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IMPACT OF SURVEILLANCE CAMERAS AT INTERSECTIONS

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ABSTRACT

Traffic violations are on an increasing pace due to the tremendous increase in the traffic volume in the city. Public highways and private facilities demands an increasing need for video transport surveillance facilities to capture evidence of traffic offences, parking violations theft and for gathering details of transport entering and exiting a particular area, such as at toll roads or city toll points, car-parks or in the case of suspected serious and organized crime. This paper describes the impact of surveillance cameras installed in Thiruvananthapuram City. The surveillance cameras are installed in the Thiruvananthapuram City on April 2011.It has been successively installed over 70 locations and traffic violations are monitored. From the analysis of accidents in the Thiruvananthapuram city from 2008 to 2011 it is inferred that the surveillance camera has no effects in reducing the accident rates of the city but there is a considerable increase in the usage of seat belt and helmet. Surveillance cameras plays significant role in reducing crime rate as well as other traffic violations to a certain extent. In order to improve the efficiency of cameras proper enforcement measures should be taken.

Keywords: Surveillance camera, traffic violations

1.INTRODUCTION

Intelligent Transportation System (ITS) places an important role in improving a countries transportation system. ITS applies advanced and emerging Technologies in information processing, communications, control, and electronics to transportation needs effectively[3]. Advanced Transportation Management is an important application of ITS and can be done effectively by using the traffic monitoring and surveillance equipment. The primary goal of traffic surveillance is to supply information about conditions in the field to other system components so that appropriate response and control actions can be taken. Monitoring and traffic surveillance include the use of closed circuit television (CCTV), system detectors and communication networks [4]. These tools can help improve incident management, inform control-decision making and determine the traffic conditions. Traffic surveillance cameras are installed in busy junctions of Thiruvananthapuram city. Dome type surveillance cameras are used in Thiruvananthapuram, which can tilt and rotate giving a full 360 degrees freedom. Traffic violations such as jumping signals, stopping on zebra cross, parking at 'No parking' zones, speed limit violations etc registered through the

surveillance cameras. Helmet and seat belt wearing violations are also registered. When a vehicle is caught for any violation, the police will send a notice to vehicle owner's address. These surveillance cameras enhance the ability of law enforcement, detect and apprehend criminals and improve road safety[5]. The surveillance system also helps the police to optimize manpower deployment[6].

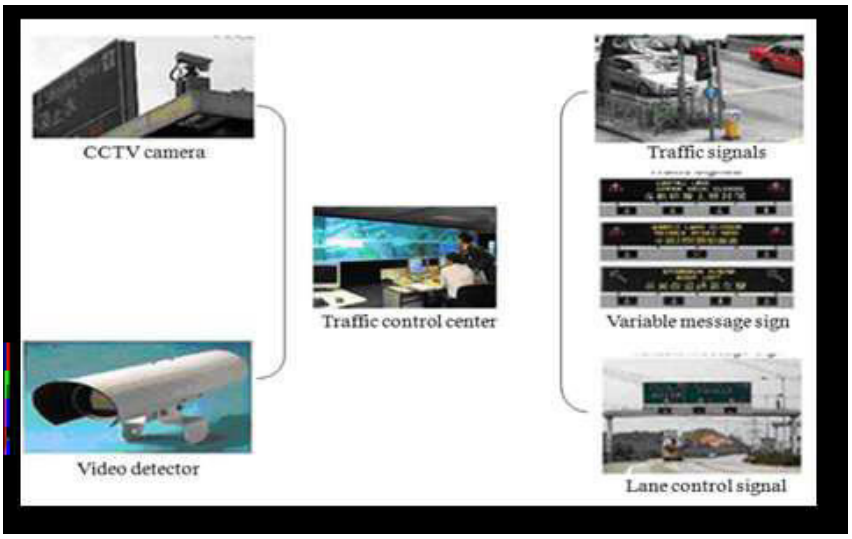


FIGURE 1. TRAFFIC CONTROL AND SURVEILLANCE

2. SCOPE AND OBJECTIVES

- To identify the road stretches and junctions where surveillance cameras are installed.
- To evaluate the impact of surveillance cameras in reducing the road accidents and operational efficiency of the identified intersections.
- To evaluate the impact of surveillance cameras in traffic congestion and crowd management during jathas or processions on city roads.

3. METHODOLOGY

This project is mainly meant for finding the impact of surveillance cameras in the Thiruvananthapuram city. Firstly the locations and stretches where the surveillance cameras and radar speed check cameras installed are identified. The concerned data are obtained from traffic control room. From the traffic police, collection of past and present road accident data on selected stretches was identified. In order to find out positive and negative impacts of surveillance cameras, an opinion survey of road users and local people are conducted. Analysis and evaluation of the observed data are done based on the road safety and traffic accident control.

4. STUDY AREA

Thiruvananthapuram District is the southernmost district of the coastal state of Kerala, in south India. It is the capital city of Kerala. The district has an area of 2,192 square kilometers (846 sq mi) and a population of 3,307,284 (as per the 2011 census). With the boom of Information Technology, banking and insurance, travel and tourism and carrier education, the city is the focal centre for many job opportunities from all these industries. This results in faster growth of vehicles in the region. However, traffic infrastructure is not expanding at the same pace leading to demand supply mismatch. Nearly eight lakh vehicles are on road in the district which recorded the increase of 2.5 times over the past decade between 2001 and 2011.

5. RESULTS AND DISCUSSIONS

TABLE 1. PETTY CASES DETECTED USING RADAR SPEED CHECK CAMERAS

Offence	Offences total 2011	Offences total 2012	Offences total 2013
Radar over speed	1504	3703	2494
Signal violation	2098	698	94
total	3601	4401	2588

TABLE 2. PETTY CASES DETECTED USING SURVEILLANCE CAMERAS

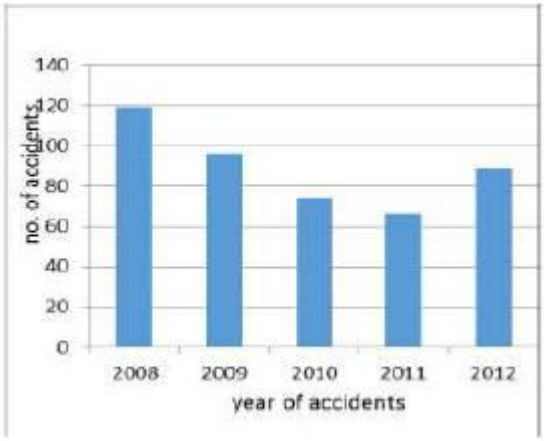
Offence	Offences total 2011	Offences total 2012	Offences total 2013	Offences total detected
No seatbelt	16276	8273	2031	26580
No helmet	27374	48662	16683	92719
Zebra line crossing	5137	2822	634	8593
Signal violation	10	41	28	79
Mobile phone using	26	47	0	73
Triple overload	6	30	13	49
Foot path parking	0	24	58	82

Total petty cases detected using surveillance cameras including black film usage, foot path parking, triple overload, mobile phone usage, signal violation, no parking , no helmet, no seatbelt and zebra line crossing during 2011,2012,2013 are 4885,60653,20338 respectively .Surveillance cameras are also used for crime detection and prevention. They are also very effective in providing proof of evidence in accidents, to monitor and ensure human safety during dharnas and jathas. All over 150 cases had registered related to these crimes. Accident analysis is carried over on these seventy locations were cameras are installed based on severity basis as well as stretch basis.

TABLE 3. ANALYSIS OF ACCIDENTS REPORTED ON THE MAJOR ARTERIAL CORRIDOR (THAMPANOOR-STATUE-PALAYAM-PMGPATTOM- KESAVADASAPURAM-ULLOOR) IN THIRUVANANTHAPURAM CITY

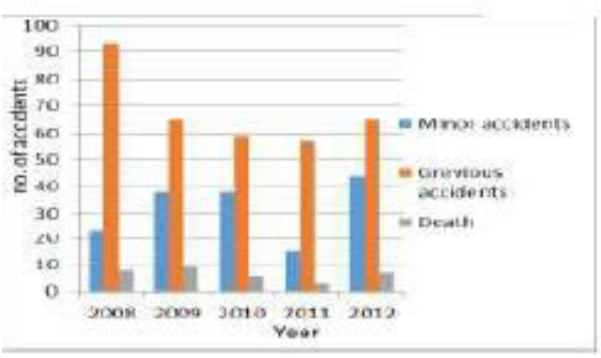
Sl.no.	Year of accident	No. of accident
1	2008	119
2	2009	96
3	2010	74
4	2011	66
5	2012	89

CHART 2.ACCIDENT ANALYSIS



It is observed from the chart that accident rate follows a decreasing pattern upto 2011 and then it is increasing in 2012.Since the cameras are installed in 2011 April, it is clear that surveillance cameras have no significance in reduction of accidents.

CHART 3. ACCIDENT ANALYSIS BASED ON SEVERITY OF ACCIDENTS



The chart shows the severity of accidents during the past five years in the MG road stretch. It is clearly observed that the grevious injuries and death occurred have reduced from 2008 to 2011. Even though it shows a slight increase in 2012, compared to 2008 the rate is in a controlled level.

Place	Year of accidents				
	2008	2009	2010	2011	2012
Palayam	19	18	14	9	8
VJT	3	5	4	1	3
Marikar	0	0	0	0	0
Secretariate main gate	2	2	0	0	2
Candonment gate	0	1	0	0	0
Bakery junction	5	1	1	3	10
Vanrose	0	0	0	1	0
Housing board	0	0	2	1	0
Secretariate Pankaj Gate	0	0	0	0	0
Spencer	0	2	2	0	2
Asan Square	3	0	1	2	0
Pulimudu	3	4	7	1	4
Old war	0	0	0	0	0
KLA	0	0	0	0	0
Mascot	0	0	0	0	0
PMG	13	10	4	9	3
LMS	0	2	1	1	3
Museum	4	2	2	1	3
Vazhuthacadu	12	2	3	6	0
SMC	1	1	2	0	0
Zanadu	0	0	0	0	0
Vellayambalam	17	6	12	13	8

Nanthancodu	0	0	0	0	0	Ponnaparapark	0	0	0	0	0
Devasam Board	0	2	0	1	1	Railway station	0	0	0	0	0
Savithaman galam	4	10	6	7	10	Indian coffee house	0	0	0	0	0
Kawdiyar	8	2	5	8	1	Overbridge	3	0	2	1	2
Ayurveda college	6	3	6	4	4	Chanthitta	2	2	1	3	2
Vanchiyoor court	1	0	1	7	0	Kannanna	22	14	18	36	29
Uppilamud u	4	0	4	0	0	Kumarapur am	11	7	11	9	9
General hospital	0	9	2	4	7	Murinjapal am	1	0	0	0	2
Pattoor	0	1	0	0	4	MCH	3	13	2	10	4
Pettahjn	21	21	19	18	20	Ulloor	24	14	6	7	9
Nahnnakku	3	2	2	1	3	Pattom	33	25	16	13	29
Pallinnakku	3	2	3	5	4	Kesavadasa puram	8	11	5	6	7
Chakkai	6	5	5	8	6	Marappala m	0	4	2	2	1
Eanchakkal	0	0	0	1	0	Statue	12	3	10	13	16
Ambalamm kku	5	3	7	8	7	Panavila	7	5	3	7	8
Plamudu	5	8	12	8	11	Kims E	2	1	1	1	1
Peroorkada	16	18	13	20	13	Veapalavat tom	0	0	0	0	0
Kuravanko nam	3	0	3	6	9						
Pazhavanga di	2	4	2	1	8						
East fort	7	14	10	21	3						
Chala entrance	0	0	0	1	1						
Kottakyama m	0	0	0	0	0						
Padmanabh a temple	0	0	0	0	0						
Attakulang ara	8	5	3	6	7						
Killippalam	15	16	8	8	6						
Manacaud	0	3	3	3	8						
Model school jn	4	0	0	4	2						

A questionnaire survey was conducted through local motorists in order to find out the influence of surveillance cameras on them. A sample of 50 motorists was taken including two wheelers, three wheelers and four wheelers. Analysis of survey data showed that about 94% of the people are aware of the surveillance camera installation and more than half percent of the people know about the radar speed check cameras. Regarding the driving behavioral changes, it is noted that 24% of the people avoids jumping signals, 10% controls their speed .About 22% of the individuals are caught for not wearing helmet, 8% for seatbelt and 4% for jumping signals. Regarding the behavioral changes in other road users, it is found that helmet usage increases by about 42%.

6. CONCLUSION

From the accident analysis it is observed that surveillance cameras have no effects on the accident rate of the city. It also reflects that there is no reduction in the severity of accidents even after the installation of surveillance cameras. From the questionnaire survey analysis it is clearly observed that there is a lack of awareness among the people regarding the speed check cameras, even though there is a considerable increase in the helmet and seatbelt usage. In order to improve the efficiency laws should be properly implemented. Regarding the information obtained from the traffic control room the surveillance cameras plays an important role in the reduction of crime rate and other traffic violations in the city

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