

Characteristic Vulnerabilities of Districts of Andhra Pradesh



J. Rajendra Prasad, S. Sai Kumar, T. Santhi Sri

Abstract: Finding out the vulnerability of each district in the state of Andhra Pradesh for determining which districts are at risk and which districts are in safe for livelihood. Based on nine important factors such as crop yield, employee, literacy, livestock, population, rainfall, roads, and social along with sub factors associated with them we can obtain efficient results. Based on these we can determine the vulnerability scores for each district and find out best and worst districts. Further we can develop the vulnerable district by using suitable measures. Also we must find out the most impacting attributes on the final score so that those attributes can also be considered for reducing the risk of livelihood associated with a district.

Keywords: Vulnerability, Yield, Rainfall, Districts.

I. INTRODUCTION

Determining the vulnerability of districts is useful for finding out suitable livelihood districts and also for development of a district. Vulnerability of a district can be identified based on nine factors such as crop yield, employee, literacy, livestock, population, rainfall, roads, and social. It requires analyzing each district based on all factors and determining which districts are vulnerable. We calculate the vulnerability using statistical methods. It is also necessary to consider several sub attributes for efficient results. Thereby we can determine the most vulnerable districts and take necessary precautions to reduce the risk of livelihood. The existing system consists of analyzing the district based on individual attributes and determines its vulnerability over a single attribute. Using this developments take place to recover the district from the vulnerability. The existing system only deals with basic level of information.

Disadvantages:

The existing system results in the following drawbacks:

- Less Efficiency
- Inaccurate
- Expensive
- Takes more time

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II. PROPOSED WORK

Our goal is to find an analytical framework to characterize vulnerability of rural livelihood systems on a district scale is proposed. Nine types of attributes namely, crop yield data, employee data, literacy data, livestock data, population data, rainfall data, roads data, social data are used to characterize vulnerabilities. The attributes are measured at different scales and in different units. The analysis is carried out in three stages. In the first stage, the data of the attributes will be normalized and we calculate average to find out the score of that particular attribute and we come to know which district stands at top and which district stands at low. In the second stage, we calculate the overall score of each district based on 9 attributes scores by calculating overall average for each district. Based on these scores we can identify which district is more vulnerable and which district is least vulnerable. In the third stage, we construct correlation matrix based on which we can find at what scale does each attribute effect the final score, so that we find out the most effecting attributes that decide the vulnerability of district. Later we can send these attributes and scores to government to develop the vulnerable districts.

Advantages:

The proposed system results in the following advantages:

- Fast and accurate results.
- Considers several attributes along with sub attributes.
- Visualization.
- Finds most effecting attributes based on correlation.

III. APPROACH

Load Dataset: Initially the data set contained in excel sheet must be loaded into the module. Operations will be performed on loaded data set and results will be obtained.

Data Preprocessing: The data loaded must be processed to remove redundancy or missing data. Data contains multiple attributes in different formats and all these must be converted into single format so that analyzing and processing will be easy. Some fields may be missing and these must be filled for accurate results. Finally entire processed data must be converted into a single format so that machine can understand and process data efficiently

Analyze Multiple Attributes About States: All the attributes are analyzed as per requirement based on correlation between the attributes and the threshold values given.

Determine The Vulnerability Of Each District: After analyzing the attributes, vulnerability scores for each district will be obtained and based on these scores, best district will be predicted.

IV. PYCHARM

PyCharm is the most popular IDE for Python, and includes great features such as excellent code completion and inspection with advanced debugger and support for web programming and various frameworks. PyCharm is created by Czech company, Jet brains which focusses on creating integrated development environment for various web development languages like JavaScript and PHP. PyCharm offers some of the best features to its users and developers in the following aspects

- Code completion and inspection.
- Advanced debugging.
- Support for web programming and frameworks such as Django and Flask.

Features of PyCharm :

Besides, a developer will find PyCharm comfortable to work with because of the features mentioned below –

Code Completion

PyCharm enables smoother code completion whether it is for built in or for an external package.

SQLAlchemy as Debugger

You can set a breakpoint, pause in the debugger and can see the SQL representation of the user expression for SQL Language code.

Git Visualization in Editor

When coding in Python, queries are normal for a developer. You can check the last commit easily in PyCharm as it has the blue sections that can define the difference between the last commit and the current one.

Code Coverage in Editor

You can run .py files outside PyCharm Editor as well marking it as code coverage details elsewhere in the project tree, in the summary section etc.

Package Management

All the installed packages are displayed with proper visual representation. This includes list of installed packages and the ability to search and add new packages.

Local History

Local History is always keeping track of the changes in a way that complements like Git. Local history in PyCharm gives complete details of what is needed to rollback and what is to be added.

Refactoring

Refactoring is the process of renaming one or more files at a time and PyCharm includes various shortcuts for a smooth refactoring process.

V. DATASETS

Sl.No.	District	PULSES_AREA in Hects.	PULSES_PROD in Tonnes	SUNFLOWER in Hects	SUNFLOWER PRODUCTION in Tonnes	SUNFLOWER YIELD in Kgs	ONIONS AREA in Hects	ONIONS YIELD in Kgs	COTTON AREA	COTTON PRODUCT ION	COTTON YIELD in Lint
1	Srikakulam	91677	48349	639	600	764	289	22337	7478	27390	623
2	Vizianagaram	46541	28538	0	0	764	207	22756	13630	35550	418
3	Visakhapatnam	24757	18986	99	93	764	148	22716	1474	2000	231
4	East Godavari	45331	34018	114	107	764	52	16468	16364	35740	371
5	West Godavari	47233	37622	118	111	764	0	0	4525	13985	525
6	Krishna	162377	189198	4	4	764	0	23681	48357	195380	688
7	Guntur	141296	176257	0	0	0	122	22693	183735	802213	742
8	Prakasam	227111	188415	395	395	1059	209	24105	35572	85473	408
9	S.P.S.Nellore	27229	24654	336	365	1201	5	23681	4827	9486	334
10	Y.S.R	114638	79086	3279	6357	1281	4356	12782	24803	17976	123
11	Kurnool	283996	304881	1579	1562	938	17021	17729	259225	733779	481
12	Ananthapuramu	161355	69810	1951	985	383	1752	23398	45552	129120	482
13	Chittoor	31959	19556	632	1091	1276	557	19524	497	1328	455

Fig 5.1: Crop Yield Dataset

Sl.No.	District	AVG_TOTAL WORKING PEOPLE IN POPULATION	AVG_AGRICULT URAL WORKING SET	AVG_HOUSE HOLD WORKERS	AVG_NON- AGRICULTURAL WORKING CLAS S	AVG Factories	AVG Workers yees	AVG Empl o	AVG Gaz etted	AVG Non- Gazetted
1	Srikakulam	47.73	67.1	2.7	32.9	665	19505	22734	1749	18389
2	Vizianagaram	49.39	66.4	2.4	33.6	278	14803	17374	1532	17984
3	Visakhapatnam	44.05	47.7	2.9	52.3	845	69007	88216	2617	24230
4	East Godavari	41.04	62.2	2.7	37.8	1288	36615	46015	3088	32216
5	West Godavari	45.26	69.1	1.9	30.9	937	41527	47074	1757	25152
6	Krishna	45.36	56.5	2.4	43.5	1016	39477	50892	2331	28627
7	Guntur	48.73	64.2	2	35.8	2586	77456	93247	2525	27862
8	Prakasam	50.05	68.7	2.5	31.3	1399	21439	27376	1856	23186
9	S.P.S.Nellore	44.36	60.2	2.7	39.8	579	28379	33753	2897	11963
10	Y.S.R	45.81	59.5	4.2	40.5	730	12127	14783	2675	21865
11	Kurnool	50.07	66.4	3	33.6	1045	17139	21342	2817	25288
12	Ananthapuramu	49.89	63.5	5.2	36.5	618	23249	27826	2527	24474
13	Chittoor	46.32	61.2	3	38.8	977	32395	40214	3660	31015

Fig 5.2: Employee Dataset



Sl.No.	District	INCOME - GVA in crores
1	Srikakulam	27982
2	Vizianagaram	25955
3	Visakhapatnam	81993
4	East Godavari	75070
5	West Godavari	71268
6	Krishna	88829
7	Guntur	72107
8	Prakasam	46994
9	S.P.S.Nellore	48353
10	Y.S.R	37578
11	Kurnool	50037
12	Ananthapuramu	50592
13	Chittoor	58950

Fig 5.3: Income Dataset

Sl.No.	District	AVG_Male_LITERACY_RATE	AVG_Female_LITERACY_RATE	AVG_TOTAL_LITERACY_RATE
1	Srikakulam	71.61	52.08	61.74
2	Vizianagaram	68.15	49.87	58.89
3	Visakhapatnam	74.56	59.34	66.91
4	East Godavari	74.1	66.95	70.5
5	West Godavari	77.65	71.01	74.32
6	Krishna	78.3	69.18	73.74
7	Guntur	74.79	60.09	67.4
8	Prakasam	72.92	53.11	63.08
9	S.P.S.Nellore	75.74	61.99	68.9
10	Y.S.R	77.78	56.77	67.3
11	Kurnool	70.1	49.78	59.97
12	Ananthapuramu	73.02	53.97	63.57
13	Chittoor	79.83	63.28	71.53

Fig 5.4: Literacy Dataset

Sl.No.	District	TOTAL LIVE STOCK	TOTAL POULTRY	TOTAL MEAT in '000 MT's
1	Srikakulam	1708	2726	8.19
2	Vizianagaram	1222	3538	11.1
3	Visakhapatnam	1300	5715	15.19
4	East Godavari	1589	13988	5.09
5	West Godavari	1449	16207	5.18
6	Krishna	1445	11752	19.88
7	Guntur	1962	6976	16.54
8	Prakasam	2868	1238	61.83
9	S.P.S.Nellore	2149	1491	20.91
10	Y.S.R	2477	1563	21
11	Kurnool	2854	1201	74.68
12	Ananthapuramu	5682	1589	46.31
13	Chittoor	2698	12601	12.8

Fig 5.5: Livestock Dataset

Sl.No.	District	Male	Female	Total_ POPLATION	AVG_Decadal Growth Rate of Population 2001-2011	AVG_Sex Ratio (Females per 1000 Males)	AVG_PERCENTAGE_TO_TOTAL_STATE POPULATION
1	Srikakulam	1342	1361	2703	6.52	1015	5.45
2	Vizianagaram	1161	1183	2344	4.23	1019	4.73
3	Visakhapatnam	2139	2152	4291	11.96	1006	8.66
4	East Godavari	2633	2652	5285	5.26	1007	10.66
5	West Godavari	1994	2002	3996	3.58	1004	8.06
6	Krishna	2267	2250	4517	7.87	992	9.11
7	Guntur	2441	2447	4888	9.47	1003	9.86
8	Prakasam	1715	1683	3398	11.05	981	6.85
9	S.P.S.Nellore	1493	1471	2964	11.05	985	5.98
10	Y.S.R	1452	1431	2883	10.79	985	5.82
11	Kurnool	2039	2014	4053	14.85	988	8.18
12	Ananthapuramu	2064	2017	4081	12.1	977	8.23
13	Chittoor	2090	2084	4174	11.43	997	8.42

Fig 5.6: Population Dataset

Sl.No.	District	Actual	Normal
1	Srikakulam	1053.4	1161.6
2	Vizianagaram	1071.5	1130.7
3	Visakhapatnam	1098.4	1202.3
4	East Godavari	904.3	1217.6
5	West Godavari	873.1	1153
6	Krishna	804	1033.5
7	Guntur	654.1	853
8	Prakasam	600.2	871.5
9	S.P.S.Nellore	816.4	1080.4
10	Y.S.R	783.1	699.6
11	Kurnool	678.9	670.5
12	Ananthapuramu	646.7	552.3
13	Chittoor	978	933.9

Fig 5.7: Rainfall Dataset

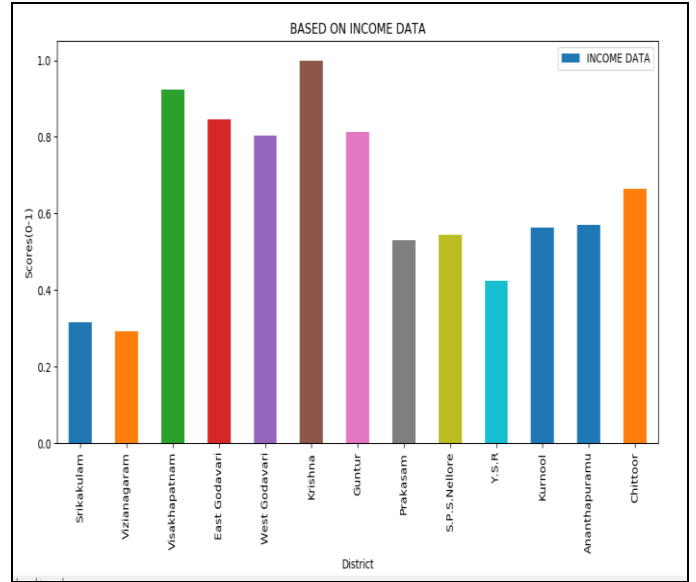
Sl.No.	District	LENGTH OF ROADS IN KMS
1	Srikakulam	6283
2	Vizianagaram	5889
3	Visakhapatnam	8924
4	East Godavari	11615
5	West Godavari	8466
6	Krishna	8089
7	Guntur	11094
8	Prakasam	11950
9	S.P.S.Nellore	8338
10	Y.S.R	12381
11	Kurnool	11232
12	Ananthapuramu	16098
13	Chittoor	12495

Fig 5.8: Roads Dataset

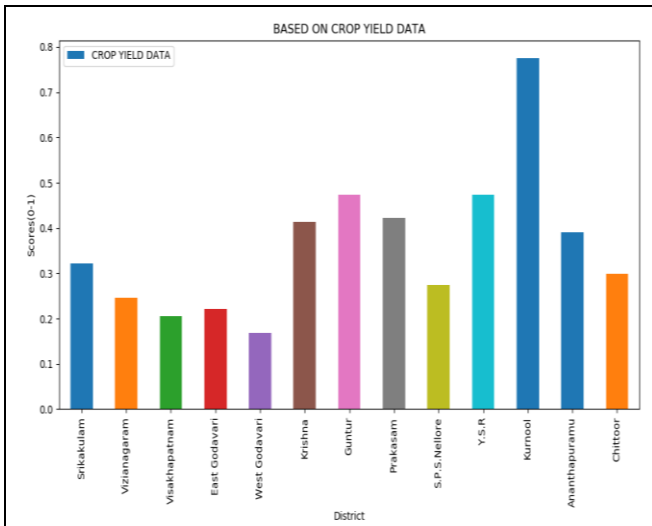
Sl.No.	District	AVG_Birth Rate	AVG_Mortality Rate	AVG_NO_OF_GRADUATES	AVG_NO_OF_GENERAL_HOSPITALS	AVG_NO_OF_TOURIST_ARRIVALS
1	Srikakulam	13.5	10	123065	19	21313652
2	Vizianagaram	12.5	8	110341	13	5511447
3	Visakhapatnam	14.5	12	340146	16	20644523
4	East Godavari	13.5	16	289504	32	12815162
5	West Godavari	11.1	4	212801	18	9740978
6	Krishna	14.1	9	313132	17	17667176
7	Guntur	12.9	16	324762	21	12174447
8	Prakasam	14.5	6	181620	18	3711895
9	S.P.S.Nellore	12.9	5	180427	18	3689777
10	Y.S.R	16.8	11	180011	15	4966547
11	Kurmoor	14.2	24	201842	21	7037573
12	Ananthapuramu	12.7	19	199948	19	1515251
13	Chittoor	13.4	13	267902	21	44916832

Fig 5.9: Social Dataset

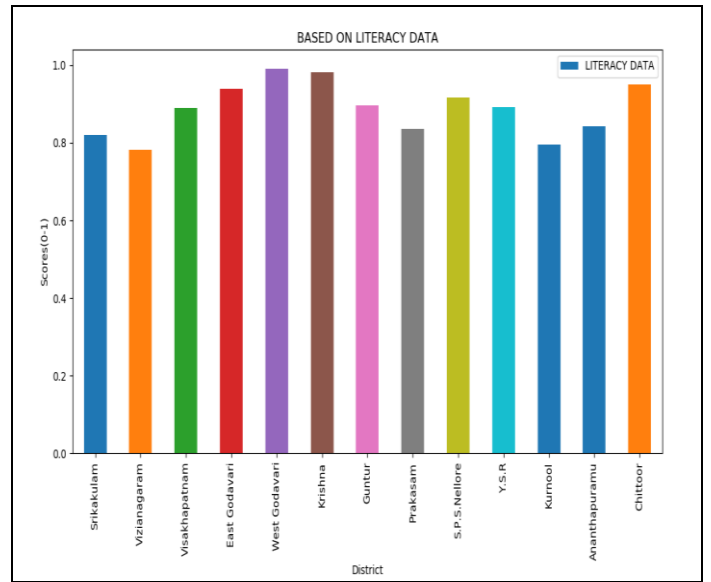
VI. RESULTS



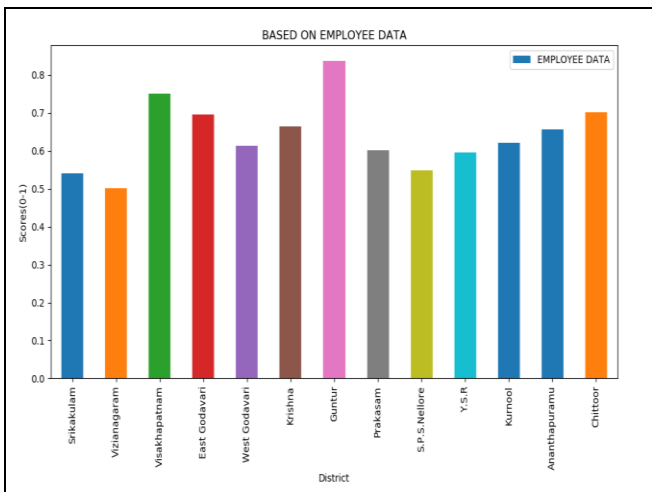
Description: Graph for Income data



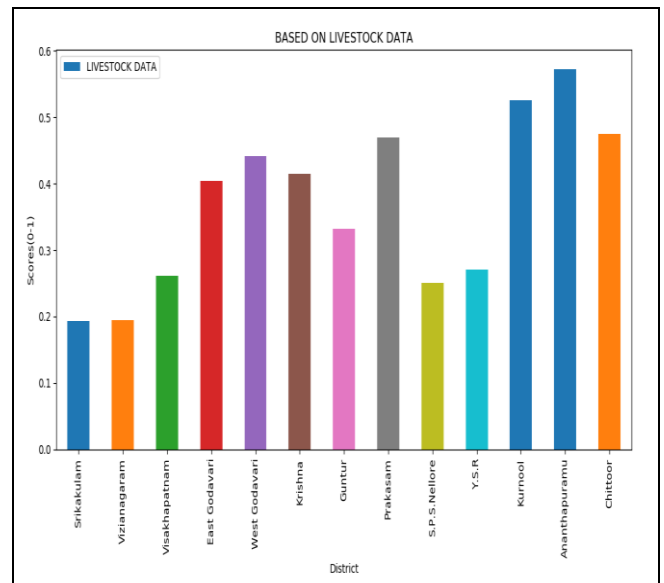
Description: Graph for Crop Yield data



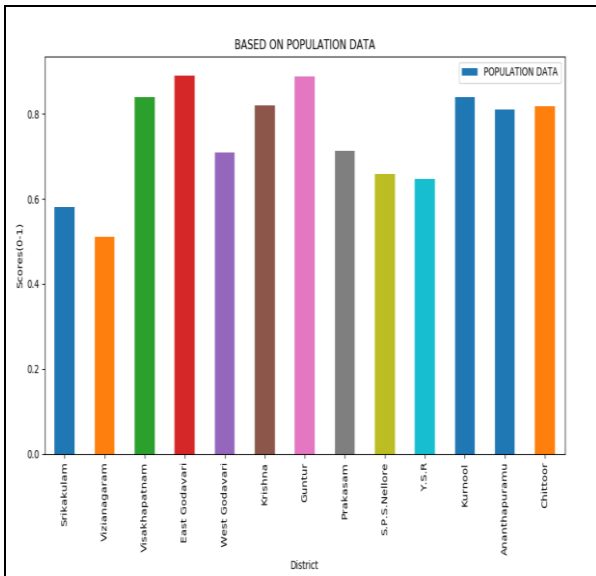
Description: Graph for Literacy data



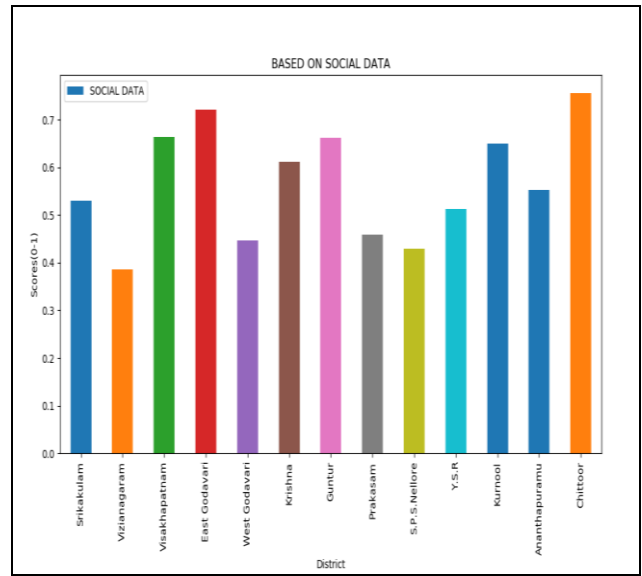
Description: Graph for Employee data



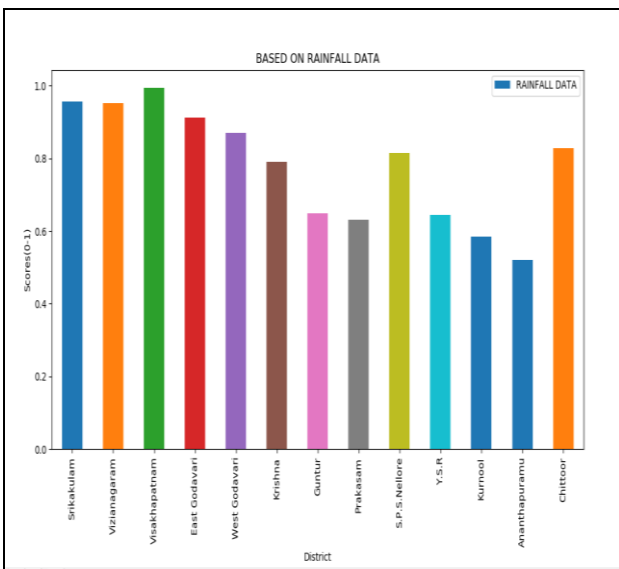
Description: Graph for Livestock data



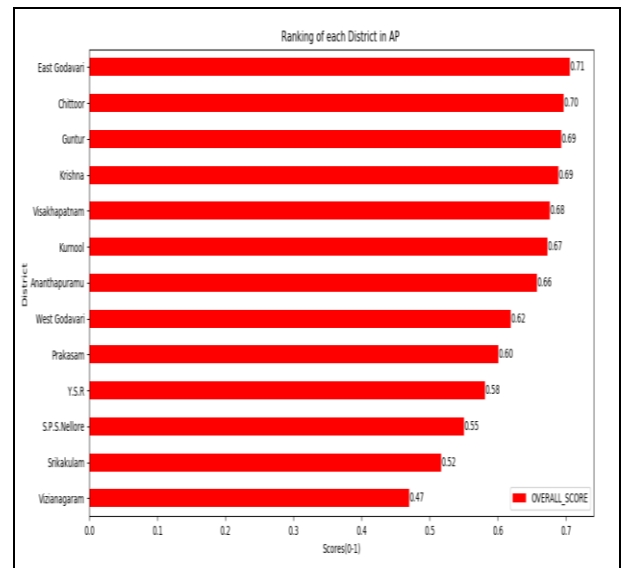
Description: Graph for Population data



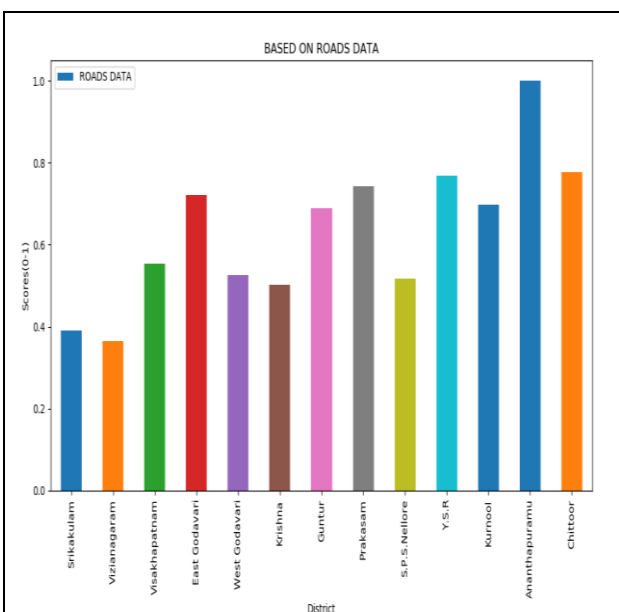
Description: Graph for Social data



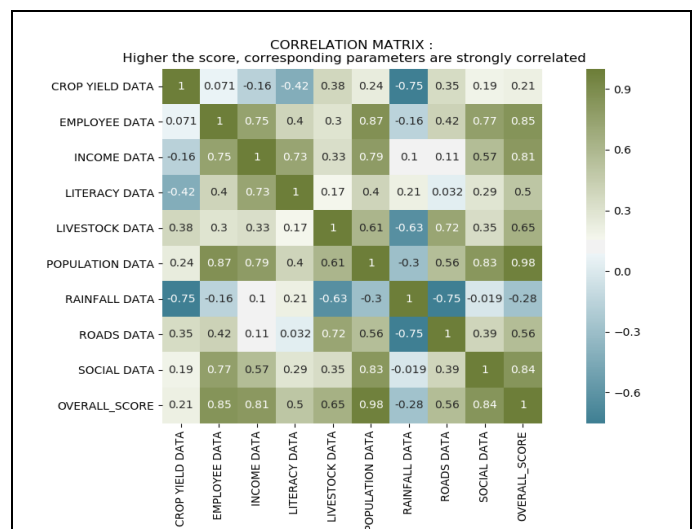
Description: Graph for Rainfall data



Description: Graph representing final score for each district



Description: Graph for Roads data



Description: Correlation matrix between all attributes and final score

VII. CONCLUSION

At present we are calculating scores of each district considering nine attributes and we determine the vulnerable districts. Here we are determining vulnerability of a district using present data. Further we can analyze past few years data and predict the vulnerability of district in future and take actions beforehand to reduce risk. Moreover we can analyze individual attributes and predict its behavior in future and managing it can reduce the vulnerability. Hence by predicting the future behavior, we can reduce the vulnerability and increase the districts livelihood environment.

Finally we obtained scores for each district and we found out the vulnerable districts. So we can know which districts are at danger for livelihood and which districts are safe for livelihood. We also found the most affecting parameters using correlation matrix based on which we can reduce the vulnerability of districts by developing the district over that attribute. We also visualized each and every attribute and using bar graphs determine which district is at top and which district is at lowest position in every aspect.

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Dr. J. Rajendra Prasad completed M.Tech., Ph.D and currently working as a Professor of Information Technology in PVP Siddhartha Institute of Technology. He has more than 35 years of research and teaching Experience. Life member of ISTE and CSI. He published more than 55 Papers in International and National Journal and Conferences.

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