

# Spatial Representation of Black Spots and Luminous Intensity

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## Abstract

Road accidents are a major cause of mortality worldwide with immediate action required to mitigate against the negative impacts. As per the statistics of 2015 Tamil Nadu stands second position in number of accidents and stands first in number of persons killed in accidents. Geo spatial data and Geographic information system are essential components for building smart cities in a basic way that maps the physical world into virtual environment as a referencing framework then it serves as a platform for data integration, a system for geospatial analysis and collection of models for visualization and decision making. GIS has provided users with real time urban sensing and visualization and at the same time has challenged existing systems. This project covers the Madurai city for the accident analysis. The black spots in Madurai city are identified and corrective measures are provided with the GIS tool itself.

## I. INTRODUCTION

The accidents are increasing day by day. The accidents are analyzed and the black spots are found and represented in the ArcGIS map. After representing the black spots the luminous intensity of that spot are found. The records are poorly maintained and updated and inaccurate feeding of information so that problems are easily rectified by GIS. Thus it is fair to use GIS for bringing about the reduction of traffic accidents by giving alternate solution for the major cause of accidents. Geographical Information System – Geography : pertaining to a certain locality and reference of the location with respect to world geographical system, Information system : Storage of attribute data that describes the properties and characteristics of spatial features. Arc gis is mapping software where boundaries of area can be created, the data for a chosen sector is given as attribute(input) and information becomes computerized and can be assessed by both utility providers and users and for operation and maintenance purposes. It thus serves as a system of records for various public agencies to work in tandem and brings about a traffic free sector. Arc catalog and Arc map are the two main components used for creation of a geo referenced and digitized map.

## II. OBJECTIVE

- To collect, compile and manage information about the accident details in spatial form
- To use Arc GIS bridge the gap between different sectors by acting as an integrated cross sector platform
- To reduce the accident rate thereby reducing the number of casualties
- To reduce the usage of paper by compiling information in the form of soft copies and in gis format.

## III. PROGRESS OF WORK

- Data collection
- Data analyzing
- Map collection
- Geo – referencing
- Digitizing
- Importing data
- Marking black spots
- Collection of lux values
- Importing lux values
- Interpolation
- Correlating lux values and black spots

## IV. DATA COLLECTION

The primary work started with the collection of data. The accident data were collected from Commissioner's office, Madurai. The Madurai city was taken for the project because we have compared accident statistics for three district head quarters madurai, virudhunagar, dindigul. Among the three Madurai has more number of accidents than the other two cities. The accident details collected which includes the date, time, place and other details etc.

## IV. DATA ANALYZING

The data collected from the commissioner's office were analyzed keenly to find out the black spots and their details like the accident reason, type of accidents either fatal or non-fatal or grievous etc.

## V. MAP COLLECTION

To mark the black spots location we need to import the Madurai city's map as a base map into the

ArcGis software. The Madurai city's map was collected from survey of India as a hard copy and then scanned and imported into the ArcGIs.

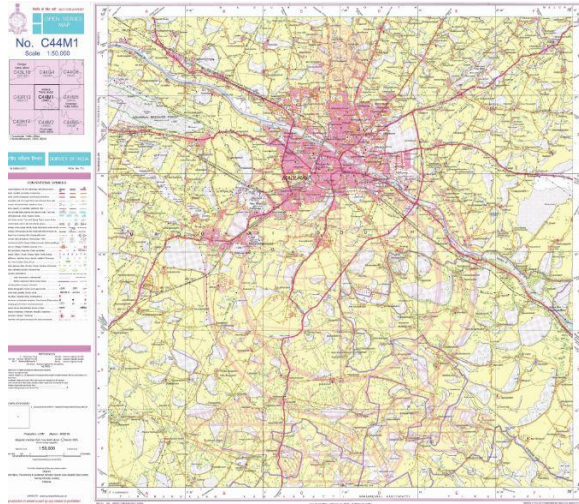


Fig 1: Base map

VI. GEO-REFERENCING

Geo referencing is the process of assigning spatial coordinates to data that is spatial in nature, but has no explicit geographic coordinate system. The ground control points were taken from the Google map or by GPS and were fixed in the base map and correlating its points with it

VII. DIGITIZING

Digitizing is the process of creating roads in the base map. The roads created were major roads minor roads, minor roads, arterial roads etc. these roads were created by creating layer and shape file in the Arc catalog and imported it in the Arc map.

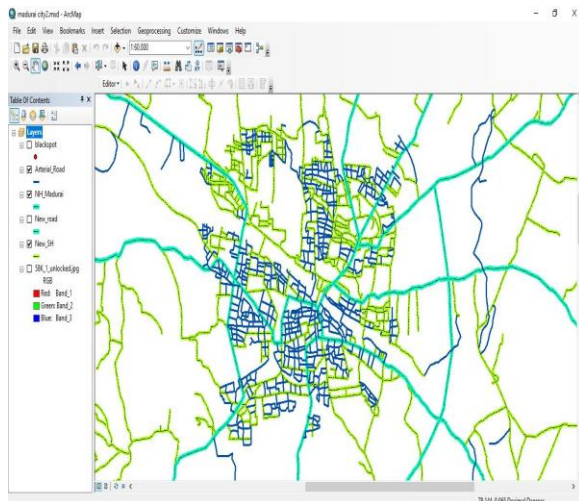


Fig 2: Digitized roads of Madurai city

VIII. IMPORTING DATA

Data collected and analyzed were given as an input for detailing the black spots in the arc map. The data input given are time of accident location of accident, date of accident occurred and other details. As per the rule the victim details and other confidential details were not allowed to reveal in the project and they were kept confidentially. The details were given in the attribute table in arc map.

FPID	Shape #	Id	Date	Time	Location	cause
0	Point	1	11-01-2017	4:30P	Near Jaee overseas exports	rash driving by the bus driver who struck the car which caused the car to overturn
1	Point	2	23-01-2017	7:45 A.M	Near Koll gate Arupulathu Ring Road	bus lost its control and strayed into the center median which caused the bus to overturn
2	Point	3	07-01-2017	12:00 P.M	near nagar chithambam road Madurai	TNSTC bus drive into bus in rash manner and hit a motorcycle
3	Point	7	01-01-2017	8:15 P.M	Muthamban, Nilar road, Madurai.	unknown vehicle hit and run
4	Point	6	08-01-2017	8:45 P.M	Stron Sha Nil, Pakam Station Road, Madurai.	rash driving and hit against B post
5	Point	5	02-01-2017	8:30 P.M	Kanagaipalayam kappad road, Kanagaipalayam, Madurai.	unknown vehicle hit and run
6	Point	4	03-01-2017	10:00 P.M	near Koll gate, Nilar road, Madurai.	lost control of the vehicle due to application of sudden brake
7	Point	8	07-01-2017	9:10 P.M	Chidigay Road, Madurai.	rash driving by the motorist and hit against the cyclist
8	Point	9	08-01-2017	10:45 P.M	Pandi kooling road, Madurai.	rear end collision between a car and a 407 van
9	Point	11	08-01-2017	11:40 A.M	Sivagangai main road, Madurai.	lost control of the vehicle and dashed against the center median
10	Point	13	05-01-2017	7:15 P.M	Opposite of Muthamban bus stand, Madurai.	pedestrian was struck by a TNSTC bus while trying to cross the road
11	Point	10	17-01-2017	2:30 P.M	Vagga Nagar Nilar Road, Anna Nagar, Madurai.	an known vehicle hit and run
12	Point	14	08-01-2017	7:15 P.M	Kanagaipalayam, Chidigay main road, Madurai.	pedestrian was struck by a motor cycle while trying to cross the road
13	Point	12	04-01-2017	8:45 P.M	Saravaliy main road, Madurai.	hit the pedestrian while trying to reverse the vehicle
14	Point	15	05-01-2017	5:30 P.M	Then Nilar Road, Madurai.	pedestrian was struck by a Van while trying to cross the road
15	Point	16	04-01-2017	11:00 P.M	Near Arish hospital Eye pass road Madurai.	collision between a motorcycle and speeding car
16	Point	17	13-01-2017	10:15 P.M	TKM Nilar Road, Madurai.	side on collision by motorist that struck against a Bus sidewalk trying to overtake
17	Point	18	14-01-2017	2:30 P.M	Thiruvagar Madurai.	pedestrian was struck by a trolley while trying to cross the road
18	Point	19	03-01-2017	10:00 A.M	Thiruvagar GST road Madurai	motorist lost control of vehicle and fell into the center median
19	Point	20	01-02-2017	7:45 P.M	Vilavarur, Madurai.	collision between two motor cycles
20	Point	21	05-02-2017	2:30 P.M	Aranagaipalayam Nilar Road, Madurai.	hit and run collision between motor cycle and mini bus
21	Point	22	05-02-2017	8:30 P.M	Near Koll gate, Nilar road, Madurai.	pedestrian was struck by a motorcycle while trying to cross the road
22	Point	23	09-02-2017	5:40 P.M	Arupulathu Ring Road, Madurai.	lost control of the vehicle due to the application of brake
23	Point	24	04-02-2017	8:45 A.M	Thiruvannamuram Nilar Road, Madurai.	pedestrian was struck by a Auto while trying to cross the road
24	Point	25	04-02-2017	2:30 P.M	Aranagaipalayam Nilar Road, Madurai.	overturning of Auto due to Rash driving
25	Point	41	20-02-2017	10:30 A.M	Kanagaipalayam, Madurai.	pedestrian was struck by a motorcycle while trying to cross the road
26	Point	26	20-02-2017	7:15 P.M	Kodakpudur road Madurai	collision between motor cycles and cycle
27	Point	27	02-02-2017	7:15 P.M	Muthamban Nilar main road Madurai	rear end collision between motor cycle and mini bus
28	Point	28	02-02-2017	8:30 P.M	Near Koll gate, Nilar road, Madurai.	rear end collision between motor cycle and trolley
29	Point	29	04-02-2017	5:30 A.M	Kanagaipalayam main road, Karambakkam, Sakar Madurai	unknown vehicle hit and run
30	Point	30	05-02-2017	7:15 P.M	Kadachanallur to Comanchalam road Madurai.	pedestrian was struck by a motorcycle while trying to cross the road
31	Point	31	08-02-2017	7:40 A.M	Meena garden Vilar nagar Nilar ring road Madurai	an known vehicle hit and run
32	Point	32	01-02-2017	8:15 P.M	Narayanapuram Nilar Natham main road Madurai.	an known vehicle hit and run-pedestrian
33	Point	33	01-01-2017	8:30 P.M	near nagar Aragar Madurai	lost control of the motorist
34	Point	34	14-02-2017	8:15 P.M	In front of 2nd gate New GP Panagal road Madurai	an known vehicle hit and run-pedestrian
35	Point	35	05-02-2017	8:15 A.M	Opposite to Nagar Alagar Nilar main road Madurai	an known vehicle hit and run-pedestrian
36	Point	36	05-02-2017	7:15 P.M	TKM Nilar-Panagal Madurai	pedestrian was struck by a motorcycle
37	Point	37	07-02-2017	10:45 P.M	Arupulathu Madurai	collision between trolley and motor cycle
38	Point	38	11-02-2017	12:45 P.M	TKM Nilar road Thiruvagar Madurai	lost control of the vehicle due to the application of brake

Fig 3: Imported data in Attribute Table

FPID	Shape #	Id	Date	Time	Location	cause
38	Point	38	15-02-2017	1:50 P.M	TKM Nilar road, Panagal Madurai	reckless driving in the wrong side
40	Point	39	04-02-2017	5:30 A.M	Narayanapuram main road Sakar Madurai	unknown vehicle hit and run
41	Point	37	08-02-2017	7:00 P.M	Meena garden Vilar nagar Nilar ring road Madurai	an known vehicle hit and run
42	Point	34	14-02-2017	5:00 P.M	In front of 2nd gate New GP Panagal road Madurai	an known vehicle hit and run-pedestrian
43	Point	30	08-02-2017	8:40 A.M	Vinayathu Then main road Madurai	collision between auto and car
44	Point	40	08-02-2017	8:00 P.M	Vinayathu Then main road Madurai	collision between trolley and motor cycle
45	Point	0	08-02-2017	5:15 A.M	Arupulathu Ring Road Madurai	collision between Auto and motor cycle
46	Point	0	13-02-2017	11:45 A.M	Near panagal arupulathu ring road	an known vehicle hit and run
47	Point	0	14-02-2017	11:15 P.M	TKM Nilar, Kanagaipalayam	collision between motor cycles and trolley driven vehicle
48	Point	0	05-02-2017	8:45 A.M	Near A. K. Koll gate, Arupulathu main road	pedestrian was struck by a trolley cycle while trying to cross the road
49	Point	0	13-02-2017	8:30 A.M	Comanchalam, Sivagangai main road	pedestrian was struck by a motorcycle and motor cycle was deceased
50	Point	0	14-02-2017	8:00 A.M	North river road, aviyaravan	pedestrian was struck by a trolley cycle while trying to cross the road
51	Point	0	17-02-2017	4:00 P.M	Opposite to meenambal college, kappadam road	lost control of the trolley cycle and dashed against the Auto
52	Point	0	23-02-2017	10:30 P.M	Near pandi kooling road	Pedestrian was struck by a bus while trying to cross the road
53	Point	0	23-02-2017	11:00 P.M	IF of Panagal arupulathu ring road	unknown vehicle hit and run the motorist
54	Point	0	28-02-2017	10:30 A.M	Near kanna department store, Thekkattar	lost control of the vehicle due to the application of brake
55	Point	0	02-03-2017	10:40 P.M	Opp. of Royal Court Hotel, aviyaravan	Motor cycle hit another auto; motor cycle and car away
56	Point	0	16-03-2017	05:55 A.M	IF of KFC	Rear end collision between car and a motor cycle
57	Point	0	18-03-2017	02:40 P.M	Near Nether colony, then main road	an known vehicle hit and run
58	Point	0	19-03-2017	04:45 P.M	IF of Sing Statue, sudhamani valiam road	Motor cycle lost control of the vehicle while turning
59	Point	0	19-03-2017	8:30 P.M	Near vijaynagar, TKM road	Deceased hit by motorist then he got hit by trolley bus
60	Point	0	23-03-2017	09:15 P.M	Opp. to nether colony, TKM road	Lorry hits behind the cyclist
61	Point	0	23-03-2017	11:00 P.M	Opp. to Nether colony main road TKM road	an known vehicle hit and run-pedestrian
62	Point	0	04-03-2017	07:20 A.M	Near panagal panagal main road	Lorry dashed behind the pedestrian while taking reverse
63	Point	0	14-03-2017	09:00 A.M	Near Jaee overseas exports	an known vehicle hit and run-pedestrian
64	Point	0	17-03-2017	05:20 A.M	Near nirma school, Kanagaipalayam	Lorry hits the pedestrian while trying to cross the road
65	Point	0	17-03-2017	09:20 A.M	Near Tamirasu, Polytechnic	Motor cycle lost control of the vehicle while turning
66	Point	0	22-03-2017	12:20 A.M	Near Veerambal nagar, vilavarur	unknown vehicle hit and run the motorist
67	Point	0	23-03-2017	03:20 A.M	Near nirma Lorry shed, madurai	Lorry hits the pedestrian
68	Point	0	14-03-2017	09:20 A.M	IF of Comanchalam Sakar Madurai	two motor cycles hit opposite to each other
69	Point	0	14-03-2017	10:15 P.M	Near indrayathuvalam, K.V. sala	two motor cycles dashed against each other
70	Point	0	18-03-2017	03:00 P.M	IF of Nithya college, Chidigay main road	Lorry dashed behind the motor cycle
71	Point	0	18-03-2017	05:30 A.M	IF of NPI Madurai, Nilar Natham road	an known vehicle hit and run-pedestrian
72	Point	0	23-03-2017	08:20 A.M	Comanchalam, Sivagangai Nilar road	Auto dashed the trolley cycle
73	Point	0	28-03-2017	10:30 P.M	IF of Nether Colony, Chidigay main road	lost control of the motorist
74	Point	0	23-03-2017	07:00 P.M	IF of Thiruvannamur main road Sivagangai colony	Car dashed against the pedestrian
75	Point	0	23-03-2017	08:00 A.M	IF of Sing Statue, Nilar Thiruvannamur road	two motor cycles dashed against each other
76	Point	0	28-03-2017	08:00 P.M	Periyambathu health, Thiruvannamur	lost control of the motorist
77	Point	0	14-03-2017	09:55 A.M	IF of panagal nether colony kappadam p	Lorry dashed against the motor cyclist

Fig 4: Imported data in Attribute table 2



FID	Shape	ID	Date	Time	Location	Cause
75	Point	0	01-18-2017	02:10PM	Olda Nagar road near air turn stop	unknown vehicle hit the pedestrian and ran away
76	Point	1	02-24-2017	02:10PM	IP of KBI road, Bylappa Road	Rear end collision by the motorcyclist with another
77	Point	2	01-18-2017	02:10PM	IP of KBI road, Bylappa Road	Rear end collision by the motorcyclist with another
78	Point	3	02-24-2017	02:10PM	near Thangajay arts college bus stop	Thrust bus hits the pedestrian while trying to cross the road
79	Point	4	03-26-2017	02:10PM	opp to zoodhanth city vi, AP Road	Van hits the pedestrian while walking on the left side sidewalk
80	Point	5	02-24-2017	02:10PM	near bus stand, Gopuram	Car hit from behind and cut the pedestrian
81	Point	6	03-26-2017	02:10PM	East side Bus stop, Gopuram	Lorry dashed behind the motor cycle
82	Point	7	03-26-2017	02:10PM	IP of KBI road, Bylappa Road	Motor cycle hit over a speed breaker wrongly
83	Point	8	03-26-2017	02:10PM	IP of KBI road, Bylappa Road	Unknown vehicle hits the pedestrian and ran away
84	Point	9	03-26-2017	02:10PM	Opposite to High Theatre, AA Road, Hakkara	Motor cycle lost control of the vehicle while applying brake to save life of a pedestrian
85	Point	10	01-18-2017	02:10PM	near KBI road, Bylappa Road	Motorcyclist hit the pedestrian
86	Point	11	01-18-2017	02:10PM	IP of KBI road, Bylappa Road	An unknown vehicle hit and ran the pedestrian
87	Point	12	01-18-2017	02:10PM	near Pongra bus stop, Thangajay Road	Thrust bus hits the pedestrian
88	Point	13	03-26-2017	02:10PM	near KBI road, Bylappa Road	Two motor cyclists dashed against each other
89	Point	14	03-26-2017	02:10PM	IP of KBI road, Bylappa Road	motor cyclist's walking stick struck the ground while riding and lost control
90	Point	15	03-26-2017	02:10PM	Opposite to High Theatre, AA Road, Hakkara	unknown vehicle hit and ran the motor cycle
91	Point	16	03-26-2017	02:10PM	Opposite to High Theatre, AA Road, Hakkara	Motor cycle dashed behind the pedestrian
92	Point	17	03-26-2017	02:10PM	Opposite to High Theatre, AA Road, Hakkara	Rear end collision between tractor and a car
93	Point	18	03-26-2017	02:10PM	near The Chemistry School	Motor lorry dashed against the motorcyclist road
94	Point	19	03-26-2017	02:10PM	Alapet road, Uthala Junction	Car dashed against the motor cycle
95	Point	20	03-26-2017	02:10PM	near KBI road, Bylappa Road	Bus dashed against the motor cycle
96	Point	21	03-26-2017	02:10PM	near KBI road, Bylappa Road	motor cyclist hits the pedestrian while trying to cross the road
97	Point	22	03-26-2017	02:10PM	near KBI road, Bylappa Road	Two motor cyclists dashed against each other
98	Point	23	03-26-2017	02:10PM	near KBI road, Bylappa Road	motor cyclist lost control and hit the pedestrian, both passenger and pedestrian gets injured
99	Point	24	03-26-2017	02:10PM	near KBI road, Bylappa Road	Motor cycle dashed against a hole along the side of the road
100	Point	25	03-26-2017	02:10PM	near KBI road, Bylappa Road	when lorry turned left, the motor cycle lost its control and dashed against the lorry
101	Point	26	03-26-2017	02:10PM	near KBI road, Bylappa Road	Lorry dashed against the car
102	Point	27	03-26-2017	02:10PM	near KBI road, Bylappa Road	Lorry dashed against the motor cycle
103	Point	28	03-26-2017	02:10PM	near KBI road, Bylappa Road	A bus hits the pedestrian while trying to cross the road
104	Point	29	03-26-2017	02:10PM	near KBI road, Bylappa Road	Motor cyclist lost control over the vehicle and dashed against the iron trash bin
105	Point	30	03-26-2017	02:10PM	near KBI road, Bylappa Road	Lorry dashed against the motor cycle while trying to cross the road
106	Point	31	03-26-2017	02:10PM	near KBI road, Bylappa Road	Motor cyclist dashed behind the motor cycle and hit over
107	Point	32	03-26-2017	02:10PM	near KBI road, Bylappa Road	Motor cyclist hit while applying the brakes when a dog try to cross the road
108	Point	33	03-26-2017	02:10PM	near KBI road, Bylappa Road	Car dashed behind the pedestrian while trying to cross the road
109	Point	34	03-26-2017	02:10PM	near KBI road, Bylappa Road	Motor cycle hit while applying the brakes when a dog try to cross the road
110	Point	35	03-26-2017	02:10PM	near KBI road, Bylappa Road	Car dashed against the motor cycle
111	Point	36	03-26-2017	02:10PM	near KBI road, Bylappa Road	Car dashed against the pedestrian while trying to cross the road
112	Point	37	03-26-2017	02:10PM	near KBI road, Bylappa Road	Motor cycle dashed against the motor cycle while trying to cross the road
113	Point	38	03-26-2017	02:10PM	near KBI road, Bylappa Road	Van dashed against the motor cycle
114	Point	39	03-26-2017	02:10PM	near KBI road, Bylappa Road	Van dashed against the motor cycle while standing at the side of the road
115	Point	40	03-26-2017	02:10PM	near KBI road, Bylappa Road	Unknown vehicle hits the pedestrian and ran away
116	Point	41	03-26-2017	02:10PM	near KBI road, Bylappa Road	Lorry dashed against the motor cyclist and ran over his head

Fig 5: Imported data in Attribute table 3

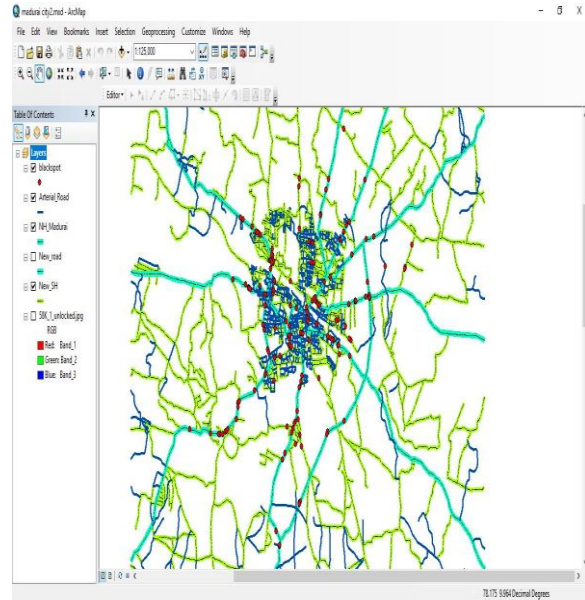


Fig 8: Digitized Roads with Black spots

FID	Shape	ID	Date	Time	Location	Cause
117	Point	0	01-18-2017	02:10PM	near KBI road, Bylappa Road	Car dashed against the motor cycle
118	Point	1	02-24-2017	02:10PM	IP of KBI road, Bylappa Road	Van hit dashed against the motor cyclist and ran over his head
119	Point	2	03-26-2017	02:10PM	near KBI road, Bylappa Road	Car dashed against the pedestrian and ran over
120	Point	3	01-18-2017	02:10PM	near KBI road, Bylappa Road	Motorcyclist hits the pedestrian while he is trying to cross the road
121	Point	4	03-26-2017	02:10PM	near KBI road, Bylappa Road	Motor cyclist lost control of the vehicle
122	Point	5	03-26-2017	02:10PM	near KBI road, Bylappa Road	Motorcyclist lost control of the vehicle and dashed against the motor cyclist
123	Point	6	03-26-2017	02:10PM	near KBI road, Bylappa Road	Van dashed against the motor cyclist
124	Point	7	03-26-2017	02:10PM	near KBI road, Bylappa Road	Car dashed against the motor cyclist
125	Point	8	03-26-2017	02:10PM	near KBI road, Bylappa Road	Motor cyclist dashed against the motor cyclist and ran over the victim's neck
126	Point	9	03-26-2017	02:10PM	near KBI road, Bylappa Road	Motor cyclist dashed against the motor cycle
127	Point	10	03-26-2017	02:10PM	near KBI road, Bylappa Road	A car lost its control and dashed against the motor cyclist
128	Point	11	03-26-2017	02:10PM	near KBI road, Bylappa Road	Car dashed against the motor cycle
129	Point	12	03-26-2017	02:10PM	near KBI road, Bylappa Road	Motor cyclist lost control of the vehicle
130	Point	13	03-26-2017	02:10PM	near KBI road, Bylappa Road	Motor cyclist lost control while on the dip
131	Point	14	03-26-2017	02:10PM	near KBI road, Bylappa Road	Van dashed against the motor cyclist
132	Point	15	03-26-2017	02:10PM	near KBI road, Bylappa Road	Motorcyclist lost control of the vehicle while applying the brakes when a dog try to cross the road
133	Point	16	03-26-2017	02:10PM	near KBI road, Bylappa Road	Unknown vehicle hit and ran the pedestrian
134	Point	17	03-26-2017	02:10PM	near KBI road, Bylappa Road	Tractor dashed against the pedestrian while trying to cross the road
135	Point	18	03-26-2017	02:10PM	near KBI road, Bylappa Road	Motor cycle dashed behind the pedestrian while trying to cross the road
136	Point	19	03-26-2017	02:10PM	near KBI road, Bylappa Road	Unknown vehicle hit and ran the motorcyclist
137	Point	20	03-26-2017	02:10PM	near KBI road, Bylappa Road	Motorcyclist lost control of the vehicle and dashed against the motor cyclist
138	Point	21	03-26-2017	02:10PM	near KBI road, Bylappa Road	Thrust bus dashed against the pedestrian
139	Point	22	03-26-2017	02:10PM	near KBI road, Bylappa Road	Unknown vehicle hit and ran the motor cyclist
140	Point	23	03-26-2017	02:10PM	near KBI road, Bylappa Road	Tractor with water tank dashed against the motor cycle
141	Point	24	03-26-2017	02:10PM	near KBI road, Bylappa Road	Motor cyclist lost control over the vehicle and fell down on the road
142	Point	25	03-26-2017	02:10PM	near KBI road, Bylappa Road	Motor cyclist dashed against the motor cyclist
143	Point	26	03-26-2017	02:10PM	near KBI road, Bylappa Road	Unknown vehicle hit and ran the pedestrian
144	Point	27	03-26-2017	02:10PM	near KBI road, Bylappa Road	A bus dashed behind the pedestrian while trying to cross the road
145	Point	28	03-26-2017	02:10PM	near KBI road, Bylappa Road	A bus dashed behind the pedestrian while trying to cross the road
146	Point	29	03-26-2017	02:10PM	near KBI road, Bylappa Road	Bus dashed behind the pedestrian
147	Point	30	03-26-2017	02:10PM	near KBI road, Bylappa Road	THCTC bus dashed against the motor cyclist
148	Point	31	03-26-2017	02:10PM	near KBI road, Bylappa Road	Unknown vehicle hits the pedestrian and ran away
149	Point	32	03-26-2017	02:10PM	near KBI road, Bylappa Road	Lorry dashed behind the motor cycle and ran over the victim
150	Point	33	03-26-2017	02:10PM	near KBI road, Bylappa Road	Thy Aca with water tank hits the pedestrian while trying to cross the road
151	Point	34	03-26-2017	02:10PM	near KBI road, Bylappa Road	Thy Aca with water tank dashed against the pedestrian
152	Point	35	03-26-2017	02:10PM	near KBI road, Bylappa Road	A van dashed against the motor cyclist
153	Point	36	03-26-2017	02:10PM	near KBI road, Bylappa Road	THCTC bus dashed against the motor cyclist
154	Point	37	03-26-2017	02:10PM	near KBI road, Bylappa Road	Unknown vehicle hits the pedestrian and ran away
155	Point	38	03-26-2017	02:10PM	near KBI road, Bylappa Road	College bus dashed against the pedestrian

Fig 6: Imported data in Attribute table 4

**IX. MARKING BLACK SPOTS**

Marking of black spots were alike creating roads in the base map. The only difference is placing the point shape file as the black spots in the map and their details were already given as an input in attribute table.

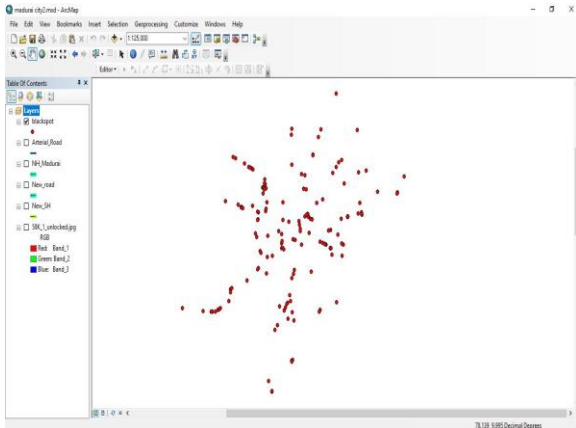


Fig 7: Digitized Black spots

**X. COLLECTION OF LUX VALUES**

Lux is the unit of light intensity. We consider that light intensity is also one of the factor for accidents happening in the city. We took the lux values for two black spot places in the city using the instrument called lux meter. Lux is the measure of one lumen per meter square. The lux values were taken under the street lights of the two black spot places.

**XI. IMPORTING LUX VALUES**

The lux values taken from the street lights were imported in the attribute table alike given in the black spots details, its values were given as an input

FID	Shape	ID	Lux Values
0	Point	0	4.2
1	Point	0	10.7
2	Point	0	15.1
3	Point	0	16.3
4	Point	0	11.1
5	Point	0	3.9
6	Point	0	3.5
7	Point	0	9.2
8	Point	0	15.6
9	Point	0	15.5
10	Point	0	9.3
11	Point	0	3.5
12	Point	0	3.4
13	Point	0	9.5
14	Point	0	15.7
15	Point	0	15.6
16	Point	0	9.4
17	Point	0	3.4
18	Point	0	3.6
19	Point	0	9.4
20	Point	0	15.5
21	Point	0	15.7
22	Point	0	9.3
23	Point	0	3.6
24	Point	0	3.5
25	Point	0	9.4
26	Point	0	15.7
27	Point	0	15.7
28	Point	0	9.3
29	Point	0	3.5
30	Point	0	3.3
31	Point	0	9.3
32	Point	0	15.6
33	Point	0	15.6
34	Point	0	3.6
35	Point	0	3.6
36	Point	0	3.2
37	Point	0	9.3
38	Point	0	15.6

Fig 9: Imported Lux values in Attribute table

FID	Shape	Id	Lux_Value
39	Point	0	15.5
40	Point	0	9.4
41	Point	0	3.5
42	Point	0	3.2
43	Point	0	9.2
44	Point	0	15.5
45	Point	0	15.5
46	Point	0	9.5
47	Point	0	3.5
48	Point	0	3.3
49	Point	0	9.3
50	Point	0	15.8
51	Point	0	15.6
52	Point	0	9.7
53	Point	0	3.5
54	Point	0	4.6
55	Point	0	11.4
56	Point	0	16.7
57	Point	0	15.9
58	Point	0	10.3
59	Point	0	3.8
60	Point	0	3.2
61	Point	0	15.4
62	Point	0	15.5
63	Point	0	10.1
64	Point	0	3.7
65	Point	0	3.3
67	Point	0	9.7
68	Point	0	15.6
69	Point	0	15.6
70	Point	0	3.8
71	Point	0	3.5
72	Point	0	3.2
73	Point	0	9.4
74	Point	0	15.4
75	Point	0	15.7
76	Point	0	9.7
77	Point	0	3.4

Fig 10: Imported Lux Values in Attribute table 2

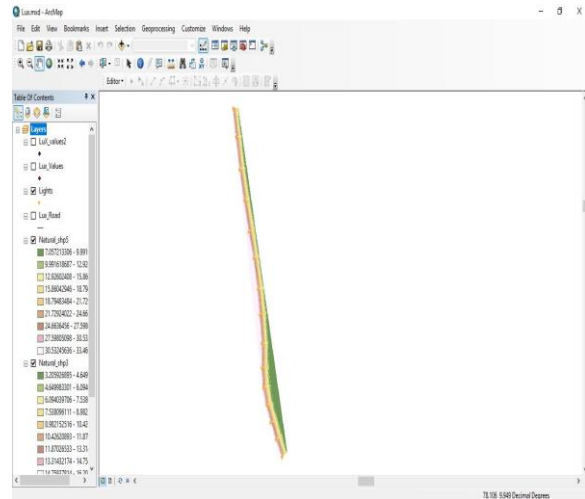


Fig 13: Interpolation of Lux Values for Road 2

FID	Shape	Id	Lux_val
0	Point	0	32.1
1	Point	0	26.5
2	Point	0	8.7
3	Point	0	33.3
4	Point	0	27.3
5	Point	0	7.9
6	Point	0	32.8
7	Point	0	7.3
8	Point	0	8.3
9	Point	0	32.5
10	Point	0	28.4
11	Point	0	8.5
12	Point	0	33.3
13	Point	0	27.1
14	Point	0	7.9
15	Point	0	32.9
16	Point	0	7.6
17	Point	0	33.3
18	Point	0	27.5
19	Point	0	8.2
20	Point	0	33.5
21	Point	0	8.4
22	Point	0	28.4
23	Point	0	33.1
24	Point	0	32.6
25	Point	0	27.9
26	Point	0	33.1
27	Point	0	26.8
28	Point	0	7.8
29	Point	0	31.8
30	Point	0	25.5
31	Point	0	6.9
32	Point	0	32.3
33	Point	0	26.4
34	Point	0	7.3
35	Point	0	34.1
36	Point	0	28.3
37	Point	0	9.1
38	Point	0	

Fig 11: Imported Lux values in Attribute table 3

## XII. CORRELATING LUX VALUES AND BLACK SPOTS

After interpolation of lux values the black spots in that particular place should be correlated with the lux values of that stretch of road in the map. This is how it is shown that it was related to the accident spots.

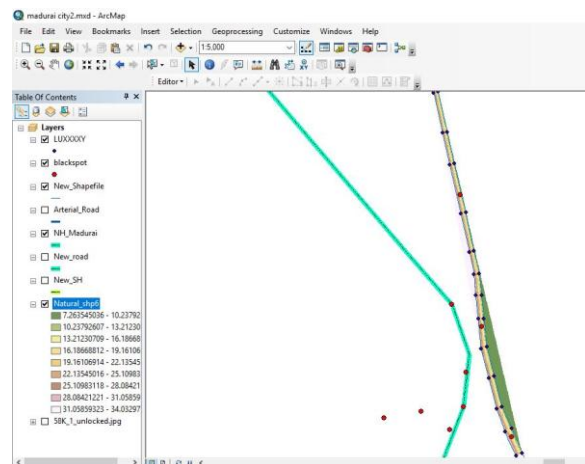


Fig 14: Correlation of Lux Values with Black spots

## XII. INTERPOLATION

With the imported lux values the point shape file were plotted in the road stretch in the Arc Map for interpolation. In interpolation the spread of light in the streets will be shown in the arc map by raster interpolation in 3D analyzing.

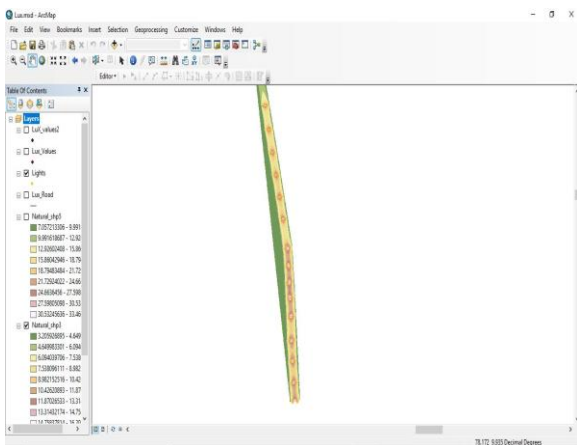


Fig 12: Interpolation of Lux Values for Road 1

## XIII. CONCLUSION

From the data's collected from S.P office and Commissioners office were analyzed and the various reasons for the black spots found out. Mostly the speed of the vehicle is the primary reason as well as the driver's negligence that leads to accident. In order to reduce these accidents proper road sense has to be taught to all the road users and certain geometric designs as well as modern tools are such as speed gun and exclusives lanes required bringing down the speed of vehicle and co ordinate the moving vehicles in proper order.

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#### **REFERENCES**

- [1] Gholam ali shafabaksh, Afshin Famili, Mohammad Sadegh Bahadori "GIS-based spatial analysis of urban traffic accidents".
- [2] Romi Satria, Maria Castro "GIS tools for analyzing accidents and road design".
- [3] Edy Purwanto,"Application of Geosynthetics Technology for Landfill Structure Design at Pt. Toba Pulp Lestari Tbk. North Sumatera, Medan - Indonesia",International Journal of Civil Engineering (SSRG-IJCE),Volume2 Issue2 2015.
- [4] Evangeline Muthoni Njeru, Andrew Imwati "GIS In road accident mapping and emergency response management..
- [5] Dr.S.K.Ghosh, Dr. M.Parida, Jay K.Uraon "Traffic accident analysis for Dehradun cityusing GIS".
- [6] Vinod Kumar Gupta, Prof. AkhilKhare,"Geo Polymer Concrete",International Journal of Civil Engineering (SSRG-IJCE),Volume2 Issue4 2015.
- [7] Jayvant Choudary, Anurag Ohri, Brind Kumar "Spatial and statistical analysis of road accidents and hot spots using GIS".
- [8] S.S.Bachhav, Dr. S.K.Dubey, Sanket Jain," Effect of Geopolymer on Strength of Concrete",International Journal of Civil Engineering (SSRG-IJCE), Volume3 Issue1 2016.