

# MOBILE PHONES TO CHECK TRAFFIC RULE VIOLATIONS

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Researched and Documented by:

  
**oneworld.net**

**OneWorld Foundation India**

## TABLE OF CONTENTS

Executive Summary .....	3
Methodology.....	3
Background.....	4
Objective.....	5
Project Design.....	5
Key Stakeholders .....	5
Work Flow .....	5
Funding.....	8
Achievements .....	8
Challenges in Implementation .....	9
Conclusion .....	10
References .....	10
Appendix A – Interview Questionnaire .....	11

## EXECUTIVE SUMMARY

India accounts for just one per cent vehicles of the world but for nearly ten per cent road accidents worldwide.<sup>1</sup> Despite this, traffic management has hardly been an administrative priority in most parts of the country. Until recently, the use of technology had been conspicuous by its absence and low usage in checking traffic violations, particularly in north India. Closed Circuit Tele Vision (CCTV) cameras are extensively used now to aid traffic police in larger cities to monitor traffic. While this has helped capture traffic violations effectively as well as provided a means to record evidence of the violation, the system is limited in its reach across the entire city. CCTV cameras are fixed at main junctions and monitored centrally. This leaves many zones out of their surveillance.

Against this backdrop, along with a dire requirement to check large scale flouting of traffic rules in the city, the Gurgaon Traffic Police initiated the Third Eye project with the aim to complement their outdoor surveillance programme through use of portable mobile phone cameras. Launched in August 2011 in collaboration with Denave India Private Limited, Nokia India and Millennium City Welfare Association, the project utilises Nokia E5 mobile handsets that are enabled with Tselina software. Traffic constables are provided adequate training in the use of these handsets and related processes involved; constables on duty can click photographs of the traffic violation and number plate of the offending vehicle and they are automatically uploaded on the central server at traffic police headquarters. Tselina allows geo-tagging of pictures so as to instantly provide the time, date and location of the violation. These photographs are then used as evidence for issuing *challans* to the defaulting citizens. Another unique aspect of the project is that a constable takes the *challans* to defaulters' for recovery of penalty, eliminating the need for the latter to travel to the police station for paying the same.

Certain enhancements are still in the planning phase but the project has shown promising results so far. As of November 2011, 200 traffic constables have been trained and manned with Tselina-enabled Nokia handsets and approximately 3000 *challans* have been issued under the project.

## METHODOLOGY

Traffic violations cause numerous accidents and incidents of death as well grievous injury throughout India. A large number of police personnel are engaged in checking such violations and penalising the offenders. Traditionally, this has been done using manual methods for checking offences and the use of technology has been conspicuous by its absence despite the increasing usage of ICT tools for making governance simpler, less labour-intensive and more thorough. The Third Eye project of the Gurgaon Traffic Police

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<sup>1</sup> Joint Commissioner of Police, Gurgaon, Mr. Alok Mittal in 'Third Eye project starts at Gurgaon', *HimSatta*, August 02, 2011

utilises mobile technology to enable police personnel to capture evidence of traffic violations, instantly upload the photographs to a central server and issue *challans* speedily. The initiative is the first of its kind in north India.

Introduced in August 2011, the initiative is in the fourth month of its operation and has already assisted Gurgaon Traffic Police to issue nearly 3000 *challans*. The technology used is simple, low-cost, effective and requires minimal training, making the initiative replicable elsewhere in the country. Based on desk-based research, the Governance Knowledge Centre (GKC) team identified a set of unique features and benefits of the initiative. These were confirmed and elaborated upon, and proposed enhancements explored through an interview with the Inspector-in-Charge of the Third Eye project, Gurgaon Traffic Police. In order to understand the functioning of the technological tools involved, the Chief Executive Officer and Vice President of Technology Services Department of Denave India Private Limited were interviewed.

## **BACKGROUND**

Traffic violations in India are consistently on a rise in India, even in the metropolitan cities that are perceived to have robust mechanisms to police and penalise traffic offenders. The city of Gurgaon in Haryana is a bustling hub of technology and service provision in the north of India. The resident population mostly comprises of migrants from various parts of the country who move to the city for jobs. As such, there is hardly a homogenous and permanent cohort of people inhabiting the city, making it more difficult to monitor behaviour across groups. In addition, the sheer number of people and vehicles on the roads of Gurgaon necessitate vigorous and efficient traffic policing.

Traditionally, traffic in Gurgaon has been monitored manually by the city's traffic police. This system suffered from obvious time and location constraints. Recognising the need to expand the reach of the traffic police, the Gurgaon Traffic Police has employed a system of surveilling traffic through Closed Circuit Tele Vision (CCTV) cameras installed at main traffic junctions in the city. This outdoor surveillance system has been designed to complement the already existing manual mechanisms to check traffic violations. HARTRON is the nodal body for the development and implementation of this system, working with a budget of INR 15 crores. However, CCTV cameras would be fixed, thereby leaving out certain parts of the city from their surveillance.

With a view to cover predominantly these areas that would fall out of the geographical range of outdoor surveillance system, Third Eye project was launched by the Gurgaon Traffic Police in collaboration with Denave India Private Limited, Nokia India and Millennium City Welfare Society. The project was launched in August 2011 and utilises mobile phone technology to keep a check on traffic violations in Gurgaon. It covers the East, West and National Highway zones of the city. Starting with 50 constables, the project

currently (November 2011) involves 200 traffic constables who have been trained in the use of technology involved. Nearly 3000 *challans* have been issued under the project till now.

## OBJECTIVE

The Third Eye project aims to use simple ICT tools to simplify and make more efficient the process of checking traffic violations and penalising traffic offenders in Gurgaon.

## PROJECT DESIGN

### KEY STAKEHOLDERS

- Gurgaon Traffic Police
- Government of Haryana
- Millennium City Welfare Association (MCWA)
- Denave India Private Limited
- Nokia India

### WORK FLOW

The Third Eye project utilises simple, affordable, and easily operable technology and processes to check traffic violations in Gurgaon. It started as an initiative to improve the quality of work and residential life in Gurgaon and, as such, strongly supported by the Government of Haryana's Transport Department, the Gurgaon Traffic Police and MCWA. The project employs a fairly uncomplicated process for penalising traffic offenders, the main components of which are as follows:

- i. Tselina software- enabled Nokia E5 handsets to capture photographs of traffic violations
- ii. Immediate uploading of photographs on a central server
- iii. Issuance of *challans* based on photographic evidence
- iv. Recovery of penalty from the offender at his residence

### Salient Features

- Launched by Gurgaon Traffic Police in August 2011
- Currently covers the East, West and National Highway zones of Gurgaon
- Nokia E5 handsets made available to traffic marshals for capturing evidence of traffic offences
- Software named 'Tselina' used in the handsets to enable geo-tagging of photographs
- Photographic evidence uploaded on a central server in real time makes for a permanent record of the violation
- First instance of utilisation of mobile phones for checking traffic violations in north India
- 140 police marshals equipped with mobile phones thus far
- Approximately 3000 *challans* issued under the project till November 2011

### *Tselina software*

The Tselina software was developed by Denave India Private Limited in 2010. It is currently in use in over 250 Indian cities, Indonesia and Malaysia to help managers keep track of sales personnel and their reports. Tselina is capable of carrying data from one point to another with geo-tagging and can be customised for variety of uses. Denave contributed the Tselina technology to Gurgaon Traffic Police under their Corporate Social Responsibility (CSR) initiative. The software was simplified for use of traffic personnel, considering their average literacy levels and familiarity with technology, so as to require minimum data entry.

#### **Tselina**

- Developed by Denave India Private Limited in 2010
- Simplified and customised for use in Third Eye project so as to require minimum data entry
- Proprietary software
- Based on open source software J2ME designed using Java technology
- Over the Air (OTA) capabilities
- Web interface with restricted back end access
- Open source data base MySQL
- Native application- can be accessed by clicking a single dedicated icon in the phone

Tselina is proprietary software based on open source software J2ME designed on Java technology. It has Over the Air (OTA) capabilities, that is, it can distribute new software updates or configuration settings to mobile phones on stream. It enables upgrades without the need of physical access, saving time and money. Tselina has a web interface with restricted back end access. Content collected in the form of photographs and information entries is stored in the open source database MySQL. Java is used for the front end; Tselina is a native application, not a browser-based application. This is to mean that a dedicated icon, which can directly connect to the application, is made available on the handset.

### *Nokia E5 Handsets*

The minimum configuration required in a handset for the Tselina software to function appropriately include (a) being J2ME compliant, (b) Global Positioning System (GPS), (c) General Packet Radio Service (GPRS), (d) ability to click photographs clearly, and (e) preferably a QWERTY keypad for quick data entry.

Tselina was tested on various handsets but many of their Operating Systems (OS) did not support Java applications. However, Nokia E5 was found to be best suited for use in Third Eye project owing to its faring well against all of the above requirements, its market reach, the existing expertise of Denave, and the simplicity of working with Nokia's interface.

GPS enables geo-tagging of the images clicked by the police personnel; photographs are instantly tagged with time and lat-long (geographical location) stamps. This enables

personnel manning the central server to instantly identify the time and location where the violation occurred. Along with this, the application also provides for traffic personnel to type in the exact details of the traffic violation. The photographs captured are stored in the local memory of the handset.

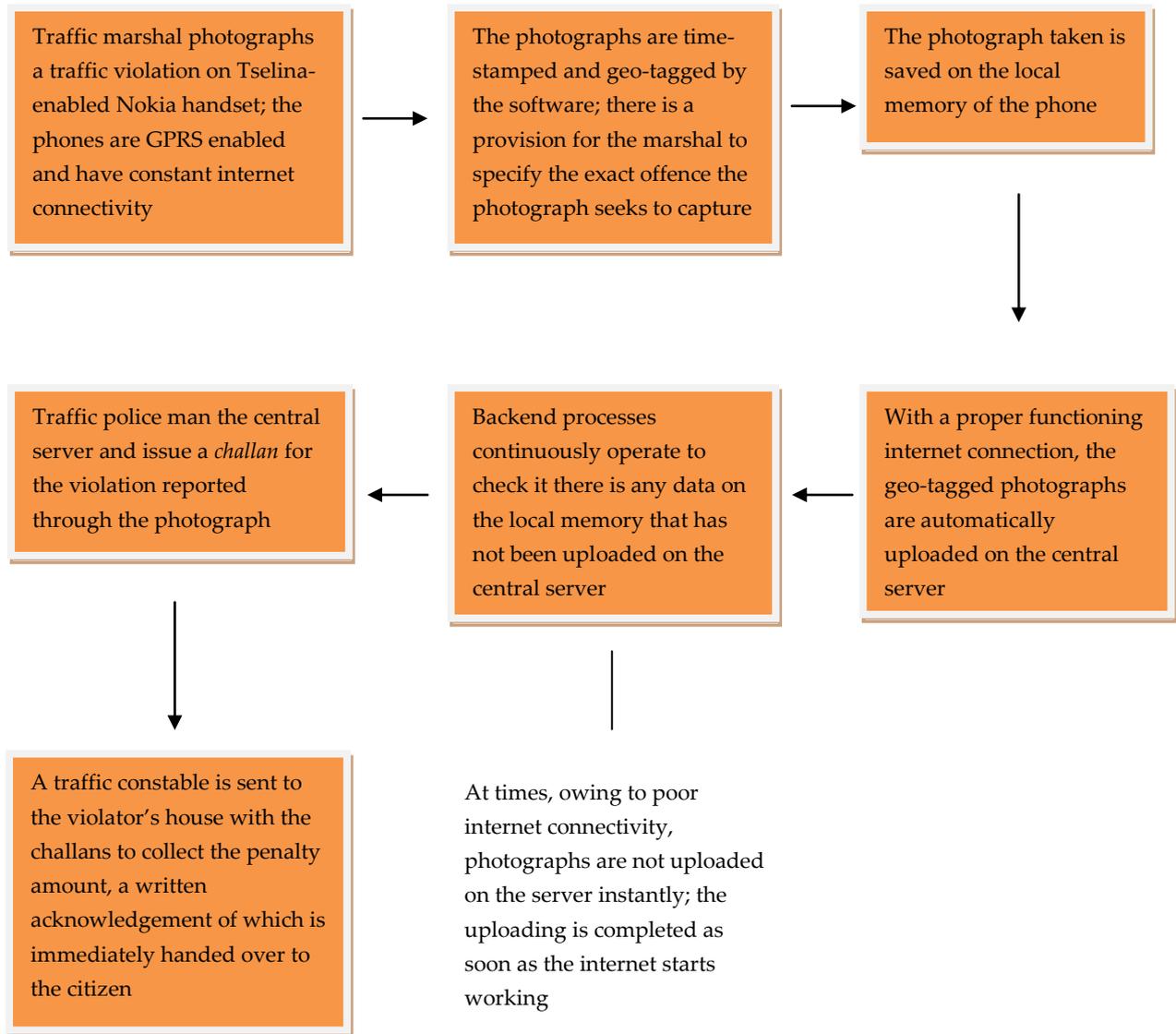
#### *Central Server*

Since the handsets are enabled with GPRS for constant internet connectivity, the photographs are instantly uploaded on a central server housed in the Gurgaon Traffic Police headquarters. Upon receiving a photograph, it is checked and verified for validity as evidence of traffic violation. If the offence and the vehicle's number plate have been clearly captured in the photograph, a *challan* is issued against the driver, using his/her details contained in the consolidated database.

In the event of failure of internet connectivity, the photographs are stored in the handset's local memory till such time as they are uploaded on the server automatically upon availability of internet connectivity. Tselina is designed in a way to let back end processes run continuously to check for any un-uploaded photographs and upload them.

#### *Issuing challans and recovering the penalty amounts*

A written copy of the *challan*, along with a printed copy of the photograph with time, location and offence listed, is taken to the offender by a traffic policeman. The penalty amount can instantly be recovered from the offender without requiring the latter to travel to the police station for paying it. A receipt is issued for the payment right at his/her doorstep.



*Figure 1: Process flow of Third Eye project*

## FUNDING

The Third Eye project is funded by the Government of Haryana. It covers the entire administrative and operational costs of the project.

## **ACHIEVEMENTS**

Project Third Eye has been in operation for a little over four months. During this period, it has enabled Gurgaon Traffic Police to issue approximately 3000 *challans* in excess of their usual numbers. The average amount of penalty is INR 100 for offences like driving without helmet, jumping a red light, not following zebra crossing rules, and such like. Hence, an excess of nearly INR 3,00,000 accrued to the department since the launch of the project.

While the project would take some enhancements, training and time to learn from experiences and fine tune itself for more efficient functioning, the Gurgaon Traffic Police has

already indicated a huge change in the on-road behaviour of people in the city. Since people are aware that a single photograph of their number plate can help the police to track them and impose *challans*, better discipline has been observed on the roads of Gurgaon.

Under the previously existing system, one of the most significant reasons for the traffic policemen's inability to check traffic violations was that offenders could easily escape because of the sheer number of people on the roads. If the policemen were to *challan* an offender, another could easily go unnoticed. Mobile phones have enabled them to instantly click photographs of offenders, their number plates and the traffic violations, upload them on the central server, and delegate the work of issuing *challans* to other personnel within the department. Eliminating the need to issue *challans* on the spot has worked to save time and resulted in issuance of a larger number of *challans*.

Under Third Eye, a police personnel is sent to the offender's house to collect the penalty amount and give a written acknowledgement for the same. This has negated the need for people to travel long distances to pay a fine of INR 100. Therefore, more penalty cases have been disposed off in a shorter time.

## CHALLENGES IN IMPLEMENTATION

Since the project is in its nascent stages, challenges to its effective implementation are likely to be ones that will be rectified on their own as the project undergoes certain planned enhancements.

The most immediate challenge to the project lies in the capacity of mobile phones to capture pictures clearly from some distance and while bodies are in motion. While it is possible to capture stationery objects from a close proximity, most offences occur while offenders are driving the vehicle. According to the Gurgaon Traffic Police, this often renders many photographs unfit for use as evidence for penalising offenders. This is made amply evident by the fact that almost 1000 pictures are uploaded every day on the central server and only 3000 *challans* have been issued against them till date.

The Nokia handsets used in the project are GPRS enabled to provide continuous internet access for uploading photographs on the central server. However, swift internet connectivity proves to be a problem in some parts of Gurgaon, in effect, delaying uploading of photographs on the central server.

While some photographs are not adequately clear to be used as evidence of traffic violations, certain offenders go un-penalised owing to outdated government records of citizens' contact details. This makes it difficult to track offenders.

Only Gurgaon registration numbers are covered under the Third Eye project. However, the resident population of the city combines people from all over the country, many of whom use vehicles with registration numbers from different parts of Haryana and other states.

Proximity to Delhi and other parts of the National Capital Region results in further inundation of Gurgaon roads by vehicles registered outside the city. Gurgaon Traffic Police does not have records on these vehicles, making it difficult to track and penalise the vehicle owners. This factor has the potential to seriously undermine the reach of the project.

## CONCLUSION

Project Third Eye utilises mobile simple, easy-to-operate and cheap mobile technology to keep a close eye on traffic rule violators in Gurgaon. Though beset with some challenges, it is proving to be an increasingly efficient complementary mechanism for the outdoor surveillance system of the Gurgaon Traffic Police.

Some enhancements in Tselina software, like capacity to capture and upload videos in a compact format, could help prevent the problem of unclear pictures. However, this would need to be supplemented by enhanced internet connectivity. With the arrival of 3<sup>rd</sup> Generation (3G)-enabled handsets and faster internet connectivity, and expected entry of 4<sup>th</sup> Generation (4G) in the Indian market, uploading of larger files is set to get faster.

While technical enhancements can make the process of checking traffic violations more efficient, project Third Eye would require interventions at other levels as well to expand its reach and impact.

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*Research was carried out by the OneWorld Foundation, Governance Knowledge Centre (GKC) team.*

*Documentation was created by Researcher, Aditi Dayal*

*For further information, please contact Mr. Naimur Rahman, Director, OWFI.*

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# APPENDIX A – INTERVIEW QUESTIONNAIRE

## Background

1. What was the motivation for the Third Eye project? How, where and by whom was the idea initiated?
2. When was Third Eye officially launched? For how long has work on the project been going on?
3. Our research indicates that the Third Eye project is meant to complement Haryana Government's outdoor traffic surveillance programme.
  - i. Please provide the basic details of the outdoor surveillance project.
  - ii. Does this imply that Third Eye will remain limited to certain specific parts of Gurgaon that the outdoor, fixed cameras cannot cover?
4. Third Eye currently covers the East, West and the Highway traffic zones of Gurgaon. Does it imply the district or the city of Gurgaon? What were the reasons for launching the initiative in these locations specifically at first?
5. Before the launch of Third Eye, how were traffic violations monitored in Gurgaon? Was technology used in any form?

## Work process

### Partnerships

6. According to our research, there are four partners in this project- Gurgaon Police, Millennium City Welfare Association, Denave and Nokia. What are the exact roles of these organizations? What were the criteria for choosing Denave and Nokia as partners?

### Technology

7. What were the reasons for choosing Nokia E5 mobile handset for Third Eye?
  - i. Have any changes been made in the handset to customize it for use in this project?
  - ii. Has the handset been equipped with GPS to enable geo-tagging of the photographs taken?
  - iii. Can content be captured in video format as well?
8. Was software 'Tselina' designed particularly for project Third Eye? Please provide the specifics of the software:
  - i. Is it an open source or proprietary software?
  - ii. Which technology is being employed for this software- Microsoft or Open Source Technologies?
  - iii. What is the architecture of the technology? Please provide the following details related to the central server:
    - a) the back end

- b) storage of content
  - c) criteria for processing
  - d) web interface- public or restricted
- iv. Can this application be deployed to any other handset or is it customized for Nokia E5? Does it necessarily require a particular operating system, Symbian or Android, for instance
  - v. What is the minimum configuration required for a handset to be compatible with this software?
  - vi. At what frequency can content be captured by this application?
9. How long does it take to process a traffic violation case in whose context a photograph is uploaded on the server?
  10. Please explain the process flow of the application.

#### Training

11. Is any training required for using the Tselina-based application or for using information on the server to impose challans? If yes, please provide details of the training provided to traffic police personnel: resource persons, exact content, methodology, duration, following up mechanisms.

#### Monitoring and evaluation

12. Will the information collected through Third Eye- number and form of traffic violations, evidence collected, cases processed, challans imposed, and revenue collected etc- be available for public scrutiny? If yes, in what format?

#### Impact

13. Please provide details about the pilot experimentation: duration, location, personnel involved, financial investment, impact in terms of the challans issued, challenges faced, lessons learned for improvement in the model.
14. Since the launch of Third Eye, how many challans have been issued in all? What does that translate into in terms of revenue generated? On an average, how many photographs are uploaded in a single day?
15. Please compare the performance of Third Eye with the performance of the system that existed earlier or still exists in some parts of Gurgaon. (e.g., violations reported and challans imposed daily or weekly, revenue generated, area covered etc)

#### Sustainability

##### Financial costs

16. As per our research, the Third Eye system was developed at a cost of INR 15 crore. How were the funds procured? Please provide a breakdown of the major heads of expenditure (cost of mobile handsets, software development, training etc.)
17. What are the daily operational costs of the project? What are the current sources of funding?
18. Is the revenue collected through challans imposed using this system invested back in the project?

#### Challenges

19. What have been the major challenges faced in the implementation of the project till date? Are there any challenges that you can foresee at this stage?
20. The ability to swiftly impose challans on traffic offenders requires the existence and easy availability of up-to-date records on vehicle registrations, driving licenses etc. What is the format (digital or manual) in which these records are currently available with the Gurgaon Police? Has there been a need to work on the maintenance of records in order to better implement project Third Eye?
21. A 5-megapixel camera can clearly capture still objects. Have there been any problems with capturing moving objects as evidence in relation to, for instance, driving without wearing a helmet? If yes, how do you propose to deal with this challenge?

#### Future plans

22. Are there plans to expand the project to other parts of Gurgaon and to equip more traffic police personnel with mobile handsets? If yes, what are the details and is there a timeline for the same?
23. Have you heard about Pune police's traffic management system called Trafficop? Launched in 2009, it uses a software application installed on a Blackberry mobile device that stores individual vehicle and license data. Traffic officers can enter the vehicle and license details of the offenders on the device and in real time, see the offender's past history to issue a penalty accordingly.
  - i. Are there any plans to make the database of vehicles and licenses available on the Nokia phones being used under Third Eye?
  - ii. Are there plans to enable the current handsets so as to allow input of data for uploading on the server?