FeyNN Labs Final Assignment

Analysing the respective market in India using Segmentation analysis for Bio-Tech Startup

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Project Link:
https://github.com/RohitNale/Market-Segmentation-Analysis/blob/main/Market_Segmentation_in_Medical_Market.ipynb

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Problem Statement

Task is to analyse the Medical Market in India using Segmentation analysis and come up with a feasible strategy to enter the market, targeting the segments most likely to use their product in terms of Geographic, Demographic, Psychographic, Behavioral.

In this report we analyse the Medical Market in India using segments such as outpatient care centres, hospitals, pharmaceuticals, medical equipment and supplies, diagnostic services, digital healthcare, research and development, medical insurance, and medical tourism.

Background

Healthcare has become one of India's largest sectors, both in terms of revenue and employment. Healthcare comprises hospitals, medical devices, clinical trials, outsourcing, telemedicine, medical tourism, health insurance and medical equipment. The Indian healthcare sector is growing at a brisk pace due to its strengthening coverage, services and increasing expenditure by public as well private players.

India's healthcare delivery system is categorised into two major components public and private. India's competitive advantage lies in its large pool of well-trained medical professionals. India is also cost competitive compared to its peers in Asia and Western countries. The cost of surgery in India is about one-tenth of that in the US or Western Europe.

As of March 21, 2022, more than 181.52 crore COVID-19 vaccine doses have been administered across the country.

The Indian healthcare sector is expected to record a three-fold rise, growing at a CAGR of 22% between 2016–2022 to reach US$ 372 billion in 2022 from US$ 110 billion in 2016.

By FY22, Indian healthcare infrastructure is expected to reach US$ 349.1 billion.

As of 2021, the Indian healthcare sector is one of India's largest employers as it employs a total of 4.7 million people. The sector has generated 2.7 million additional jobs in India between 2017-22 -- over 500,000 new jobs per year.

In the Economic Survey of 2022, India's public expenditure on healthcare stood at 2.1% of GDP in 2021-22 against 1.8% in 2020-21 and 1.3% in 2019-20.

In FY21, gross direct premium income underwritten by health insurance companies grew 13.3% YoY to Rs. 58,572.46 crore (US$ 7.9 billion). The health segment has a 29.5% share in the total gross written premiums earned in the country.

The Indian medical tourism market was valued at US$ 2.89 billion in 2020 and is expected to reach US$ 13.42 billion by 2026.

According to India Tourism Statistics at a Glance 2020 report, close to 697,300 foreign tourists came for medical treatment in India in FY19. India has been ranked 10th in the Medical Tourism Index (MTI) for 2020-21 out of 46 destinations by the Medical Tourism Association.

The e-health market size is estimated to reach US$ 10.6 billion by 2025.

As of January 2022, the number of medical colleges in India stood at 595.

Between April 2000-December 2021, FDI inflows for the drugs and pharmaceuticals sector stood at US$ 19.19 billion, according to the data released by the Department for Promotion of Industry and Internal Trade (DPIIT). FDI inflows in sectors such as hospitals and diagnostic centres and medical and surgical appliances stood at US$ 7.73 billion and US$ 2.35 billion, respectively.

India currently holds the fourth position in attracting VC funding to the health-tech sector, with investments of US$ 4.4 billion between 2016 and 2021, with US$ 1.9 invested in 2021 alone.

In March 2022, Hyderabad-based pharmaceutical company Biological E applied for emergency use authorisation (EUA) for its Covid-19 vaccine Corbevax for the 5-12 year age group.

In January 2022, Phase 3 trials commenced of India's first intranasal vaccine against COVID-19, that is being developed by Bharat Biotech in conjunction with Washington University School of Medicine in St Louis, the US.

Startup HealthifyMe, with a total user base of 30 million people, is adding half a million new users every month and crossed US$ 40 million ARR in January 2022.

The number of policies issued to women in FY21 stood at 93 lakh, with one out of every three life insurance policies in FY21 sold to a woman.

In December 2021, Eka Care became the first CoWIN-approved organisation in India, through which users could book their vaccination slot, download their certificate and even create their Health IDs.

As of April 5, 2022, 117,771 Ayushman Bharat-Health and Wellness Centres (AB-HWCs) are operational in India.

As of April 5, 2022, 748 e-Hospitals were established across India as part of the central government's ‘Digital India’ initiative.

In November 2021, Flipkart Group announced its foray into the healthcare sector through the launch of Flipkart Health+. As part of this development, Flipkart has signed definitive agreements to acquire a majority share in Sastasundar Marketplace Limited, which owns and operates SastaSundar.com, an online pharmacy and digital healthcare platform.

In November 2021, Aster DM Healthcare announced that it is planning Rs. 900 crore (US$ 120.97 million) capital expenditure over the next three years to expand its presence in India, as it looks at increasing the share of revenue from the country to 40% of the total revenue by 2025.

In September 2021, Russian-made COVID-19 vaccine, Sputnik Light received permission for Phase 3 trials in India.

In July 2021, India made its Covid-19 vaccination platform, CoWIN, open source for all countries. Almost 76 countries have displayed interest in leveraging the CoWIN platform to manage their national COVID-19 vaccination drives.

In June 2021, Tata Digital Limited, a 100% subsidiary of Tata Sons Private Limited, announced that it will acquire a majority stake in digital health company 1mg.

In June 2021, PharmEasy acquired a majority stake in Thyrocare Technologies, a diagnostics chain, to diversify and bolster its testing business.

In June 2021, AstraZeneca India signed a memorandum of understanding (MoU) with Docon Technologies, a Bengaluru-based health start-up, to digitise 1,000 clinics across India by implementing customised electronic medical record (EMR) systems in clinics to offer doctors access to a patient's complete medical history.

In March 2021, Virchow Biotech, a Hyderabad-based firm, and the Russian Direct Investment Fund (RDIF) announced a collaboration to manufacture up to 200 million doses of the Sputnik V vaccine in India.

In the Union Budget 2022-23:

- Rs. 86,200.65 crore (US$ 11.28 billion) was allocated to the Ministry of Health and Family Welfare (MoHFW).
- Pradhan Mantri Swasthya Suraksha Yojana (PMSSY) was allocated Rs. 10,000 crore (US$ 1.31 billion)
- Human Resources for Health and Medical Education was allotted Rs. 7,500 crore (US$ 982.91 million).
- The National Health Mission was allotted Rs. 37,000 crore (US$ 4.84 billion).
- Ayushman Bharat – Pradhan Mantri Jan Arogya Yojana (AB-PMJAY) was allotted Rs. 6,412 crore (US$ 840.32 million).
- The Government of India approved continuation of 'National Health Mission' with a budget of Rs. 37,000 crore (US$ 4.85 billion).
- Rs. 5,156 crore (US$ 675.72 million) was allocated to the newly announced PM-ABHIM to strengthen India's health infrastructure and improve the country's primary, secondary and tertiary care services.

In November 2021, the Government of India, the Government of Meghalaya and the World Bank signed a US$ 40-million health project for the state of Meghalaya. Project will improve the quality of health services and strengthen the state's capacity to handle future health emergencies, including the COVID-19 pandemic.

By September 21, 2021, the Health Ministry's eSanjeevani telemedicine service crossed 12 million teleconsultations since its launch, enabling patient-to-doctor consultations, from the confines of their homes, and doctor-to-doctor consultations.

In September 2021, Prime Minister Mr. Narendra Modi, while speaking at the global COVID-19 summit said that India had shared its vaccine production with 95 countries and the UN peacekeepers. He also stated that India will supply COVID-19 vaccines to other countries after increased production.

In September 2021, Prime Minister Mr. Narendra Modi launched the Ayushman Bharat Digital Mission. The mission will connect the digital health solutions of hospitals across the country with each other. Under this, every citizen will now get a digital health ID and their health record will be digitally protected.

In September 2021, Telangana government in a joint initiative with World Economic Forum, NITI Aayog and HealthNet Global (Apollo Hospitals) launched 'Medicine from the Sky' project. The project will pave the way for drone delivery of life saving medicines and jabs in far-flung regions of the country.

STRONG DEMAND

- Healthcare market in India is expected to reach US$ 372 billion by 2022, driven by rising income, better health awareness, lifestyle diseases and increasing access to insurance.
- As of 2021, the Indian healthcare sector is one of India's largest employers as it employs a total of 4.7 million people.

ATTRACTIVE OPPORTUNITIES

- In the Economic Survey of 2022, India's public expenditure on healthcare stood at 2.1% of GDP in 2021-22 against 1.8% in 2020-21.
- Two vaccines (Bharat Biotech's Covaxin and Oxford-AstraZeneca's Covishield manufactured by SII) – were instrumental in medically safeguarding the Indian population against COVID-19.

RISING MANPOWER

- Availability of a large pool of well-trained medical professionals in the country.
- The number of allopathic doctors with recognised medical qualifications (under the I.M.C Act) registered with state medical councils/national medical councils increased to 1.27 million in July 2021, from 0.83 million in 2010.

POLICY AND GOVERNMENT SUPPORT

- In the Union Budget 2022-23, Rs. 86,200.65 crore (US$ 11.28 billion) was allocated to the Ministry of Health and Family Welfare (MoHFW).
- The Indian government is planning to introduce a credit incentive programme worth Rs. 500 billion (US$ 6.8 billion) to boost the country's healthcare infrastructure.

Fermi Estimation

Estimate the market size of Health Checkup Service?

A. Total population of India: 1.4 Billion
B. Urban population in India: 30%

   1.4 B * 30% = 420 Million

C. Population segmentation by income

   Upper middle class, UMC(10%)

   420 M * 10% = 42 M

   Middle class, Mid-C (30%)

   420 M * 30% = 126 M

   Lower middle class, LMC (40%)

   420 M * 40% = 168 M

D. Assuming 35% of the population above 35 years old

   For UMC 42 M * 35% = 14.7 M

   For MC 126 M * 35% = 44.1 M

E. Internet penetration in India: 30%

   For UMC 14.7 M * 30% = 4.41 M

   For MC 44.1 M * 30% = 13.23 M

F. The National Statistical Commission surveyed literacy to be 77.7% in 2017–18. Literacy rate in urban areas was higher 87.7% than rural areas with 73.5%

   Probably most of the Upper Middle Class is literate, there will be more chances of 4.41 Million People using the Health Check Up Service.

   For MC 13.23 * 87.7% = 11.60 M

   In the Middle Class, 11.6 Million people of urban population above 35 years old who are literate and able to buy internet service most probably using the Health Check Up Service.

Data Collection

We are using Census 2011 data for the analysis. The Census 2011 is the 15th National census survey conducted by the Census Organisation of India. Mr. C. Chandramouli is the Commissioner & Registrar General of the Indian 2011 Census. The 2011 Indian National Census has been conducted in 2 phases - house listing and population. The national census survey covered all the 28 states of the country and 7 Union territories including 640 districts, 497 cities, 5767 tehsils & over 6 lakh villages.

About CENSUS

- Census is the collection, compilation, analysis, evaluation, publication, and dissemination of statistical data on the population.
- It is a reflection of truth and facts about people, their diversity of habitation, religion, culture, language, education, health, and socio-economic status as they exist in a country.
- The word "census" comes from the Latin word "censere," which means "to assess or rate."
- It includes demographic, social, and economic information as of a specific date. Census data is useful for developing development policies and plans, as well as determining election constituencies.
- As of 2011, the Indian Census had been conducted 15 times. Since 1871, it has been conducted every ten years.

According to the 2011 census, India's population was 1,210,854,977 people. Since 2001, India's population has grown by 181.5 million, slightly less than Brazil's. With 2.4 percent of the world's surface area, India has 17.5 percent of the world's population. With a population of around 200 million people, Uttar Pradesh is the most populous state in India. Over half of the population lived in Uttar Pradesh, Maharashtra, Bihar, West Bengal, Andhra Pradesh, and Madhya Pradesh, the six most populous states. 833 million (68.84 percent) of India's 1.21 billion people live in rural areas, while 377 million live in cities. In India, migrants account for 453.6 million people, or 37.8% of the total population.

Literacy was defined as anyone over the age of seven who could read and write in any language and comprehend it. Prior to 1991, children under the age of five were classified as illiterates in censuses. The literacy rate for the entire population is known as the "crude literacy rate," while the literacy rate for people aged 7 and up is known as the "effective literacy rate." With 82.14 percent of males and 65.46 percent of females being literate, the effective literacy rate increased to 74.04 percent.

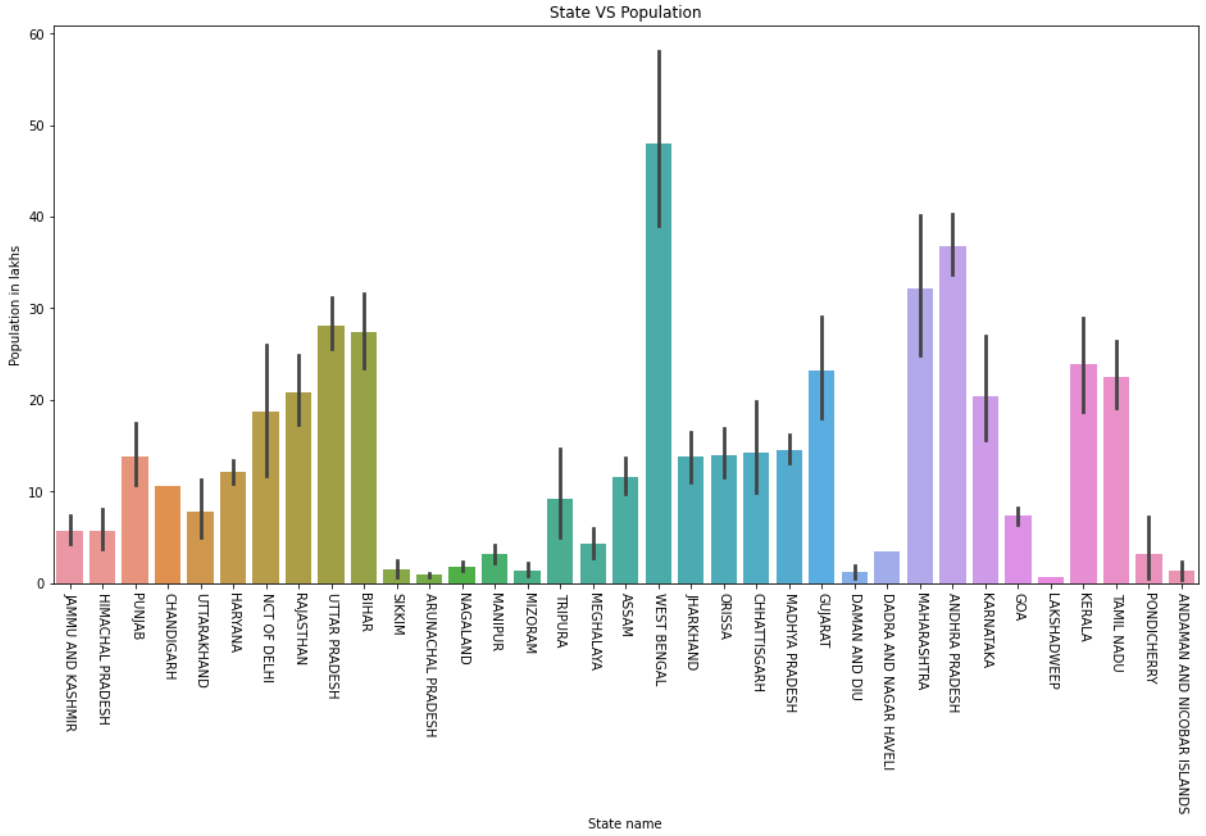
Altogether, 833.5 million persons live in rural area as per Census 2011, which was more than two-third of the total population, while 377.1 million persons live in urban areas. Urban proportion has gone up from 17.3 per cent in 1951 to 31.2 per cent in 2011. Empowered Action Group (EAG) states have lower urban proportion (21.1 per cent) in comparison to non-EAG states (39.7 per cent).

The state name column includes the state name for 28 states and 7 UT's. The MALE and FEMALE column consists of the gender wise population for various district name. The Household with Internet columns consist of number of households in every district having Internet. This will be useful in determining the market segments as our startup is based on online service. Other

column like Household with computer will also be important for analysis as it will be easier for the access of online services provided by our company. The last most important column for us is the Power parity column, it will help in determining the households with an equivalent income and will be a good measure for the income of the households, it's obvious that households with more income can afford our devices easily, hence it will help in understanding the market segments.

EDA

We will be performing EDA based on our data. The below plot shows the graph between the different states and population wise. This will help in determining the states with the most population as there is more chance for the success of our startup with the most number of people.



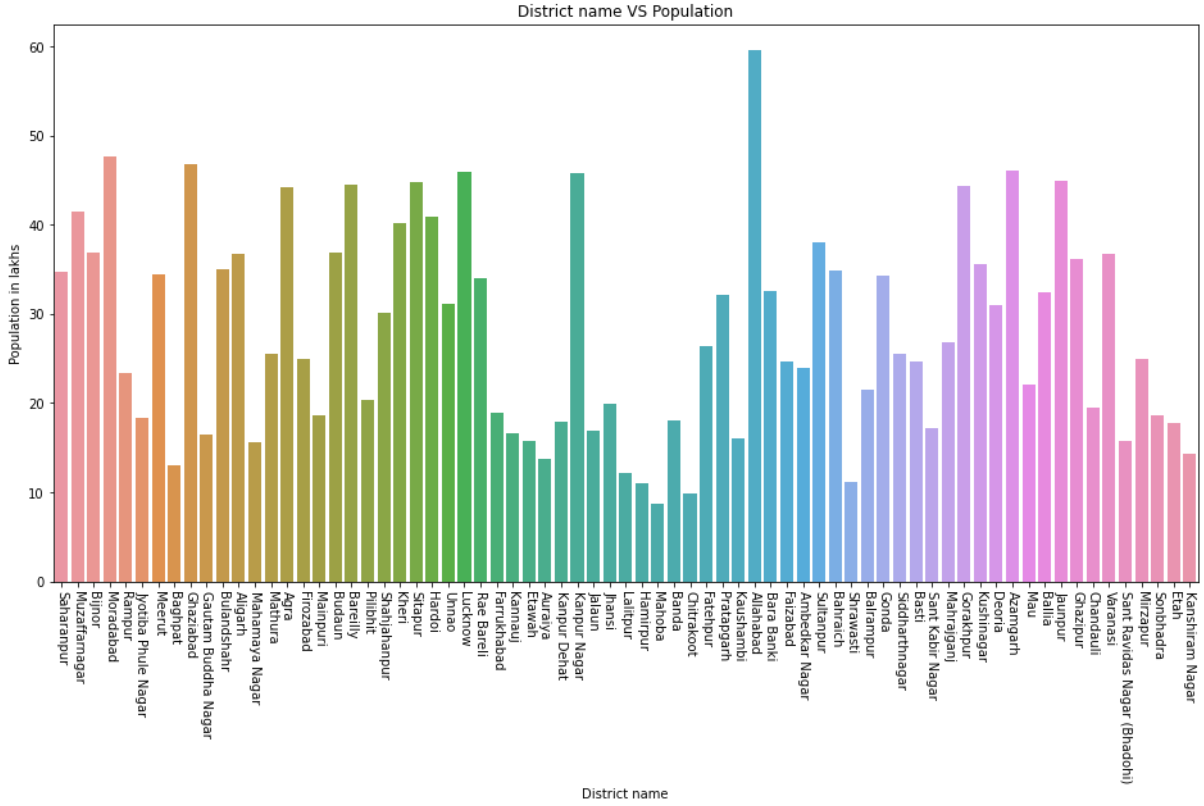
Population in lakhs vs. State name

The largest populations are in the states of Uttar Pradesh, Maharashtra, Bihar, West Bengal, Andhra Pradesh, Madhya Pradesh, Tamil Nadu, Rajasthan, Karnataka, and Gujrat. We will do analysis based on this states as they have a higher chance of targeting people.

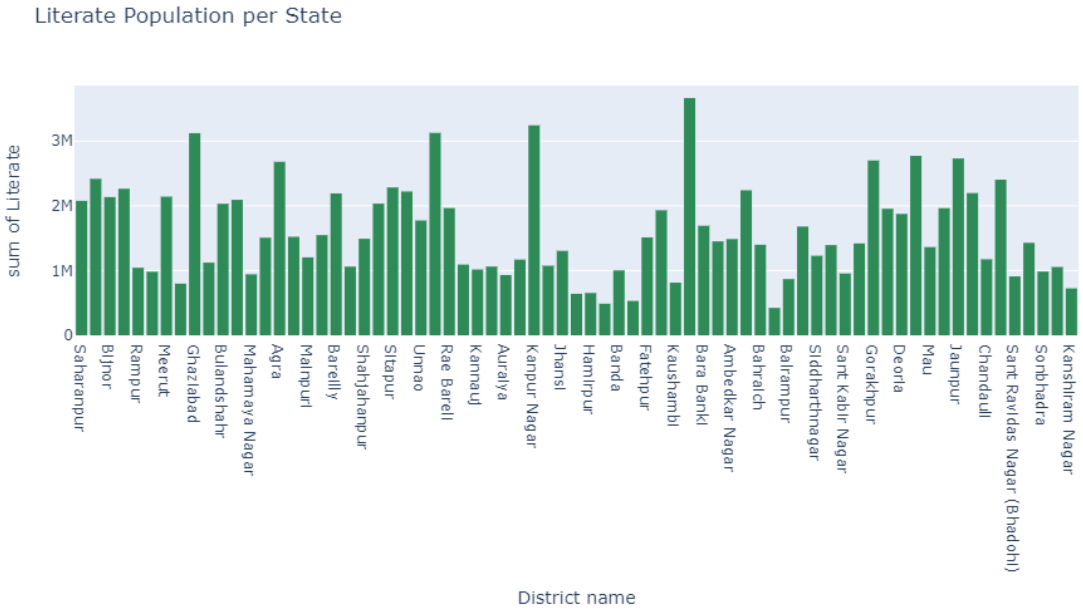
For each of these states we will be performing EDA based on **Population**, **Literacy**, **Households_with_TV_Computer_Laptop_Telephone_mobile_phone_and_Scooter_Car**, **Households_with_Internet**.

Uttar Pradesh

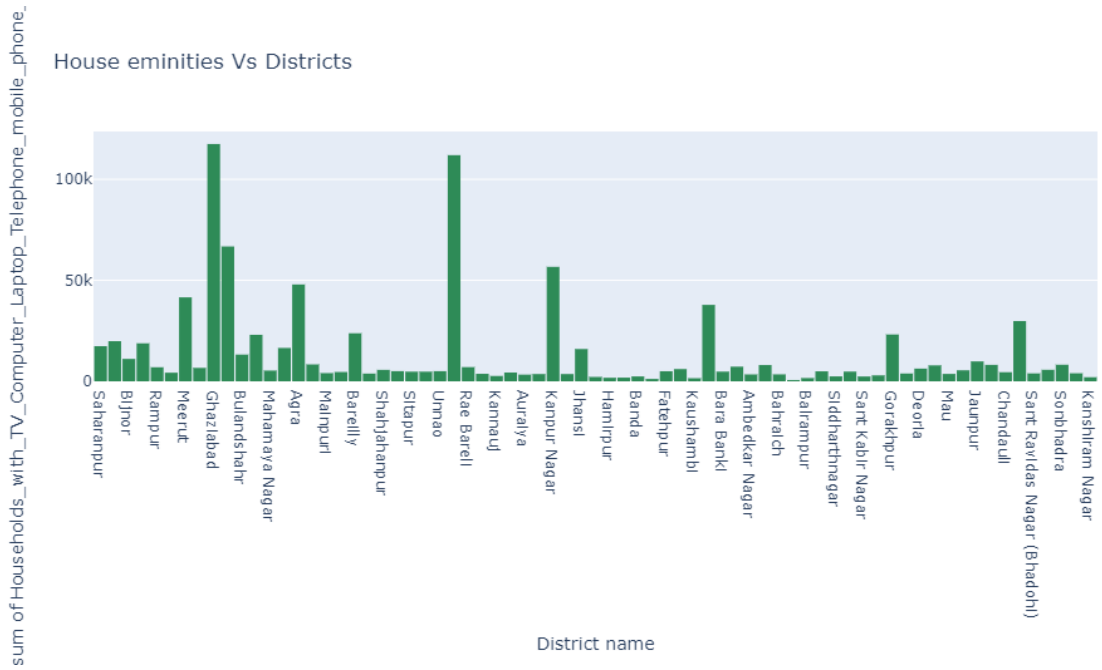
This plot shows the district wise population.



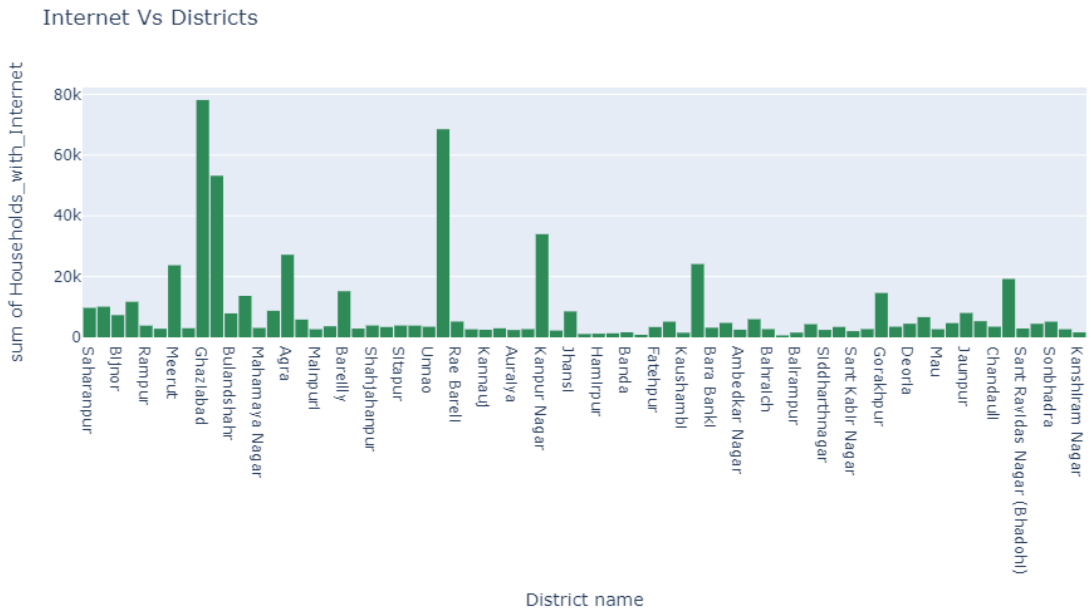
This plot shows district wise Literate person.



This plot shows Number of households with computers, mobile phones, scooter cars etc.

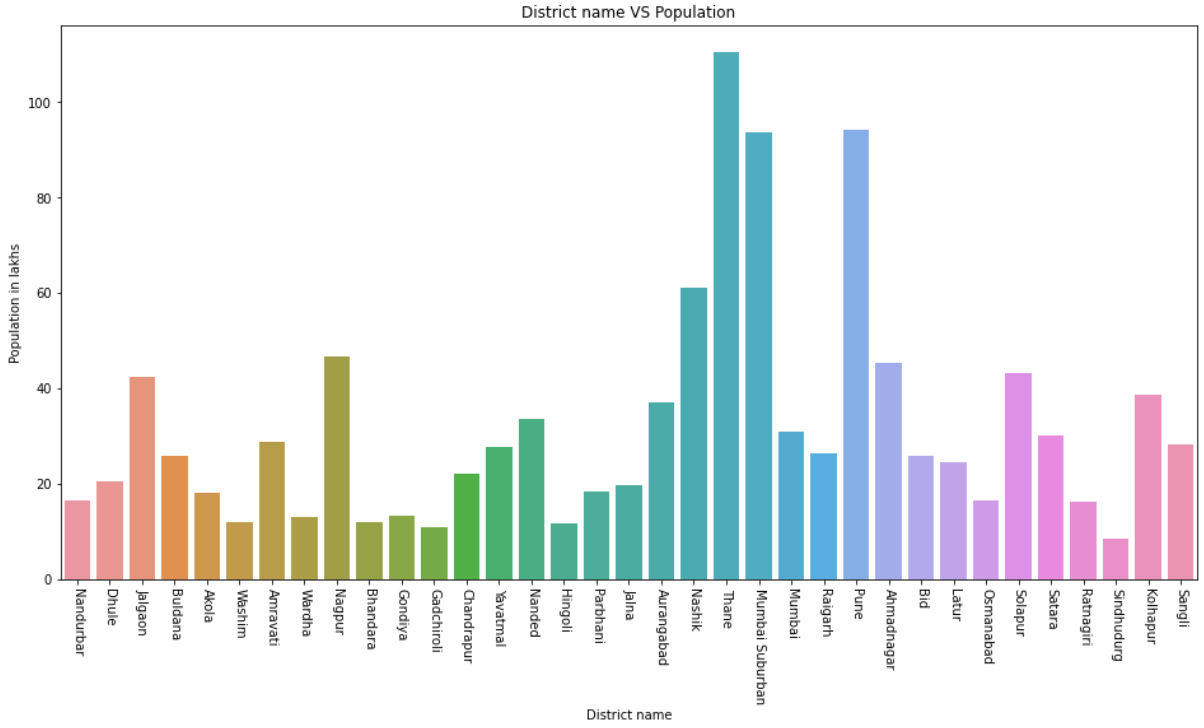


This plot shows the number of households with internet connection.

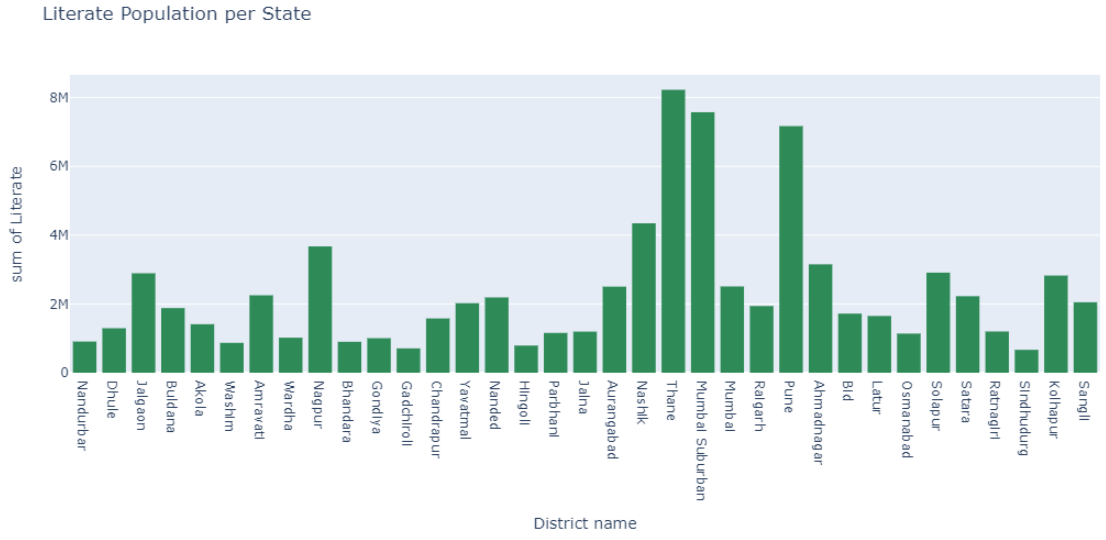


Maharashtra

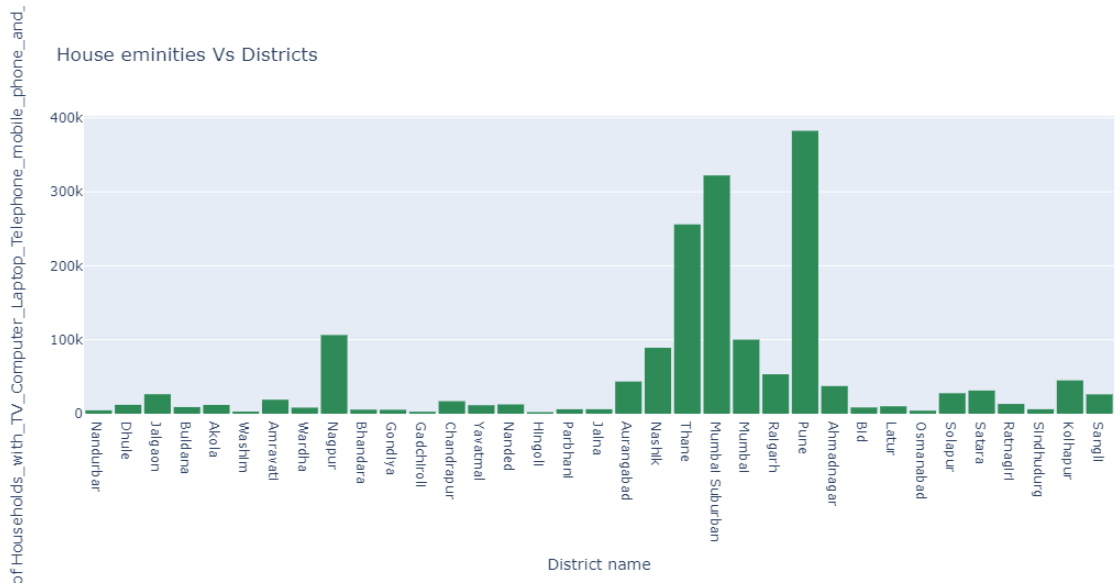
This plot shows the district wise population.



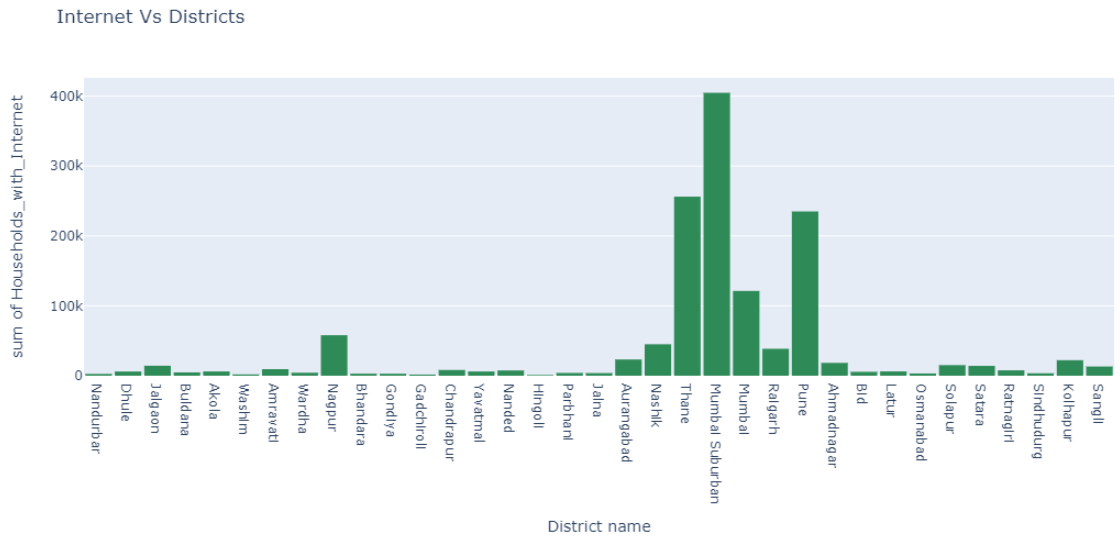
This plot shows district wise Literate people.



This plot shows Number of households with computers, mobile phones, scooter cars etc.

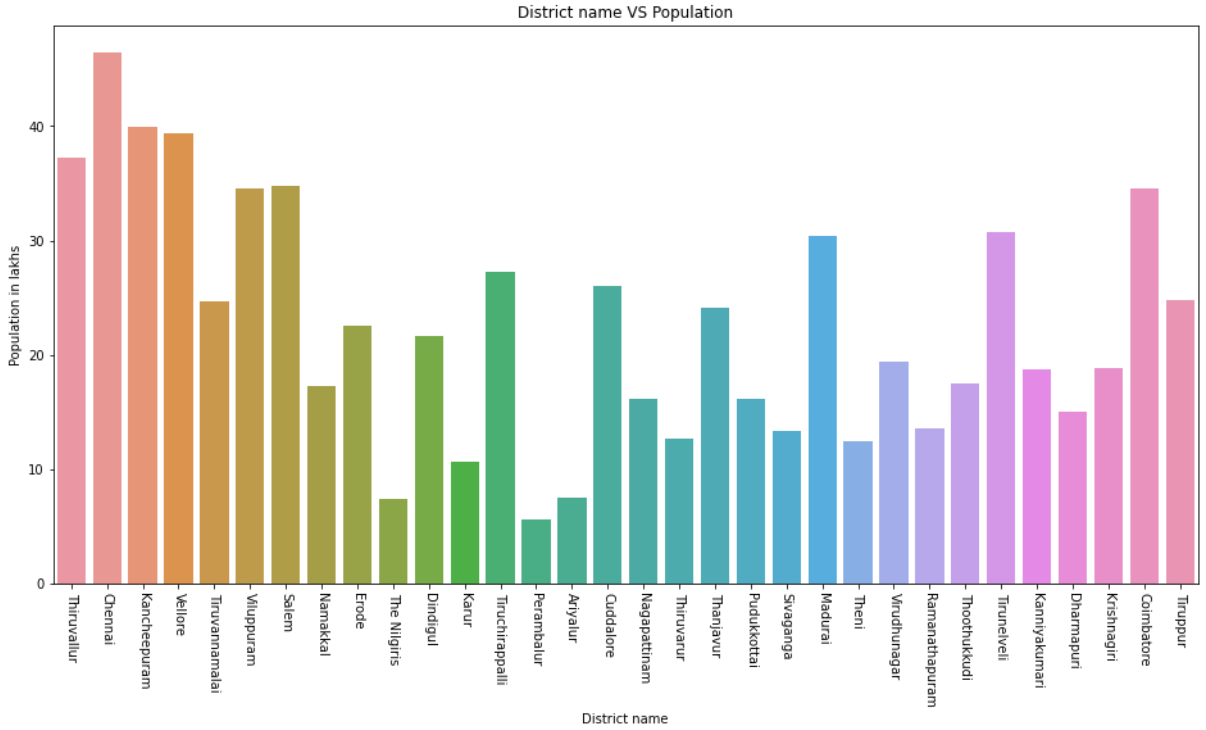


This plot shows the number of households with internet connection.

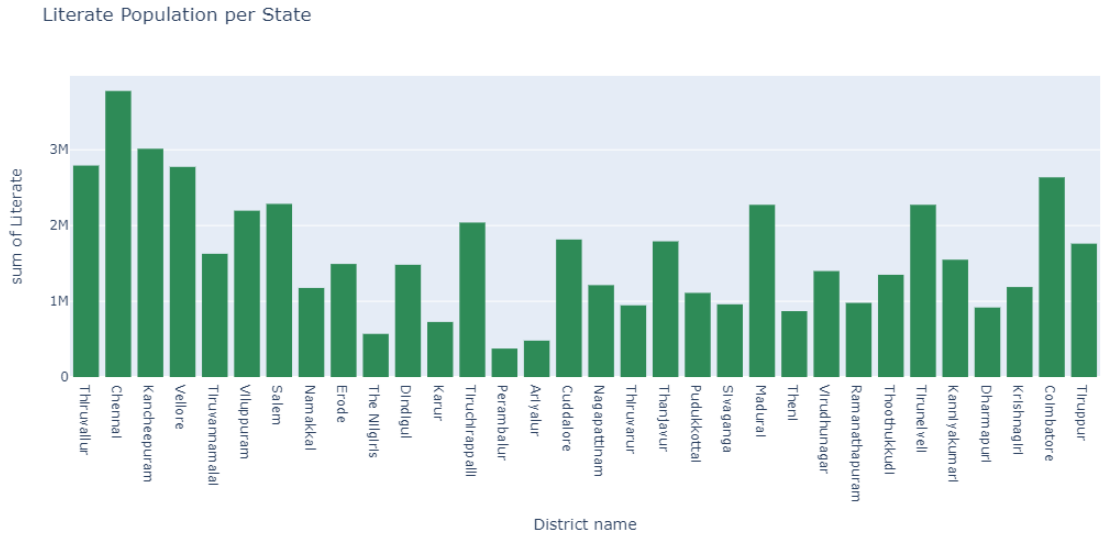


Tamil Nadu

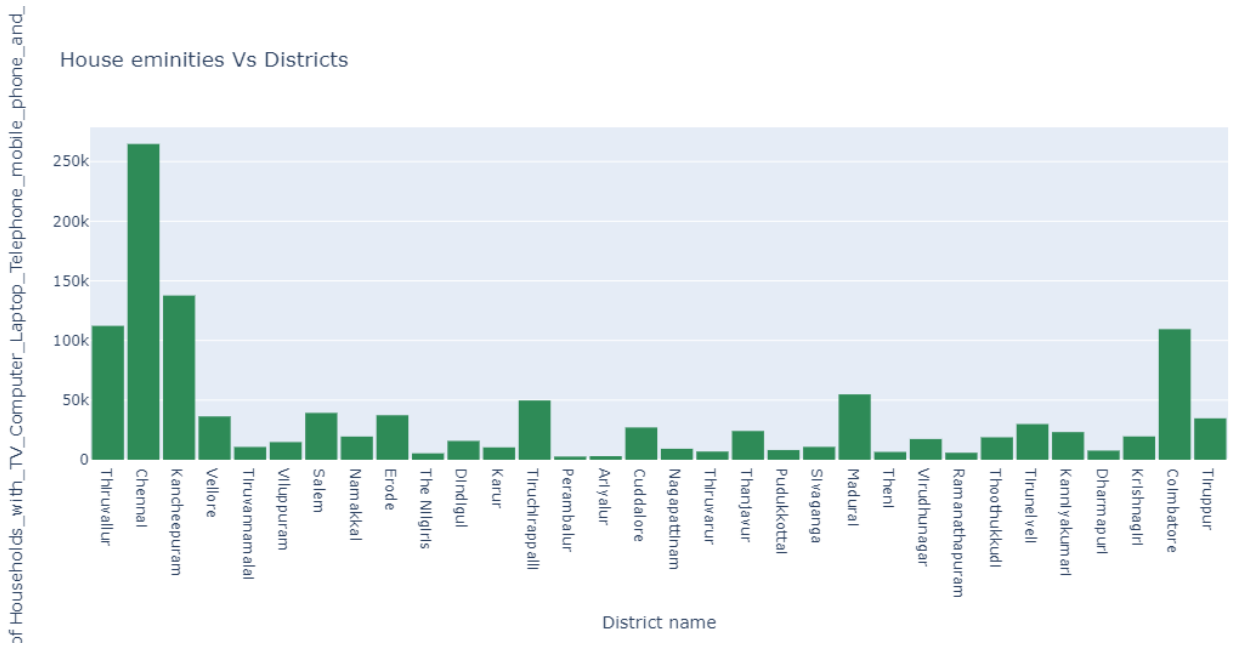
This plot shows the district wise population.



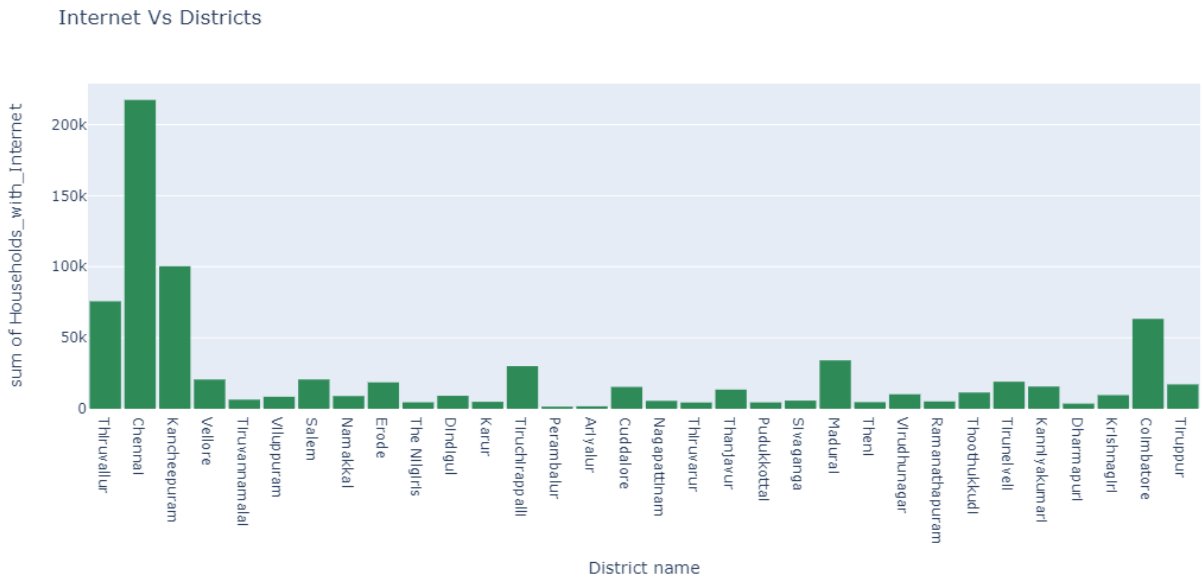
This plot shows district wise Literate person.



This plot shows Number of households with computers, mobile phones, scooter cars etc.

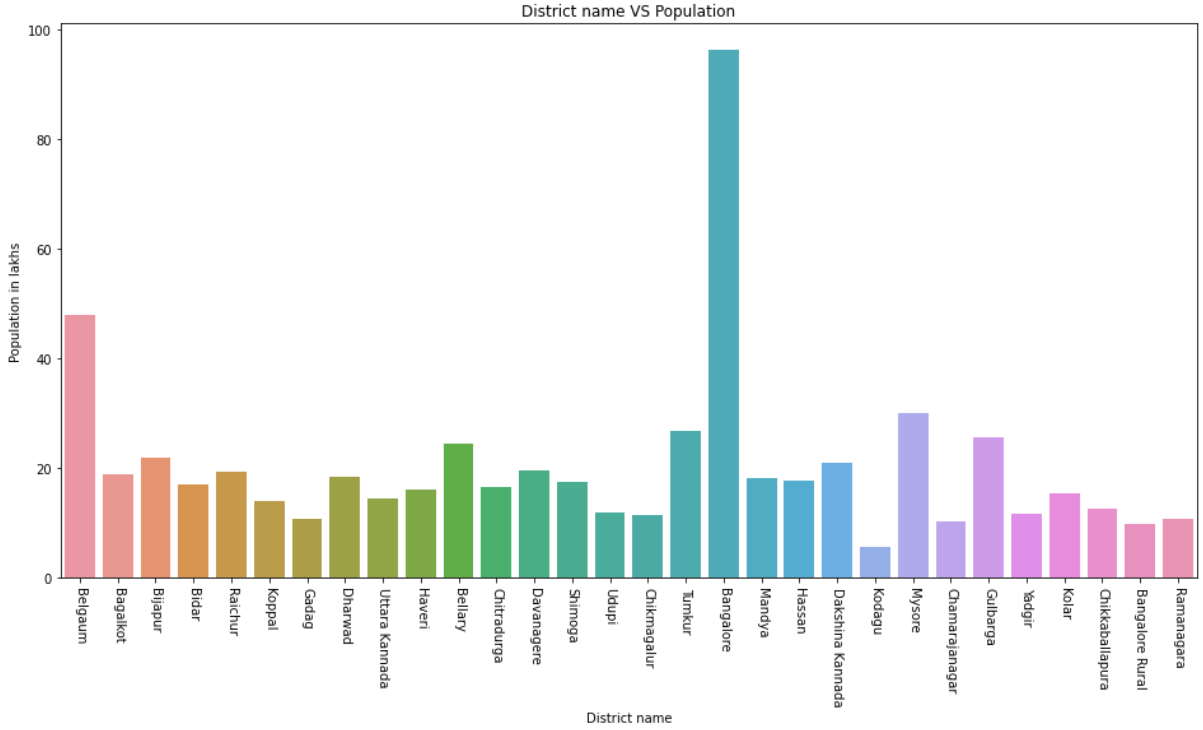


This plot shows the number of households with internet connection.

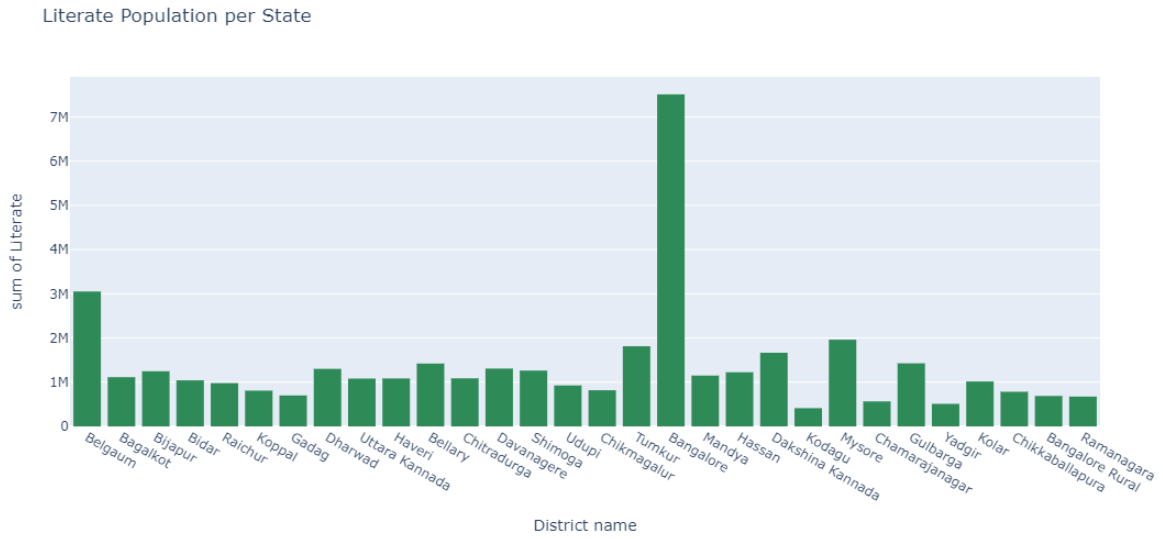


Karnataka

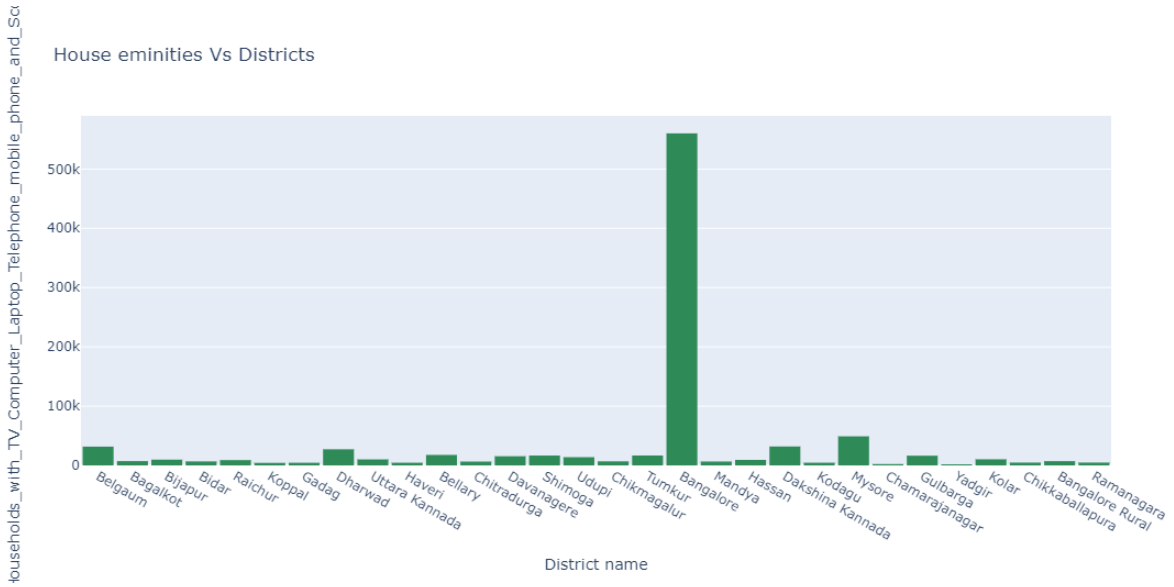
This plot shows the district wise population.



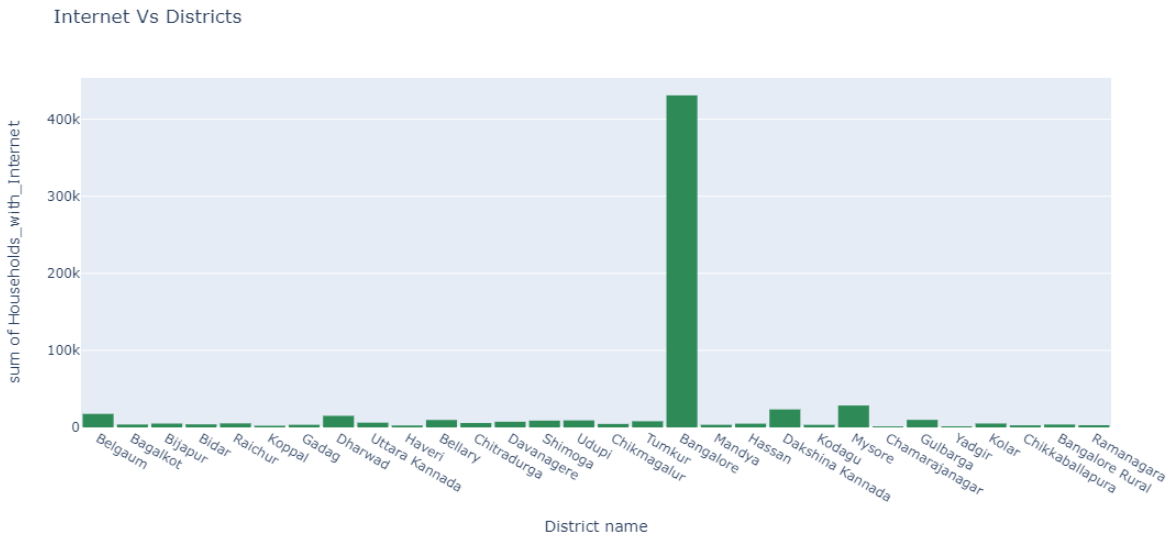
This plot shows district wise Literate people.



This plot shows Number of households with computers, mobile phone, scooter car etc.



This plot shows the number of households with internet connection.

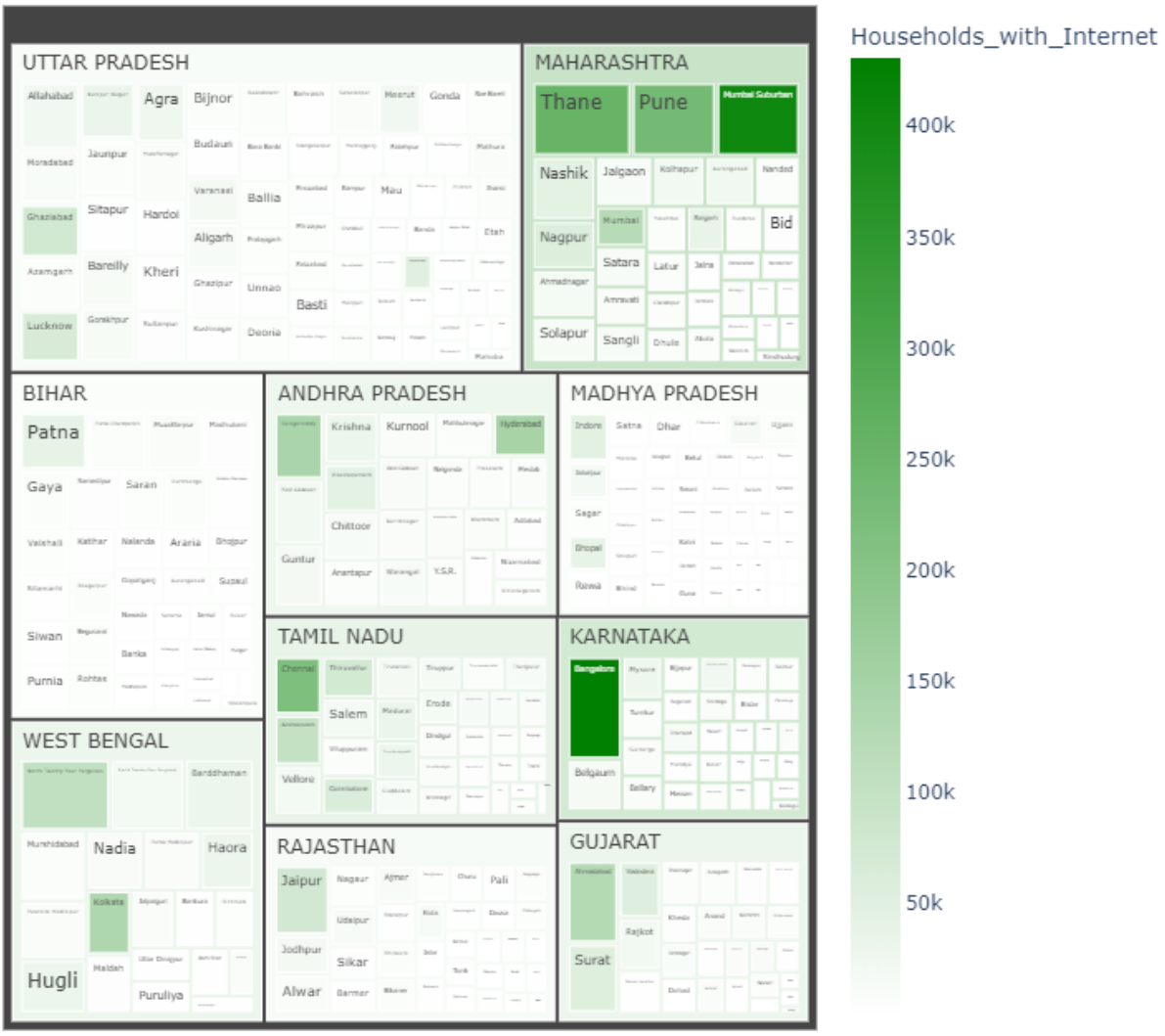


This was the district wise analysis for the states of Maharashtra, Tamil Nadu, Uttar Pradesh and Karnataka. From the above analysis we can see that the most number of Internet, Computer and Literacy is in the following cities of Mumbai Suburban, Thane, Pune, Bangalore and Chennai. So our main focus for launching our services will be these five cities. We will work upon expanding our service to other cities as well in the future.

Now let's focus on a few states and do analysis by creating treemaps.

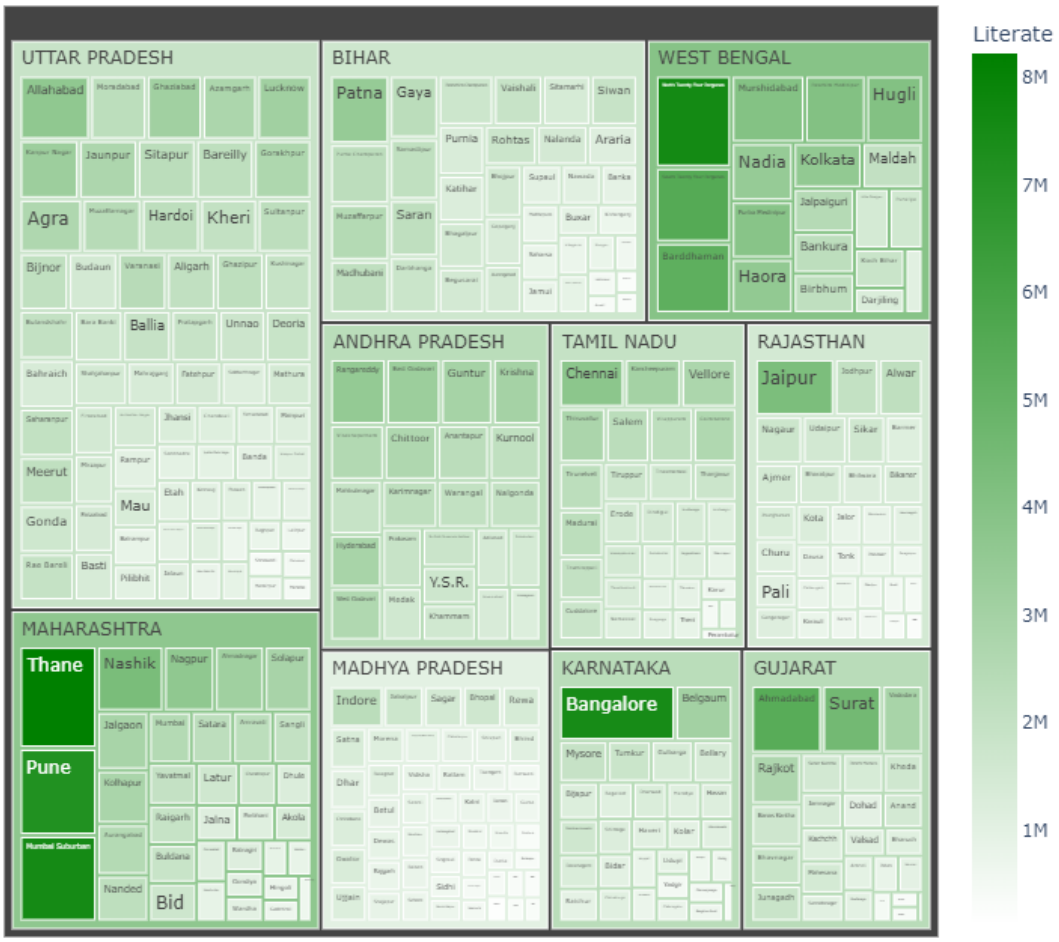
This tree map tells us about the states and districts with the most number of Internet connections with the darkest green showing the most number of Internet users. The district with the most households with internet are Thane, Pune, Mumbai suburban, Bangalore, and Chennai.

State with most number of internet connections



The other tree map that we used for analysis is based on literacy, it tells us about the district with the highest number of literate persons. The districts with most literate are Thane, Mumbai, Pune, Bangalore, and North twenty four Pargana.

States with most Literate population



Now we will generate the treemap for the states based on the power parity. The richer the person, the greater the chance of buying the devices. Hence we will construct a tree map which will show parity for income above Rs. 150,000. This will help in targeting richer sections of society in different districts.

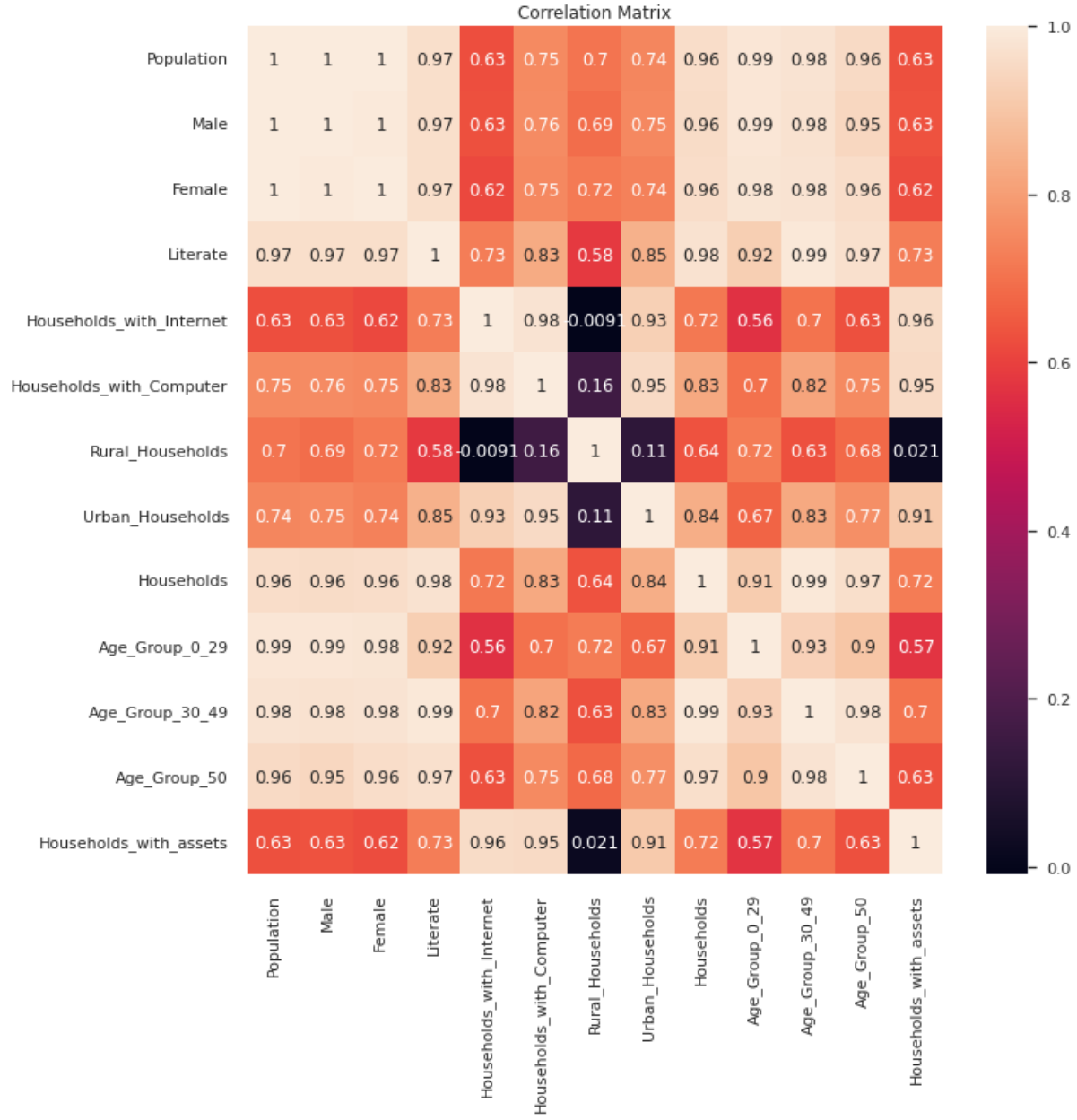
Based on Power Parity we have found out that the five most influential districts based on power parity are Thane, Pune, Mumbai, Bangalore, and Chennai. This is the same as the most number of population treemaps.

Richer states

Based on these three treemaps we have come to the conclusion that the top 5 most influential target markets are Thane, Mumbai, Pune, Bangalore, and Chennai. Our business should focus on starting business in these five areas. We can afterwards expand our business to neighbouring cities and cities with maximum internet connections. This will help us in growing all together because Internet connection is the basic requirement for an online business. People including lower middle class and above will be able to afford as well.

Correlation Heat Map for target States

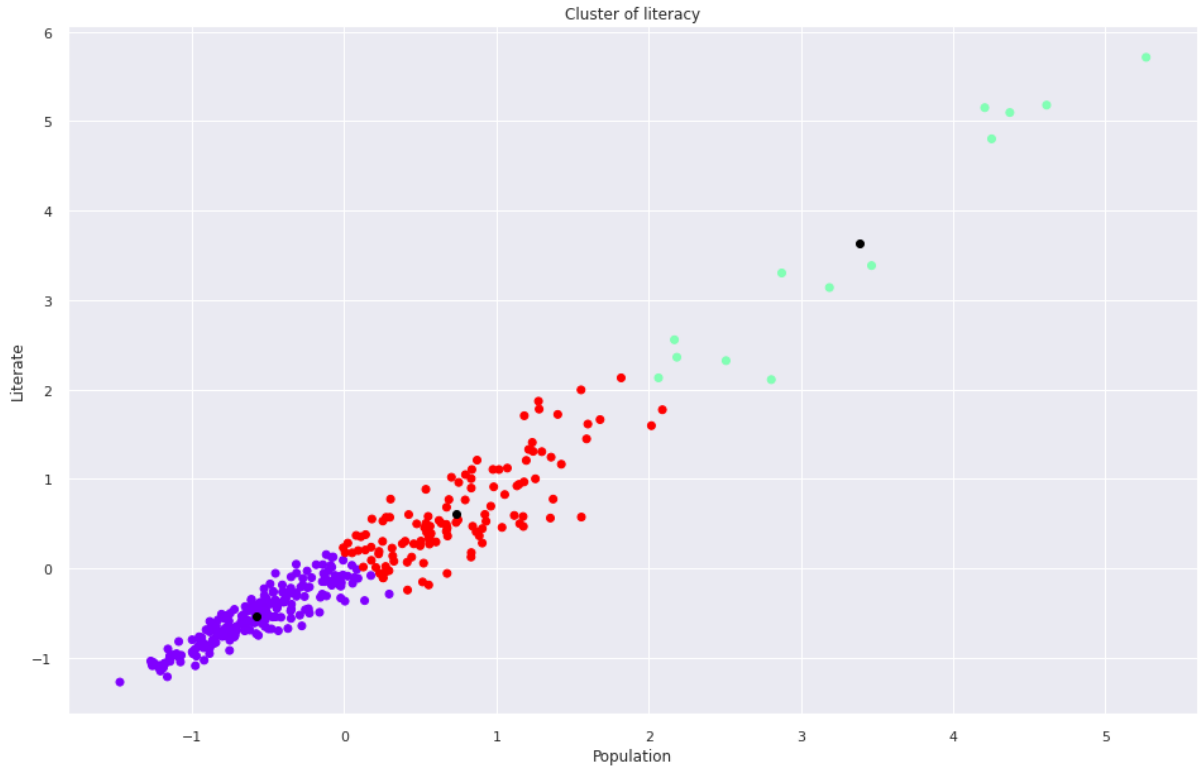
This heat map gives the correlation of various columns that we have used for market segmentation for the Target states of states involving 10 most populated states. This gives a general overview of what parameters are highly correlated with our analysis.



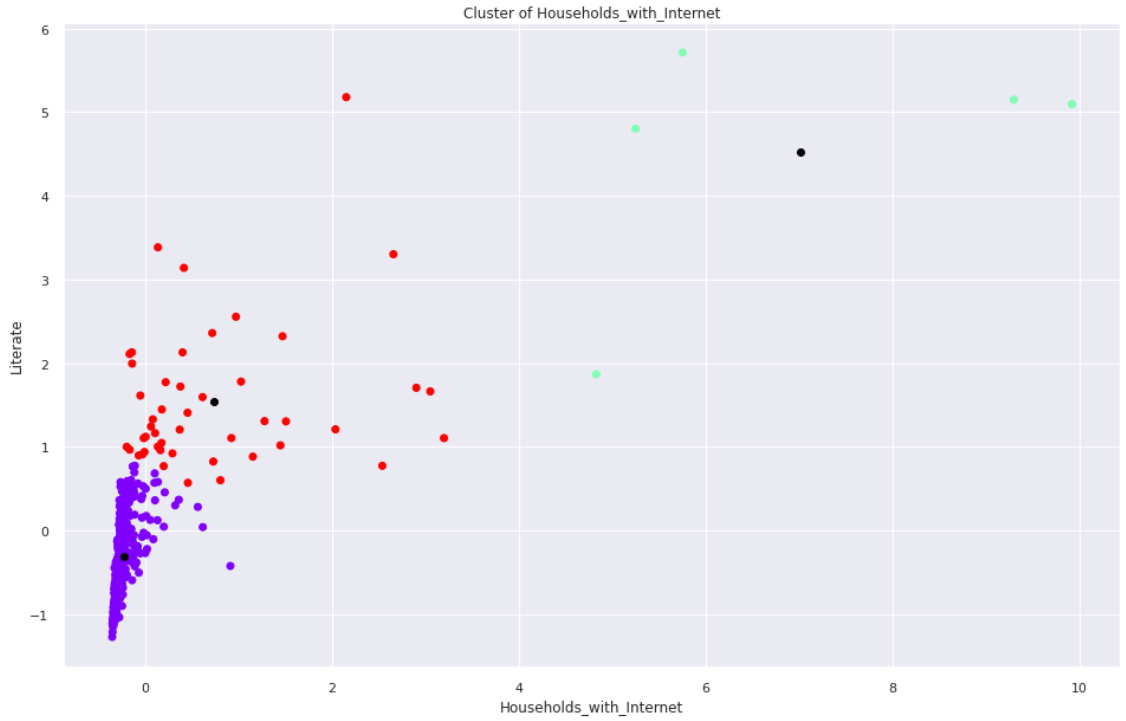
K-Means Clustering

We perform KMeans clustering on different set of columns

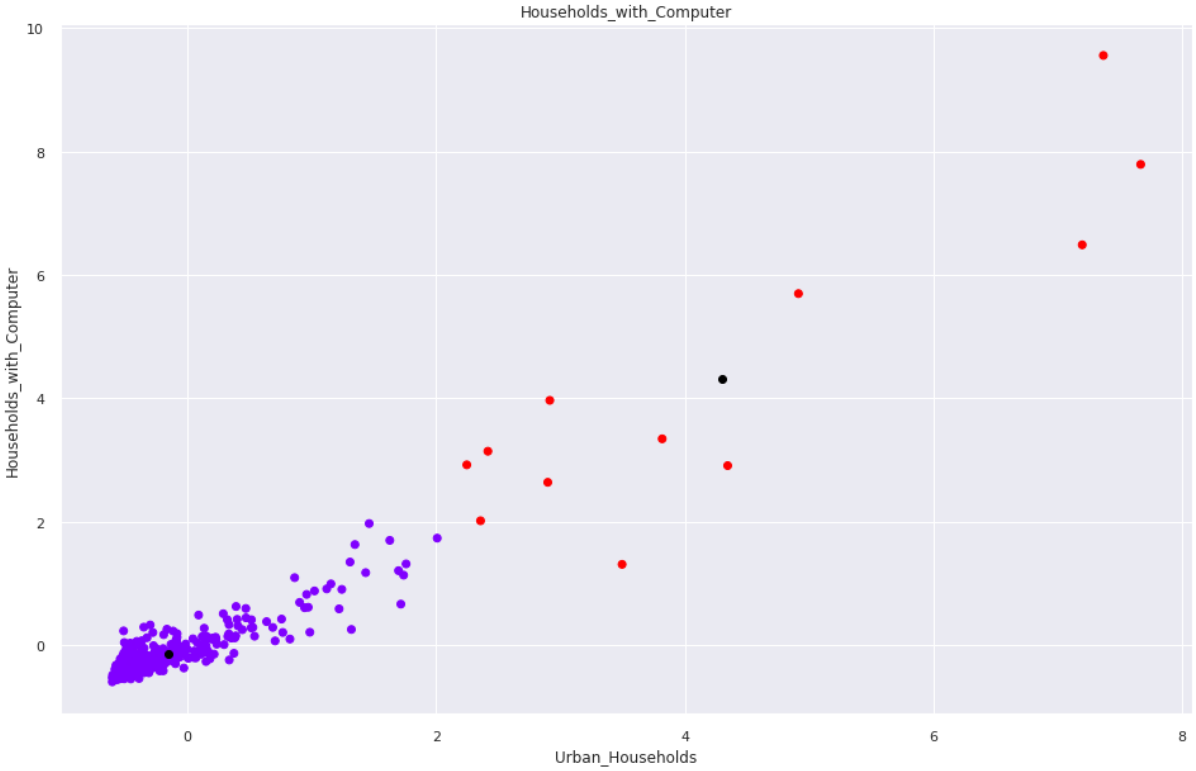
1. Population & Literate



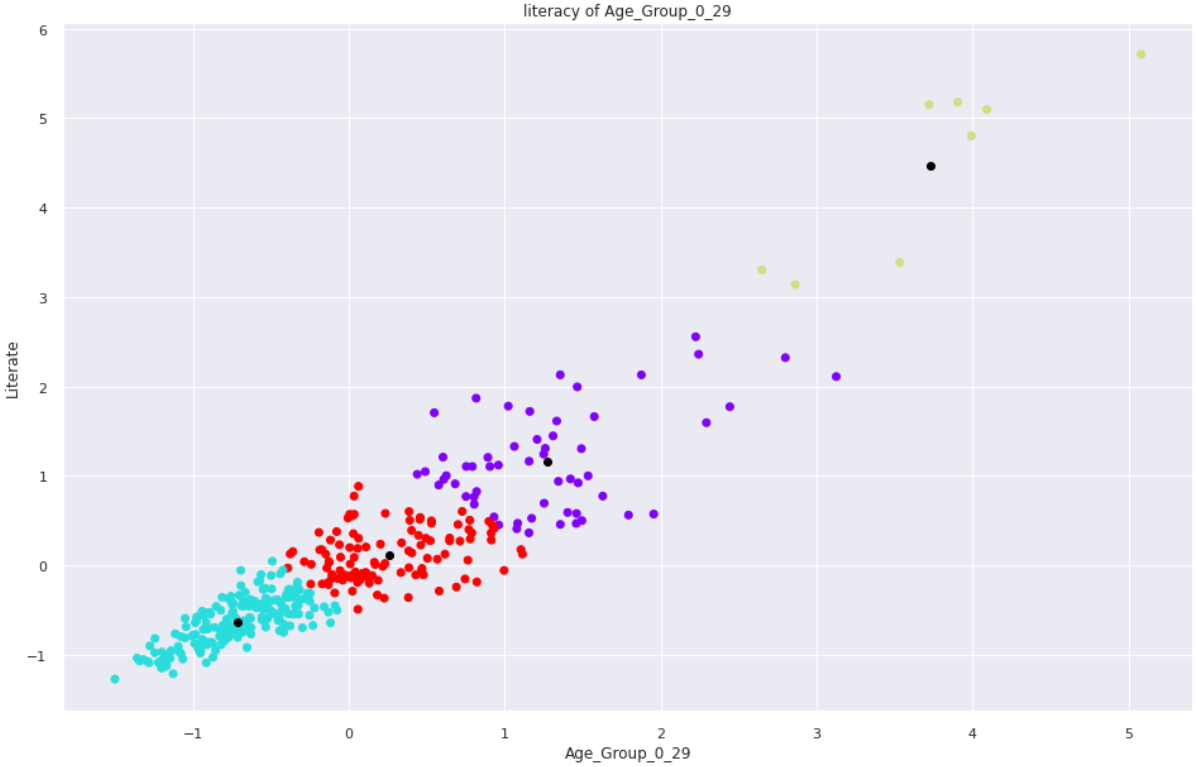
2. Households_with_Internet & Literate



3. Urban_Households & Households_with_Computer

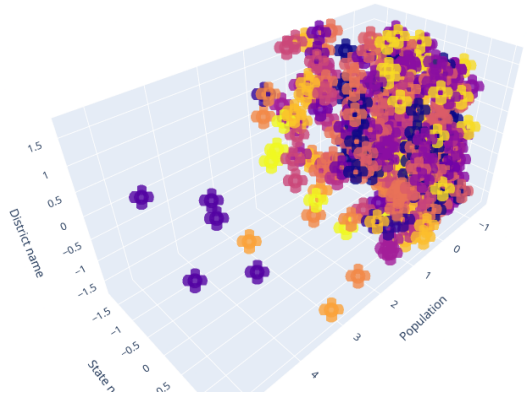


4. Age_Group_0_29 & Literate

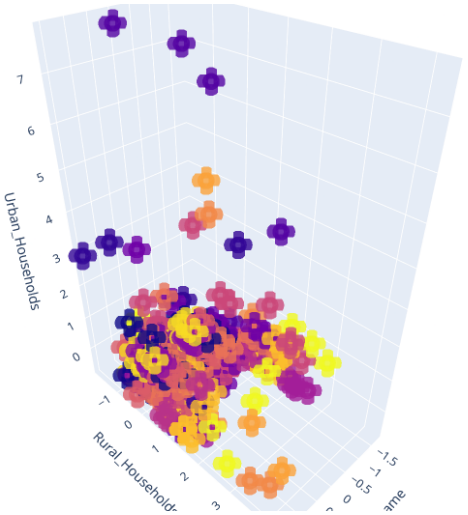


Implications for Marketing Mix Decisions

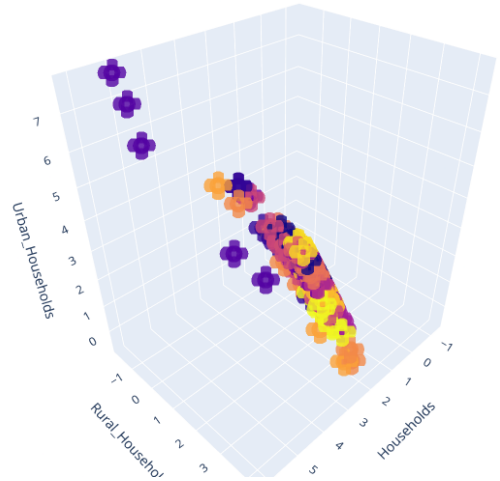
Here you can see different 3D scatter plots of different segments.



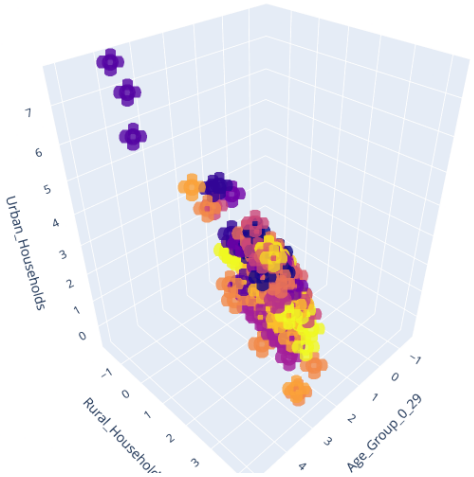
Population Vs State name Vs District name



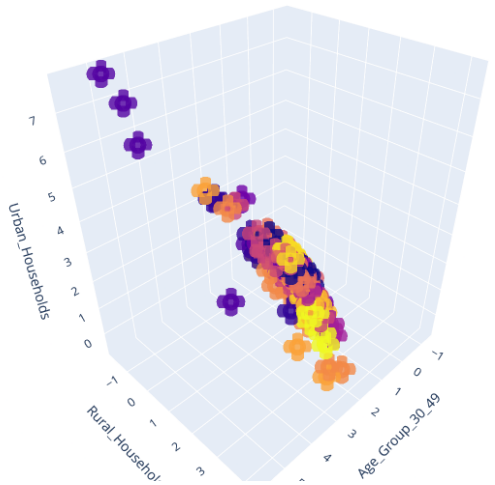
State name Vs Rural_Households Vs Urban_Households



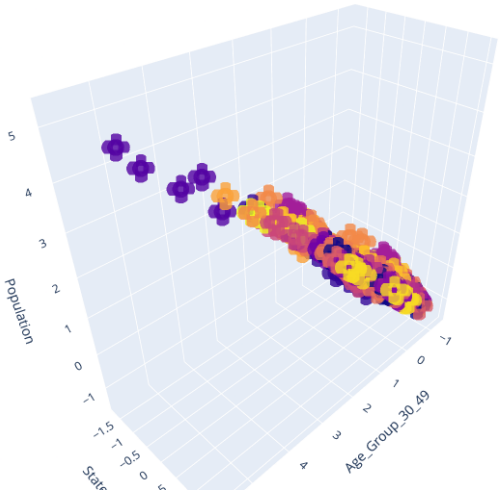
Households Vs Rural_Households Vs Urban_Households



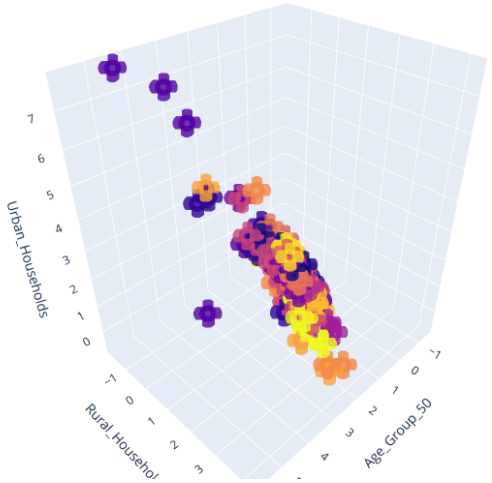
Age_Group_0_29 Vs Rural_Households Vs Urban_Households



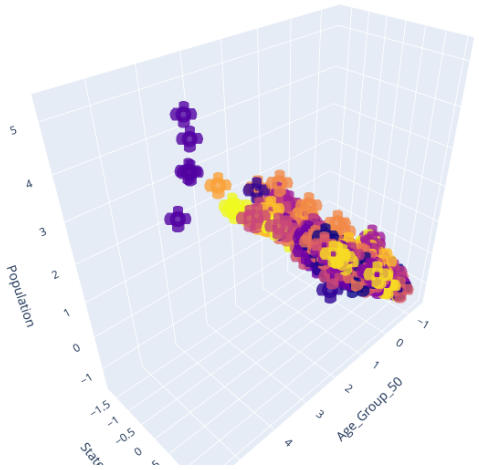
Age_Group_30_49 Vs Rural_Households Vs Urban_Households



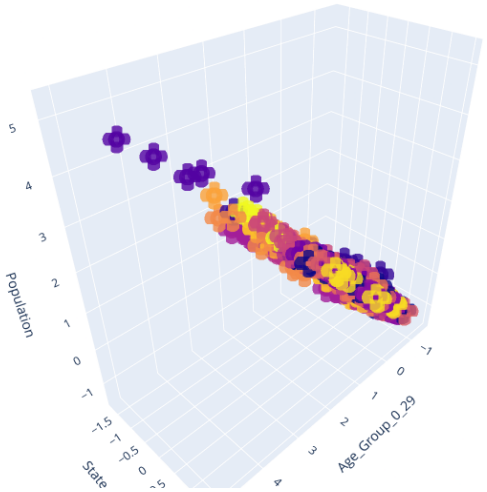
Age_Group_30_49 Vs State name Vs Population



Age_Group_50 Vs Rural_Households Vs Urban_Households



Age_Group_50 Vs State name Vs Population



Age_Group_0_29 Vs State name Vs Population

PRICING

SERVICE:

The service provided by the start-up is:

- Full body checkup based on blood samples

A brief comparison of prices charged by various online health care providers (our competitors) is shown below.

City	Service provider	Service cost(approx 80-90 parameters) in Rs
Chennai	pharmeasy	800
Chennai	healthians	650
Chennai	diagnosticcentres	700
Chennai	healthcareontime	1700
Chennai	netmeds	2250
Chennai	medibuddy	700
Bangalore	pharmeasy	800
Bangalore	practo	600
Bangalore	mfine	700
Bangalore	thyrocare	1600
Bangalore	healthians	1200
Bangalore	nirmaya	1200
Bangalore	aarthi	1500
Bangalore	healthcareontime	1600
Mumbai	healthians	650
Mumbai	pharmeasy	700
Mumbai	nirmaya	1200
Mumbai	tata 1mg	2000
Mumbai	apollo	3400
Mumbai	thyrocare	2200
Delhi	healthians	650
Delhi	pharmeasy	800
Delhi	Redcliffe labs	1000
Delhi	meditest	1000
Delhi	tata 1mg	3500
Delhi	cnc pathlabs	1800
Delhi	houseofdiagonistics	2000
Delhi	practo	900

At present, the price range of health checkup ranges from Rs 600 - Rs 3500. Various providers charge at different costs.

It can be noted that the nationwide providers tend to charge less than the statewide providers. This is because of the large customer market they have managed to pile up over years. On the other hand there are still customers who tend to take their checkup at some famous labs present in their state.Hence advertising our product is a main step.

The key points to be considered for pricing our service are :

- Initial capital for setting up a lab
- Hiring lab technicians
- Travel costs for collecting sample
- Lab equipments
- Advertising

Hence the service could be provided at a cost around Rs 1000 to 1100.

Points to remember while entering the market :

1. A main thing which could attract more customers is “offer”. Usually, more than half the customer strength opt for a family health checkup. So offers such as:
    - Book for 2 patients and get free check up for 1 more patient
    - First time checkup offers
2. Target the hospitals in and around the city. Collaborate with them and make them suggest our service.
3. Try to advertise more through television channels, newspapers targeting the aged people as they are more prone to order our service

PRODUCT:

GLUCOMETER:
The price range of the glucometer varies from Rs 500 to 10500. Customers usually prefer to invest less in these devices. Hence an ideal price for this would be around Rs 1000. Distributing our products in local medical shops and pharmacies would definitely boost up the sales. Also promoting our products to patients who avail our checkup services would be a good practice.

BP METER:
Cost of BP metres range from Rs 1000 to 4700. We can charge upto Rs 1200 for our BP metre.

VITAMIN TEST KIT:
There are two types of vitamin test kit based on the procedure:

- Oral swab
- Blood test

The main highlight is that there are only very few competitors for this product. Hence it would be wiser to invest more in designing and advertising these products. The vitamin test kit (oral swab) could be priced around Rs 200. On the other hand, the price of the vitamin test kit (blood test) could be around Rs 700.

The price range of products offered by various other competitors are shown below.

Devices	Device providers	Device cost
Glucometer	Accu-chek(Active)	1200
Glucometer	Accu-chek(Instant)	2000
Glucometer	Beato	900
Glucometer	Dr.Morepen	500
Glucometer	Dr.Trust	900
Glucometer	Beato curv	850
Glucometer	one touch select plus	1200
Glucometer	one touch select verio	1075
Glucometer	Accusure	600
Glucometer	Freestyle	10500
BP meter	Dr.Morepen	1000
BP meter	ELKO	1200
BP meter	BPL	1700
BP meter	HealthSense	2200
BP meter	Accusure AS	1700
BP meter	Accusure Automatic	1500
BP meter	Beurer	1500
BP meter	Dr.Trust	4000
BP meter	Omron 7124	1800
BP meter	Omron 6032	4700
Vitamin test kit	Bioline(oral swab)	185
Vitamin test kit	cerascreen(blood test)	900

PROFIT CALCULATION FOR SERVICE (per city) :
Launching the service in bigger cities would be the best strategy to attract a huge customer base. Here we have taken Mumbai suburban as our place to launch our initial services.

Targeted segment : people of Mumbai suburban aged more than 50

Count : 1.6M (approximately)

Potential profit = targeted segment count * price of the service

Let’s assume that 5% of our targeted segment use our service. Then

Profit = 0.08M * 1100 = Rs 88 MILLION

Similarly, we could extend the services to other big cities to gain more profit.

Reference

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