July 13, 2019

Analysis of Indian demographics and suggestion of a locality with maximum number of Indian Restaurants near Bangalore

Geetha Prakash

Why this project?

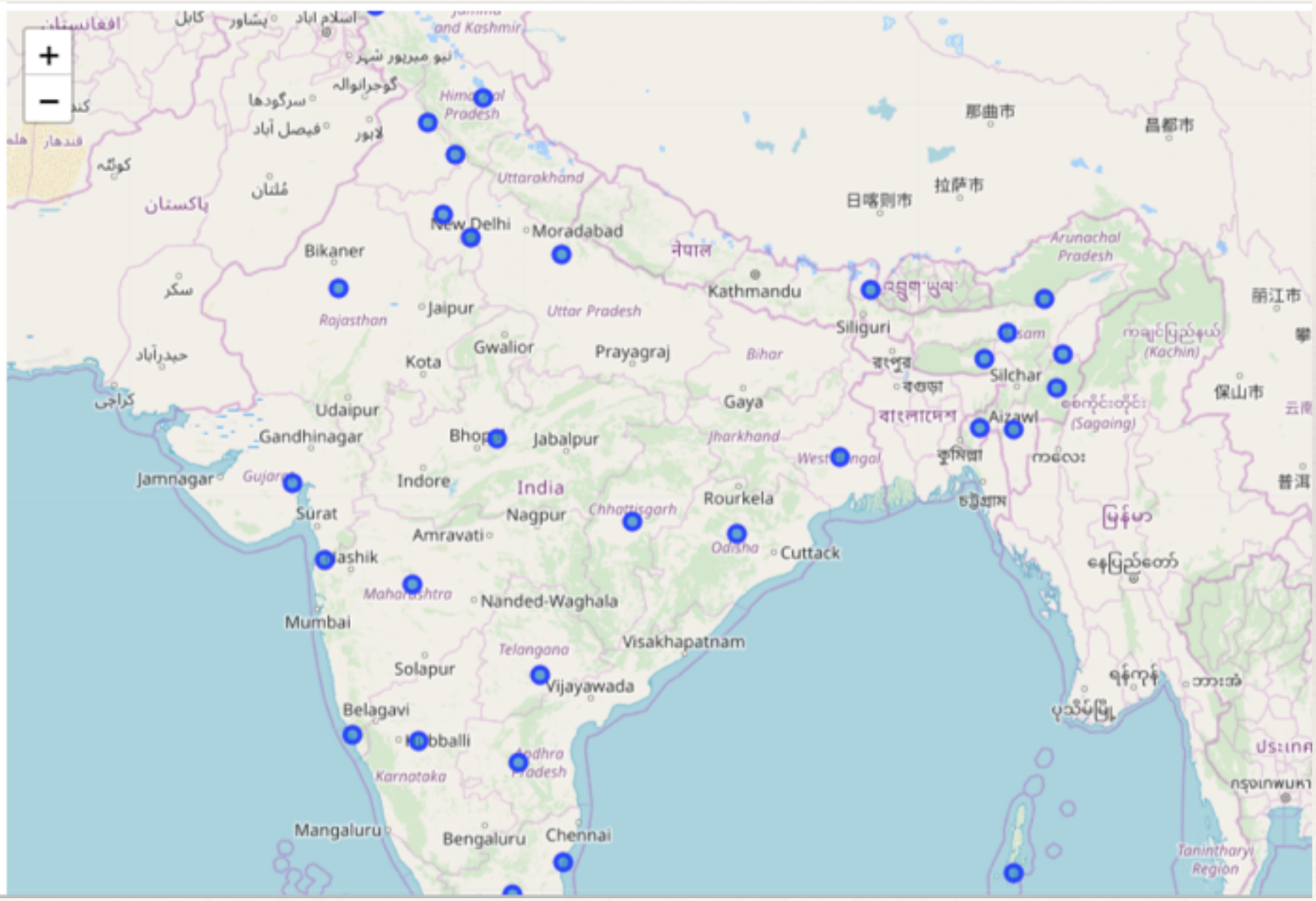
- Study of demographics provides information related to the country and will help in development and support
- Study of Women entrepreneurs and number of crimes in a state and its prediction will help economic development
- Suggestions of localities with eateries of a particular kind will help locals and tourists.

Data collection and cleaning

- Data related to women literacy, male literacy, women entrepreneurs, crimes etc. from Census data of India and other Govt. resources.
- Wikipages for Latitude and Longitudes of cities in India
- Wikipages for Wards of Bangalore and co-ordinates of these wards

Indian States and some salient cities in different states

[45]:



Sample dataframes

[48]:

	States	Total_Area	Rural_Area	Urban_Area	total _population	Rural_population	Urban_population	Male_population	Female_Population	Women_Entrepren
0	Andaman and Nicobar Island (UT)	8211.08	37.92	8249.00	380581	143488	237093	126287	110806	
1	Andhra Pradesh	160205.00	4119.27	156085.73	49386799	14610410	34776389	24738068	24648731	
2	Arunachal Pradesh	83743.00	0.00	0.00	1383727	1066358	317369	713912	669815	
3	Assam	78438.00	1259.88	77178.12	31205576	26807034	4398542	15939443	15266133	
4	Bihar	94163.00	91838.28	2324.72	104099452	92341436	11758016	54278157	49821295	

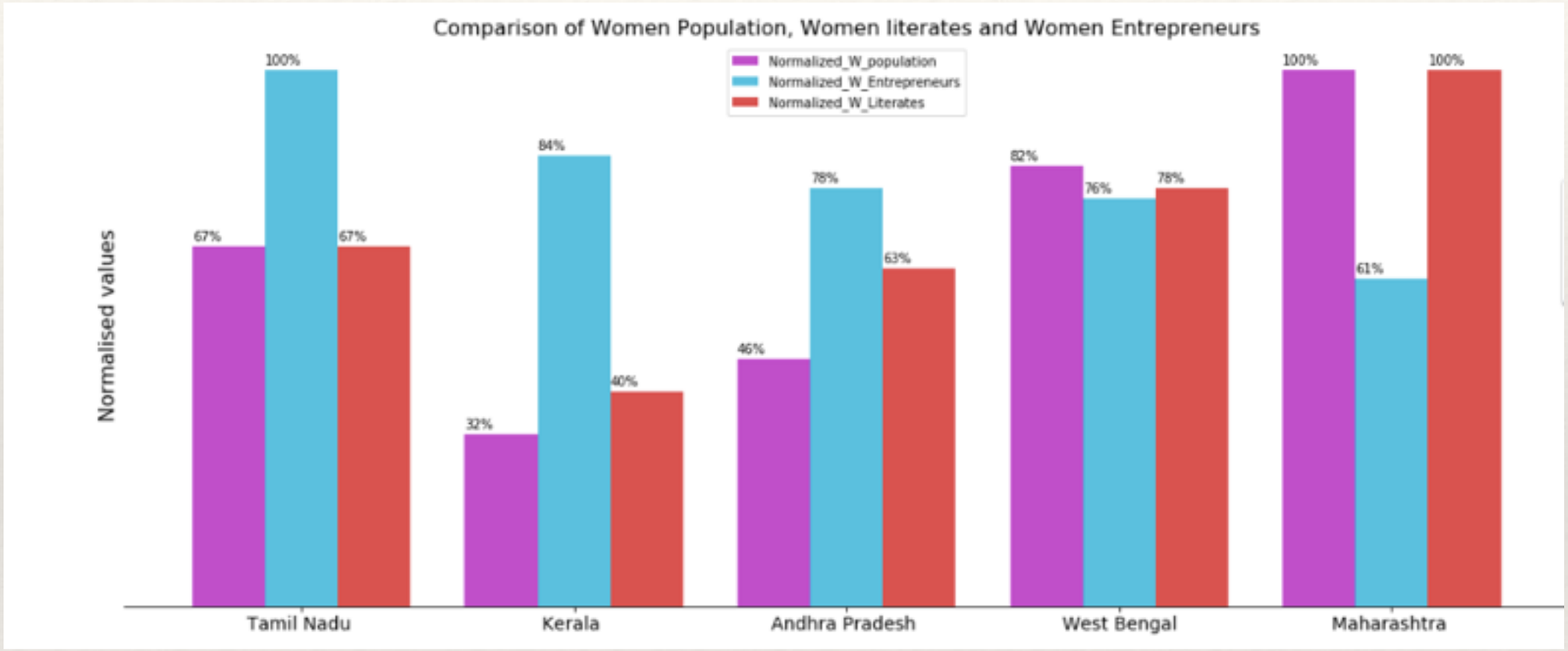
Complete data set

[12]:

	States	total _population	Male_population	Female_Population	Women_Entrepreneurship	Female_Literates	Sex_Ratio
29	Tamil Nadu	72147030	36137975	36009055	1087609	24098521	996
17	Kerala	33406061	16027412	17378649	913917	14478339	1064
1	Andhra Pradesh	49386799	24738068	24648731	849912	22678728	996
34	West Bengal	91276115	46809027	44467088	831337	28106397	953
19	Maharashtra	112374333	58243056	54131277	664300	36218184	929

Dataset after sorting with states having maximum number of Women entrepreneurs

Women Entrepreneurship

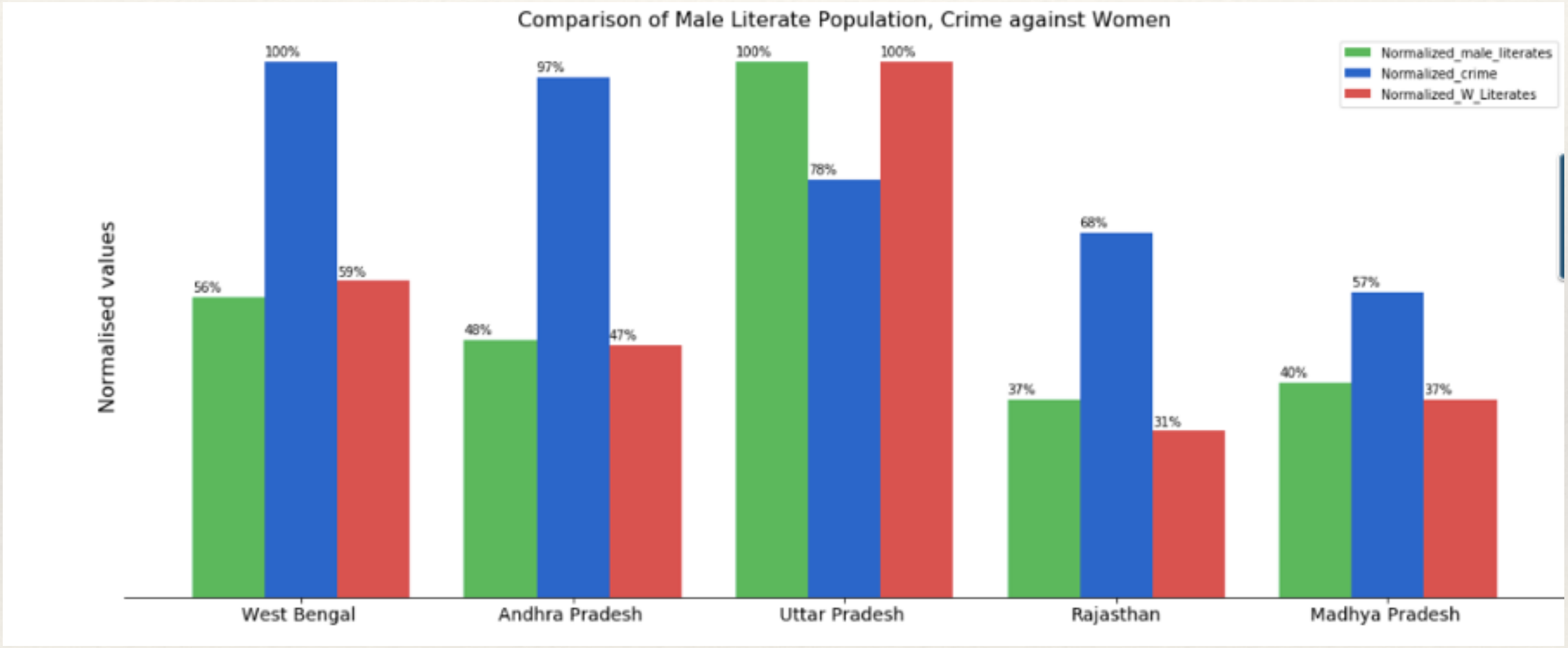


Comparison of Women literates, Women Entrepreneurs and Total women Population using Bar Graph

Regression analysis to predict state with max number of entrepreneurship influenced by multiple parameters

```
Intercept:
 1.195379976402363
Coefficients:
 [ 0.65894291 -1.19012735]
Normalized value of Predicted Women_Entrepreneurs:
 [0.66419553]
Predicted value of women entrepreneurs  [722385.03694365]
                            OLS Regression Results
==============================================================================
Dep. Variable:     Normalized_W_Entrepreneurs   R-squared:                       0.497
Model:                                    OLS   Adj. R-squared:                 -0.006
Method:                         Least Squares   F-statistic:                     0.9889
Date:                        Sat, 13 Jul 2019   Prob (F-statistic):              0.503
Time:                                09:06:19   Log-Likelihood:                 4.9722
No. Observations:                           5   AIC:                            -3.944
Df Residuals:                               2   BIC:                            -5.116
Df Model:                                   2
Covariance Type:                    nonrobust
==========================================================================================
                             coef    std err          t      P>|t|      [0.025      0.975]
------------------------------------------------------------------------------------------
const                      1.1954      0.294      4.066      0.056      -0.070       2.460
Normalized_W_population    0.6589      0.989      0.666      0.574      -3.598       4.916
Normalized_W_Literates    -1.1901      1.230     -0.968      0.435      -6.481       4.101
==============================================================================
Omnibus:                        nan   Durbin-Watson:                   2.093
Prob(Omnibus):                  nan   Jarque-Bera (JB):                0.746
Skew:                         0.883   Prob(JB):                        0.689
Kurtosis:                     2.320   Cond. No.                         34.9
==============================================================================
```

Comparison for analysis -if literacy rate influences number of crimes



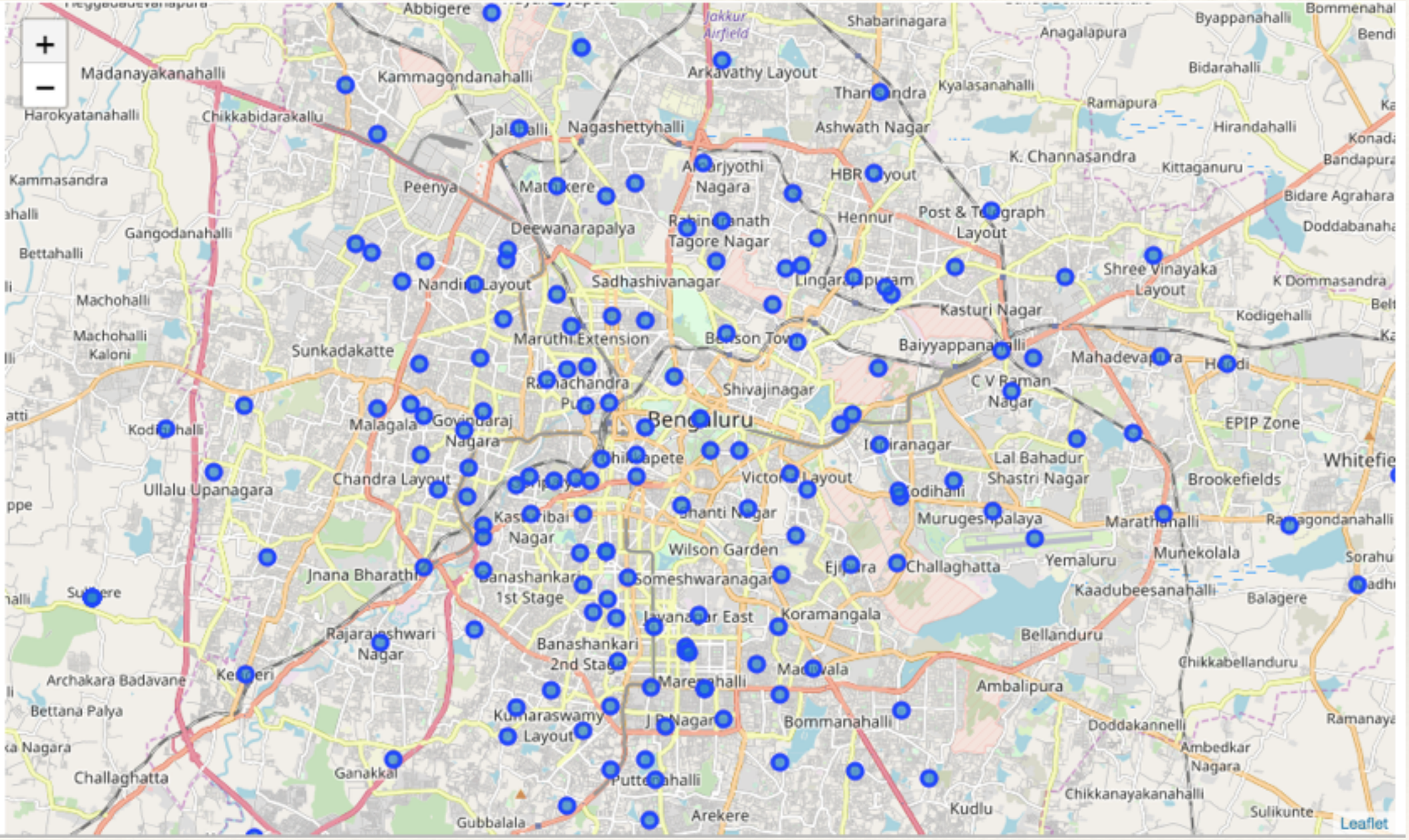
Regression analysis to predict state with reduced number of crimes influenced by literacy rates

```
Intercept:
 0.958857610791281
Coefficients:
 [ 4.69880564 -4.86441833]
Normalized value of Crime:
 [0.79324492]
Number of crimes predicted [23109.60427701]
                            OLS Regression Results
==============================================================================
Dep. Variable:       Normalized_crime   R-squared:                       0.588
Model:                            OLS   Adj. R-squared:                  0.176
Method:                 Least Squares   F-statistic:                     1.426
Date:                Sat, 13 Jul 2019   Prob (F-statistic):              0.412
Time:                        11:54:00   Log-Likelihood:                4.1214
No. Observations:                   5   AIC:                            -2.243
Df Residuals:                       2   BIC:                            -3.415
Df Model:                           2
Covariance Type:            nonrobust
================================================================================================
                                   coef    std err          t      P>|t|      [0.025      0.975]
------------------------------------------------------------------------------------------------
const                            0.9589      0.247      3.882      0.060      -0.104       2.022
Normalized_W_Literates           4.6988      2.879      1.632      0.244      -7.687      17.084
Normalized_male_literates       -4.8644      3.085     -1.577      0.256     -18.137       8.408
==============================================================================
Omnibus:                        nan   Durbin-Watson:                   1.958
Prob(Omnibus):                  nan   Jarque-Bera (JB):                0.327
Skew:                        -0.523   Prob(JB):                        0.849
Kurtosis:                     2.310   Cond. No.                         72.4
==============================================================================

Warnings:
[1] Standard Errors assume that the covariance matrix of the errors is correctly specified.
```

Wards in Bangalore

[5]:



Sample datasets-wards and co-ordinates

[4]:

	Ward_name	Ward_number_y	Latitude	Longitude
0	Kempegowda	1	13.109018	77.601900
1	Chowdeshwari	2	12.925190	77.588020
2	Attur	3	11.599586	78.596362
3	Yelahanka Satellite	4	13.095231	77.594296
4	Jakkur	5	13.078474	77.606894
5	Thanisandra	6	13.054713	77.633926
6	Byatarayanapura	7	13.062074	77.596392
7	Kodigehalli	8	12.976657	77.464564
8	Vidyaranyapura	9	13.076641	77.557731
9	Doddabommasandra	10	13.064967	77.562966
10	Kuvempu Nagar	11	13.073193	77.541713
11	Shettyhalli	12	12.884645	76.020329
12	Mallasandra	13	13.215966	78.159144
13	Bagalagunte	14	13.056476	77.507324
14	T-Dasarahalli	15	13.045141	77.514789

Sample datasets-wards with venues

[16]:

	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Kempegowda	13.109018	77.601900	Sri Raghavendra Food Line	13.111306	77.605188	Indian Restaurant
1	Chowdeshwari	12.925190	77.588020	1947	12.927642	77.586216	Indian Restaurant
2	Chowdeshwari	12.925190	77.588020	Meghana Foods	12.926237	77.584584	Indian Restaurant
3	Chowdeshwari	12.925190	77.588020	The Sofraah	12.923417	77.585262	Indian Restaurant
4	Chowdeshwari	12.925190	77.588020	Hot Chips	12.928670	77.585349	Indian Restaurant
5	Attur	11.599586	78.596362	Hotel Saravana Bhavan	11.599601	78.597274	Indian Restaurant
6	Byatarayanapura	13.062074	77.596392	Sanjay Dhaba	13.058612	77.593767	Indian Restaurant
7	Byatarayanapura	13.062074	77.596392	Swathi Gardenia	13.059108	77.593184	Indian Restaurant
8	Byatarayanapura	13.062074	77.596392	Bhagini Express	13.062840	77.592754	Indian Restaurant

Suggested locations with max number of Indian restaurants

```
[17]: Neighborhood
      Jayangar                9
      Basavangudi             9
      Maruthiseva Nagar       8
      Hosathippasandra        8
      Gandhi Nagar            8
      dtype: int64
```

Conclusions-Demographics

- Prediction is made as to which state would be the most cohesive state for a women entrepreneur . This is done by using Multivariate regression with the influencing parameters being the women population and the number of women literates.
- Analysis is also done to check which state has the maximum number of crimes and pre- diction is made using Multivariate regression analysis with male and female literacy rates being the factors of influence.

Conclusions-Eateries

- Suggestions for localities near Bangalore with maximum number of Indian restaurants.

References for data

- http://www.censusindia.gov.in/2011census/populationenumeration.html
- http://censusindia.gov.in/CensusAndYou/literacyandlevelofeducation.aspx
- http://districts.nic.in/districts.php
- http://www.mospi.gov.in/statistical-year-book-india/2017/171
- https://data.gov.in/catalogsv2format=json&offset=0&limit=9&sort%5Bcreated%5D=desc
- http://www.indiaenvironmentportal.org.in/files/file/Crimes%20in%20India%20Statistics-2014.pdf
- http://ncrb.gov.in/StatPublications/CII/CII2016/pdfs/NEWPDFs/Crime%20in%20India%20-%202016%20Complete%20PDF%20291117.pdf
- https://foursquare.com/explore?near=Bangalore,%20Karn%C4%81taka&cat=food https://
- en.wikipedia.org/wiki/List of wards in Bangalore