

# ARTIFICIAL LOCATER FOR HUMAN ASSISTANCE

Vibha Tyagi<sup>1</sup>, Vaibhav Jaiswal<sup>2</sup>, Suhana Choudhry<sup>3</sup>, Prachi Tyagi<sup>4</sup> & Ravi Shankar Pal<sup>5</sup>

<sup>1</sup>Dept. of Information Technology, IMS Engineering college, U.P. , India

<sup>2</sup>Dept. of Information Technology, IMS Engineering college, U.P. , India

<sup>3</sup>Dept. of Information Technology, IMS Engineering college, U.P. , India

<sup>4</sup>Dept. of Information Technology, IMS Engineering college, U.P. , India

<sup>5</sup>Dept. of Information Technology, IMS Engineering college, U.P. , India

## Abstract

*In remote sensing application, a change may be considered to as an alteration of the surface components. Change detection is used in Forest or vegetation, landscape and urban change. The process of identifying differences in the state of an object or phenomenon by observing it at different times. It is useful in many applications such as land use changes, habitat fragmentation, rate of deforestation, coastal change, urban sprawl and other cumulative changes. It involve the application of multitemporal datasets to quantitatively analyze the temporal effects. Therefore, we have used RS and GIS to study land use of Solapur district, Solapur is one of the thirty-six districts of Maharashtra. Solapur is a district in Maharashtra which is spread over an area of 180.67 sq. km. The people of Solapur mainly speak Hindi. According to the 2011 census, Population Density in the District is 5300 per sq.km. and the total population is 9.51 million. The district is located on major road and rail routes between Mumbai and Hyderabad. Solapur is located at India country with the GPS coordinates of 17.6800° N and 75.9200° E.*

*The Pradhan Mantri Gram Sadak Yojana (PMGSY) is a nationwide plan in India to provide good all-weather road connectivity to unconnected villages Of 178,000 (1.7 lakh) habitations with a population of above 500 in the plains and above 250 in the hilly areas planned to be connected by all-weather roads, work-in-progress on the remaining 47,000 habitations was on-track for completion by March 2019*

**Keywords:** GIS, Remote Sensing, PMGSY, Pradhan Mantri Gram Sadak Yojana , Google Mapper, Google Earth.

## 1.Introduction

The Pradhan Mantri Gram Sadak Yojana (PMGSY) was launched in December 2000 to provide all weather road connectivity to 1.6 lakh unconnected Habitations with population of 500 persons or more in the rural areas by end of the 10th Plan Period (2007) at an estimated cost of rupees 60,000 Crores. Ministry of Rural Development (MoRD) executes the program as a centrally sponsored scheme in all the States and Union Territories.

### 1.1Stages of study

The three stages of the study are:

Stage I: Review & Assessment of current practices/policies and guidelines

Stage II: Recommendation & Formulation of Environmental & Social Management Framework (ESMF) Stage III: Preparation of EMP/RAP/IPDP for first year corridors in accordance with ESMF

Land cover is commonly defined as the vegetation (natural or planted) or man –made constructions (buildings etc.) which occur on the Earth surface. Water, ice, bare rock, sand and similar surfaces also count as land cover. Land cover refers to the surface cover on the ground, whether vegetation, urban infrastructure, water, bare soil or other, it does not describe the use of land, and the use of land may be different for lands with some cover type.

## 1.2.Role of technology

Area detection for GIS is a process that measures how the attribute of a particular area have changed between two or more-time periods. Area detection often involves comparing aerial photographs or satellite imagery of the area taken at different times. Area detection has been widely used to assess shifting cultivation, deforestation, urban growth, impact of natural disasters like tsunamis, earthquakes land use and land cover changes etc.

We have chosen the area of Solapur district, Maharashtra for sample study in the process implementation of Geographic Information System(G.I.S) for demonstrating the chosen of the same technology to find accurate and quick result for Pradhan Mantri Gram Sadak Yojana(P.M.G.S.Y) the data base have been collected using open source information. Geographic Information System(G.I.S) help to find results which abide by the constraints of Pradhan Mantri Gram Sadak Yojana(P.M.G.S.Y) efficiently, redundantly and accurately.

## 2. STUDY AREA

### 2.1.Introduction

Solapur is a city located in the south-western region of the Indian state of Maharashtra. Solapur is located on major road and rail routes between Mumbai and Hyderabad, with a branch line to the cities of neighboring state of Karnataka

### 2.2.Location

The city of Solapur is the district headquarters. It is located on the south east edge of the state and lies entirely in the Bhima and Seena basins. The latitude of Solapur, Maharashtra, India is 17.6800, and the longitude is 75.9200. Solapur, Maharashtra, India is located at India country in the Cities place GPS coordinates of 17.6800° N and 75.9200° E.

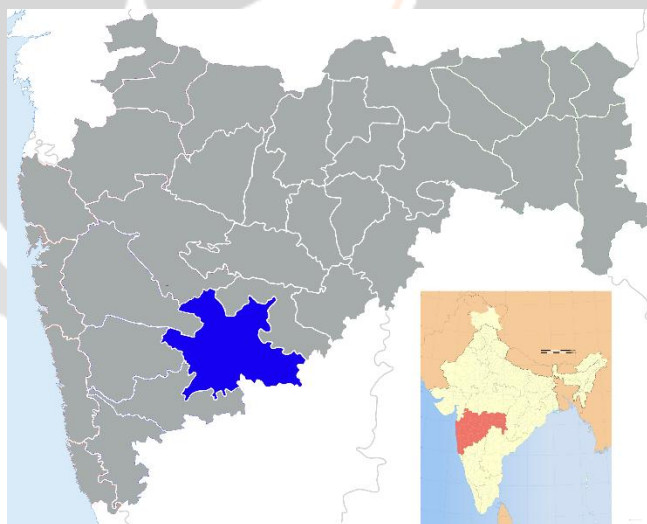
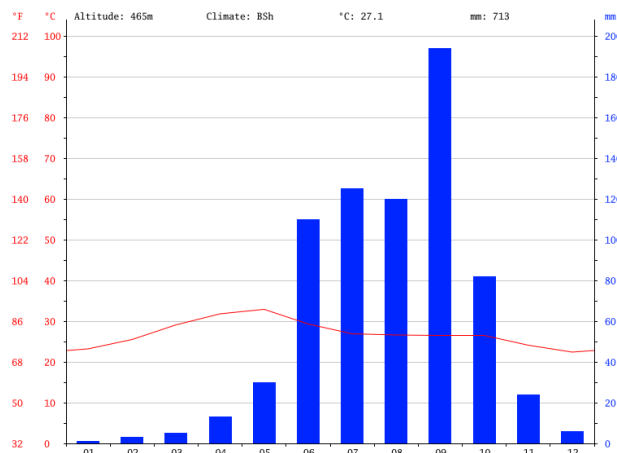


Fig -1:Location of Solapur

### 2.3.Climate and Temperature

Solapur is one of the most-polluted cities in Maharashtra due to the effluent chemicals produced as the waste products from the textile industries in its region. As many vehicles in the city utilize diesel fuel, it also generates tremendous smog emitted by sugar factories and heavy textiles industries in the city's suburb



**Chart-1:** Climograph of Solapur

Solapur falls under the category of dry (arid and semiarid) climate. The city experiences three distinct seasons: summer, monsoon and winter. Typical summer months are from March to May, with maximum temperatures ranging from 30 to 40 °C (86 to 104 °F). The warmest months in Solapur are April and May. The typical maximum temperatures being 40 °C (104 °F) or more. The highest temperature ever recorded is 46.0 °C (114.8 °F) in May 1988.

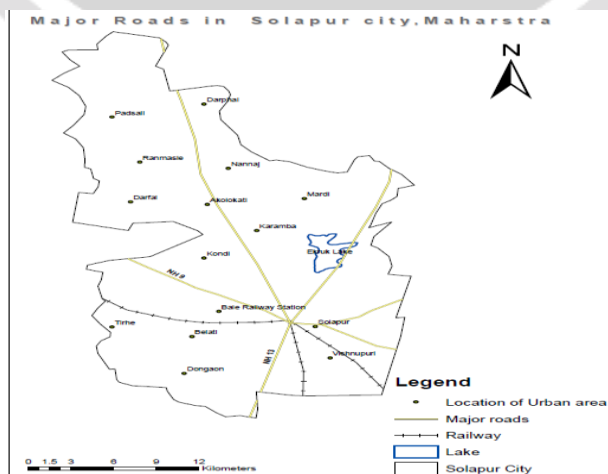
**2.4.Population**

In 2011, the total literates in Solapur city are 710,180 of whom 390,335 are males while 319,845 are females. The average literacy rate of Solapur city is 83.88 percent of which male and female literacy was 91.31 and 76.30 percent respectively.

Hinduism is the majority religion in Solapur city with 75.73% followers. Islam is the second most popular religion, with approximately 20.64% following it. Buddhism 1.62% Jainism by 1.00%, Christianity 0.73%, others, no religion and not stated 0.28%

**2.5.Geography of Solapur**

Solapur is well connected by road with major cities of Maharashtra as well as the adjoining State Capital of Hyderabad and important cities in Karnataka by four National Highways. Ratnagiri-Nagpur NH-204 passes through city, connecting Solapur to other important cities in Maharashtra like Nagpur, Sangli, Kolhapur and Nanded. Recently sanctioned National Highways.



**Fig -2:** Geography of Solapur

### 3.MATERIAL AND METHODOLOGY

The satellite data used in the present study includes the imagery of LANDSAT-5 “TM” And LANDSAT-8 “OLI” & “TIRS” sensor. Landsat 5 imagery is of February 2011 and Landsat 8 is of February 2017 with resolution of 30m nominal, panchromatic resolution is 15m. Map projection used is “UTM” datum used is “WGS84” and UTM zone is 45

#### 3.1.Software Used

In this study ARC Map is a remote sensing application with raster graphics editor abilities designed by Google Mappers or geospatial. ARC Map is aimed primarily at geospatial raster data processing and allows the user to prepare, display and enhance digital image for mapping use in GIS or software.

#### 3.2.Data acquisition

This step is dividing into two parts, in which first we have to download vector file (.shp) format of the study area. Then we have to download the satellite imagery of the study area from internet. In this study, the satellite data includes the imagery of Digital globe (high resolution) 1 m. And projection used is “UTM” datum used is “WGS84” and UTM zone is 45.

#### 3.3. ASSESSMENT OF CURRENT CONDITIONS.

##### 3.3.1 Topography

Relief and topography of the state varies from flat terrain in western and northwestern region to elevated plains in the southern area.

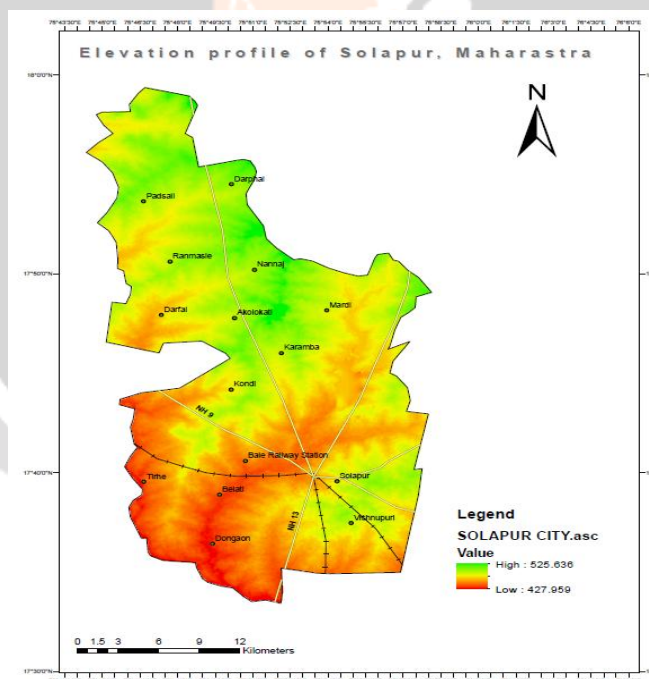


Fig -3:Topology of Solapur

##### 3.3.2 Geology

The geological formations in the state ranges from the oldest Archaean, Metamorphites (Schists or Quartzites), in the plains and plateau sub-recent, alluvium and sand in the western and northwestern parts of the state. Solapur, the city in Maharashtra, India is one of the most-polluted cities in Maharashtra due to the effluent chemicals produced as the waste products from the textile industries in its region which makes it more significant.

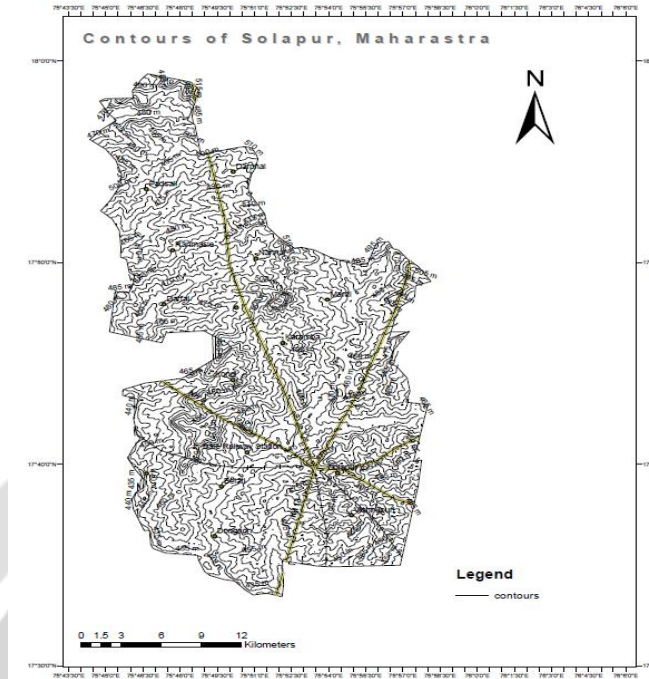


Fig -4:Geology of Solapur

### 3.4 Review of Design Standards

IRC:SP-20:2002, lays down guidelines for the various aspects of rural roads. The standards laid down are suggestions to be followed in the planning, design, construction and maintenance of rural roads. It further lays down uniform standards for adoption across the states. It has been stated that the guidelines should be applied taking local experience into consideration. But the states have not tailored guidelines to suit the states varying conditions.

#### 3.4.1. Design Speed

Designing speed is shown in the following table.

Table -1: Design Speed

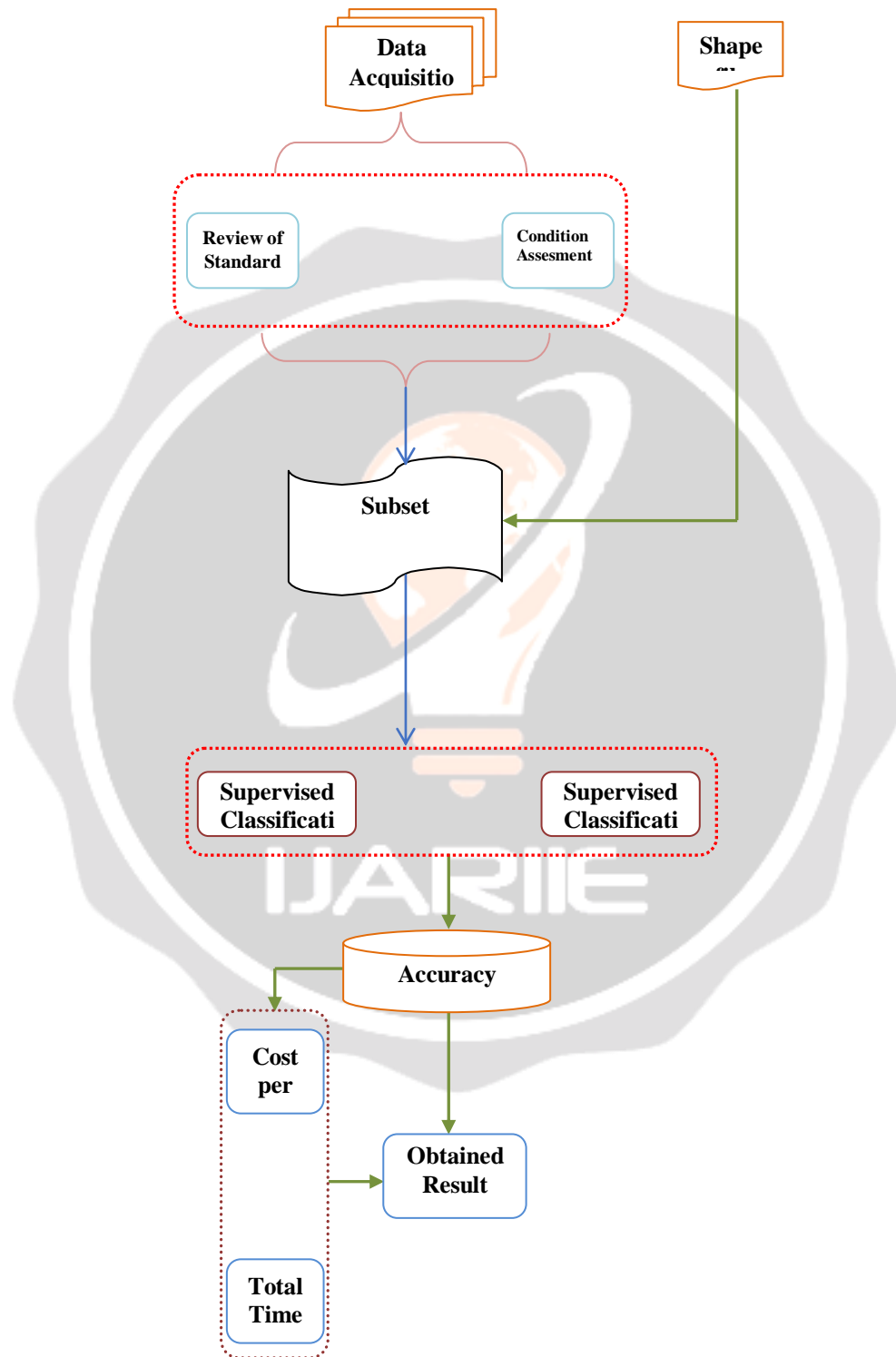
Road Classification	Design Speed (km/h)							
	Plain Terrain		Rolling Terrain		Mountainous Terrain		Steep Terrain	
	Ruling	Min.	Ruling	Min.	Ruling	Min.	Ruling	Min.
Rural Roads (ODR and VR)	50	40	40	35	25	20	25	20

#### 3.5.Subset

Sub setting refers to breaking out a portion of a larger file into one or more smaller file. Often image files contain areas much larger much larger than a particular study area. In these cases, it is helpful to reduce the size of the image file to include only the area of interest (AOL). This not only eliminates the extraneous data in the file, but it speeds up processing due to the smaller amount of data to process. This can be important when dealing with multiband data. In this step, we have to subset the shape file which is overlapped on the satellite imagery.

### 3.6. Supervised Classification

Fig -5: Methodology Chart

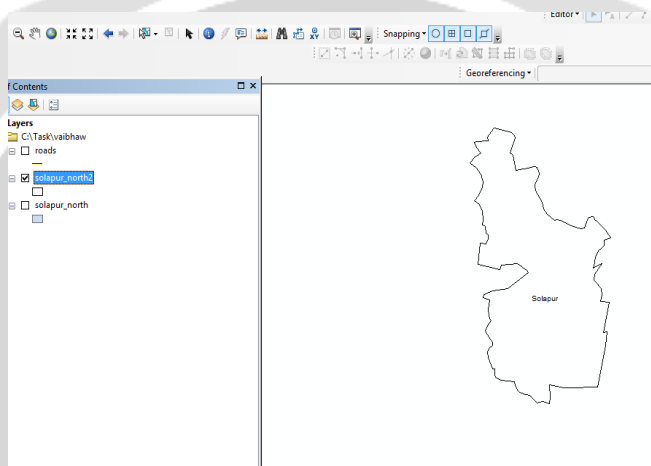


Multispectral classification is the process of sorting roads into a finite number of individual classes, or categories of data, based on their data file values. If a constraints of Pradhan Mantri Gram Sadak Yojana(P.M.G.S.Y) satisfies a certain set of criteria, the data is assigned to the class that corresponds to that criteria. This process is also referred to as data segmentation.

The Geographic Information System GIS model also produced smaller estimates of the individual growth areas and helped to identify weaknesses in the manual overlay process.

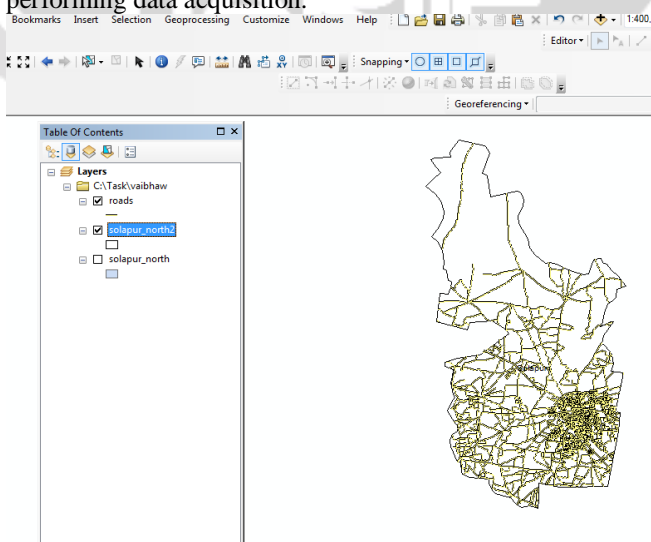
#### 4.RESULT AND ANALYSIS

We have used supervised image classification with maximum likelihood algorithm, for classifying the imagery of Solapur, Maharashtra, India for years 2011 and 2017. For computing accuracy assessment, we have used the KHAT statistics formula to compute the Overall accuracy (OA), Producer’s accuracy (PA) and User accuracy (UA). The study uses Landsat time series images for showing road use and land cover over the period of time in Solapur, Maharashtra, India. The results can be shown in the following figures.



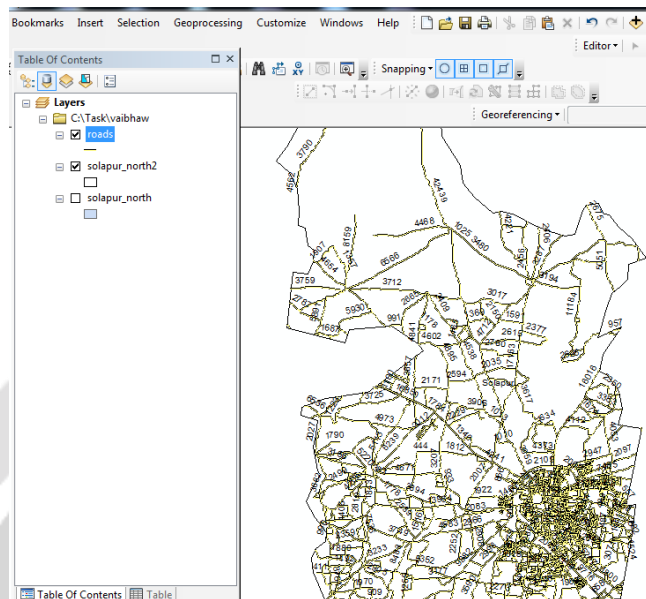
**Fig -6:**Geolospatial boundary of Solapur

Figure 6 represents the geospatial boundary of Solapur city of Maharashtra, India. This area is used by us for sample study of our technology for Pradhan Mantri Gram Sadak Yojana(P.M.G.S.Y). The image is taken as a snapshot of the software ArcMap while performing data acquisition.



**Fig -7:**Road Map of Solapur

Figure 7 represents the road map of Solapur city of Maharashtra, India. It includes the attributed data of population as well as the road lengths. This area is used by us for sample study of our technology for Pradhan Mantri Gram Sadak Yojana(P.M.G.S.Y). The image is taken as snapshot of the software ArcMap while performing data acquisition.



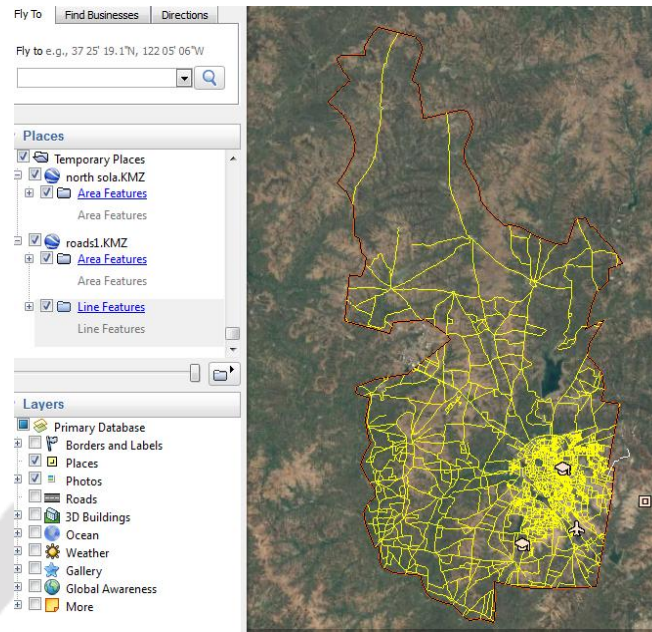
**Fig -8:**Road Length Map of Solapur

Figure 8 and Table 2 includes the attributed data of population as well as the road lengths. This area is used by us for sample study of our technology for Pradhan Mantri Gram Sadak Yojana(P.M.G.S.Y). The image is taken as a snapshot of the software ArcMap while performing data acquisition.

**Table -2:**Attribute Table of Solapur

LINE_WIDTH	length	FID_1	population	Field3
1	2150	16	16	
1	1369	17	17	
1	97	18	18	
1	1687	19	19	
1	2	20	20	
1	817	21	21	
1	615	22	22	
1	2665	23	23	
1	45	24	24	
1	45	25	25	
1	1739	26	26	
1	686	27	27	
1	1591	28	28	
1	433	29	29	
1	166	30	30	
1	124	31	31	
1	1414	32	32	
1	2377	33	33	
1	1328	34	34	
1	37	35	35	
1	142	36	36	
1	2094	37	37	
1	1027	38	38	
1	1465	39	39	
1	420	40	40	
1	366	41	41	
1	2760	42	42	



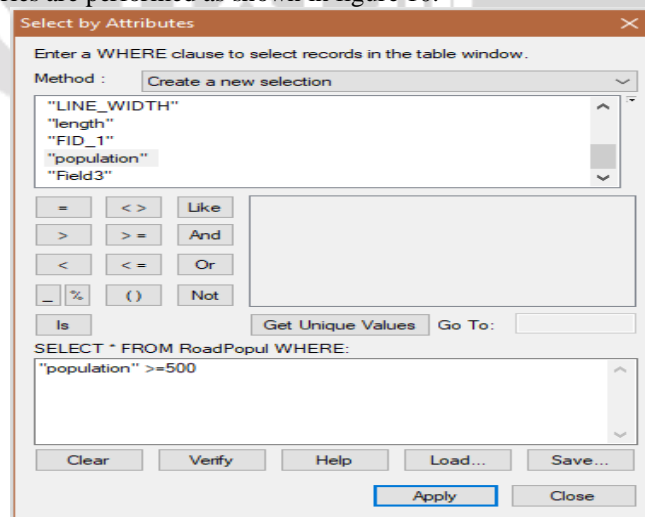


**Fig -9:**Satellite Map of Solapur

Figure 9 represents the satellite road map of Solapur city of Maharashtra, India. It includes the attributed data of population as well as the road lengths. This area is used by us for sample study of our technology for Pradhan Mantri Gram Sadak Yojana(P.M.G.S.Y). The image is taken as a snapshot of the software ArcMap while performing data acquisition.

**4.1.QUERY RESULTS**

In order to find the required results in chosen the area of Solapur district, Maharashtra for sample study in the process implementation of Geographic Information System(G.I.S) for demonstrating the chosen of the same technology to find accurate and quick result for Pradhan Mantri Gram Sadak Yojana(P.M.G.S.Y) the data base have been collected using open source information. Geographic Information System(G.I.S) help to find results which abide by the constraints of Pradhan Mantri Gram Sadak Yojana(P.M.G.S.Y) efficiently, redundantly and accurately, the following data base queries are performed as shown in figure 10.



**Fig -10:**Query

**4.2.Final output**

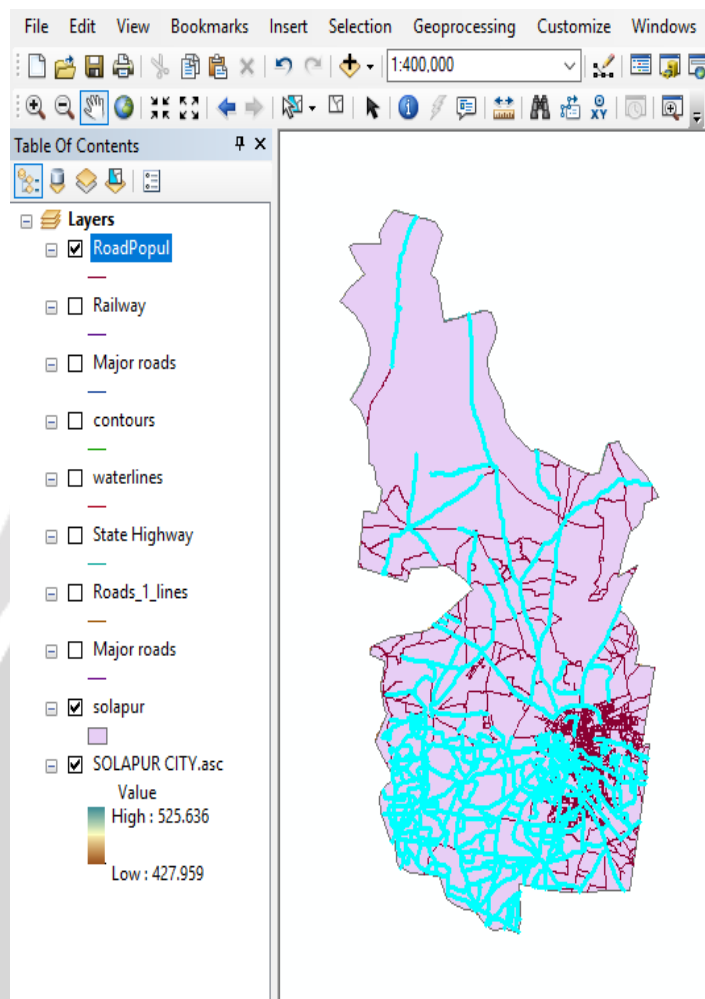
Once the queries are executed which follows the constraints of Pradhan Mantri Gram Sadak Yojana(P.M.G.S.Y) efficiently, redundantly and accurately, the following outputs are shown in figure 11 and figure 12.

The roads in figure 11 can be used to clearly demonstrate the area where the action can be performed with high accuracy. Similarly queries can be made for checking the total length of the roads which are following the ideals of Pradhan Mantri Gram Sadak Yojana(P.M.G.S.Y) for estimating the total amount which need to me sanctioned for the construction of the roads, Likely, queries can be made for checking the total area of the roads which are following the ideals of Pradhan Mantri Gram Sadak Yojana(P.M.G.S.Y) for estimating the total time which need to me sanctioned for the construction of the roads

The attributes in table 2 can be used to clearly demonstrate the names of the roads along with various data fields which are following the ideals of Pradhan Mantri Gram Sadak Yojana(P.M.G.S.Y) precisely and with very high efficiency.

LINE_WIDTH	length	FID_1	population	Field3
1	1359	354	354	
1	488	355	355	
1	1340	356	356	
1	1013	357	357	
1	1047	358	358	
1	3480	359	359	
1	2456	360	360	
1	4221	361	1361	
1	2406	362	362	
1	3287	363	363	
1	992	364	364	
1	3166	365	365	
1	2255	366	1366	
1	3725	367	367	
1	863	368	368	
1	1394	369	369	
1	4802	370	1432	
1	2409	371	371	
1	137	372	372	
1	543	373	373	
1	1347	374	374	
1	1025	375	375	
1	5594	376	1376	
1	3380	377	377	
1	2411	378	378	
1	22	379	379	
1	1165	380	380	

**Fig -10:** Attributes Following the Query



**Fig -10:**Roads Following the Query

## 5.CONCLUSION

We have chosen Solapur district for our study which is one of the thirty-six districts of Maharashtra. Solapur is a district in Maharashtra which is spread over an area of 180.67 sq. km. The people of Solapur mainly speak Hindi. According to the 2011 census, Population Density in the District is 5300 per sq.km. and the total population is 9.51 million. The district is located on major road and rail routes between Mumbai and Hyderabad. For remote sensing propose we take the help of ARC Map software and for GIS purpose we took help of Google earth and Arc map 10.1 software.

We have supervised the data set according to the guidelines of The Pradhan Mantri Gram Sadak Yojana (PMGSY), which is a nationwide plan in India to provide good all-weather road connectivity to unconnected villages Of 178,000 (1.7 lakh) habitations with a population of above 500 in the plains and above 250 in the hilly areas planned to be connected by all-weather roads, work-in-progress on the remaining 47,000 habitations.

The constraints of Pradhan Mantri Gram Sadak Yojana(P.M.G.S.Y) can be applied efficiently, redundantly and accurately to the data set to obtain the outputs clearly demonstrate the area where the action can be performed with high accuracy. Similarly queries can be made for checking the total length of the roads which are following the ideals of Pradhan Mantri Gram Sadak Yojana(P.M.G.S.Y) for estimating the total amount which need to me sanctioned for the construction of the roads, Likely, queries can be made for checking the total area of the roads

which are following the ideals of Pradhan Mantri Gram Sadak Yojana(P.M.G.S.Y) for estimating the total time which need to be sanctioned for the construction of the roads

## 6.REFERENCES

- [1] Impact assessment of . Pradhan Mantri Gram Sadak yojana (PMGSY) by CMI Social Research Center.
- [2] Pradhan Mantri Gram Sadak Yojana: A path to Inclusive Growth of MP Mrs. Preeti Jain Assistant Professor, Dept. of Commerce St. Aloysius College (Auto), Jabalpur E-Mail: ppreetijain18@yahoo.co.in Mobile No.:9301728830
- [3]Evaluation of Pradhan Mantri Gram Sadak Yojana in Haryana. IRACST – International Journal of Commerce, Business and Management (IJCBM), ISSN: 2319–2828 Vol. 4, No.2, April 2015.
- [4] James R. Anderson, Ernest E. Hardy, John T. Roach, And Richard E, A Land Use And Land Cover Classification System For Use With Remote Sensor Data, Witmer Geological Survey Professional Paper 964.
- [6] Chauthan, T.S., 2003, Geographical Information system and Remote Sensing for sustainable Development, Vol, 2, Universal Scientific publishers, Jaipur.
- [7] Sabins F.F., 1997, Remote Sensing Principles and Interpretation W.H. Freeman and Company, Newyork.
- [8] Rajan, K.S. and Shibasaki, R., (2000). A GIS Based Integrated Land Use/Cover Change Model To Study HumanLand Interactions. In: International Archives of Photogrammetry and Remote Sensing, Vol. XXXIII Part B7 (3), pp.12121219.

