Selecting best state to open biggest lighting Megastore in India

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Introduction
Background
The world around us is growing at never seen before rate, working day and night. Without artificial lightings achieving efficiency in the night time is next to impossible. SunDas is a Lighting company which has very stronghold in entire Europe and North America. SunDas is planning to open its first and biggest megastore in India. The company wants to open the megastore in the capital of a State/Union Territory of India. There are various parameters to consider while opening a new store anywhere in the world. Some of the features which might impact most in the decision are ease of doing business, population, electricity availability, GDP per capita, transport network, etc.

Problem
With the use of relevant data SunDas aims to finalise the State/Union Territory and its corresponding capital in India to open its Biggest Megastore.

Few questions that will need to be answered-

1. Which feature are highly correlated with each other? So can we can reduce the number of features impacting.
2. Which State/Union Territory should be chosen to open the store?

Interest
Similar analysis can be undertaken by any new company interested in entering in Indian market for the first time.

Data Acquisition and Cleaning
Data Sources
Data needed to be scraped from Wikipedia for the relevant information. Few sources I will be using are - Per Capita Income , Ease of Doing Business, Population, Transport Network, Own Housing and Household having Electricity. Most of the data is of the current decade latest being 2018 and population of 2011 census.

Data Cleaning and Feature Selection
1. Per Capita Income by States/Union Territory of India:
   Net state domestic product (NSDP) is the state counterpart to a country's Net domestic product (NDP), which equals the gross domestic product (GDP) minus depreciation on a country's capital goods. I will be using 2018-19 nominal data from the only table on the wiki page.
2. Ease of Doing Business ranking of States/Union Territory of India:
   Ease of doing business ranking of states of India is the annual ease of doing business index of states and union territories of India based on the completion percentage scores of action items points of annual Business Reforms Action Plan (BRAP) under the make in India initiative. Here I will be using 2018 ranking from the only table on the wiki page.
3. Population of States/Union Territory of India:
   India is a union of 28 states and 8union territories.[1] As of 2011, with an estimated population of 1.2 billion, India is the world's second most populous country after the People's Republic of China. Here I will be using the data from census 2011 from the only table on the wiki page.
3. Transport Network:
4. National Highways are the arterial roads of the country for inter-state movements of goods and passengers. They traverse the length and width of the country connecting the National and State capitals,

major ports and rail junctions and link up with border roads and foreign highways. State Highways are the arterial roads in a State for inter-district movements. They traverse the length and width of a state connecting the state capital, district headquarters and important towns and cities and link up with the National Highways and adjacent State Highways. Here I will be adding the total road lines lengths from National as well as State highways.

5. Families owning house:
    Buying of lightings depends a lot on whether the housed is owned or rented. Here I will be using the percentage of the families owning their own houses from the table 1 on the wiki page

6. Households having electricity:
    Another factor that matters a lot in the buying capacity of the lightings is the availability of electricity. Here I will be using 2016 data as per the second column on the wiki table

I will be creating a single database displaying the features of a State/Union Territory. The features namely being the above mentioned ones.

Final Table:

Columns	Data Type
States	Index
Ease of Doing Business Medal	object
Ease of Doing Business Points	float64
Normalized_Points	float64
NSDP Per capita in US Dollars	float64
Normalized_NSDP	float64
Total Length of Transport Network(km)	float64
Normalized_Length(km)	float64
Households having electricity (%)	float64
Normalized_Electricity	float64
Population	float64
Normalized_Population	float64
Normalized_sum	float64

Methodology

Exploratory Analysis

I consolidated the metrics from various Wikipedia pages into the below table. While evaluating the best and worst choices I first normalized each and every column and then found out the most favourable state.

States	Ease of doing Business Medal	Ease of Doing Business Points	NSDP Per capita in US Dollars	Total Length of Transport Network(km)	Households having electricity (%)	Population
Andhra Pradesh	Top Achievers	98.42	8261	8859.08	98.8	49577103
Assam	Fast Mover	84.75	4485	6809.06	78.2	31205576
Bihar	Fast Mover	81.91	2395	9535.79	58.6	104099452
Chhattisgarh	Top Achievers	97.36	5294	8318.4	95.6	25545198
Delhi	Slow Mover	31.6	19974	160	99.8	16787941
Goa	Average Mover	57.34	25044	541	99.8	1458545
Gujarat	Top Achievers	97.96	10789	22453.29	96	60439692
Haryana	Top Achievers	98.07	12904	4578.48	98.8	25351462
Himachal Pradesh	Fast Mover	87.9	9792	4022.48	99.5	6864602
Jharkhand	Top Achievers	97.99	4154	4882.64	80.1	32988134
Karnataka	Top Achievers	97.4	11524	27068.29	97.8	61095297
Kerala	Slow Mover	44.79	11153	6152.52	99.2	33406061
Madhya Pradesh	Top Achievers	97.31	4973	15685.57	89.9	72626809
Maharashtra	Achievers	92.71	10477	56486.44	92.5	112374333
Manipur	Very High Aspirers	0.27	3824	2625.74	92.4	2570390
Meghalaya	Very High Aspirers	0	4865	2060.36	91.4	2966889
Mizoram	High Aspirers	3.63	9215	1881	95.9	1097206
Nagaland	Aspirers	14.04	6387	2047.09	97	1978502
Odisha	Achievers	92.09	5200	8298.52	85.5	41974219
Puducherry	Aspirers	15.65	12047	102.03	99.6	1247953
Punjab	Average Mover	53.92	8470	3613.15	99.6	27743338
Rajasthan	Top Achievers	95.69	6044	18262.2	91	68548437
Sikkim	Very High Aspirers	0.13	19543	488	99.4	610577
Tamil Nadu	Achievers	90.68	10587	15770.14	98.8	72147030

Telangana	Top Achievers	98.33	11174	8859.07	98.3	35003674
Tripura	Aspirers	22.27	6180	1266	92.7	3673917
Uttar Pradesh	Achievers	92.87	3635	15739	70.9	199812342
Uttarakhand	Achievers	94.21	10860	6152.92	97.5	10086292
West Bengal	Achievers	94.7	5983	7414.8	93.7	91276115

The visual analysis is as follows:

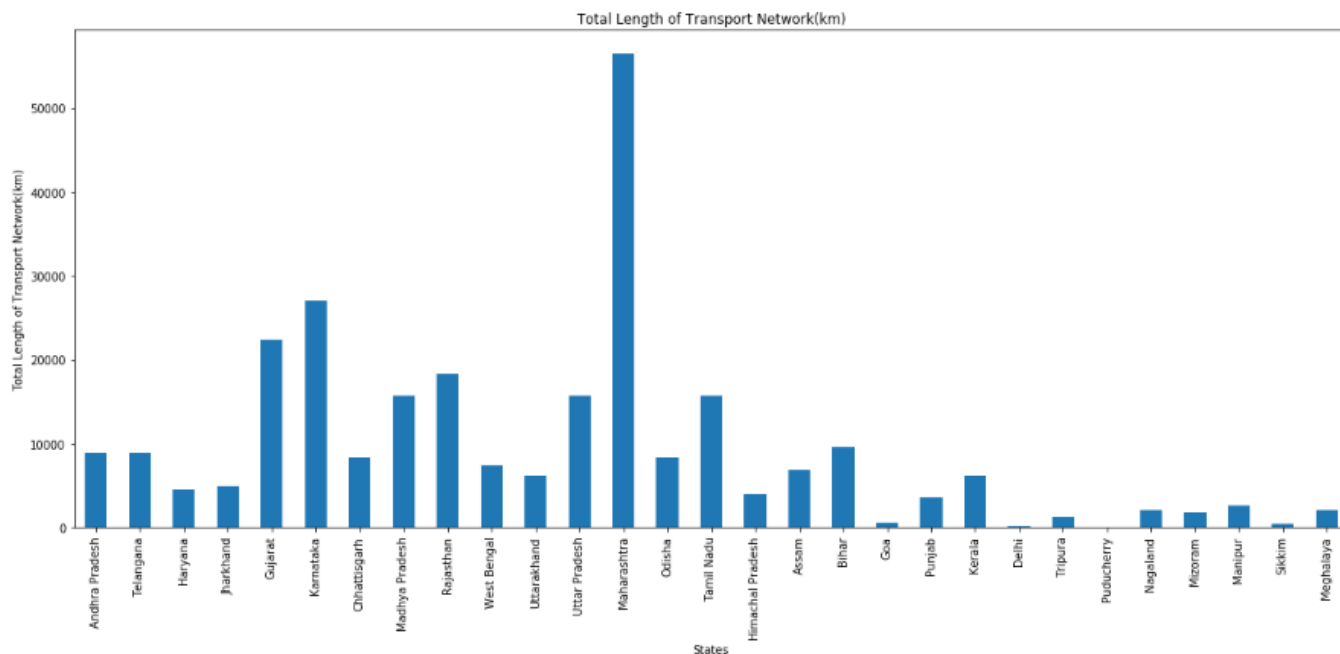Ease of doing business of various states:

Andhra Pradesh leads here.
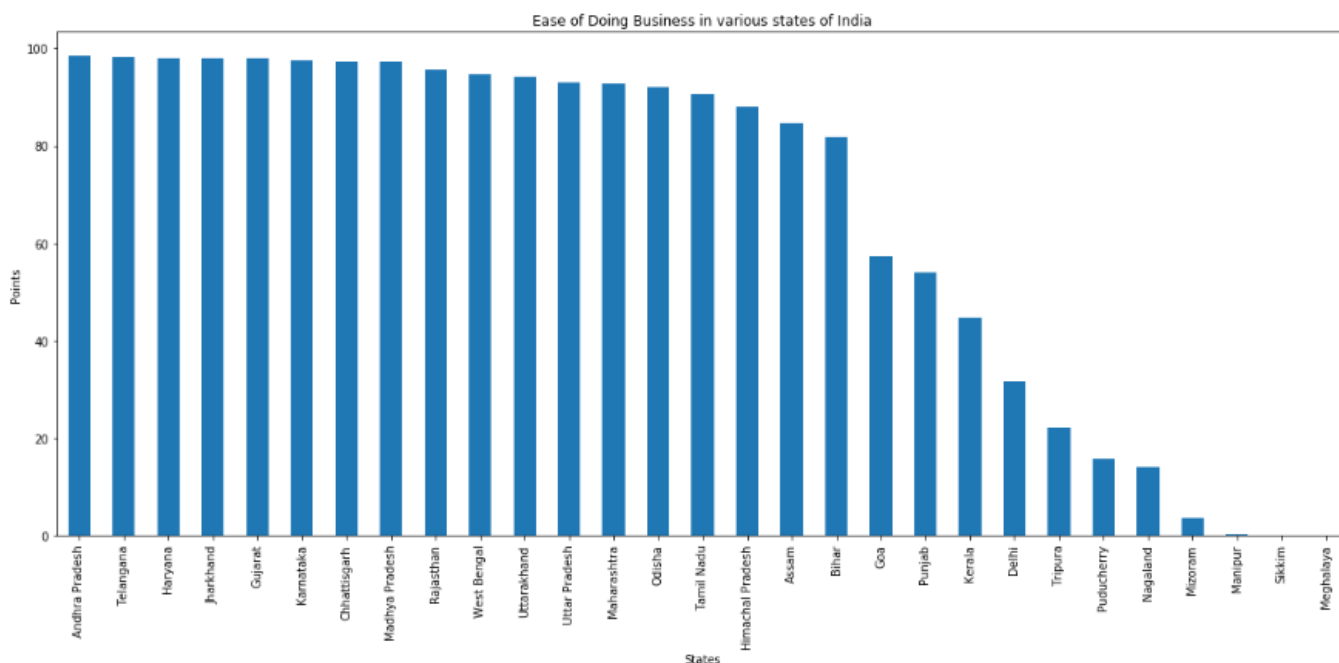
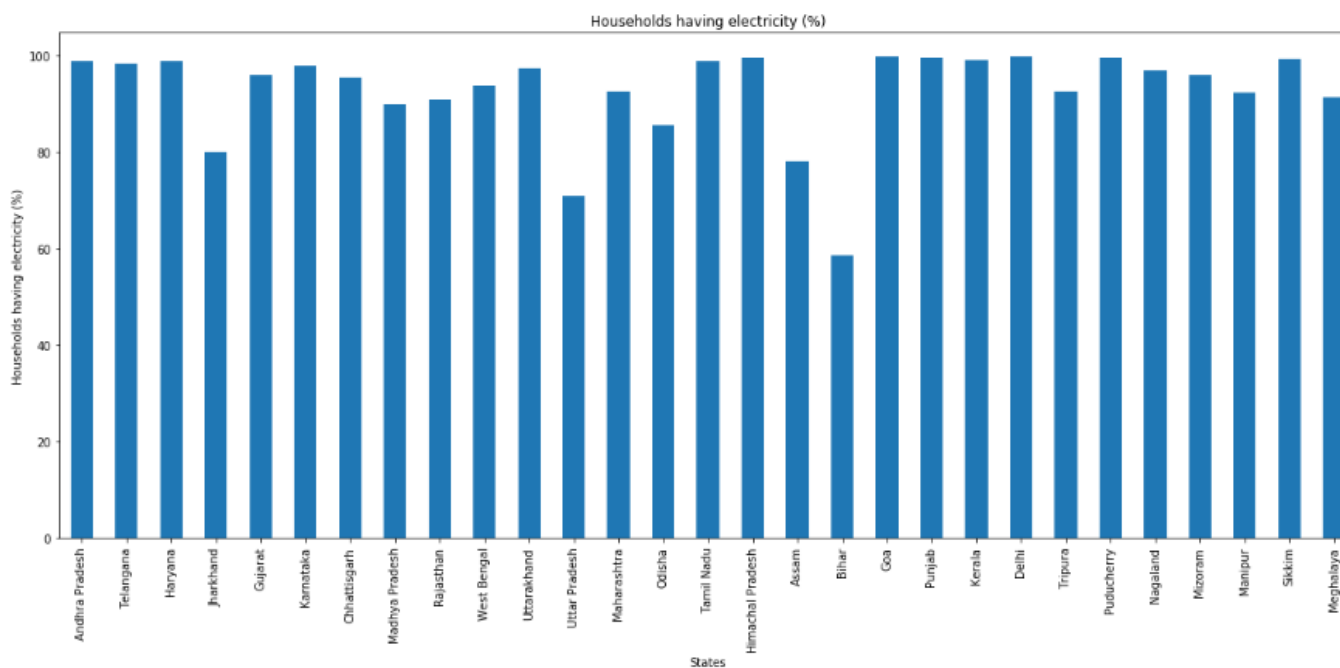Net State Domestic Product (NSDP) Per Capita of various states in US Dollars:
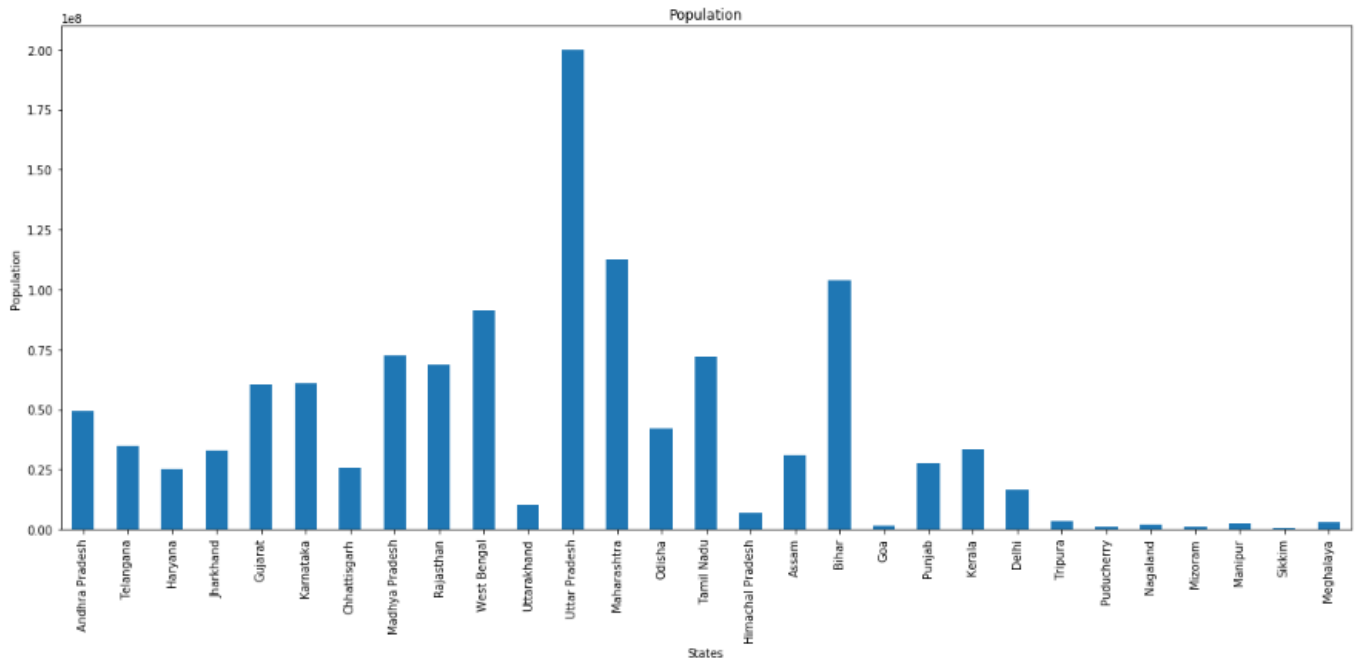
Goa leads here.
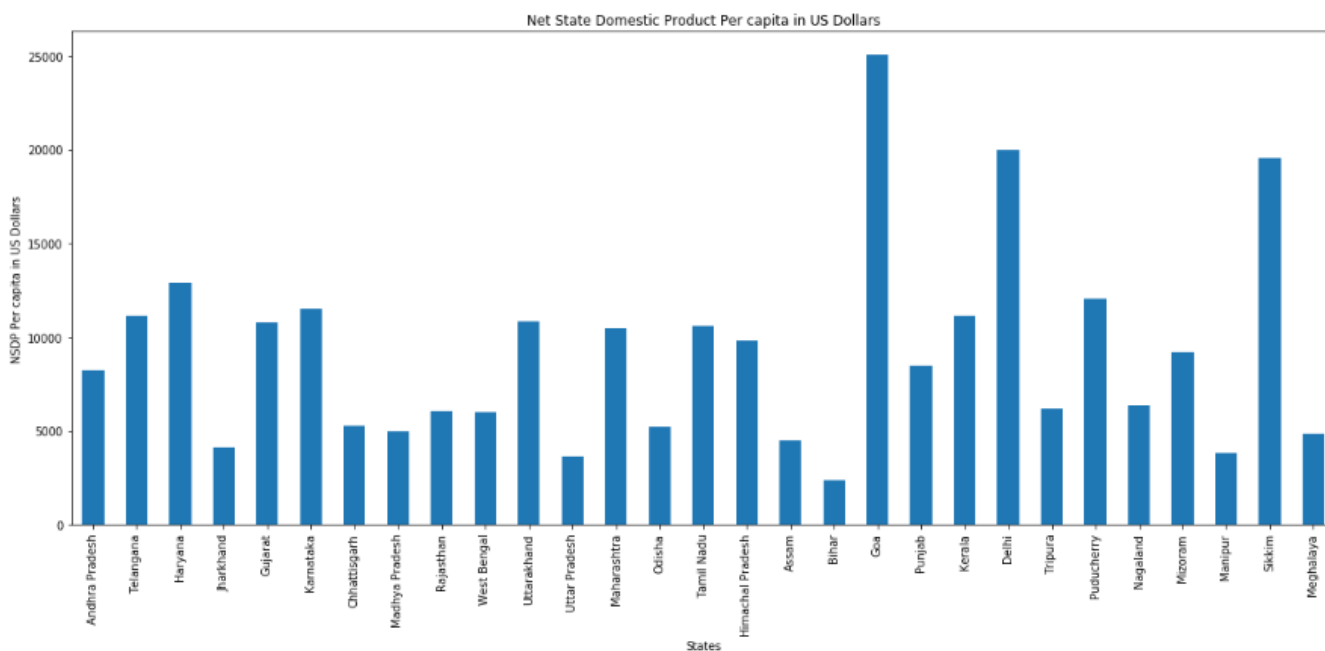
Total Length of Road Transport Network (km) spread across various states including National and State Highways:
Maharashtra leads here.

Households having electricity as a percentage of state population of various states:
Delhi and Goa jointly heads here.

Population of various states:
Uttar Pradesh leads here

Results:

Below table shows the statistical properties of each metric chosen along with their normalized values:

Columns	count	mean	std	min	0.25	0.5	0.75	max
States	29	-	-	-	-	-	-	-
Ease of Doing Business Medal	-	-	-	-	-	-	-	-
Ease of Doing Business Points	29	66.69	37.95	0.00	31.60	90.68	97.31	98.42
Normalized_Points	29	0.68	0.39	0.00	0.32	0.92	0.99	1.00
NSDP Per capita in US Dollars	29	9145.97	5273.49	2395.00	5200.00	8470.00	11153.00	25044.00
Normalized_NSDP	29	0.30	0.23	0.00	0.12	0.27	0.39	1.00
Total Length of Transport Network(km)	29	9314.93	11410.11	102.03	2060.36	6152.92	9535.79	56486.44
Normalized_Length(km)	29	0.16	0.20	0.00	0.03	0.11	0.17	1.00
Households having electricity (%)	29	92.70	9.71	58.60	91.40	96.00	98.80	99.80
Normalized_Electricity	29	0.83	0.24	0.00	0.80	0.91	0.98	1.00
Population	29	41191620	44815590	610577	3673917	31205580	61095300	199812300
Normalized_Population	29	0.20	0.22	0.00	0.02	0.15	0.30	1.00
Normalized_sum	29	2.17	0.67	0.94	1.70	2.29	2.59	3.68
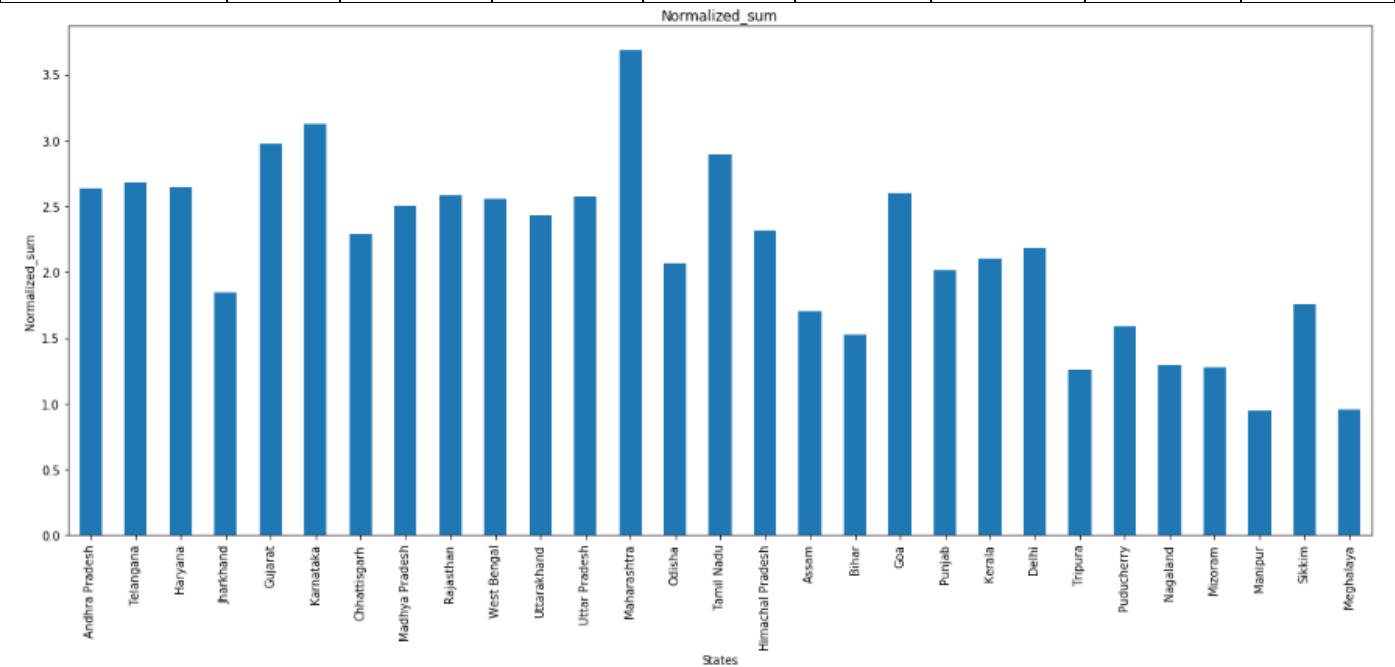
Normalized_sum

Now we have to find the most favourable state which can be decided to open the new megastore. I have given equal weightage to all the metrics and added all the normalized values to get the Normalized_sum for each state of India.

Above bar graph shows the normalized_sum values for various states in India.

We can clearly see that Maharashtra leads with a score of 3.682694 which is followed by Karnataka with a score of 3.126050.

Selecting Maharashtra will mean opening the megastore in Mumbai (State Capital) whereas selecting Karnataka will mean opening the megastore in Bangalore (State Capital).

I have also used Foursquare to find the nearby venues in Mumbai which will make Mumbai even more worth of setting up the store.

Below is the screenshot of the map:
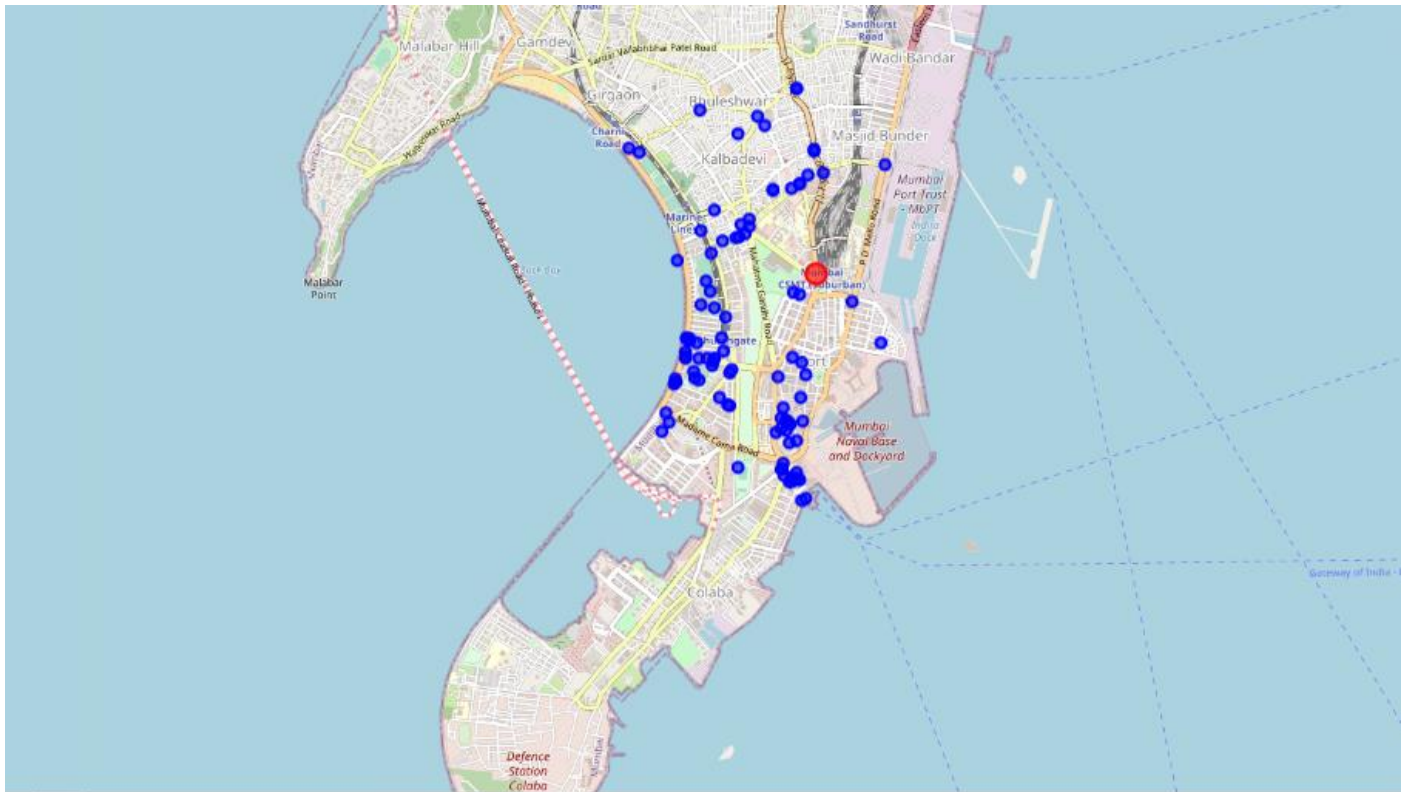
Discussion:

Based on the chosen metrics and venues analysis I will strongly recommend to open the megastore in Mumbai as it not only clearly identified from our analysis but Mumbai is also the financial capital of India.

Conclusion:

We had to decide which state would be best fit for the SunDas company's new biggest megastore in India. We first decided on the metrics on which we are going to evaluate various states and found out the metrics like Ease of doing business, per capita domestic product, population, electricity accessibility and network of transport. From our analysis with compared all the states and found out that Maharashtra is the best state for our new venture. And based on our analysis and discussion Mumbai (Maharashtra) is the recommended location for SunDas First and Biggest Megastore in India.