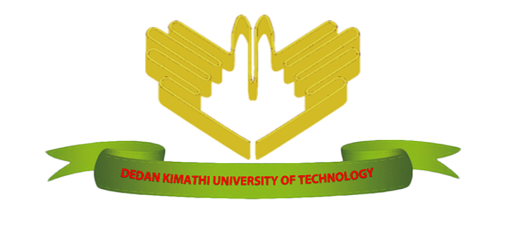
****

**SCHOOL OF COMPUTER SCIENCE AND INFORMATION TECHNOLOGY**

**DEPARTMENT OF INFORMATION TECHNOLOGY**

**PROJECT TITLE:**

**TRAFFIC VIOLATION MANAGEMENT SYSTEM**

**NAME: ONDIEKI CALVIN KUMBA**

**REGISTRATION NUMBER: C025-01-1405/2015**

**MONTH OF SUBMISSION: JUNE 2018.**

# DECLARATION

I hereby declare that this proposal report is based on my original work except for citations and quotations which have been duly acknowledged. I also declare that it has not been previously and concurrently submitted for any other degree at any other institutions or university by any other person

NAME: ONDIEKI CALVIN KUMBA

REGISTRATION NUMBER: C025-01-1450/2015

SIGNATURE: ……………

DATE: …………………………

SUPERVISOR

NAME:

SIGNATURE: ………………………………….

DATE: …………………………...

# ABSTRACT

Nowadays road traffic has become a real problem. There are several ways to make travelling safe through the traffic police. Responsibility of the traffic police regarding to traffic management includes directing traffic, enforcing traffic rules and regulations and regulations and penalizing the drivers in case of violating traffic rules. Another way of enforcing traffic discipline is frequent conduction of awareness program from the department of traffic police, based on the offence data collected. This project work is in attempt to develop an application which will help the police and courts to record the penalty information in a centralized repository, it also will consist of analysis part of traffic offences based on which higher authorities can take necessary measures regarding traffic discipline.

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# **Chapter One: INTRODUCTION**

## BACKGROUND OF THE STUDY

Traffic offence management is a major concern in cities around the world.In recent years, the quantity of motor vehicles increases rapidly and the burden of the management of the road traffic are increasingly heavy.The number of accidents is also on the rise due to recless drivers and over speeding. There are several ways to make travelling safe and one is through the Traffic Police. Responsibility of the traffic Police regarding traffic management includes enforcing traffic rules and regulations and penalizing the driver in case of violating traffic rules [1]. In today's information-rich society, everything is becoming smart. This project shows the design and development of smart traffic offence analysis tool with e-paymentThe application helps the traffic police keep adequate information of all traffic offences that has been committed by road users and also maintain the databases of the driver and vehicle details application focuses on traffic police as user and he can penalize the one who commits the traffic offence

## PROBLEM STATEMENT

Acoording to a Kenyan article;There has been increased road accidents over the years, innocent lives are lost everyday yet people do not seem to care, the society is doing so little to change this, yet it is the lives of people we are talking about here. Both young and old, women and men alike, their lives just end in an instant, causes that we can easily prevent but we choose to ignore. If this continues, then a lot of lives will surely end.There is need for everyone to be involved in reverting this situation, the passengers, drivers and the whole society at large.

Causes

Speeding vehicles-Due to the improved construction of roads, these roads are now very smooth and fun to drive on, however this has become a curse as some of the drivers now drive at a very high speed no thinking of the passengers they carry. When these speeding vehicles meet something on their way for instance a sharp bend, an animal or as passenger, it becomes hard for them to regulate this car and will most often than not cause accidents Others will speed because they want to drive for more trips so that they can pay up the amount set by their owners and get extra shilling on their pockets for themselves. Though this seems like a noble thing to do, but we have to recognize that it is causing more harm than good.

Driving while drunk-Many people on the roads especially on weekends will drive while they are drunk, we are well aware of the effects alcohol has on our judgment, most of this drivers end up in accidents a higher percentage being caused by them.

Carelessness of pedestrians on the road-There are road bridges designed for pedestrians to use while crossing highways but due to our laziness and carelessness, we choose to cross anywhere we are, some of this places are very dangerous and in the process allot of lives are lost

In addition, some pedestrians would cross the road while talking on the telephone, holding hands or even not observant at all, this carelessness eventually leads to death.

Road unworthy vehicles-Some vehicles on our roads are in a very bad shape, these vehicles will at times break in the middle of the road in the event the lead to accident.

Taking of bribes by policemen-This has greatly contributed to the increased accidents on the roads. Police are supposed to ensure that all the traffic rules are observed to the latter and those that fail taken to court, but what happens when a police sees a vehicle that is being driven recklessly and instead of correcting the offender, they are silenced by money? Are human lives worth those 50 shillings?

Lack of observing traffic rules

Many drivers do not observe traffic rules at all since few of them attended a proper driving school; a great number just obtained a fake driving license without proper qualification. These drivers will always cause accidents due to failure to observe the traffic rules. Go to the roundabouts you will be surprised at how crazy our drivers are, overtaking on the roundabout is very dangerous, but they do not know this and hence they will end up causing accidents due to their ignorance

Bad roads and bad whether

Though a lot has been done in terms of road improvement, there is still a lot that needs to be done. Many roads are in a very bad state and they have greatly contributed to accidents

Furthermore, bad weather has also lead to increased road accidents especially during rainy days when allot of trees fall on the road and eventually cause accidents, moreover some areas are really foggy and it becomes hard for drivers to see, in the event they end up in accidents and a lot of lives are lost in the process

Overloading -Due to greediness of some of our drivers, even though the car is full, they will always want to carry extra passengers in order to gain more money, however this poses a serious risk on the lives of the passengers.some passengers also are to blame, while seeing that the car is full instead of waiting for another car, they will want to squeeze themselves in an already full car claiming they are in a hurry or just because of shear ignorance. These acts of carelessness eventually lead to the loss of many innocent lives

Solution

there is a solution to all this, just to mention but a few;

Strict rules to be put into place and strong penalties to the abusers this will greatly prevent some of the accidents that are experienced on our roads

Passengers should also be involved, do not just stay silent when the driver is putting your lives at risk, no matter how late you are, it is better to be late than not to reach at that particular place at all. Do not allow the vehicle to overloaded, there are allot of public services, if the owner does not want to listen to you then just alight and get another vehicle.

Police should desist from taking bribes as by doing so they are putting the lives of many Kenyans at risk.

Proper public road signs should be put in places that are clearly visible and at a proper distance. This will warn drivers early in time and in the event prevent accidents.

## 1.3 OBJECTIVES

### 1.3.1 General Objectives

This work is aimed at developing an application that depicts traffic offence analysis tool.

This project is also aimed to depict highway courts systems.

### 1.3.2 Specific Objectives

## To do traffic offence analysis the project:

1. Acquire and stores information from street cameras.
2. It analyses every information and obtains offences done by road users.
3. It also acquires details of vehicles marching them to its users or owners.
4. Stores details of all road user mostly that of drivers, owners of cars and their contact information.
5. Provide an update of the information of road users.

To depict highway courts system:

1. the system analyses the offences in comparison with the fines according to the regulation of a country
2. it sends a message for one to pay a fine or assigns one a day and location to attend a court session.
3. The system is also supposed to give flag out offenders who are supposed to pay a court fine or appear in court and have passed the deadline for the same.

## 1.4 SCOPE OF RESEARCH

This project is to be developed as a desktop based application, it is aimed at helping the police to document,warn, all traffic offences by road users and also help the courts in provide evidence for offence for court sessions, give fines and obtain fines and update the system too.

## 1.5 ASSUMPTIONS MADE

The only assumption made in this project is that cameras are installed all over the country’s roads

## 1.6 LIMITATIONS

## 1.7 JUSTIFICATION

# CHAPTER TWO: LITERATURE REVIEW

## 2.1 INTRODUCTION

## 2.2 Overview and Analysis of Related System/ Work

### 2.2.1. FREEWAY MANAGEMENT SYSTEMS

### Three primary ITS functions make up freeway management systems: monitoring and surveillance, control of freeway operations, and the display or provision of information to motorists via dynamic message signs, highway advisory radio, in-vehicle navigation or information systems, or specialized information transmitted only to specific set of vehicles. Evaluations of freeway management system improvements such as ramp metering systems have demonstrated improvements in safety, reduction in travel time and delay, increased flows, and flow improvements (USDOT, 2002b). Despite early efforts to deploy metering and management systems, actual traffic monitoring over a widespread area and real-time response is easier now due to advances in technology and greater system coverage. Typical traffic operations centers (TOCs) collect and process surveillance and monitoring data, most often from inductive loop detectors, and supplemented this with closed circuit television (CCTV) cameras that are also directly controlled from the TOC. The ability to collect data and reflect on it in real time has made a difference.

### Interstate 5 Evaluations in Portland, Oregon

### Presently, projects are underway by the authors to evaluate the performance of ramp metering and incident management in the Interstate 5 corridor in Portland, Oregon. The Oregon Department of Transportation (ODOT) has deployed a systemwide ramp metering program throughout the Portland metropolitan area. As part of the system itself, approximately 400 inductive loop detectors have been installed. Loops are included on each metered on ramp and in the freeway mainline lanes just upstream of each metered ramp. However, there are no detectors on off-ramps and there are few detectors at intermediate points (between interchanges) on the freeways. These detectors report speed, count, and occupancy every 20 seconds, but ODOT only archives data aggregated over 15-minute periods. Through special arrangement for the evaluation projects, the raw data are being archived. Thus far, the loop detector data has been validated with vehicle count data manually extracted from the video surveillance system. Figure 1 shows two sample validation curves, which include cumulative vehicle arrivals (plotted on oblique axes in order to magnify the details). The curves extracted from the loop detectors are aligned with the curves extracted from the surveillance video, indicating that the detectors are functioning reliably.

### 2.2.2 Interstate 5 Evaluations in Portland, Oregon

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### 2.2.3 Arterial Management Systems

### An arterial management system is used to manage traffic by employing various detection and control devices along arterial roadways. This includes surveillance and traffic signal control, and sometimes includes audio or visual information on arterial roadway conditions. Detectors collect basic traffic condition data (typically flow and speed information) and adaptive control systems can be used to coordinate traffic signal control across a metropolitan area by adjusting the lengths of signal phases and cycles. Without centralized control, vehicles would be delayed at intersections irrespective of actual traffic conditions as the vehicle progressed through the route. This caused undue vehicular delay to all vehicles including transit vehicles. Using knowledge of real-time traffic characteristics and coordination, arterial management systems have contributed to reductions in red light violations of 20–75 percent and reductions in fuel consumption by 2–13 percent in the studied areas (USDOT, 2002a). It was shown that St. Paul, Minnesota, traffic signal preemption systems reduced crashes for emergency vehicles by 71 percent in seven years (USDOT, 2002a). An arterial management system can be also monitored by the existing vehicles running on the system. For example several transit agencies have equipped their vehicles with GPS which reports the location of the vehicle back to a dispatch center every few seconds. As an example, using some of TriMet archived data, a fusing process was developed as shown in Figure 7. This figure displays time-space diagrams for both TriMet buses and “ground truth” probe vehicles that were traveling on Powell Boulevard at the same time on the same day. The bus AVL data was extracted from archived data for Route 9 beginning at Front Avenue on the west side to the intersection of Powell Boulevard and SE 39th Ave. The probe vehicle data were collected with GPS installed on the vehicle. The bus AVL data were archived through BDS described above. A comparison between travel time for both the bus and the vehicle is shown in Table 3. The integration between these two systems can also be compared using vector analysis in Geographic Information Systems (GIS). Figure 8 shows an interpolated surface comparing a bus speed “surface” with a “surface” constructed from probe vehicle speeds. The surface was created using 20 runs collected by the GPS installed on the probe vehicles. The surface was interpolated using a krigging method in the ArcGIS software. Another vector surface was created for 20 bus trips using the same method and during the same period of time. Both the probe vehicles and buses had the same origin and destination.

### Looking in depth at the comparison, the bus has behaved in the same way as the probe vehicle yet the percentage of drop in speed at some locations were not similar. These differences are due to the variations in speed between the two modes during free flow travel time. Statistical relations between the probe vehicle and bus performance can be developed for reporting arterial performance to travelers and to quantify improvements to arterial management systems. 2.2.4 Summary

From the three case studies examined, we have seen that no single product caters for the Kenyan local languages which is the main focus of the proposed system. This is a problem the proposed system purposes to fix. It would be pointless for a tourist touring the North Rift region and relying on Google Translate or Microsoft Translator to handle all the translations, yet the only language those two applications can deal with is Swahili, where Kenya has over forty languages.

The proposed application helps traffic police to penalize traffic offences. And helps them in analyzing traffic details with centralized data repository stored in the department server. There by generates graphs for the easier analysis by which the traffic police can enforce the traffic discipline. By this application, we can reduce the traffic offences drastically.

### 2.2.4. Interstate 5 Evaluations in Portland, Oregon

### Presently, projects are underway by the authors to evaluate the performance of ramp metering and incident management in the Interstate 5 corridor in Portland, Oregon. The Oregon Department of Transportation (ODOT) has deployed a systemwide ramp metering program throughout the Portland metropolitan area. As part of the system itself, approximately 400 inductive loop detectors have been installed. Loops are included on each metered on ramp and in the freeway mainline lanes just upstream of each metered ramp. However, there are no detectors on off-ramps and there are few detectors at intermediate points (between interchanges) on the freeways. These detectors report speed, count, and occupancy every 20 seconds, but ODOT only archives data aggregated over 15-minute periods. Through special arrangement for the evaluation projects, the raw data are being archived. Thus far, the loop detector data has been validated with vehicle count data manually extracted from the video surveillance system. Figure 1 shows two sample validation curves, which include cumulative vehicle arrivals (plotted on oblique axes in order to magnify the details). The curves extracted from the loop detectors are aligned with the curves extracted from the surveillance video, indicating that the detectors are functioning reliably.

# **CHAPTER THREE METHODOLOGY**

## **3.1 Introduction**

This section outlines the different methodologies that will be used in developing the system. It will give detail description of the software design methodologies used, data collection methods used, the plan and implementation and the programming languages to be used in development of the proposed system.

It also gives rationale behind the choice of the development process and the technologies.

## 3.2 System Development and Methodology

The proposed system will be developed using incremental development methodology. The idea is to develop the fundamental functionalities of the system first, present the system to the users, then add the other less crucial functionalities incrementally until the system is fully functional as per the specific objectives. This model combines some approaches of waterfall merged with prototyping methodology to come up with a superior hybrid.

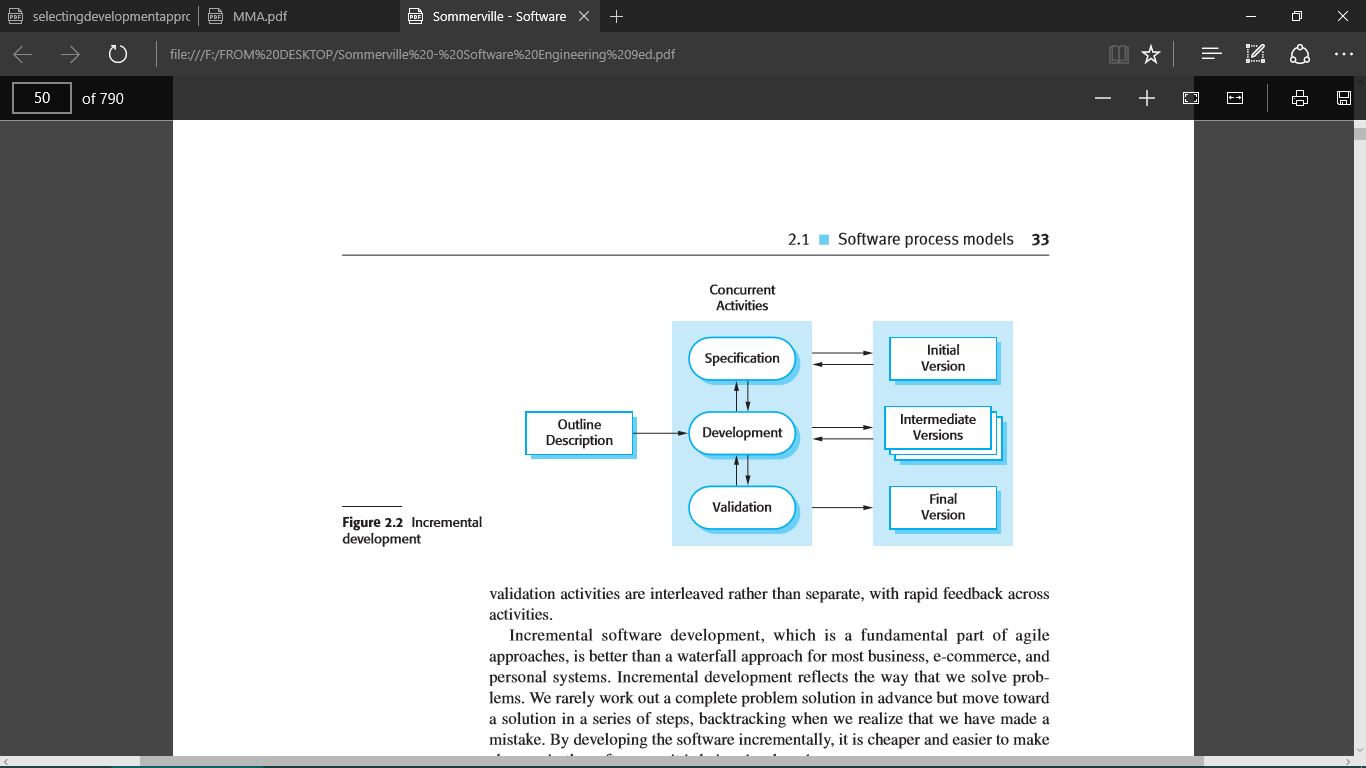


Figure 3.1 Incremental Development Methodology

This approach would be appropriate because, there is a need to build the most important modules of the system first, and then add the rest later as the system stabilizes. The decision to use incremental rather than waterfall or solely prototyping was arrived at, first and foremost, after considering the following advantages among others: -

1. There would be need to exploit knowledge gained in development of early in increments as later increments are being developed.
2. Users will be allowed to test the system at various stages of increments to make sure that it meets the requirements up to that far.
3. It will allow delivery of a series of implementations that are gradually more complete and can go into production more quickly as incremental releases.
4. Gradual implementation would provide the ability to monitor the effect of incremental changes, isolate issues and make adjustments before users change over to the proposed system.

This would make sure that testing is done after every iteration (incremental release). This would mean that identifying bugs and developing of test cases and scenarios would be easier for this system, given its complexity.

## 3.3 Data Collection Methods

Data will be collected from both secondary and primary sources of data

Secondary Sources of Data

Data was collected from government portal, gazzetted regulation, and NTSA portal.

Primary Sources of Data

Other data was collected from highway installed cameras

## 3.4 Implementation

The desktop based application will be developed using java platform.

The database technology to be used is MySQL database and apache application server. Database transactions will be implemented using Structured Query Language.

# Appendices

### Budget

Table 3.1 Budget 1

|  |  |
| --- | --- |
| **Resources** | **Cost Estimation in KS** |
| Personal Computer | 40,000.00 |
| Android Studio | 0.00 |
| Code Editors | 0.00 |
| Stationery | 500.00 |
| Internet Connection | 2,500.00 |
| Power | 500.00 |
| **Total in KS** | 44,500.00 |
|  |  |

### Time Schedule

Gannt Chart

Table 3.2 Gannt Chart

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Task | May | | June | | July | | August | | Sep | | October | | Nov | | Dec | |
| 2 | 4 | 2 | 4 | 2 | 4 | 2 | 4 | 2 | 4 | 2 | 4 | 2 | 4 | 2 | 4 |
| Topic selection |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Research planning |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Proposal writing |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Proposal presentation |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Analysis |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Design |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Coding |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Documentation |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Final presentation |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

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