# 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, tha 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 sectored 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**

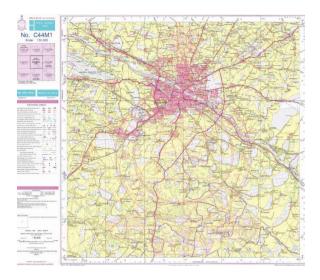
The primary work started with the collection of data. The accident data were collected from Commissioner's office, Madurai. The Madurai city was taken for the project because we have compared accident statistics for three district head quarters madurai, virudhunagar, dindigul. Among the three Madurai 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.

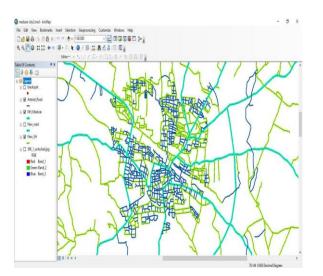


Fig 2: Digitized roads of Madurai city

#### VIII. IMPORTING DATA

Data collected and analyzed were given as an iput 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.

. 64	E.P.	a di x						
• 穏•	1911	- 같 &						
clispot	kspot							
FID Sh	ape' i	d Date	Time	Location	cause			
0 Point		1 14-01-2017	4.30P3I	Near Jas overseas exports	rash driving by the bus driver who struct the car which caused the car to overturn.			
1 Point	1	2 26-01-2017	7.45 A.M	No 4 toll gale Anupukottai Ring Road	bus lost its control and rammed into the center median which caused the bus to overturn			
2 Point	1	3 27-01-2017	12.00 P.M	rejaman negar chinthamani road Nadurai	TNSTC bus drive drove he bus in rash manner and hit a motorcycle			
3 Point	1	7 01-01-2017	9.15 P.W	Vatuthavani, Vielur med, Vladurai.	unknown vehicle (ht and run)			
4 Point	1	6 06-01-2017	9.45 P.M	Stiran Sha Wil, Palan Staton Road, Wadurai	rash driving and hit against E.B post			
5 Point	1	5 02-01-2017	6.30 P.M	Karuppeyurani sand road, Valamagar (Kadurai,	unknown vehicle (ht and run)			
6 Point	1	4 31-12-2017	10.00 P.M	Vatuthavani, Vielur main mad, Viadurai	lost control of his vehivle due to application of sudden brake			
7 Point	t	8 07-01-2017	9PH	Dindigul Roed, Hadurai.	rash driving by the motorist and hit against the cyclist			
8 Point	t	9 18-01-2017	10.45 P.M	Pendi kovil ring roed, Madurai.	rear end collison between a car and a 407 van			
9 Point	1	11 20-01-2017	11.40 A.W	Sivagangal main road, Wadurai.	lost control of the vehicle and dashed against the center median.			
10 Point	t .	13 25-01-2017	7.159.11	Opposite of Naturhavani bus stand, Nadurai	pedestrian wwas struck by a TNSTC Bus while trying to cross the road			
11 Point	1	10 17-01-2017	2.30938	Yagappa Nagar Nain Road, Anna Nagar, Madurai.	un intown vehicle (hit and run)			
12 Point	1	14 28-01-2017	7.15P.M	Kamarajar bridge, Dindigul main road, Nadurai.	pedestrian was struck by a lifetar cycle while trying to cross the road			
13 Point		12 04-01-2017	6.45931	Sarvodaya main road Iladurai	hit the pedestrain while trying to reverse the vehicle			
14 Point	1	15 01-01-2017	5.30P3I	Theni Vain Road, Nadurai,	pedestrian wwas struck by a Van while trying to cross the road			
15 Point	1	16 10-01-2017	11.00P.M	Near Aristo hospital Bye pass road Wadurai	collion between a motorcycle and speeding car			
16 Point	1	17 13-01-2017	10.159.0	TPK Main Road Madural	side on collison by motorist that struck against a Bus sideward trying to overtake.			
17 Point		18 14-01-2017	2.30938	Thrunagar Nadural	pedestrian was struck by a lony while trying to cross the road			
18 Point		19 20-01-2017	10.00A.M	Thrunagar GST road Natural	notorist lost control of vehicle and fell into the center median			
19 Point		20 01-02-2017	7.45218	Villepuram, Nadurai	collision between two motor cycles.			
20 Point		21 05-02-2017	2.50P3I	Axeriyapuran By Pass Road, Madural	sideon collision between van and motorcycle			
21 Point		22 06-02-2017		New Ramanathapuram Road, Madurai	pedestrian was struck by a notorcycle while trying to cross the road			
22 Point		23 08-02-2017	3A.W	Angukatai Ring Road, Waturai	lost control of his vehicle due to the application of brake			
23 Point		24 16-02-2017	6.45A.II	Thinoaramkundram Main Road, Madurai,	pedestrian was struck by a Auto while trying to cross the road			
24 Point		25 19-02-2017	2.30931	Akenwapuram Man Road, Madurai	overturning of Auto due to Rash driving			
25 Point		41 20-02-2017		Kamarajar Salai Vadurai.	pedestrian was struck by a notorcycle while trying to cross the road			
28 Point		26 30-01-2017	7.1593	Koodalpedur road Nadurai	collision between motor cycles and cycle.			
27 Point		27 02-02-2017	7P.W	Vahatma Gandhi Nacar main road Vadurai	rear end collison between motor cycle and mini bus			
28 Point		28 03-02-2017		Pandikoli rino road Vadurai	rear endcollision between motor cycle and lorry			
29 Point		29 04-02-2017	5.20A H	Kulamancelem mein roed Kanmekerei Selur Nedurei	ut known vehice (hit and run)			
30 Point		30 05-02-2017	7.1521	Kadacharendhai to Conachikuları road Nadurai	pedestrian was struck by a notorcycle while trying to cross the road			
31 Point		31 06-02-2017	74.9	Neena carden Valar napar Nelur ring road Nadurai	ut ktown vehicle (hit and run)			
32 Point		32 01-02-2017	8P.W	Naravanapuram New Natham main road Madurai	ut known vehicle (ht and runi-pedestrian			
33 Point		33 31-01-2017		inayam nagar Anayur Nadurai	lost control of the notorcycle			
34 Point		34 14-02-2017	5P.W	In front of 2nd gate New GH Panagal road Madural	ut known vehicle iht and runi-oedestrian			
35 Point		35 25-02-2017		Opposite to Naegar alayam Melur main road Madurai	un krown vehicle (ht and run)-pedestrian			
36 Point		36 05-02-2017	79.1	TPK Kan road Pasumalai Wadurai	pedestrian was struck by a notorcycle			
37 Point		37 07-02-2017	10.40P31	Andaburan Madurai	collision between lorry and motor cycle			
38 Point		38 11-02-2017		TPK Ifain road ThiruNapar Hadurai	lost control of his vehicle due to the application of brake			

#### Fig 3: Imported data in Attribute Table

19 P 10 P 11 P 12 P 13 P 13 P 14 P 15 P 15 P 19 P 19 P 10 P	Port Port Port Port Port Port	39 ( 29 ( 31 ( 34 (	14-02-2017	Time 1.50P.M	Location	Cause
40 P 41 P 42 P 43 P 44 P 45 P 46 P 49 P 49 P 50 P	Port Port Port Port Port Port	29 ( 31 ( 34 )	14-02-2017			
11 P 12 P 13 P 13 P 14 P 15 P 15 P 16 P 19 P 19 P 19 P 10 P	Point Point Point Point Point	31 0 34 1			TPK Wain road Pasumalai Wadurai	reciless driving in the wrong side
12 P 13 P 14 P 15 P 15 P 18 P 19 P 19 P 19 P	Point Point Point Point	34	6.02.2017	5.20A.M	Kulamangalam main road Sellur Nadurai	unknown vehicle (hit and run)
13 P 14 P 15 P 15 P 16 P 18 P 18 P 19 P 19 P	Point Point Point			7.00P.M	Veena garden Valar nagar Kelur ring road Nadurai	un known vehicle (hit and run)
44 P 45 P 46 P 46 P 48 P 49 P 50 P	Point Point	32/	14-02-2017	S.DOP.M	In front of 2nd gate New GH Panagal road Nadural	un known vehicle (hit and run)-pedestrian
15 P 16 P 17 P 18 P 19 P 19 P	Point	-	18-42-2017	6.40A.M	Vratpathu Theri main road Madurai	collision between auto and car
46 P 47 P 48 P 49 P 50 P		40 0	16-02-2017	9.00P.M	Vratpathu Theni main road Madurai	collision between lorry and motor cycle
17 P 18 P 19 P 50 P		00	18-43-2017	5.15 AM	Aruppukatai Ring Road Nadurai	collision between Auto and motor cycle
18 P 19 P 50 P 51 P	Point	0	13-03-2017	11.45 A.M	Near petrol pump aruppulicital ring road	un known vehicle (hit and run)
19 P 50 P 51 P	Point	0	14-03-2017	11.15 P.N	WK puram Jahindpuram	collision between motor cycles and Hand drawn vehicle
50 P	Point.	0	843-207	6.45 A.H	Near A K Ahaned, Arupukottal main road	pedestrian was struck by a lilotor cycle while trying to cross the road
51 P	birt.	0	13-03-2017	8.30 A.M	Gonathipuran, Sixatgargai nain road	pedestrian was struck by a notorcycle and notor cyclist was deceased
	Point	0	14-03-2017	9.00 A.M	North river bed road, alwarpuram	pedestrian was struck by a lilotor cycle while trying to cross the road
	Point	0	17-43-2017	4.00 P.H	opposite to meenakshi college, kalpalam road	lost control of the Notor Cycle and dashed against the Auto
52   P	Point	02	23-03-2017	10.30P.M	Near pandi kovil ring road	Pedestrian was struck by a bus while trying to cross the road
53 P	Point.	02	23-03-2017	11.00P.W	if thiagarajan agro products, dindigul main road	unknown vehicle hit and run the motorist
14 P	Point	0	38-43-2017	10.15A.M	Near kannan departmental store, theekathir	lost control of his vehicle due to the application of brake
55 P	-trit	00	12-03-2017	10.40P.M	Opp. of Royal Court Melaveliveethi	Notor cyclist hits another static motor cyclist and ran away
56 P	trint.	0	18-03-2017	05.50 A.II	IF of KFC	Rear end collision between car and a motor cycle
17 P	Point	0	18-03-2017	02.40P.M	Near ferner colory, theni main road	un known vehicle (ht and run)
58 P	Point	0	19-43-2017	04.45P.M	If of Sivaj Statue, suduftianni vaikai road	Notor cyclist lost control of the vehicle while turning
9 P	Point.	01	19-03-2017	9.35P.W	Near alagappa nagar, TPK road	Decessed hit by matcrist first then he got hit by tratic bus
50 P	túrt.	02	20-03-2017	06.15P.W	opp. to mannar college, TPK read	Lony hits behind the cyclist
51 P	birt	0	21-03-2017	11.00P.M	opp to veylugendamman kovil tpk road	un known vehicle (hit and run)-pedestrian
52 P	-birt	00	14-05-2017	07.20A.M	Avaniyapuran purasaradi cross road	Lorry dashed behind the pedestrian while taking reverse
53 P	hint.	0	14-05-2017	06.00A.W	Near Jas overseas exports	un known vehicle (ht and run)-pedestrian
14 P	bit	0	17-05-2017	05.25A.W	Near nimala school, Kannajar salai	Lony has the pedestrian while trying to cross the road
5 P	Point	0	17-45-2017	09.20A.M	Near Taminadu Polytecnic	Notor cyclist lost control of the vehicle while turning
6 P	birt	0	22-05-2017	12.20A.M	Near Veenalishi nagar , villaguram	unknown vehicle hit and run the motorist
17 P	Point.	02	23-45-2017	03.30A.M	Near Anna Lony sted, reipettai	Lony has the pedestrian
18 P	Point	01	11-05-2017	01.20P.M	IF of SI complex Dindgul Road	two notor cyclist hits opposite to each other
9 P	Point.	0	14-05-2017	10.15P.M	Near indrapriyadharshini st, K.V salai	two notor cyclist dashed against each other
ID P	birt	0 1	16-05-2017	03.00P.W		Lorry dashed behind the notor cycle
11 P	tirt.	0	18-05-2017	05.30A.M	AF of VPN Hardware, New nathern road	un known vehicle (hit and run)-pedestrian
12 P	Point	03	20-05-2017	08.20A.M	Gonathipuram, Sivagangai Nain road	Auto dashed the lilotor cyclist
13 P	birt	0			IF of bind School, Dindiqui mainroad	lost control of the matorcycle
14 P	birt	0.2	21-05-2017	07.00P.W	IF of Thirumurugan motor shop Surveyor colony	Car dashed against the pedestrian
5 P	bit				IF of Raia plastic shop Pandkovil ringroad	two notor cyclist dashed against each other
16 P	hirt	6	38-04-2017	08 00P W		lost control of the matorcycle

Fig 4: Imported data in Attribute table 2

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- D1 - D1	BB#						
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tipet							
RD Shape	· kt Da	e Time	Location	Cause			
78 Point	0 18-05-	017 03.30P.M	Ells rager road near air horn shop	unknown vehicle hit the pedestrian and ran away			
79 Point	0 24-85-	017 03 15P M	IFot KV mahal, ByeRass Road	Rear end collision by the notorcyclist with another			
80 Point	0 18-06-	017 08.30P.M	No. 4 toll gate Anapukattal Ring Road	Rear end collision by the notorcyclist with another			
81 Point	0 21-06-	017 09.05P.M	Near thiyagarajar arts college bus stop	Triate bus hits the pedestrian while trying to cross the road			
82 Point	0 33-06-	017 02.30P.W	oop to Jeyobharath city iv, APK road	Van has the pedestrian while walks on the left side shoulder			
83 Point	0 03-06-	017 03.00P.M	Welur Mainroad	Van fre buerts and lost its control when it tried to turnieft			
84 Point	0 05-06-	017 01.30P.M	East side Busstop, Gorippalayam	Lorry dashed behind the notor cycle			
85 Point	0 06-06-	017 02.30P.M	IF of Menakshi coffee bar, Dindigul main road	Water cycle ran over an speed breaker rashly			
86 Point	0 01-06-	017 11.00A.M	V.P Rathnasamy nadar road	Unknown vehicle hit the motorist and ran away			
87 Point	0 07-06-	017 08.00P.M	Koodal pudhur to aanayur road	Victor cyclist last control of the vehicle while applying brake to save life of a pedestrian			
88 Point	0 11-06-	017 10 40P.M	opp to kannen departmental store, theekathir	Wolorcyclist hits the pedeablian			
89 Point	0 17-06-	017 07.45A.M	IF of Meanakshi wood shop, Kulamangalam road	un known vehicle (ht and run)-pedestrian			
90 Point	0 01-06-	017 05.40A.M	Near Poonga bus stop. Tiruperangundram	Trate bus hits behind the cyclist			
91 Point	0 02-06-	017 12.15P.M	Near kasisvasal classic motor service	two notor cyclel deshed epainst each other			
92 Point	0 05-05-	017 05.15P.M	IF of thiyagarajar colony jn, pasumalai	motor cyclist's waking stick stroke the ground while riding and lost control			
93 Point	0 08-06-	017 07 1SP M	Chokalings ragar entrance, bypess road	unknown vehicle hit and ran the motor cycle			
94 Point	0 18-06-	017 07.20P.M	Opposite to SNR bulk, tok road	Wotor cyclist dashed the Pedestrians			
95 Point	0 24-05-	017 04 30P M	Occosite to Mathy Theatre, AA Road, Madural	Rear end collision between tricycle and a car			
96 Point	0 27-06-	017 12.45P.M	Near TPK Bementry School	Water Lony dashed against the compound wall			
97 Point	0 05-04-	017 02.45P.M	Airport road , Velaiai junction	Car dashed against the notor cycle			
SE Point	0 10-04	017 05 50A M	Wunichalai sional Jn	Bus dashed against the motor cycle			
99 Point	0 13-04	017 08.00P.W	Avanalyzouram byepasa, sempoorani road	notor cyclet hits the pedestrian while trying to cross the road			
100 Point	0.07-04	017 10 50A M	IF of as in mik booth, south meret st	Two notor cyclists dashed against each other			
101 Point	0 20-04-	017 05 30A M	IF of Kennitchi tiffin centre. Avanivacuram road	Auto lost its control and hits the pedeatrian, both pessenger and pedeatrian gets injured			
102 Poet	0 23-04-	017 08 30P M	IF of hyperarguram residence, panalysr road	Wotor cycle dashed against a lady sitting infront of her house			
103 Point	0 28-04	017 04 30P M	East and South cement road in teopakulam	when kiny turned left, the motor cycle lost its control and dashed against the lony			
104 Point	0 29-84	017 06 00A W	Tiese' Jas puerseas exports	Lony deated against the car			
105 Point	0 05-04	017 01.45P.M	Near Devendrar marriage hall alagar koli road	Lony dashed against the motor cycle			
106 Point	0 16-04	017 10.05P.W	Near theekathir office, Dindgul road	A bus hits the pedestrian while trying to cross the road			
107 Point	0 58-04	017 04 30P M	Nettai man road, B.B.kulan	Wotor cyclet bat control over his vehicle and dashed against the iron trash bin			
155 Point	0 18-04	017 09.40P.M	Opp to Kannan store. Dindigul Mainroad	Lony dealed against the cyclist while trying to cross the road			
109 Point	0 23-04	017 08.00P W	PT Raian mad. B B kulam	Wolper cyclist dashed behind the auto and fell down			
110 Point	0 02.67.	017 08.30P.W	Kanaraar salai Teccelulan	Wotor cyclist last vehicle while applying the breakwhen a dog try to cross the road			
111 Point	0 11-07-	017 12 30A M	IF of tower shop, kamarajor salai	Car dashed behind the pedestrian while trying to cross the road			
112 Point	0 11.67.	017 05.20P.W	opp to Nimela school, kamarajar salal	Trate bus dashed against the bicycle rider when he is trying to cross the road			
113 Port	0 13-67-	017 08 30P M	Near pathine theatre, vilapurant main road	Van dashed against the motor cyclist			
114 Ppint	0 31-07-	017 05.00P M	Valarentheourammein street, avervysouram	Van dashed against the victim while she standing infront of her house			
115 Point	0 33-56-	017 01.00P M	Near uthangudi melur main road	Water cyclist last control of his vehicle			
116 Point		017 09 00A W	Near koodalputhur alancervalur main road	Lonv dashed against the motor cyclist and ran over his head			

Fig 5: Imported data in Attribute table 3

			長 8				
depot							
FID	Shape *	ы	Date	Time	Location	Cause	
117	Point	0 1	8-87-2017	09.30A.M	Dathaneri mainroad	Car dashed against the notor cycle	
118	Point	0	5-07-2017	05.35P.W	IF of emergency gate old GH panagal road	Wini bus dashed against the notor cyclist and ran over his head	
119	Point	0	0-06-2017	09.00P.M	IF of complainant house, palanganetham	Car dashed against the pedestrian and cause inury	
120	Point.	0	9-87-2017	09.20A.M	Near surya tiffn centr, westvel street	reforcyclat hits the pedestrian while he is trying to cross the road	
121	Point	0.0	1-06-2017	01.00P.M	IF of Valalarkotan, avaniyapuran	meter cyclist last control of his vehicle	
122	Point.	0 3	1-88-2017	05.45A.M	Near Little diamond school, villapuram road	Corporation dustbin lorry dashed behind the motor cyclist	
123	Point	0.3	3-08-2017	10.10P.M	opp to imalayagarden, vellakal branch	van dashed against the motor cyclist	
124	Point	00	7-88-2017	04.00P.M	Svegangelin, gendkoviliring road	Car dashed against the metor cyclist	
125	Point.	0 1	0-08-2017	08.45A.M	Near sowrashtrapuren slop, vandyur	tractor dashed against the motor cyclist and ran over the victim's neck	
126	Point	0	0-08-2017	12.300.M	Near sowrashtrapurem stop, vandyur	Auta dashed against the motor cyclist	
127	Point.	0 1	1-08-2017	09.40P.M	near ramraj cotton mil, DGL mainroad	A car lost its control and dashed against the centre median	
128	Point.	0(1	7-08-2017	12.30A.M	125ft road, suveyor colony, alegerkol road	Van dashed against the motor cyclist	
129	Point	0 3	0-08-2017	05.00P.M	Valar nagar js. melur main road	A car dashed against the motor cycle	
130	Point.	03	0-08-2017	05.00P.M	Water tank stop, alagar kol road	notor cycle lost its control while ran over the dig	
131	Point	0	3-06-2017	09.30P.M	Sharathinagar, selur main road	Van dashed against the motorcycle	
132	Point.	0 3	7-08-2017	01.30A.M	Pandkovil ring road junction	Wotorcyclet lost control of his vehicle while applying the brake when a dog try to cross the road	
133	Point	0	5-88-2017	06.45P.M	opp to new GH stop, panagal road	Unknown vehicle hit and ran(pedestrian)	
134	Point	03	9-86-2017	07.00P.M	opp to booma hospital, gokale road	tractice dashed against the pedestrian while trying to cross the road	
135	Point	0.0	6-08-2017	11.15P.W	ose to thirunger 3rd bus stop	omni bus dashed behind the peddestrian while trying to cross the road	
138	Point	0 1	3-88-2017	02.30P.M	IF of taj hotel, tok road	unknown vehicle hit and run the motorcycle	
137	Point	0.7	1-08-2017	01.00P.M	see to belarshangan achool, trunegar	instorcyclist lost control of his vehicle and dashed against the centre median	
138	Point	0 3	4-08-2017	08 30A M	HIIS colony, Theni main road	tempo travelor lost its control and dashed against the standing pedestrian	
139	Point	0	4-08-2017	11.25A.M	Periver bus stand 1st platform	Triste bus dashed against the pedestrian	
140	Point	0	6-05-2017	05.00A.M	Theyar bridge, west side downwards	unknown vehicle hit and run the motor cyclist	
141	Point	0.0	6-05-2017	09.00A m	on the way to perivar statue. Avaniyeouram	Tractor with water tank dashed against the motor cycle	
142	Point	01	4-09-2017	02.30A.M	Near purudevnagar, Avaniyapuram bypass	metar cyclist lost control over his vehicle and fall down on the road	
143	Point.	0.0	7-09-2017	10.30P.M	near karpaga nagar, alagar koli road	unknown vehicle hit and run the pedestrian	
144	Point	0.0	4-09-2017	05.45P.W	IF of Begevishi coffee bar, arapeleyers	A bus dashed behind the pedestrian while trying to cross the road	
145	Point	00	9-09-2017	11.10A.M	IF of TVS factory, then main road	A bus dashed behind the pedestrian while trying to cross the road	
148	Point.	0 1	6-09-2017	03.45P.M	IF of matura coats, new jai road	Bus dashed behind the pedestrian	
147	Point	0	9-09-2017	05.45P.M	CO road, Arapalayam	THISTC bus dashed against the metor cyclist	
148	Point.	0 1	1-09-2017	11.30A.M	uF of Preeth hospital, Ponmeni	Unknown vehicle hits the standing person and ran away	
149	Point	0	7-09-2017	02.00P.m	IF of Japralash store, North vel st	Lorry dashed behind the notor cyclist and ran over the victim	
150	Point	0.0	1-10-2017	07.30P.M	see to kings bakery, avantyaouram	Tata Ace with water tank hits the pedeatrian while trying to cross the road	
	Port			08.45A.M	IF of value bakery, vilaouram arch	Tata ace with water tank dashed against the pedestrian	
	Point		9-10-2017		Sempuranivakan perivar negar, avantivapurant	A vas dashed against the motor cyclist	
	Point		5-10-2017		Near aravind hospital, mahal road	TNSTC bus dashed behind the notor cyclist	
	Point			03.00P.m	Near velammal hospital. APK ring road	Unknown vehicle hits the pedestrian and ran away	
	Point		4-10-2017		Near Thiyagaraiar bulk. South veli street	College bus dashed against the pedeatrian	

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.

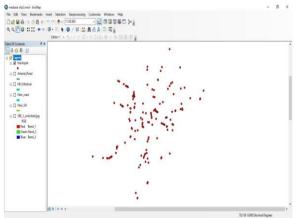


Fig 7: Digitized Black spots

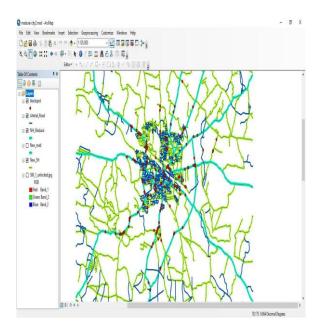


Fig 8: Digitized Roads with Black spots

## 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 vales 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

II •   🔁 •   🖫 🔂 🖾 🐠 🗙						
	CValue FID	Shape *	Id	Lux_Values		
ъŤ	0	Point	0	4.2		
- I	1	Point	0	10.7		
-1	2	Point	0	16.1		
-1	3	Point	0	16.3		
-1	4	Point	0	11.1		
-1	5	Point	0	3.9		
-1	6	Point	0	3.6		
-1	7	Point	0	9.2		
-1	8	Point	0	15.6		
-1	9	Point	0	15.5		
-1	10	Point	0	9.3		
-1	11	Point	0	3.5		
-1	12	Point	o	3.4		
-1	13	Point	o	9.5		
-1	14	Point	0	15.7		
-1	15	Point	0	15.6		
-1	16	Point	0	9.4		
-1	17	Point	0	3.4		
-1	18	Point	0	3.6		
-1		Point	0	9.4		
-1	20	Point	0	15.9		
-1	21	Point	0	15.7		
-1	22	Point	0	9.3		
-1	23	Point	0	3.6		
-1	24	Point	0	3.6		
-1	25	Point	0	9.4		
-1	26	Point	0	15.7		
-1	27	Point	0	15.7		
-1	28	Point	0	9.3		
-1	29	Point	0	3.5		
-1	30	Point	0	3.2		
-1	31	Point	0	9.3		
-1	32		0	15.6		
-1	33	Point	0	15.6		
-1	34	Point	0	9.4		
-1	35	Point	0	3.6		
-1	36	Point	0	3.2		
-	37	Point	0	9.3		
-	38	Point	0	15.6		

Fig 9: Imported Lux values in Attribute table

- =							
x_Values							
FID	Shape *	Id	Lux_Values				
39	Point	0	15,				
40	Point	0	9.				
-4-1	Point	0	3.				
42	Point	0	3.				
43	Point	0	9.				
-5-6	Point	0	15.				
45	Point	0	15.				
-46	Point	0	9,				
47	Point	0	3.				
48	Point	0	3.				
49	Point	0	9.				
50	Point	0	15.				
51	Point	0	15.				
52	Point	0	9.				
53	Point	0	3.				
5.4	Point	0	4.				
55	Point	0	11.				
56	Point	0	16.				
57	Point	0	15.				
58	Point	0	10.				
59	Point	0	3.				
60	Point	0	3.				
61	Point	0	9.				
62	Point	0	15.				
63	Point	0	15.				
64	Point	0	10.				
65	Point	0	з.				
66	Point	0	3.				
67	Point	0	9.				
68	Point	0	15.				
69	Point	0	15.				
70	Point	0	9.				
71	Point	0	3.				
72	Point	0	3.				
73	Point	0	9.				
74	Point	0	15.				
75	Point	0	15.				
76	Point	0	9.				
77	Point	0	3.				

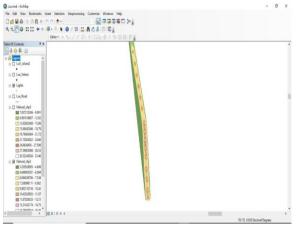
Fig 10: Imported Lux Values in Attribute table 2

X_values2						
FID	Shape *	I d I	Luxyyy			
0	Point	0	32.1			
1	Point	0	26.5			
2	Point	0	8.7			
3	Point	0	3.3			
- 4	Point	0	27.2			
5	Point	0	7.9			
6	Point	0	32.8			
7	Point	0	27.3			
8	Point	0	8.3			
9	Point	0	32.5			
10	Point	0	26.8			
11	Point	0	8.5			
12	Point	0	33.3			
13	Point	0	27.1			
1-6	Point	0	9			
15	Point	0	32.9			
16	Point	0	26.3			
17	Point	0	7.6			
18	Point	0	33.3			
19	Point	0	27.5			
20	Point	0	8.2			
21	Point	0	33.5			
22	Point	0	28.4			
23	Point	0	8.4			
24	Point	0	32.6			
25	Point	0	27.9			
26	Point	0	8,4			
27	Point	0	33.1			
28	Point	0	26.8			
29	Point	0	7.8			
30	Point	0	31.9			
31	Point	0	25.5			
32	Point	0	6.9			
33	Point	0	32.3			
34	Point	0	26.4			
35	Point	0	7.3			
36	Point	0	34.1			
37	Point	0	28.3			
38	Point	0	9.1			

Fig 11: Imported Lux values in Attribute table 3

#### **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.





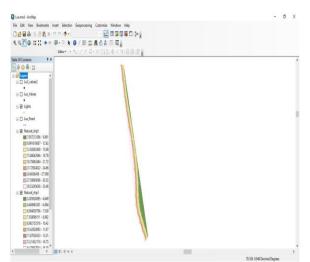


Fig 13: Interpolation of Lux Values for Road 2

## 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.

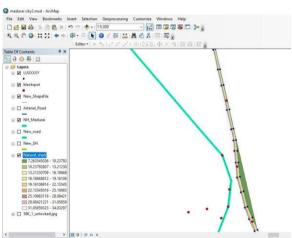


Fig 14: Correlation of Lux Values with Black spots

#### **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.

#### XVI. ACKNOWLEDGEMENT

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