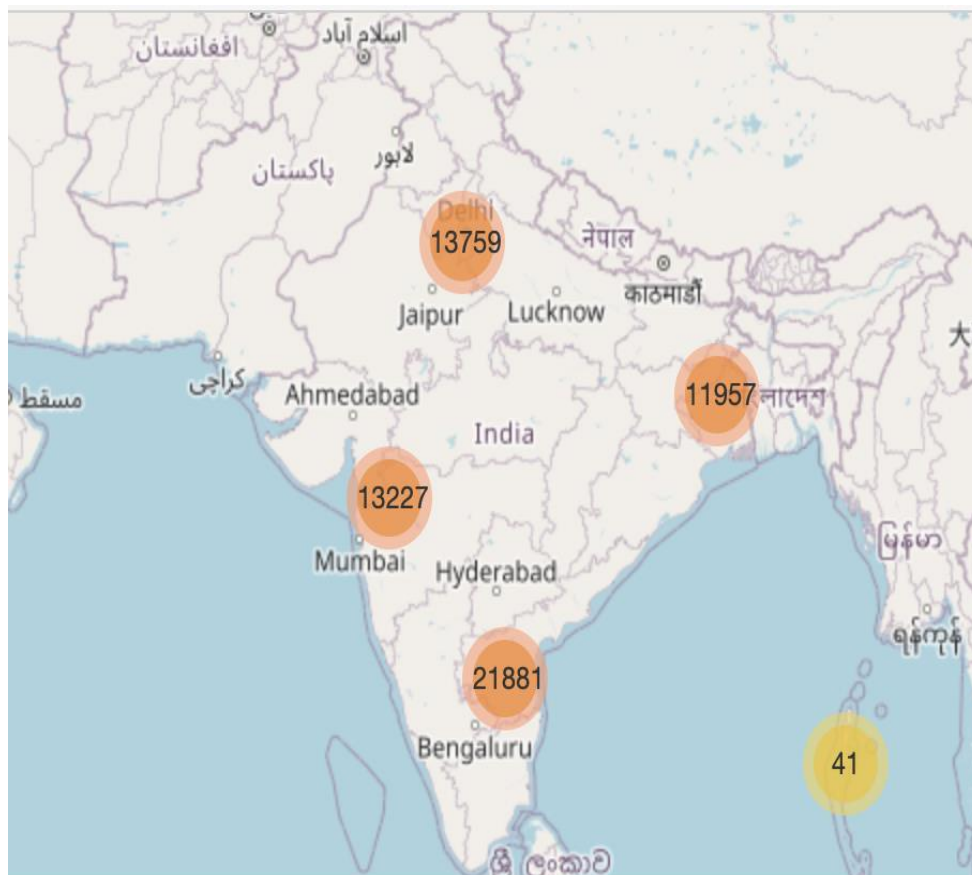
- Approx, 5M users are active per day
- Peak hrs - 10am and 9pm
- For Maharashtra, peak hrs - 7 am and 8 pm



EDA

10

User distribution on MAP



- INSAID Telecom is popular in South, followed by North and then west and least in East
- Map shows 41 latitude, longitude outliers

Summary of findings

- Maharashtra state has maximum no. of mobile users but usage is 2% less than Delhi
- Most popular brands in Maharashtra are Xiaomi, Samsung, Huawei.
- iPhone is not in the top 10 phone brands
- Male users are 2 times compared to female users
- Users comprise of 34% females in Maharashtra compared to 35.8% across India
- Male and female users of age group 27-28 is less compared to other age groups
- Male users in the 32+ years age group are maximum
- InsaID telecom is popular with female users of age <23 and >33 across states and MH
- Xiaomi, Samsung are popular brands across gender and age segments
- Approx. 5M users are active per day
- Peak hours are 10am and 9pm across states. For Maharashtra, peak hours are - 7 am and 8 pm
- INSAID Telecom is popular in the South region, followed by North, West and then East regions
- Top brand is Xiaomi followed by Samsung across males and females
- In Maharashtra
 - Top brand is Xiaomi followed by Samsung across males and females
 - Amongst males, Xiaomi is the Top brand in age group 32-38 followed by age group 23-26
 - Amongst females also, Xiaomi is the top brand in age group 33-42 followed by 29-32

Tools Used



matplotlib



seaborn



Conclusion & Actionable Insights

InsaID Telecom has a strong market place with millions of active devices on daily basis. Given dataset provides high level insights on customer segmentation, demographic characteristics based on their mobile usage, geolocation, and mobile device properties.

Actionable insights are as under:

- Mobile usage less in Maharashtra inspite of good customer base. Needs to be improved.
- Introduce special packages for cities/towns where customer base is low.
- Marketing campaigns to focus on females in the 23-33 years age group and males below 32 years.
- Special plan bundled with Xiaomi phones to be introduced.
- Mobile campaigns to focus on the peak usage hours of 7 am and 8 pm. For e.g. news shorts at 7 am and entertainment at 8 pm.

To provide insights on “Why” analysis of trends and patterns observed , we require additional data from InsaID telecom:

- Average revenue, average talktime and average data usage per user for all service providers across cities/towns in Maharashtra state
- Collate data that can help analyze factors affecting the adoption rate e.g. Competitor’s market capture, InsaID’s Contact center data, Service & Operationable data, Receivables data

Core Team

1. Kaushik Rathod
2. Ritesh Gupta
3. Kashish Khatwani
4. Madhavi Badam
5. Sudarshan Pol
6. Averly Dsa Saldanha
7. R Naga Amrutha
8. Subramanya Chelmanda
9. Parth Kacheria
10. Rajalakshmi Vasudevan
11. Sudarshan Pol
12. Sachin Varshney
13. Rayan Kazi
14. Bipul Singh
15. Sujoy Basu
16. Abhishek Nidhi
17. Swati Battul
18. Amit Bhaskarr Pande
19. Rajesh Sinha
20. Akash Bajaj
21. Aurag Aggarwal
22. Asimananda Mohanty
23. Simayan Pati
24. Anjali Kumari
25. Amal Kanti Barik
26. Pavan Diggavi
27. Rajesh Gopalakrishnan
28. Mallik Arun Bulusu
29. srikanthlaxminrayan@gmail.com
30. iniya2011@gmail.com

Thank you

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Group - 1002