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Traffic Police Automation System

Report Book

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Project report submitted in partial fulfillment of the requirement for the award of the Degree of **BS (CS)**

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CERTIFICATE

The undersigned certify that they have read and accepted the Final Year Project Report entitled "**Traffic Police Automation System**" submitted by **Syed Obaid Ur Rehman (14B-085-BS), Shaikh Mustafa Ahmad (14B-121-BS)** and **Junaid Jamal (14B-118-bs)** in conformity with the requirements for the degree of Bachelor of Science in Computer Science.

Dated: _____ _____

Dr Muhammad Wasim
Project Supervisor

CERTIFICATE

This is to certify that the project report entitled Traffic Police Automation System being submitted by Obaid Ur Rehman, Shaikh Mustafa Ahmad and Junaid Jamal partial fulfillment for the award of the Degree of Bachelor of Computer Science in 2018 to the Hamdard University is a record of work carried out by said students under the supervision of Dr Muhammad Wasim and evaluated by the following panel.

The results embodied in this project report have not been submitted to any other University or Institute for the award of any Degree or Diploma.

Engr Prakash Lohana	Dr Lubaid Ahmad
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ACKNOWLEDGEMENT

We have taken efforts in this project. However, it would not have been possible without Allah's mercy and the kind support and help of many individuals. We would like to extend my sincere thanks to all of them. A special thanks to our supervisor Dr Muhammad Wasim for his untiring efforts in guiding us and helping us understand and overcome every problem that would have otherwise stopped us mid-way. We thank him for being the motivating force and helping us understand the applications and deliverables of this project. We would also like to express our gratitude to all our friends who provide advice and guidance. Last but not least, to our parents for continuing supporting us when we need them. Our thanks and appreciations also go to our University in developing the project and people who have willingly helped us out with their abilities.

ABSTRACT

The work proposed here is based on two different domains, the first domain is on complete academics of Traffic Training Institute and the other is on Data Analytics of Challan. The academics of traffic training institute in the past years were all based on manual work and storage of data, which means that the data was a stored in manual ledgers which were ought to be dumped after usage. This proposed module of academics automates and secures the manual procedures of storing data for as long as required. The record of Data Analytics of Challan since the past four years were not previously stored and the outcome from it, was never worked upon. This proposed Data Analytics of Challan module, records the data of the previous years and keeps a record to generate outcomes based upon the previous circumstances, such as awareness programs related to the disciplines whereby the rules are mostly violated and different smaller modules are also embedded within this module.

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CHAPTER 1

INTRODUCTION

1 Introduction

Sindh Traffic Police is a law enforcement agency which was established in 1843 under the proclamation issued by Sir Charles Naipiar, who became the Governor of the state Sindh at that time by defeating the forces of Talpur rules at battle of Miyani, near Hyderabad on March 20, 1843. This is how the police force was then first established in the Indian subcontinent. Sindh police department serves an area of 140,914 km2 and has about 105,233 police officers who are currently serving the state, with Allah Dino as the Current Inspector General (IG) of Sindh and was appointed in 2016, as so.

Nowadays, people of Karachi face many problems regarding the situation handling process of the traffic police department. Sindh Traffic Police department lacks far behind the world, when it comes to data handling processes and other certain important domains. The world is far more globalized and mechanized but the Sindh Traffic Police department, as yet handles every sort of data manually, from recording an FIR (First Information Report), to paying a challan, to maintaining the database challan records accounted over the years, to the job career records of police officers, to the academic information of candidates, to their grading system, to their academic progress, to handling prisoners data, their details, etc. All this data is handled manually and there is no proper backup for all this data. This data is stored manually in several ledgers which does not guarantee appropriate backup of the data, which means, once the data is lost, they have nothing on their hands. Karachi is the one of the biggest cities of Pakistan. For an increase in the population, there is also an increase of traffic, crime rates and many such kind of things. To handle these problems, we need modern processes as the world is handling these problems. Within Pakistan, KPK Traffic Police, Islamabad Traffic Police, Punjab Traffic Police and nearly 93% of the world's traffic police departments are automated except the largest city i.e Karachi, and so as to looking at this, we need to automate Sindh Police Traffic too.

The place where Sindh Traffic Police stands today, has nothing automated on a basic level. If we talk about the most populated country, China, intelligent transportation system is being used to provide innovative services to the people of China, which helps and eases the citizens issues related to traffic. Some of the applications of intelligent transportation systems are as follows:

1.1 Automatic Road Enforcement:

Traffic enforcement camera system, consists of camera and a vehicle monitoring system, which captures the image of the driver as well as the number plate of his/her car, if one breaks the rules of traffic.

1.2 Emergency Vehicle Notification System:

In case of an emergency, such as, for example, if a road accident occurs, a call will be generated automatically through the system, to nearest hospital, which will provide important details regarding the victims, the car identification number, etc, so that the ambulance/rescuing services arrive in time causing lesser chances of proportion of loss of lives.

The purpose of the system is to make life easy for the citizens of Karachi, rather than them handling situations manually. For example, if a citizen wants to apply for a driving license, then one does not need to stand in queues just to gather information regarding its development, this could be done easily through the website, where citizens can visit the website and obtain every desirable information like the required time it would take to issue permanent license, the expenses citizens would have to pay in doing so, etc. Academic system will be established, candidate's personal information, their academic records, their contact information will be stored in proper database records. Also, if the traffic police have committed a wrong step, a report against it would also be generated and similarly stored in the database. Safety precautions to be taken will be known from the database which will hold the information of the amount of challan accounted and which challan was contracted for what violation of rule. This will help in data analysis and awareness of the future police officers.Every country wants to provide its citizens the comfort of life, and his would be a great initiative by the government of Sindh for the citizens of Karachi.

1.3 Objectives

The objective of this project is to build a system that will be able to help the citizens and make processes easy for them in every possible way, by providing services to the citizens of Karachi and the police officers as well.

In this project, a complete module of traffic training institute academics is present, which provides to-be-police officers, those who are under training, a way to view their academic progress and information related to various undergoing awareness programs.

A module for citizens that can provide services like driving license theory test preparation, license verification for its originality, calculation of the total amount of fee for the permanent and learning license, validity of the respective license, all can be done via a click rather than citizens travelling to the driving license branch and to police stations.

There are many small features included such as the traffic police officer's designation, their career records, official news about various Sindh Traffic Police departments, traffic challans in various sectors, and awareness of the cause of road accidents through data analysis of the challans accounted. Through the analysis of the data, we can spread awareness amongst people of the offences that caused it.

Currently, there is not much automation in the Sindh Traffic Police, so by this project citizen as well as police officers, both can avail these services. This will be a plus point for both police officers and the citizens, as manual ledgers will not be needed to store records anymore, so there is more security, which means data backup would be present and citizens can also keep a track of their records maintained.

1.4 Proposed System

This automated system is a website which consists of modules and a centralized database. The website is easy to use which means, user finds no hardship in interacting with the website as not all of the population is cent percent as literate. The interface is user friendly.

In this website, authorization takes place in academic module because academic data of the police officers is on the database and the database is linked with the website, which means only the admin is authorized to access and visualize the academic data. This feature is only meant for the authorized person.

The features of the website are defined as under:

Website features:

1. Traffic Training Academics
2. Traffic training sims (module to show students of traffic training academic result)
3. Awareness programs
4. Information Module
5. License fee calculator
6. License verifier
7. Zone wise Challan Data Analytics

1.5 Traffic Training Academics

In this feature the academic system of TTI (Traffic Training Institute) is placed. This module will hold data of students who are enrolled in Traffic Training Institute and this data includes information concerning registration, academic, result and courses. This module will automate all of the paperwork regarding academics and will create a database which will be updates 24/7. There will be no need for manually searching the data, it will be possible by just through a few keywords. This is a demanded module from the Traffic Training Institute.

1.6 Traffic Training SIMS (Student Information Management System):

This module shows the academic progress of students such as assessment marks, examination marks, etc., similar to UIT SIMS that operates in a similar manner, displaying the summative and formative assessment marks. This is a demanded module from TTI as this will account to 50% lesser the burden of teachers as well as students.

1.7 Awareness Programs:

In this feature, information concerned with awareness programs will be given to the citizens like interpretation of traffic signs and traffic rules. Not everyone knows about all the traffic signs, so the awareness program would be a good step to give information about important traffic rules to the citizens.

In October 2006, Pradhan, Anuj K did a research about risk and awareness programs for young drivers, comparing a group of young drivers trained with RAPT (Risk Awareness and Training Program) with an untrained group of same age. A head mounted portable eye tracker that

collected the data during drive is place on driver's head. After completion of RAPT, there was significant improve in risk perception in drivers.

1.8 Information Module:

This is a feature consisting of a method that will define how an individual can pay the fine and collect his/her documents, will provide information about the traffic police officers and their designations, as well as their career records. Information regarding the traffic roundabouts, etc. will also be provided.

1.9 License Fee Calculator:

Defines the amount required for the issuance of a permanent or learning license.
Not everyone knows about the driving license fee, so this module gives the fee structure of making a license.

1.10 License Verifier:

This is a simple feature, which lets you know about the originality of the license. The user providing the CNIC number will have his/her CNIC verified from the modules of the database, for the identity card's originality, which will respond in whether the license is fake or original.

1.11 Zone Wise Challan Data Analytics:

Modules, which shows the challan rate in different districts of Karachi. The analytics is done by data analytics of challan gathered from different districts of Karachi.
The amount of challan's will be accounted, and the safety precautions will be generated looking at data analysis and statistics

1.12 Previous Applications

There are some previous applications which are listed below:

1.12.1 Islamabad police

Islamabad police is working great and has a website. If citizens of Islamabad need help or want to inquire about Islamabad's police, then they can visit the website where all procedures are defined perfectly, so as the lay man too can easily understand. Not only are the traffic police,

each and every sector of various operating police departments automated. Similar to this, we want to establish a website for Sindh traffic police.

Here is the link of Islamabad's police website:

https://islamabadpolice.gov.pk/

1.12.2 Lahore's police website:

This website consists of modules in which many of the features are not working.

E-challan and driving license centers is not working.

http://ctplahore.gop.pk/

1.12.3 KPK Police Website:

KPK Police has automated itself within 3 years. They also in many modules and almost they automated every each system or department of kpk police.

http://kppolice.gov.pk/

1.12.4 Bangalore Traffic Police:

http://www.bangaloretrafficpolice.gov.in/

1.12.5 Los Angeles Police Department:

http://www.lapdonline.org/

1.13 Project Risks

Risk Area	**Level (H/M/L)**	**Risk Plan**
1. server not working	H	Backup server.
2. crashing of website for any reason	M	Retrieve website

1.14 Future Enhancement

When we develop a system for the user, the requirements will eventually fulfill the users need, but after time, the requirements will change. Some enhancement required in the future are as follows:

- In future when new technology arises the website can enhance according to that new technology and according to the need of the users.
- Data Analytics of accidents and providing information to citizens informing them about the main cause of the accidents, so citizens will keep in account and will be careful in the future.

CHAPTER 2

ALGORITHM ANALYSIS AND PSEUDO CODE COMPLEXITY

2.1 Literature Review

Traffic police exist for nearly three centuries. Road traffic began to increase during eighteen century and it has time make some legal rules, which citizens have to follow. In 1972 Lord Mayor of London, appoint three men to ensure that they control the traffic so that the traffic would not stop on the London bridge [3].

When we are talking about academics of traffic police academy, academy has no quality of education and officers are not properly know about their work. In 1998 Marion and Nancy says in their paper that whether the training is sufficiently prepares recruits to be effective police officer. The proper training is done by proper seminars and training programs. [4]

After the education talking about recruitment of police officers it can be done in a way that we can use NEO personality inventory to predict police academy performance and recruitment and this research is given by Detrick, Paul, John T. Chibnall, and Michael C in 2004. NEO personality inventory based on five factory theory of normal personality functioning. This study predicts academics, firearms, physical and disciplinary elements of a police academy performance. [5]

When we talking about traffic accidents in Sindh its rate become high day by day. According to the survey report of Pakistan Bureau of Statistics total number of accidents takes place in the year 2015-2016 are 924 [6] and these are becoming higher day by day and the main reason of these accidents is the ignorance of traffic rules and untrained drivers. Abbas Khalid in 2004 provides assessment of traffic safety conditions [7]. This is be done by three methods, firstly death per million vehicle kilometers are obtained and compared. Assessing traffic safety for rural roads concerned with presenting a detailed analysis of accident causes.

This is use in predicting the expected number of deaths, injuries and other things and after results, we can predict how much accidents takes place and decrease the number of accidents.

This method is used for accidents but we are doing it for challan data and analyze what is the main reason for challan (for bikes, cars etc.) and this will be very helpful, peoples aware about reason of challan and pay high attention on it, give people's awareness about that particular reason for which challan is applied.

In China, they are working for intelligent traffic system and make traffic easy for the citizens. All major cities are working on this integration. We are not making an intelligent system but this step of making traffic police automation will be a step forward towards new technology.

The police service has made an increasing use of technology is order to provide an effective and efficient policing. In 1996, Hooke, Andrew, Jim Knox, and David Portas gave the research about costing and benefit of installing traffic lights and cameras in UK. Eight types of relevant cost and benefit were identified. It was found that the number of police force using speed and traffic light cameras had increased steadily during recent year. [8]

Police and citizen must good interpersonal skills. In 2004 Richard R. Johnson write in his paper "Citizen Expectation of police traffic stop behavior" that the most common context of police citizen contact is traffic stop and verbal judo is widely used police training program in interpersonal communications intended to reduce citizen complaint against and improve citizen cooperation because most frequent type of complaint file against police officer is how the officer uses the interpersonal communication. [9]

Recruitment process is perfectly defined by P E Igbinovia in his article "Police in Trouble - Administrative and Organizational Problems in the Nigeria Police Force" in the year 1982, article says that quality personal can be get by change in personal policies that might include:

Mandatory participation of recruits in continuing education.

6 to 12 months of training.

Intensification of in-service training programs.

Citizen-police conflict can be reduced by improving police complaint procedures. [10]

To reduce the rate of accidents in police vehicles in 1980 Larson, Lynn D. says in his paper that to reduce the rate of accidents in police vehicles Tachograph is install in mobiles of police force to monitor vehicle operation to reduce the rate of accidents. Officers reviews the charts after installing tachograph and provide feedback regarding their driving performance of police officer [11]

Traffic law Enforcement is not properly maintaining in Karachi. In 2005, Dandona, Rakhi, G. Anil Kumar, and Lalit Dandona study about Traffic Law Enforcement. The aim of the study was to understand Traffic Law Enforcement carried out by police to reduce non-compliance with traffic law ion the roads. [12] They describe and compare TLE activities for the different type of

vehicles. They also gave in his study of how many cases registered of traffic violations and how many types of violations like how many times auto-rickshaw violate the rules, bikes violate the rules and many more. We can also use this type of technique to reduce traffic challans by properly applied Law Enforcement.

We are proposed this automated system and in 2012, Kumar, Balbir write in his paper that ICT (Information and Communication Technologies) are rapidly change the way of public interact not only with each other but also with private business and government institutions. [13] With ICT we can improve efficiency and effusiveness, allows us to store large amount of data. When police use ICT in their field it makes possible for them to make collections, storage and rapid dissemination of information it can increase public safety and reduces crime.

Problem in manual challan is that police officer stops you and checks your documents which causes traffic jam on the road. In 2016 Rana, Shweta, and Naveen Garg proposed in their paper that use of Information Technology to save the usage of paper. This can be done be place smart chips in number plates of the vehicles which is provide only necessary data required for monitoring. [14]. By fetching the number plate of the vehicles everything will be done automatically and I reduce traffic jam.

To write manually challans and save those manual data handwritten on papers. Dinesh Nagar, Amit Sharma, solves this problem by making an economic handled Electronic Challan System. [13]. By this system challan system is suitable for traffic police. This system works like that challan details entered by keyboard and for those offence challan will be printed buy thermal printer and this challan data is stored in EEPROM (Electrical Erasable programmable Read Only Memory).

Drivers drive in headway (tailgating) which in result in crashes. To lower down this tailgating **Michael, Paul G., Frank C. Leeming, and William O. Dwyer.** They did analytics on over

25000 drivers and place the signs that informs not to tailgating and in those signs one of which is reference to “Crash”. [15]. After the analysis the signs produce positive impact on drivers.

CHAPTER 3

HARDWARE AND SOFTWARE REQUIREMENTS

3 Requirements

The project Sindh Traffic Police Automation System is a web-based application and used by the citizens of Karachi and police officers. Development of the application includes its development requirements. Our project is a web-based application so it does not need much hardware requirements; the only hardware requirement is a PC with internet connection.
Some requirements of this project are as under:

3.1 SOFTWARE REQUIREMENTS

The main purpose in verification and validation of software requirements is to clarify and resolve software issues and high risk early in the software life cycle. [16]

- PLATFORM: web.
- PROGRAMMING LANGUAGE: ASP.NET C#.
- SERVER: Mysql.
- IDE: Visual Studio

3.1.1 SOFTWARE INTERFACE

The operating systems like Mac, Linux, and Windows are required to run this web application. Since it is a web application, the user requires a web browser to run it and visualize the content. This website is developed using ASP.net and so it needs a browser to visualize it.

3.1.2 DEPENDANCIES

- We are using Mysql for the database purpose.
- The technology we are using is asp.NET because it is secure and since we are developing a government website so it should be more secure.
- Requires a web browser for viewing the application.

3.1.3 ASSUMPTIONS

We are assuming that:

- User has the basic knowledge of how to use internet and possess little knowledge about websites.

3.2 HARDWARE REQUIREMENTS

- As it is a web application so it does not have much hardware requirements.
- Minimum hardware requirements are:
- System: Pentium 4 and above.
- Ram: 1 GB
- Hard Disk: minimum amount of space required on hard drive.

3.3 GRAPHIC REQUIREMETNS

- To get high resolution graphics on website make sure that the system supports high resolution graphics for you to visualize the graphics easily.
- PC should be internet enabled to use the services provided by this application.

CHAPTER 4

METHODOLOGY

4 OVERVIEW OF THE PROJECT

In this project, a complete module of traffic training institute academics is present, which provides to-be-police officers, those who are under training, a way to view their academic progress and information related to various undergoing awareness programs.
Modules, which shows the challan rate in different districts of Karachi. The analytics is done by data analytics of challan gathered from different districts of Karachi. The amount of challan's will be accounted, and the safety precautions will be generated looking at data analysis and statistics.

Currently, there is not much automation in Sindh Traffic Police, so, by this project, the citizen as well as the police officers, both can avail these services. This will be a plus point for both police officers and the citizens, as manual ledgers will not be needed to store records anymore, so there is more security, which means data backup would be present and citizens can also keep a track of their records maintained.

A module for citizens that can provide services like driving license theory test preparation, license verification for its originality, calculation of the total amount of fee for permanent and learning licenses, validity of the respective license, all can be done via a click rather than citizens travelling to the driving license branch and to police stations.

There are many small features included such as the traffic police officer's designation, their career records, official news about various Sindh Traffic Police departments, traffic challans in various sectors, and awareness of the cause of road accidents through data analysis of the challans accounted. Through the analysis of the data, we can spread awareness amongst people of the offences that caused it.

4.2 SYSTEM LAYOUT

Layout of the main components on which the system is going to work:

- Login/Signup
- Candidate registration
- Course registration
- Online SIMS

- Data analytics graphs and reports
- License verifier
- License theory
- Nearby police stations
- Designation View

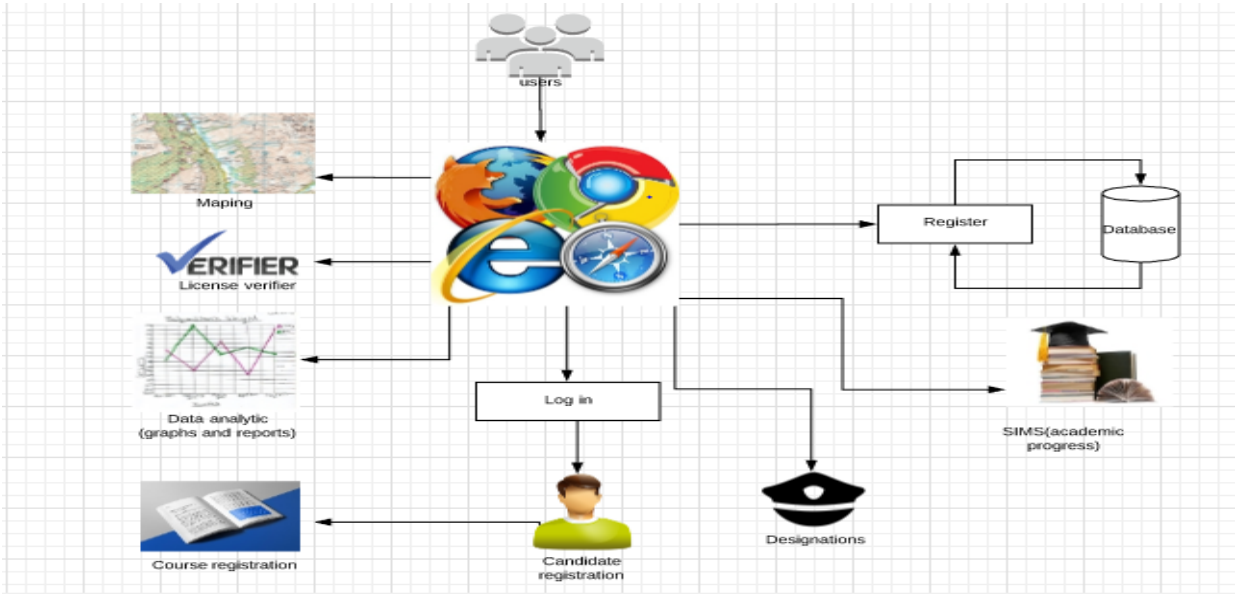

Figure 1 System Layout

4.3 GUI (GRAPHICAL USER INTERFACE)

Graphical user interfaces are provided for administrators to perform administration type operations. Sets of users granted administrative privileges may further grant and delegate administrative privileges to other sets of users to perform administration type operations on site objects over which they have administrative privileges. [17]

For the overall layout of the project, a GUI is designed according to the different screens and modules of the project. At first PSD is designed and then it is evaluated several times before going in to actual coding phase of the GUI. As this application is web based, asp.net, jQuery and bootstrap are used for the development.

4.4 MODULES

- This system is divided into following modules.
- Module 1 (Database)
- Module 2 (Complete Traffic Training Academics)
- Module 3 (Zone wise Challan Data Analytics)
- Module 4 (Awareness programs)
- Module 5 (License verifier)
- Module 6 (Information module)

4.4.1 Module 1(Database)

The Database of the system is going to be implemented using SQL Server 2012. There are two databases in this project containing multiple tables of which one database holds a table of candidate's registration details, a table of course registration details and a table of academic record details. Apart from this, the database holds one table for SIMS data (candidate's academic process) and the data regarding the license verification will be stored in different fields. We have R tools which will be used to analyses the data, which will contain data challan rates of the previous four years. This database will be maintained on strong terms and conditions and will be updated timely based on the need to update it.

4.4.2 Traffic Training Academics

In this feature the academic system of TTI (Traffic Training Institute) is placed. This module will hold data of students who are enrolled in Traffic Training Institute and this data includes information concerning registration, academic progress, results and the courses. This module will automate all of the paperwork regarding academics and will create a database which will be updated 24/7. There will be no need for manually searching the data, it will be possible through just a few keywords. This is a demanded module from the Traffic Training Institute.

4.4.3 Traffic Training SIMS (Student Information Management System)

Student Information Management System (SIMS) provides a simple interface for maintenance of student information. It can be used by educational institutes or colleges to maintain the records of students easily. [18]

This module shows the academic progress of students such as assessment marks, examination marks, etc., similar to UIT SIMS that operates in a similar manner, displaying the summative and formative assessment marks. This is a demanded module from TTI as this will account to 50% lesser the burden of teachers as well as students.

4.4.4 Zone wise Challan Data Analytics

The aim of the study was to understand traffic law enforcement (TLE) carried out by the police to reduce non-compliance with traffic laws on the roads. [19]

Modules, which shows the challan rate in different districts of Karachi. The analytics is done by data analytics of challan gathered from different districts of Karachi.

The amount of challan's will be accounted, and the safety precautions will be generated looking at data analysis and statistics.

4.4.5 Awareness Programs

In this feature, information concerned with awareness programs will be given to the citizens such as interpretation of traffic signs and traffic rules and the necessary steps to carry out in order to obey them. Not everyone knows about all of the traffic signs, so, the awareness

program would be a good step to give information about important traffic rules to the citizens, meanwhile being productive as well.

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4.4.6Information Module

This is a feature consisting of a method that will define how an individual can pay the fine and collect his/her documents, will provide information about the traffic police officers and their designations, as well as their career records. Information regarding the traffic roundabouts, etc. will also be provided, which can be used later for data analysis purpose.

4.4.7License Fee Calculator

Defines the amount required for the issuance of a permanent or learning license.
Not everyone knows about the driving license fee, so this module gives the fee structure of making a license.

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This is a simple feature, which lets you know about the originality of the license. The user providing the CNIC number will have his/her CNIC verified from the modules of the database, for the identity card's originality, which will respond in whether the license is fake or original.

4.4.9 Zone Wise Challan Data Analytics

Modules, which shows the challan rate in different districts of Karachi. The analytics is done by data analytics of challan gathered from different districts of Karachi.

The amount of challan's will be accounted, and the safety precautions will be generated looking at data analysis and statistics over time.

4.4.10 Module 7 (Nearby Location)

In this module, nearby locations of the police stations can be viewed, so that it is easy for anyone to know the best police station nearby along with the ratings and the specific details.

4.5 General Operations

General operation is as follow:

4.5.1 Candidates

- Candidate will be creating an account to Login in to it.
- Candidate will then be registering on to the profile
- The courses will be registered by the candidates
- The candidate will be able to view the marks of the courses

4.5.2 User

- Through awareness programs, the user can get information regarding which violation of traffic rule is happening the most.
- Graphs and reports can be used to analyze the traffic rules violation, observed to be the most
- License can be verified by the user from this website
- Information module can be helpful to check the designation of the officers and can extract information regarding their job details
- License test theory can be availed
- Locations of the nearby police stations can also be availed

4.5.3 Admin

- Has full access to all the modules of this system.

- Responsible for the accounts of all candidates
- Update, modify or delete queries and details
- Admin can access academic records in the SIMS
- Data’s responsibility access will be accessible to the admin
- Academic records will be updates in the SIMS daily
- Prepares and submits also Daily reports, user reports, event reports, etc.

4.6 SOFTWARE USED IN THE PROJECT

- Visual Studio
- R tool
- R Studio
- Lucid chart
- Draw.IO

4.7 PROJECT PROPOSED MODEL

The Model which is being followed in the project is Iterative model, is a way of breaking down the software development of a large application into smaller chunks. Less time is required for integration as the process of integration goes on throughout the software development life cycle. This is a complete methodology in itself with an emphasis on accurate documentation. It is proactively able to resolve the project risks associated with the client's evolving requirements requiring careful change request management. The development time required is less due to reuse of components.

Six "engineering disciplines"

- Requirement analysis
- Data requirements
- Analysis and design
- Implementation
- Test
- Deployment

CHAPTER 5

SOFTWARE DESIGN & MODELING

5 Data Flow Diagram (DFD)

Data Flow Diagram (DFD) is widely used for structured software analysis and design. [20]. the data flow diagram is shown below.

5.1. TRAFFIC TRAINING INSTITUTE ACADEMIC

The student will have to login himself/herself first, in order to register. If the student is not registered, he/she will have to register first, then login, after which three interfaces will be displayed to the student.

The candidate will have to register his/her entire profile in the first interface containing information regarding designations, departments he/she have worked in, along with other personal details which will then be recorded.

After the candidate registers himself/herself fully, he/she will then have to register the course which will be offered.

After the student has logged in after registering himself/herself, and has gone through the process of both interface registrations, the candidate will easily be able to keep a track of his/her academic progress by viewing marks obtained in formative and summative assessments on the online SIMS, throughout the academic time and then, if the candidate does not want to go through anything else, he/she will then logout from the website.

TTI Academics SIMS (Faculty):

The faculty will be provided with an account which will be given to them by the admin. The faculty will then be having access to only one task which will be of updating marks and academic progress of the students on their student accounts.

TTI Academics SIMS (Admin):

Admin has authorization and access to every module. The admin will have every equal and CRUD right to have access over the accounts provided to the faculty over the database, where they can visualize every activity being performed by the faculty. An admin has the right only to position someone as an admin, to create/delete someone's database account, to update the license verification database, to update, delete and amend the records in the database, as per necessary update schedule.

All the three processes described and mentioned above are depicted in the diagram below.

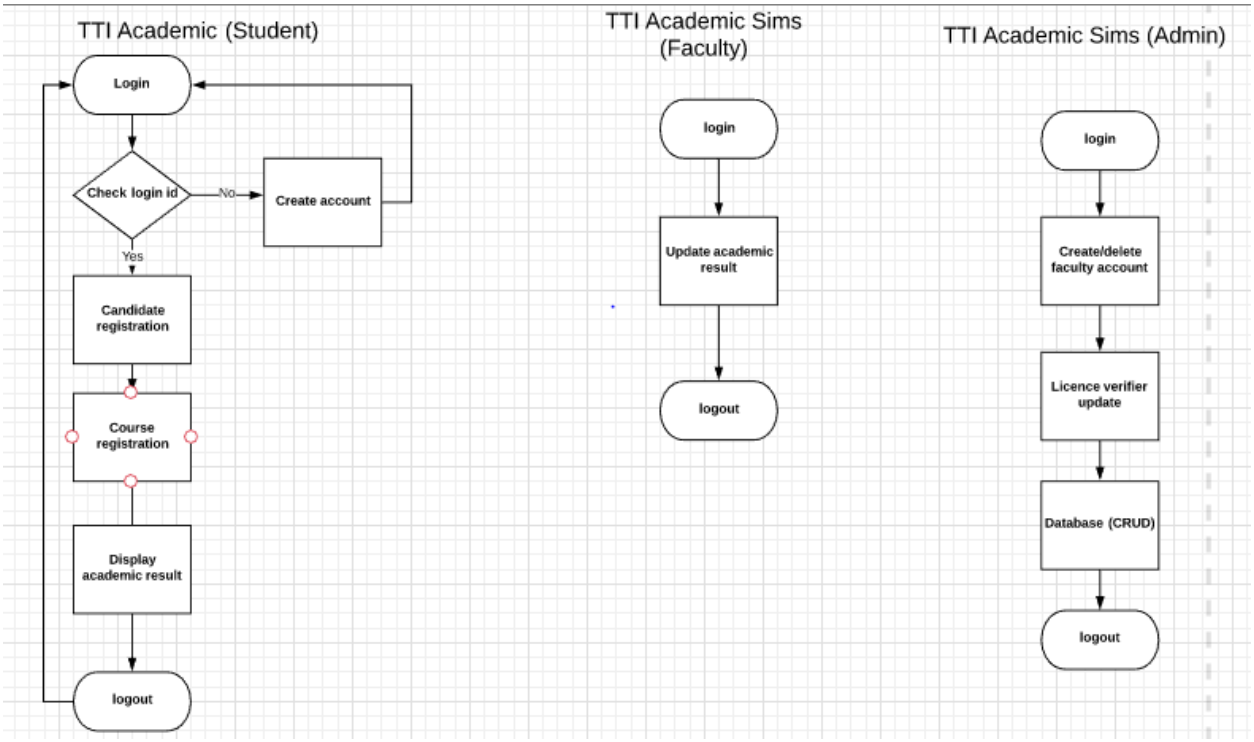


Figure 2 TTI Academics Data Flow Diagram

5.1.2 Data Analytics

Data gathering is the most important aspect of this module, without data gathering we cannot perform data analytics. The performance of this data analytics is being performed through R Tool. If we do not have the available data, we will not be able to perform the operation but, if we are provided with the data, performance of the operation would be possible. First we extract all the string values from the data and then convert it into integer form. Proceeding further, we apply formulae on the data and then find out the co-relations of the given data. We then apply the regression model after which we will generate the graphs, which will be used in generating awareness programs, which will be helpful in monitoring the conditions and will provide secure travelling process to citizens who are travelling so that they are aware of the conditions while travelling. This cycle will be repeated in the upcoming year, for the similar purpose based on the previous data and the data accounted in the upcoming year.

The entire process described above is depicted in the diagram below

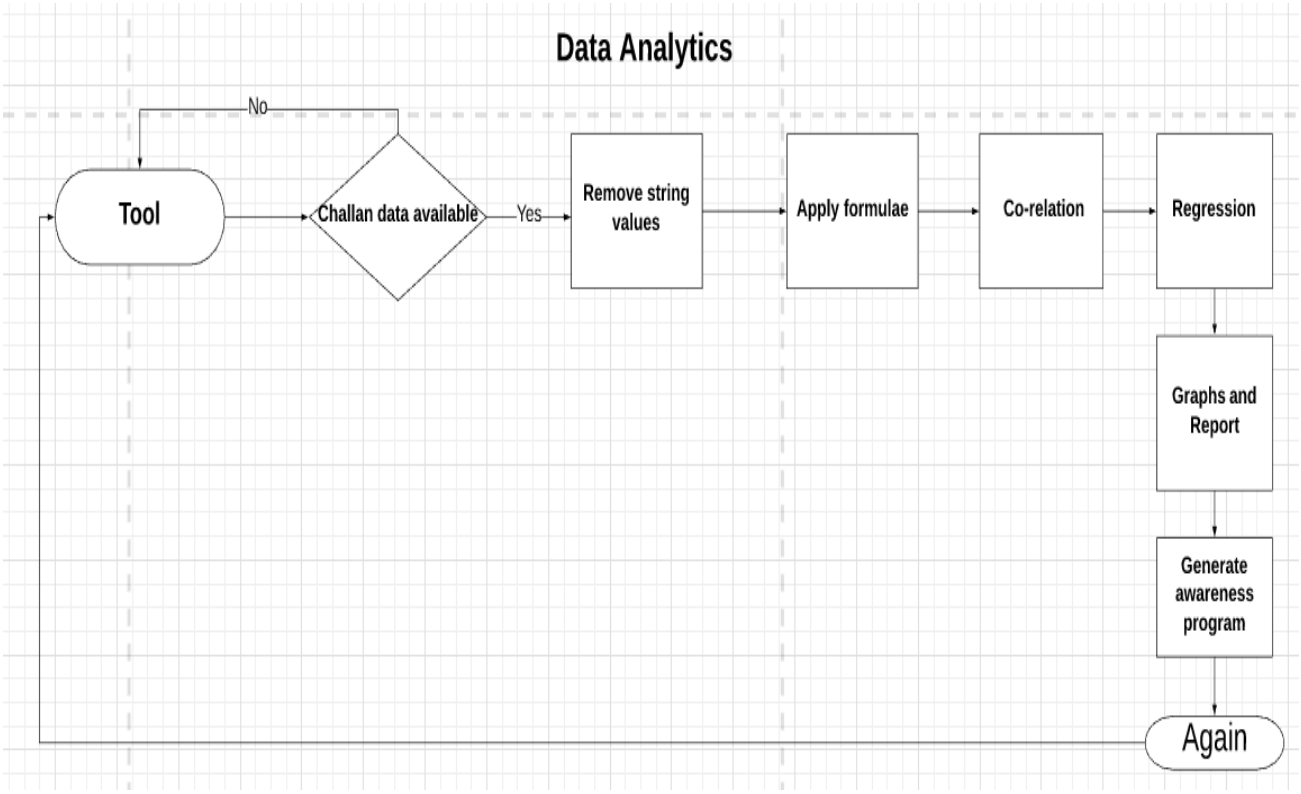


Figure 3 Data Analytics Data Flow Diagram

5.1.3 Sub modules

There will be a database, in which will be a table of license verification. In this table, data of the users will be present, who withhold licenses. When the user visits this module of the website, he/she can input their National Identification Number (NIC), which will result in the confirmation of the verification of their NIC. After going through this process, the user will return to the main menu.

In the information module, data regarding the designations and work field of the police officers will be embedded. When the user will visit the website, he/she can extract information regarding the police officers. After the user searches through the information in the information module, he/she will return back to the main menu.

5.2 UML Diagrams

UML diagram for the system are as follow:

5.2.1 Class Diagram

To produce a precise and analyzable software model, it is essential for the modeling technique to have formality in the syntax and the semantics of its notation [21]. In this class diagram, the Web user can directly visit the classes Home and Class Account first after logging in by entering the username and password. The class Home will have three methods and the class Account will have three methods which will be required initially to gather the login details, and will then proceed onto the Candidate Registration and Course Registration classes. Before that, the class Web user will not be able to visit the candidate registration and the course registration classes. These classes, to which proceeded later, will be used by making use of the "create" methods.

The diagram below depicts the details mentioned above.

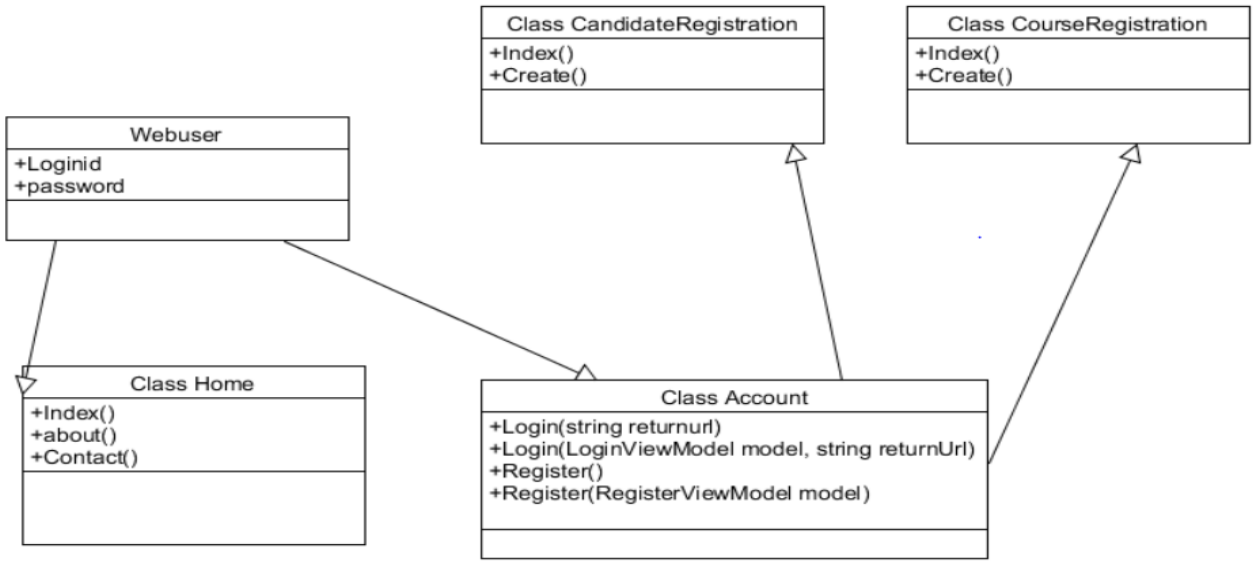


Figure 4 Class Diagram

5.2.2 Use Case Diagram

A use case diagram, as a requirements model, plays an important role in giving requirements for a software system [22]. A use case diagram is referred to as a set of diagrams that depicts a certain behavior followed by the actors.

In this use case, we have three actors and multiple use cases.

When the student will visit the website, the student can register on the website, can register the desired courses on the website, and can also visualize the awareness programs on the website by also participating in the awareness programs. The student can visit and view his/her academic progress on the website the candidate can also read the license theory for the license test and can view the designations of the police officers. The student can also look up for the police stations located nearby.

The faculty will have the right to visit the SIMS only. The faculty will have the authority to update the SIMS only. The faculty can only enter and delete the student's records. This is the only authority the faculty will have.

The admin will have full rights to update the database CRUD. The admin will also have access to the license verifier and then through the data analytics, the admin can generate the awareness programs which will then be displayed on the website.

The diagram for the modules described above is displayed below:

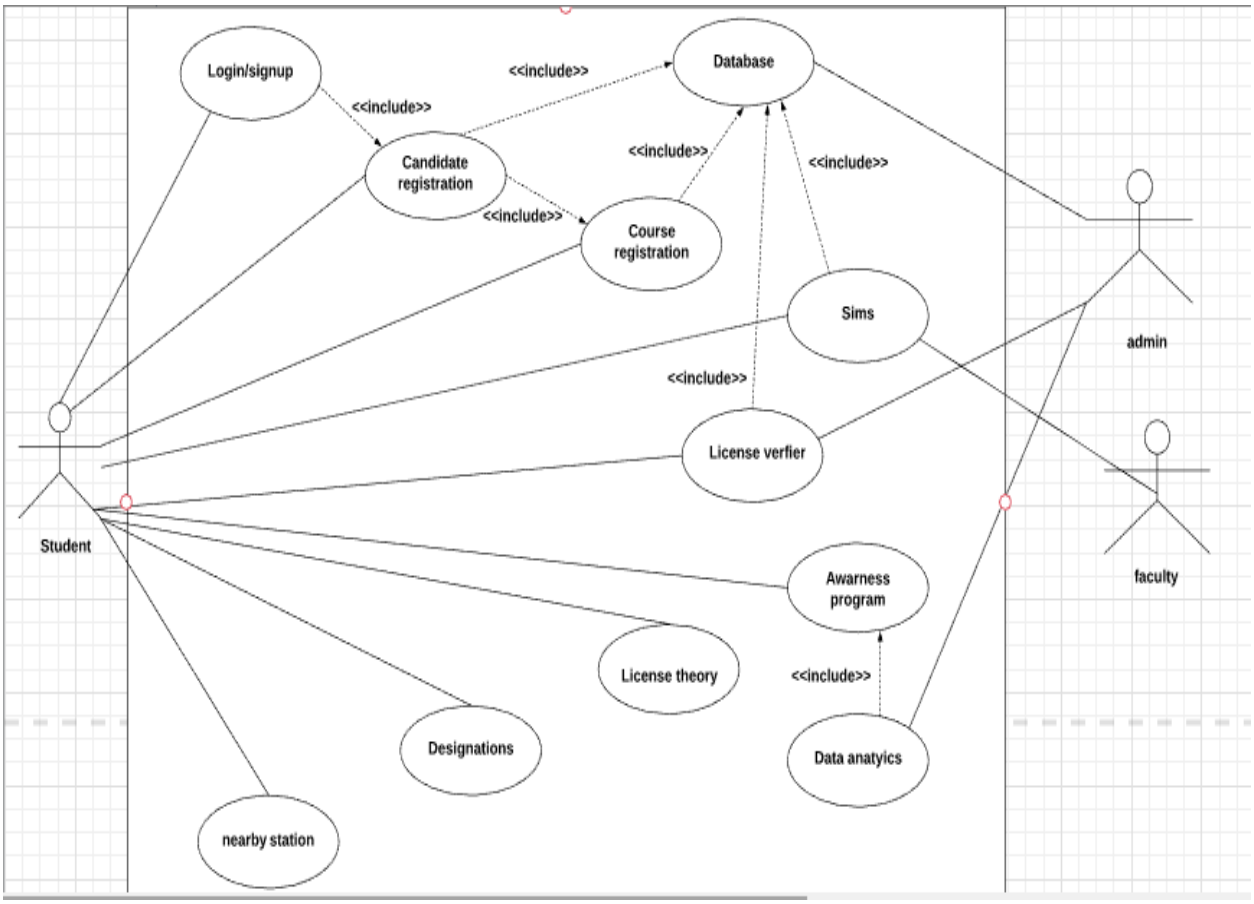


Figure 5 Use Case Diagram

CHAPTER 6

ALGORITHM ANALYSIS AND PSEUDO CODE

COMPLEXITY

6. Searching

6.1 Algorithm

1. position= -1;
2. while ((the listed item is more than one) and (the target is haven't yet found))
   2A. glance at the middle item
   2B. if (the item in the middle
   is the target)
   have found target
   else
   2C. if (target < central item)
   list = to start with half of the
   rundown
   2D. else (target > central item)
   list = last half of the rundown
   end while
3. if (desired target has been found)
   position = location of target in original list
4. return position as the result

6.1.1 Pseudo Code

```
position = -1;
    initial = 0;
    last = number of items minus 1;
    while ((number of items remaining for the search operation>= 1)
    and (target not found))
     middle = position of central item, somewhere between first and
last
      if (target is at the central (middle) position)
```

```
target    found
else
    if  (target  <  middle  item)
search for in the lower half of
the array next
last = middle - 1;
        else
search for in the upper half of the array next
            initial          =
middle   +   1;      end
while
if (target found) (i.e., middle item == target)
   position = location of target in array (i.e., middle)
return position as the concluded result
```

6.1.2 Complexity

To assess seek, include the quantity of correlations the best case and most pessimistic scenario. This examination precludes the normal case, which is more troublesome, and overlooks any contrasts between calculations in the measure of calculation relating to every correlation.

The best case happens if the center thing happens to be the objective. At that point just, a single correlation is expected to discover it. As previously, the best-case investigation does not uncover much.

In the event that the objective isn't in the cluster then the way toward isolating the rundown down the middle proceeds until there is just a single thing left to check. Here is the example of the quantity of examinations after every division, given the rearranging presumptions of an underlying cluster length that is an even intensity of 2 (1024) and correct division down the middle on every cycle:

Items left to search	Comparison so far
1024	0
512	1
256	2
128	3
64	4
32	5
16	6
8	7
4	8
2	9
1	10

Table 6.1

For a rundown size of 1024, there are 10 correlations with achieve a rundown of size one, given that there is one examination for every division, and every division part the rundown estimate down the middle.

As a rule, if n is the span of the rundown to be sought and C is the quantity of correlations with do as such in the most pessimistic scenario, **C = log2n**. In this manner, the productivity of inquiry can be communicated as a logarithmic capacity, in which the quantity of correlations required to discover objective increments just logarithmically with the span of the rundown.

The following table 6.3 summarizes the analysis for searching algorithm.

Model	**Number of Comparisons** (for n = 100000)	**Comparisons as a function of n**
Best Case (Least/fewest Comparisons)	1 (target is middle item)	1
Worst case (Most comparisons)	16 (target not in array)	Log_2n

Table 6.2

Complexity Representation in Big O

Best Case: O (1)
Worst Case:
$O(\log_2 n)$

6.1.3 Graphical Representation

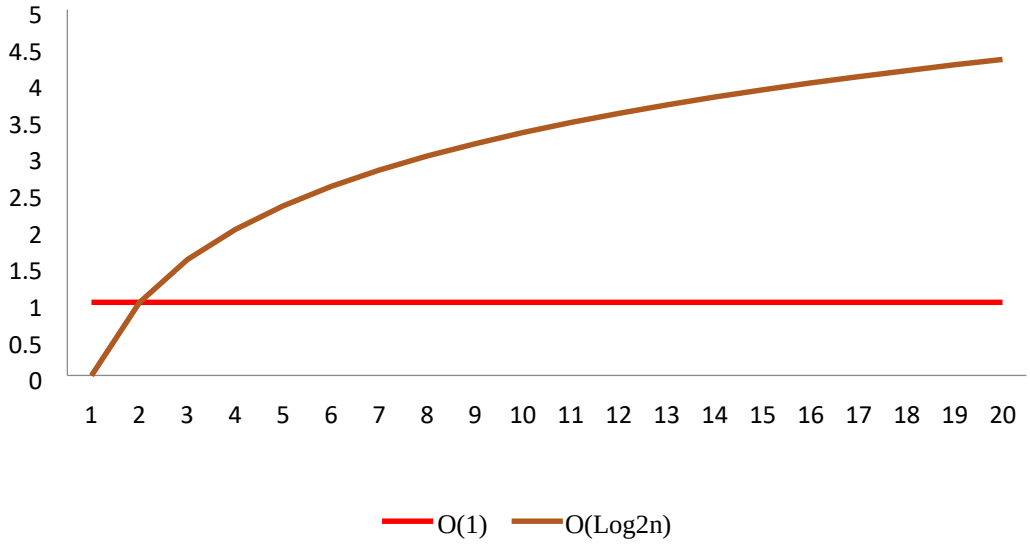


Figure. 6.1 Graphical Representation

6.2 Data Management

6.2.1 Algorithm

1. if (less than one item in list)

    1A. than goto

    else

    goto step 2

2. while ((more than one item in list))

    2A. Collect data from all previous form

    2B. if (data item is according to expectation and data is correct)

    have Print that on a report and save in database

    else

2C. if (data item is not according to expectation and data is correct)

list = According to required format

2D. else if (data is not correct and format is correct)

list = send back to last form

collect data from user

send it to step 2.

2E. else if (data is not correct and format is not correct)

list = send back to last form

collect data from user

send it to step 2.

end while

3. if (data saved)

report = geodata

4. return report as the result

6.2.2 Pseudo Code

report = -1; //mean not allow to save or print.

first = 0;

if (less than one item in list)

than go to

else go to step 2

while ((more than one item in list))

Collect data from all previous form

if (data item is according to expectation and data is correct)

have Print that on a report and save in database

else if (data item is not according to expectation and data is correct)

list will be According to required format

else if (data is not correct and format is correct)

list will be sent back to last form

collect data from user

send it to step 2.

else if (data is not correct and format is not correct)

list will be sent back to last form

collect data from user

send it to step 2. end while

if (data saved) report will be gather data

return report as the result

.

6.2.3 Complexity

For the information administration, information originates from seven distinct structures. it implies that for the best possible administration of information, client need to process seven unique structures. In the wake of handling the information will go for organize approval.

The best case is that at first endeavor when the information go for approval is as of now in wanted arrangement, in this way, the many-sided quality for the best case is 1.

The information will be sent back if the arrangement isn't as indicated by wanted and to influence it as wanted client to have make n endeavors, at that point the case tends to be most exceedingly bad. The many-sided quality for this case is n. since client need to endeavor n times.

Model	Number of Comparisons	Comparisons as a function of n
Best Case	1	1
Worst Case	n	N

Table 6.3

6.2.4 Complexity Representation in Big O

Best Case: O(1)

Worst Case: O(n)

6.2.5 Graphical Representation

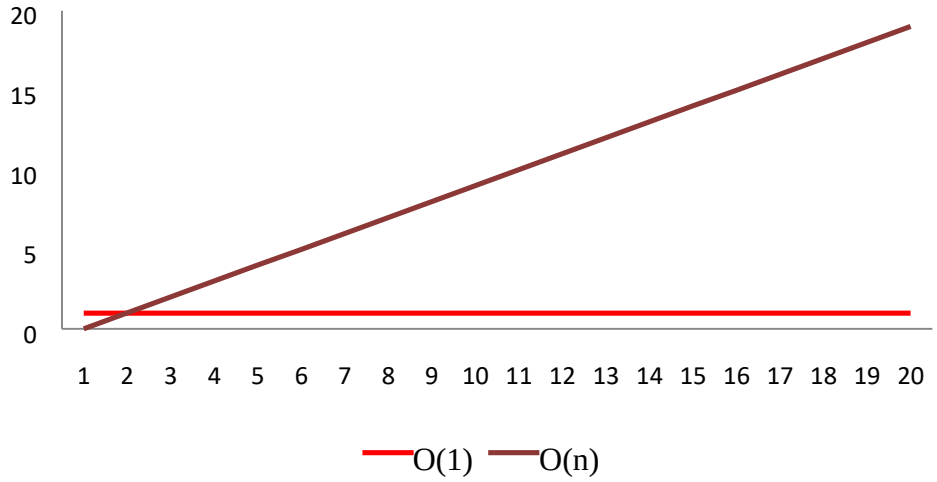


Fig. 6.2 Graphical Representation

6.3 Data Sorting

6.3.1 Algorithm

1. partition (array, left, right)

1.1. pivotIndex := choosePivot(array, left, right)

1.2. pivotValue := array[pivotIndex]

1.3. swap array[pivotIndex] and array[right]

1.4. storeIndex := left

1.5. for i from left to right - 1

1.6. if array[i] <pivotValue

1.6.1 swap array[i] and array[storeIndex]

1.6.2 storeIndex := storeIndex + 1

1.7. swap array[storeIndex] and array[right] // Move pivot to its final place

1.8. returnstoreIndex end

6.3.2 Pseudo Code

STEP 1. Choosing the pivot

Picking the rotate is a fundamental advance.

Contingent upon the turn the calculation may run quick, or in quadric time.:

Some settled component: e.g. the main, the last, the one in the center

This is an awful decision - the rotate may swing to be the littlest or the biggest component, at that point one of the allotments will be unfilled.

Arbitrarily picked (by arbitrary generator) - still a terrible decision.

The middle of the exhibit (if the cluster has N numbers, the middle is the [N/2] biggest number.

This is hard to figure - expands the multifaceted nature.

The middle of-three decision: take the main, the last and the center component. Pick the middle of these three components.

Case:

8, 3, 25, 6, 10, 17, 1, 2, 18, 5

The primary component is 8, the center - 10, the last - 5.

The three components are arranged: [5, 8, 10] and the center component is 8. This is the middle.

STEP 2. Partitioning

Dividing is delineated on the above case.

In the wake of finding the rotate the cluster will resemble this:

5, 3, 25, 6, 8, 17, 1, 2, 18, 10

1. The first activity is to get the rotate off the beaten path - swap it with the beside the last component

5, 3, 25, 6, 18, 17, 1, 2, 8, 10

2. We need bigger components to go to one side and littler components to go to one side.

Two "fingers" are utilized to check the components from left to right and from ideal to left:

[5, 3, 25, 6, 18, 17, 1, 2, 8, 10]

^ I j

Note: we realize that the main component is littler than the turn, so the principal component to be prepared is the component to one side. The last two components are the rotate and a component more prominent than the turn, so they are not prepared.

While I is to one side of j, we move I right, skirting every one of the components not as much as the turn. On the off chance that a component is discovered more prominent then the rotate, I stops While j is to one side of I, we move j left, skirting every one of the components more noteworthy than the turn. In the event that a component is discovered less than the turn, j stops When both I and j have ceased, the components are swapped. When I and j have crossed, no swap is performed, examining stops, and the component indicated by I is swapped with the rotate.

In the illustration the primary swapping will be somewhere in the range of 25 and 2, the second somewhere in the range of 18 and 1.

3. Reestablish the turn.

Subsequent to reestablishing the rotate we acquire the accompanying dividing into three gatherings:

[5, 3, 2, 6, 1] [8] [18, 25, 17, 10]

6.3.3 Complexity

T(N) = T(i) + T(N - I - 1) + cN an opportunity to sort the record is equivalent to an opportunity to sort the

left segment with I components, in addition to an opportunity to sort the correct parcel with N-I-1 components, in addition to an opportunity to manufacture the allotments

6.3.4 Complexity Representation in Big O

Assuming the worst possible scenario: O(N2)

This happens when the rotate is the littlest (or the biggest) component. At that point one of the parcels is unfilled, and we rehash recursively the system for N-1 components.

Best-case: O(NlogN)

The best case is the point at which the turn is the middle of the cluster, and after that the left and the correct part will have same size. There are logN parcels, and to acquire every segment we do N correlations (and not more than N/2 swaps). Thus, the unpredictability is O(NlogN)

Normal case: O(Long)

6.3.5 Graphical Representation of Big O

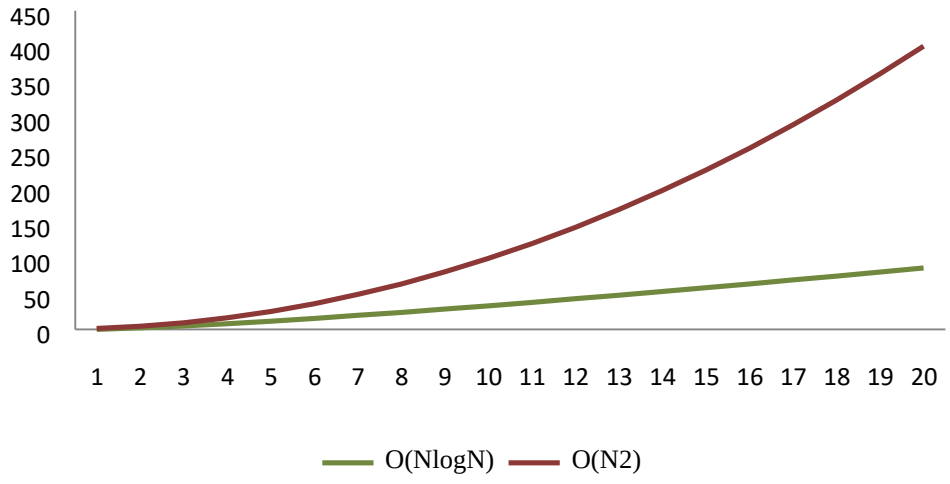


Figure. 6.4 Graphical Representation

CHAPTER 7

TESTING

7.1 Testing

Testing is a process to analyze the system whether the system completes the requirement or not. Testing is basically a process, whereby, identification for the need of rectification of errors, missing of requirements, any gaps encountered, or errors within the system are identified in contrast to the actual requirements of the system.

This depends upon the process of the system and the associated stakeholders of the project. In the larger picture, in the IT industry, large companies have teams with responsibilities held responsible to evaluate the developed software in accordance with the context of the given requirements.

Unit Testing is also a method by which developers carry out testing to check out the lack of features.

In most cases, the following professionals are involved in testing a system within their respective capacities:

- Software Tester
- Software Developer
- Project Manager
- Stake holders

There are different designations of people in different companies, who were held responsible for testing the software based on the knowledge and experience they have related to the software such as Software Tester, Software Quality Assurance Engineer, QA Analyst, etc.

7.2 Type of Testing

7.2.1 Manual Testing

Manual testing is the process where the software is tested manually without using any sort of automation of tools or any script. In this type of testing, the tester takes over the role of the end-user and tests the software for the identification of any unexpected behavior or bug in the software.

There are several different stages for manual testing such as unit testing, system testing, integration testing, and user acceptance testing. Testers use test plans, test cases, or test scenarios to test a software to ensure the full completeness of the testing process. Manual testing also includes exploratory testing where testers usually explore the software to find out and identify the errors in the software.

7.2.2 Automation Testing

Test automation which is none other than automation testing, is the process where the tester will write the script and will use another software to test the respective product. Moreover, automation testing is used to re-run the test scenarios that were performed quickly, manually and repeatedly. The load, performance, and stress point of view of the application is also tested by automation testing, apart from regression testing. Improvement of accuracy, test coverage is increased. Also, it saves time and money in comparison to manual testing.

7.2.3 Testing methods

Software testing is a highly complex and time-consuming activity- It is even difficult to say when testing is complete [23]. There are different methods that can be used for software testing. This chapter briefly describes the methods available.

7.2.4 Black Box Testing

The testing process with the lack of knowledge of the inside the application the tester does not have access for the code.

7.2.5 White Box Testing

The white box testing has all access to the code or the structure of the code for the white box testing the tester must have access to manipulate the code and he must test the code to detect the bug on the application.

7.2.6 Gray Box Testing

In gray box testing the tester design and analyze the document and database. A tester with this Knowledge can make an application better by test scenarios while he is making test plans.

7.2.7 Testing Levels

In our application we are using two main levels of testing these main levels include main methodologies that can be adopted while the period of testing

The main levels are:

- Functional Testing
- Non-functional Testing

7.2.8 Functional Testing

The functional testing is the type of black box testing. Inputs were given for the testing of an application and the result were analyzed to check whether the requirement for the functionality testing completed or not.

There are five major steps for the testing of a functionality of an application

- The determination of the functionality that the intended application is meant to perform.
- The creation of test data based on the specifications of the application.
- The output based on the test data and the specifications of the application.
- The writing of test scenarios and the execution of test cases.
- The comparison of actual and expected results based on the executed test cases.

Test Scenario	Test Case	Pre-Condition	Test Step	Expected Result	Actual Result	Pass/Fail
User Login	Enter login ID and password	Website must be open	1. Launch application 2. Go to academics	Login to academics	Login Successfully	Pass
Add User	Register a User	Website must be open and login also	1. Launch application 2. Go to academics 3. Login 4. Add user	User Registered	Successful	Pass
Assign Course to Teacher	Assign Course to teachers	Open website login and then assign courses	1. Launch application 2. Go to academics 3. Login 4. Click on assign courses to teachers	Courses assign to teachers	Successful	pass
Enter course marks	Enter marks of students	Open the website login go to marks entry module then enter marks	1. Launch application 2. Go to academics 3. Login 4. Click on marks entry module 5. Select course to be entered marks	Marks of students entered	Successfully	Pass
Show Grade sheet	Show Students all subject marks on single table	Open the website login go to Grade sheet module select batch and	1. Launch application 2. Go to academics 3. Login 4. Click on Grade sheet 5. Select Batch	Showing of marks	Successfully	Pass

		then show grade sheet	6. View marks			

7.2.9 Unit Testing

In unit testing chunks of code were tested to check whether the code is performing its functionality in correct order or not. The testers use test data which is entirely different from the data of QA department.

Login Module:

Test Case	Attribute	Expected Result	Result
Login into academics with correct id and pass.	loginID:Junaid pass:12345	Validate from database and login into academics	pass
Login into academics with incorrect id and pass.	loginID:Junaid pass:655	Not validate from database	pass
Login into academics with null id and pass.	loginID:null pass:null	Gives validation about empty values	pass

User Registration:

Test Case	Attribute	Expected Result	Result
Fill all the required fields	All the required options filled	Insert the data into database	pass
All the required fields were not filled.	All the required options were empty	No insertion of data into database	pass

Course Registration:

Test Case	Attribute	Expected Result	Result
Fill all the required fields	All the required options filled	Insert the data into database	pass
All the required fields were not filled.	All the required options were empty	No insertion of data into database	pass

7.2.10 Integration Testing

Integration testing means combining two parts of an application to check whether it is performing well there is two type of integration testing, Top-down integration testing and Bottom-up integration testing. The integration testing ends with the variety of tests of a developed application

7.2.11 System Testing

This type of testing tests the whole system after the integration of the application or system the mean of whole testing is to specified and meet the all quality standards, following reasons make the system testing meaningful:

- It is the initial step of the SDLC, in which system is tested as whole.

- The system is tested properly to make sure it meets the functional or technical requirements.
- It is the step where the application or system is to be deployed.
- It helps to developed business and application architecture.

7.2.12 Regression Testing

When we modify the code there is chance that may affect the application. It verifies that the bug was fixed is working in proper condition or not or it is violating the rules of testing the important reasons are:

- Vanish all the gaps in it after modifying an application.
- When change is to be made in an application make sure it does not affect the entire application.
- Doubled the velocity to make space in the market.
- Done all the test with in the due date.

7.2.13 Acceptance Testing

Acceptance testing is a quite recent addition to testing in agile software development holding great promise of improving communication and collaboration [24]. This the most important type of testing which is supervised by the QA department where they are measuring the system whether it satisfies the requirement or not. Sets of written scenarios and test cases helps to test the system. Several further ideas can be shared about the application. Also, different kinds of tests can be performed on the application to enhance its accuracy and provide reasons for the development of the application. This test i.e. acceptance test is not implemented for basic purposes such as minor spelling errors or interface flaws or cosmetic errors, but is also used to identify limitations in the application or bugs in the application which can result in malfunction of the system or failure in running the application without errors, efficiently. By conducting such test, it will be easier for the team to identify and deduce how the application will work at the production level. Legal and contractual requirements are also there for the acceptance of the system.

7.2.14 Alpha Testing

Combination of unit testing, integration testing and system testing is called alpha testing. During the phase of testing:

- Spell check
- Broken links
- Cloudy directions
- Load testing

Results:

No bug detected during testing process.

7.2.15 Beta Testing

Beta testing followed by the alpha testing. In beta testing consumers testify the application or system. This type of testing distributed to variety of people to check the application. Following things were test by the people:

- Users will use application and give feedback.
- Flow of application was not good.
- After the feedback the developer can fix the problem which was faced by the audience.
- It will improve the quality of the product after resolving all the issue which was arrived by the side of the users
- It satisfies all the user after resolving the issues.

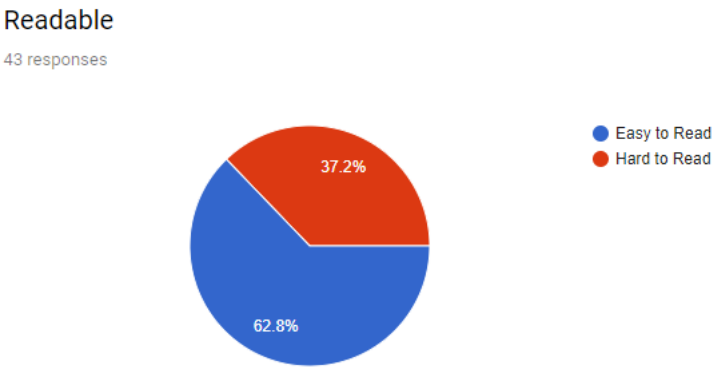


Figure 6 Beta Testing Readable

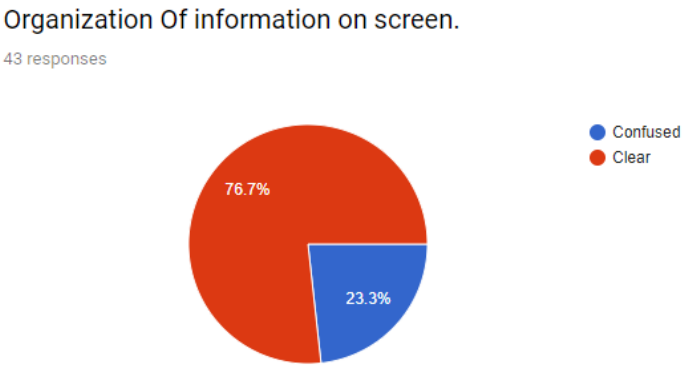


Figure 7 Beta Testing Organization of Information on Screen

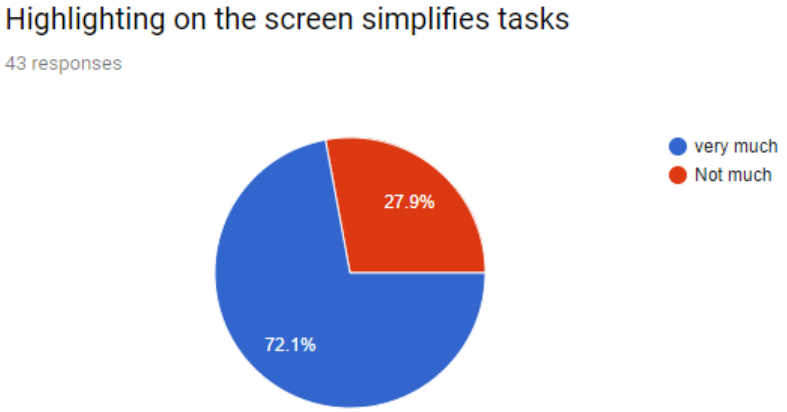


Figure 8 Beta Testing Highlighting on the Screen simples Tasks

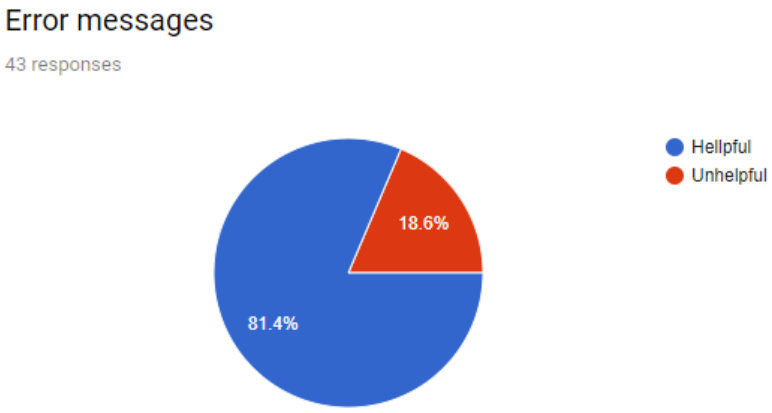


Figure 9 Error Messages

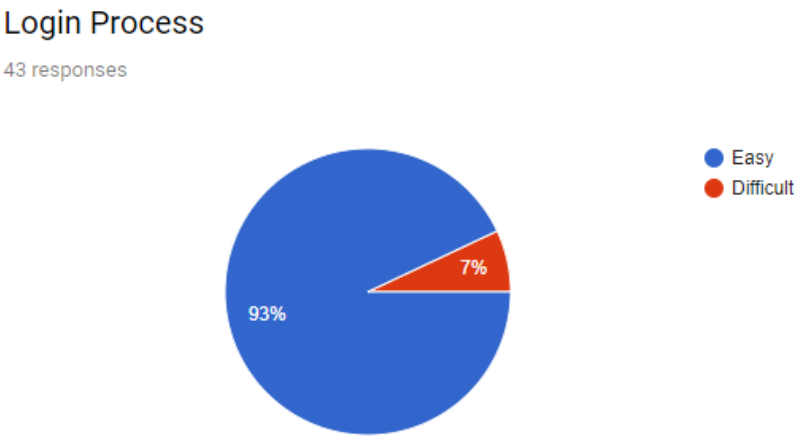


Figure 10 Login Process

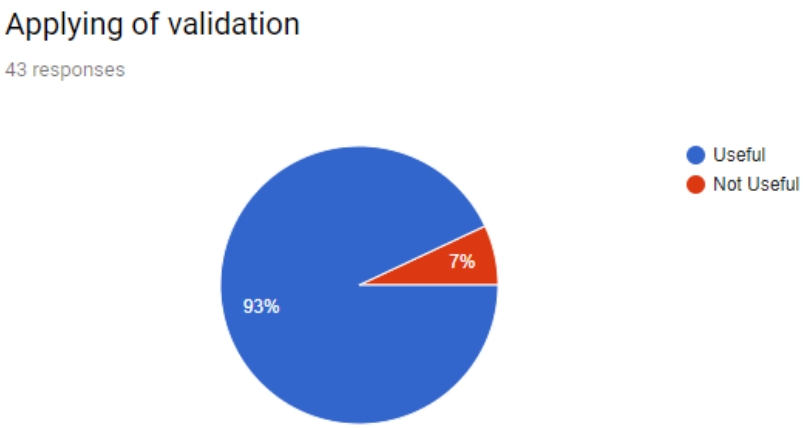


Figure 11 Applying of Validations

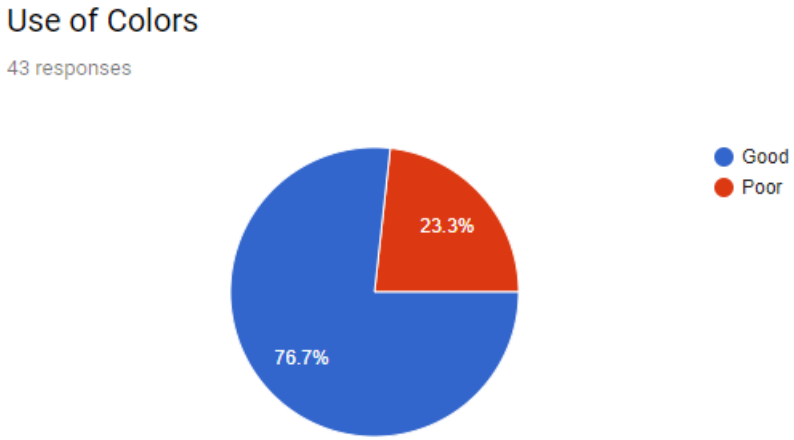


Figure 12 Use of Colors

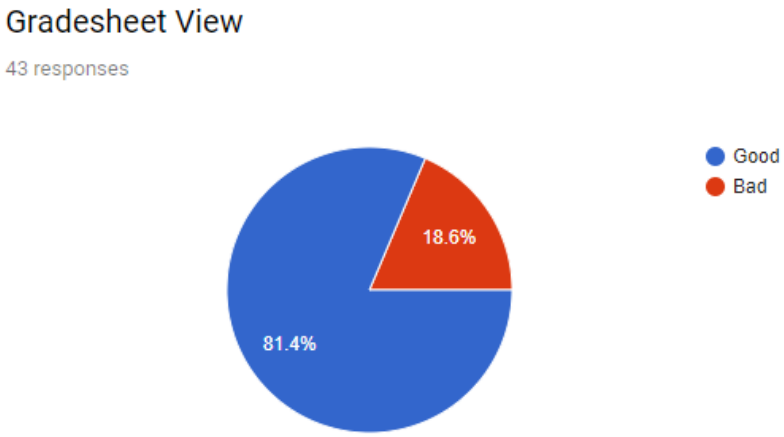


Figure 13 Grade Sheet View

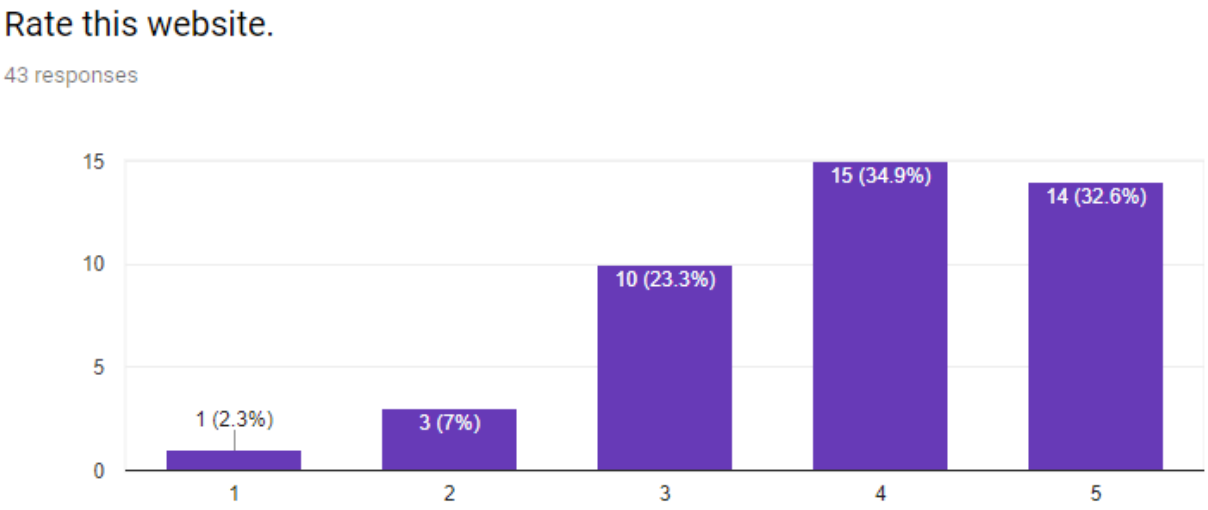


Figure 14 Rate this Website

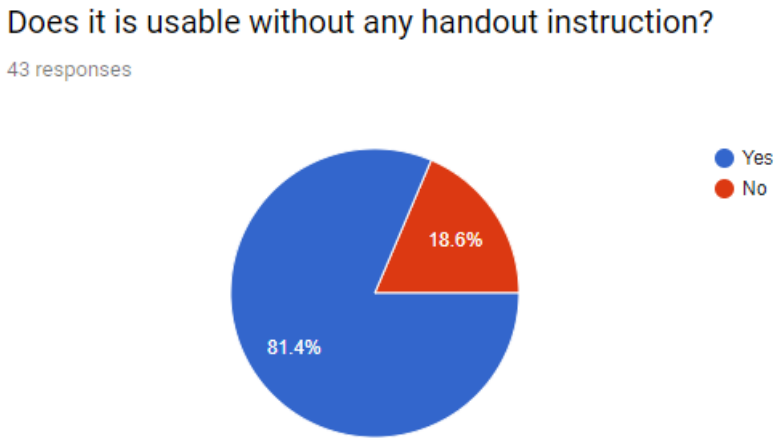


Figure 15 Usable Without any handout

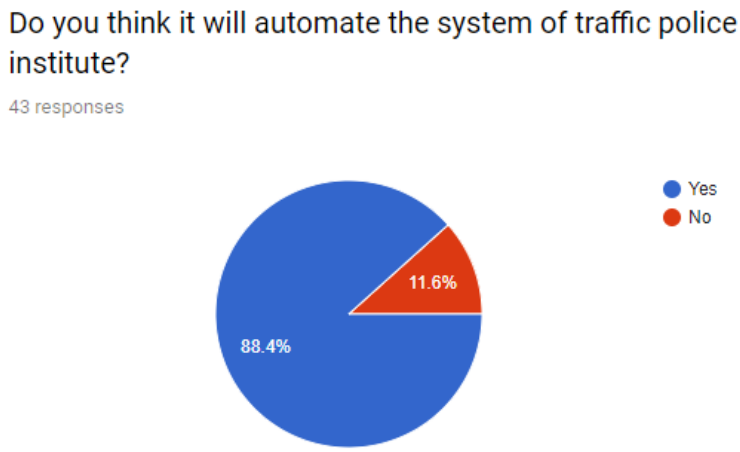


Figure 16 Automate the System

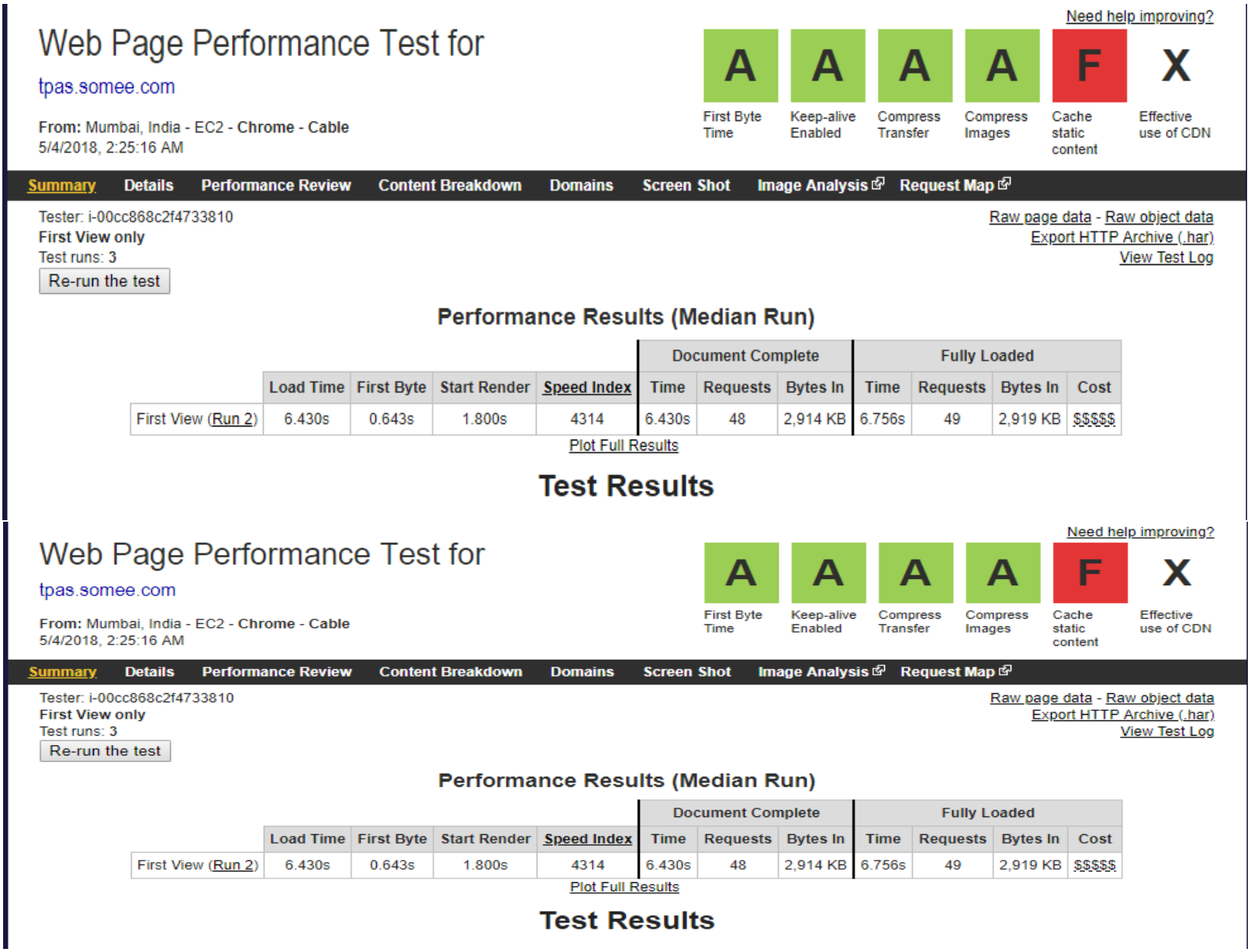
7.2.16 Non-Functional Testing

Performance, security or user interface etc. was tested in non-functional testing. It tests the application with the non-functional attributes in the application.

7.2.17 Performance Testing

Not all software systems have specifications on performance explicitly. But every system will have implicit performance requirements [25]. It resolves the performance issues in the application instead of resolving bug. There are many things that can make the performance low:

- Internet
- Transaction of data fields
- Load In server
- Data rendering



Web Page Performance Test for

tpas.somee.com

From: Mumbai, India - EC2 - Chrome - Cable
5/4/2018, 2:25:16 AM

Need help improving?

A	A	A	A	F	X
First Byte Time	Keep-alive Enabled	Compress Transfer	Compress Images	Cache static content	Effective use of CDN

Summary | Details | Performance Review | Content Breakdown | Domains | Screen Shot | Image Analysis | Request Map

Tester: i-00cc868c2f4733810
First View only
Test runs: 3
Re-run the test

Raw page data - Raw object data
Export HTTP Archive (.har)
View Test Log

Performance Results (Median Run)

					Document Complete			Fully Loaded			
	Load Time	First Byte	Start Render	Speed Index	Time	Requests	Bytes In	Time	Requests	Bytes In	Cost
First View (Run 2)	6.430s	0.643s	1.800s	4314	6.430s	48	2,914 KB	6.756s	49	2,919 KB	$$$$$

Plot Full Results

Test Results

Web Page Performance Test for

tpas.somee.com

From: Mumbai, India - EC2 - Chrome - Cable
5/4/2018, 2:25:16 AM

Need help improving?

A	A	A	A	F	X
First Byte Time	Keep-alive Enabled	Compress Transfer	Compress Images	Cache static content	Effective use of CDN

Summary | Details | Performance Review | Content Breakdown | Domains | Screen Shot | Image Analysis | Request Map

Tester: i-00cc868c2f4733810
First View only
Test runs: 3
Re-run the test

Raw page data - Raw object data
Export HTTP Archive (.har)
View Test Log

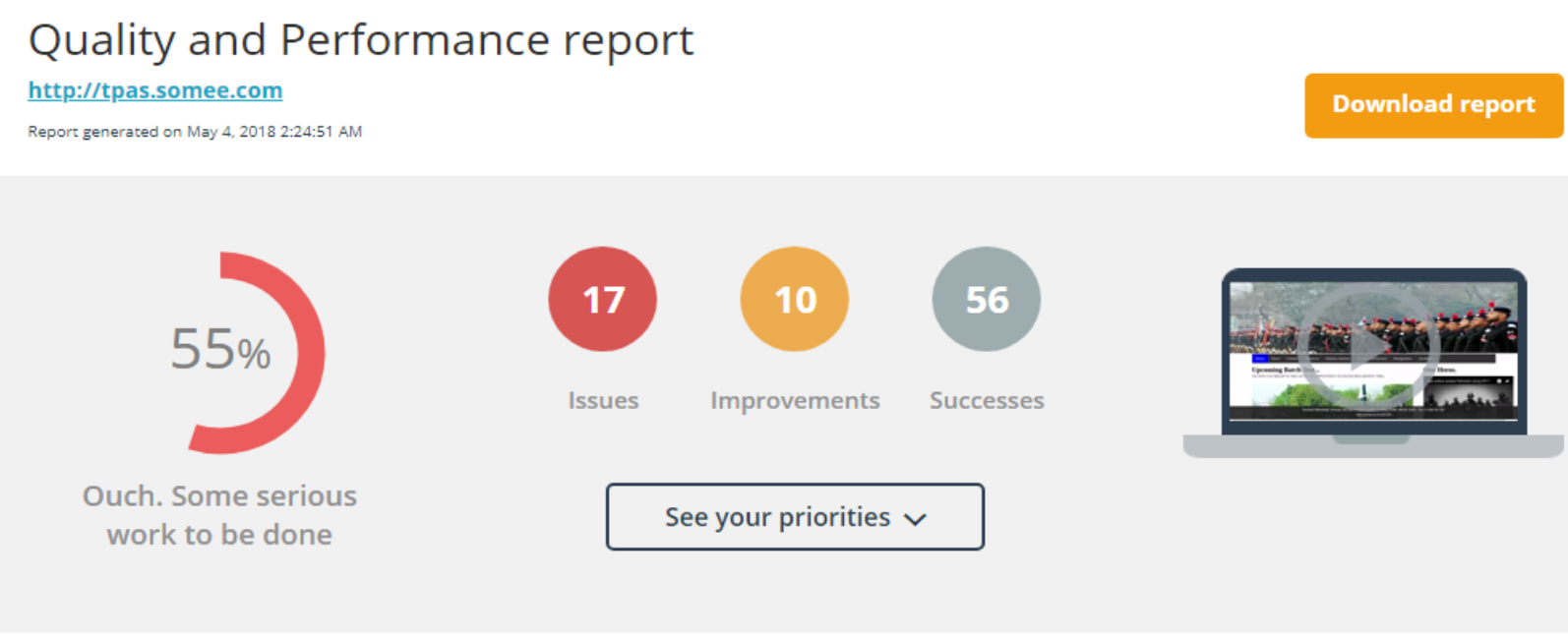
Performance Results (Median Run)

					Document Complete			Fully Loaded			
	Load Time	First Byte	Start Render	Speed Index	Time	Requests	Bytes In	Time	Requests	Bytes In	Cost
First View (Run 2)	6.430s	0.643s	1.800s	4314	6.430s	48	2,914 KB	6.756s	49	2,919 KB	$$$$$

Plot Full Results

Test Results

Figure 17 Performance Test



The load testing tests that how the system behaves when the system has maximum load and if the system can handle the huge data modification. The load testing can be check whether the system is loaded or in normal condition.

7.2.19 Stress Testing

The behavior of the software recorded after testing it under uncertain abnormal conditions is called stress testing. For instance, it can be by limiting certain resources or adding additional

load. The aim of stress testing is to catch hold of the breaking point of the software by applying excessive load to the system and taking over the resources used by the software. Testing can be performed by carrying out different testing scenarios such as:

- Restarting of network ports and or shutdown
- Turning on or off of the database
- Running different processes that consume resources such as CPU, memory, server, etc.

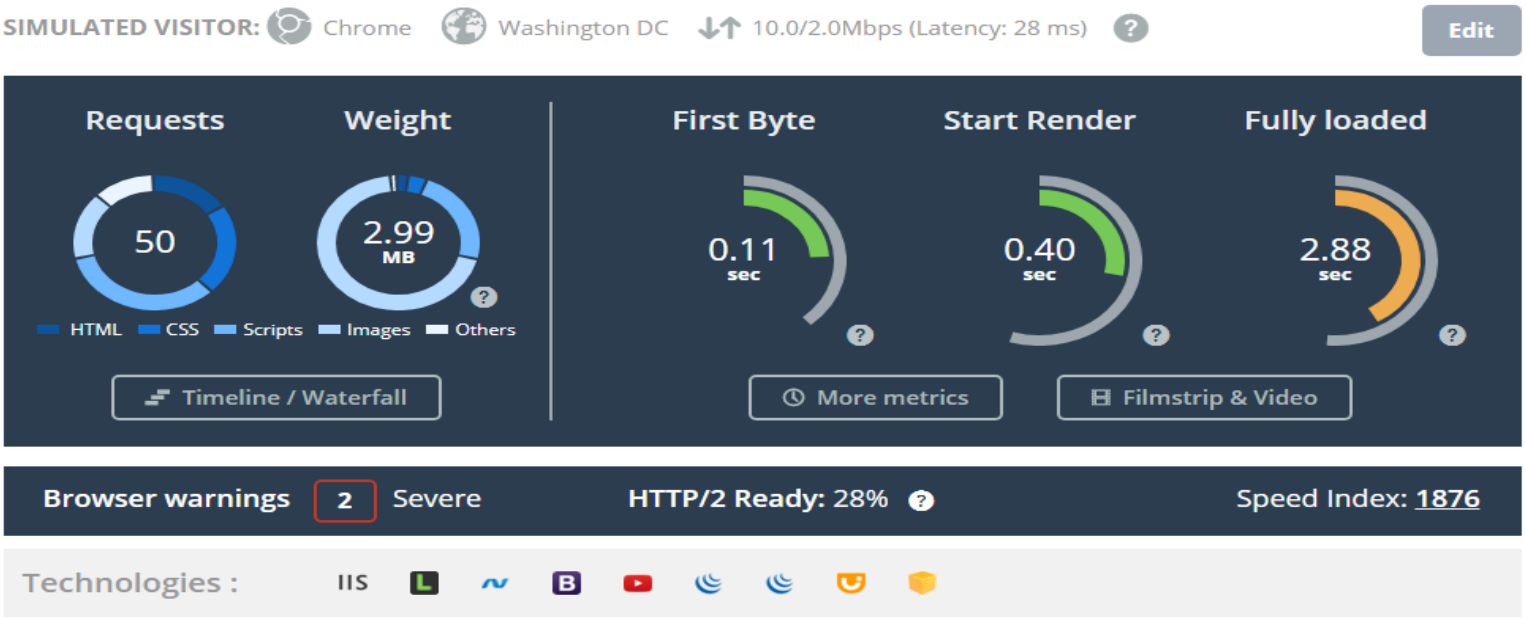


Figure 20 Stress Testing

7.2.20 Usability Testing

Usability testing is a dynamic process that can be used throughout the process of developing interactive multimedia software [25]. This type of testing is a black-box technique and is used for the identification of errors and areas of improvement within the software by observing the users through their usage and operation.

7.2.21 User Interface Testing

In this type of testing, the Graphical User Interface (GUI) of the software is tested. UI testing ensures the proper functioning of the software according to the requirements, regarding the size, color, alignment, and other properties of the software.

7.2.22 Security Testing

Testing software security is a commonly misunderstood task. Done properly, it goes deeper than simple black-box probing on the presentation layer and even beyond the functional testing of security apparatus [26]. Security testing is a type of testing used to test for the software's security, i.e., identification in any sort of flaw or gap that is occurring within the system and the vulnerability of the software. Security testing should ensure the following aspects listed below:

- Confidentiality
- Integrity

- Authentication
- Availability
- Authorization
- Non-repudiation
- Security of the software in terms of known and unknown vulnerabilities
- Data security of the software
- Software is built according to all security rules and regulations
- Input checking and validation
- SQL insertion attacks
- Buffer overflows vulnerabilities
- Directory traversal attacks
- Portability testing

7.2.23 Accessibility Testing

Protanopla:

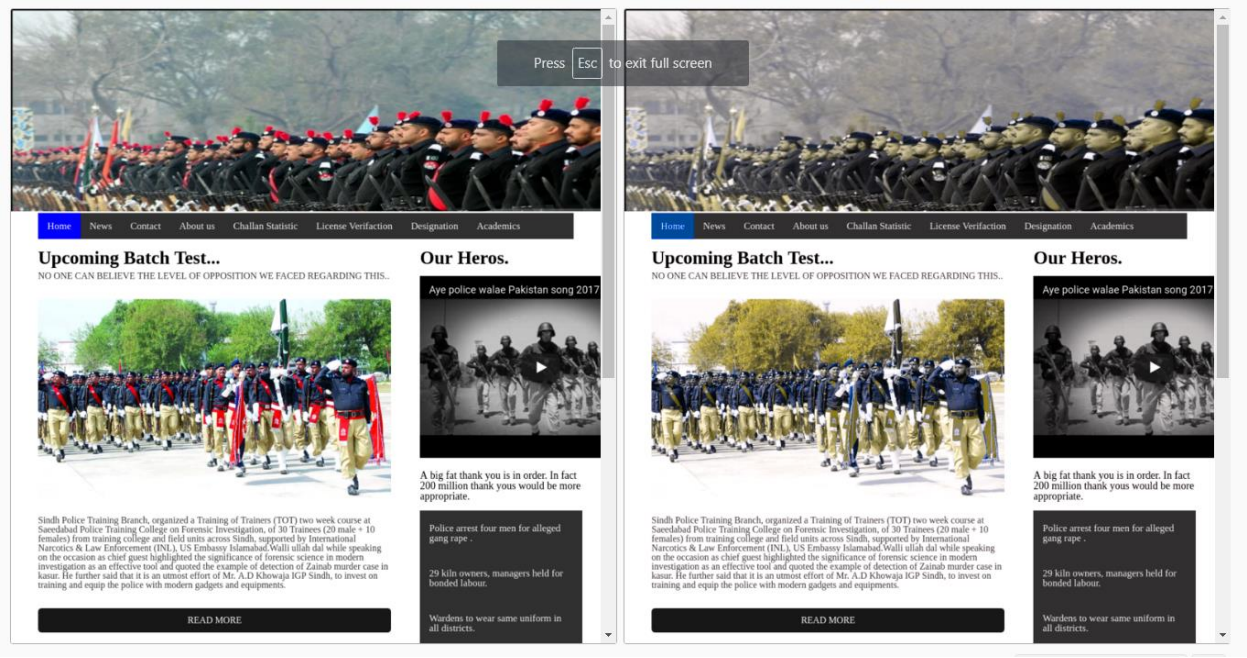


Figure 21 Accessibility Testing (Protanopla)

Deutanopla:

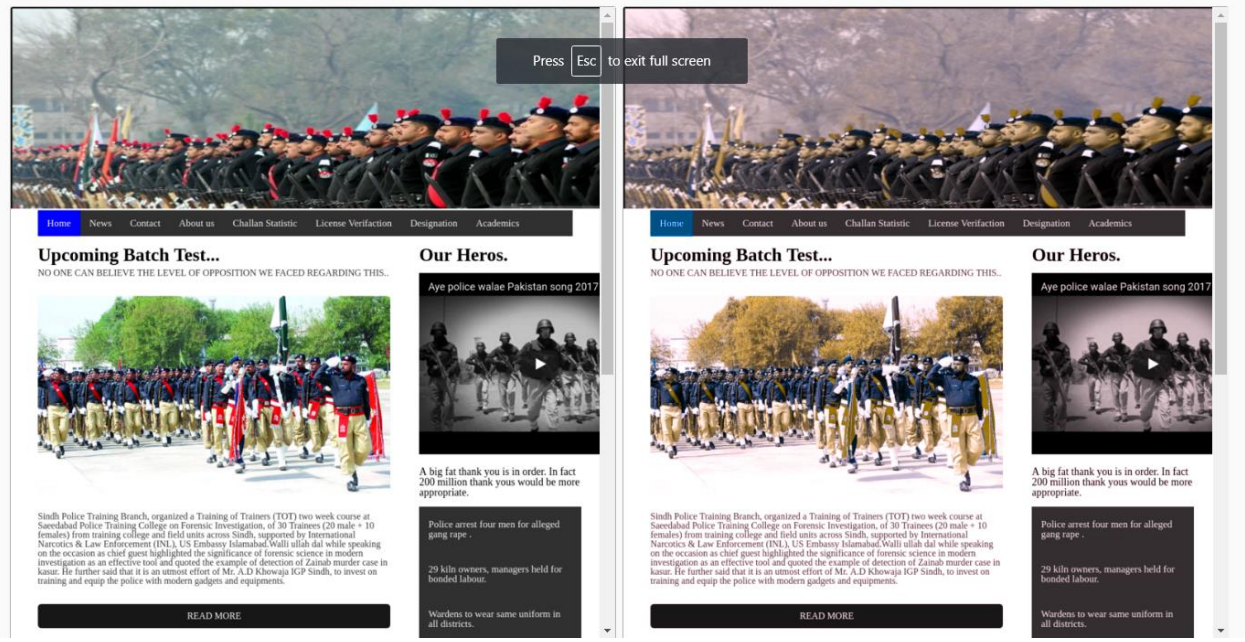


Figure 22 Accessibility Testing (Deutranopla)

Tritanopla:

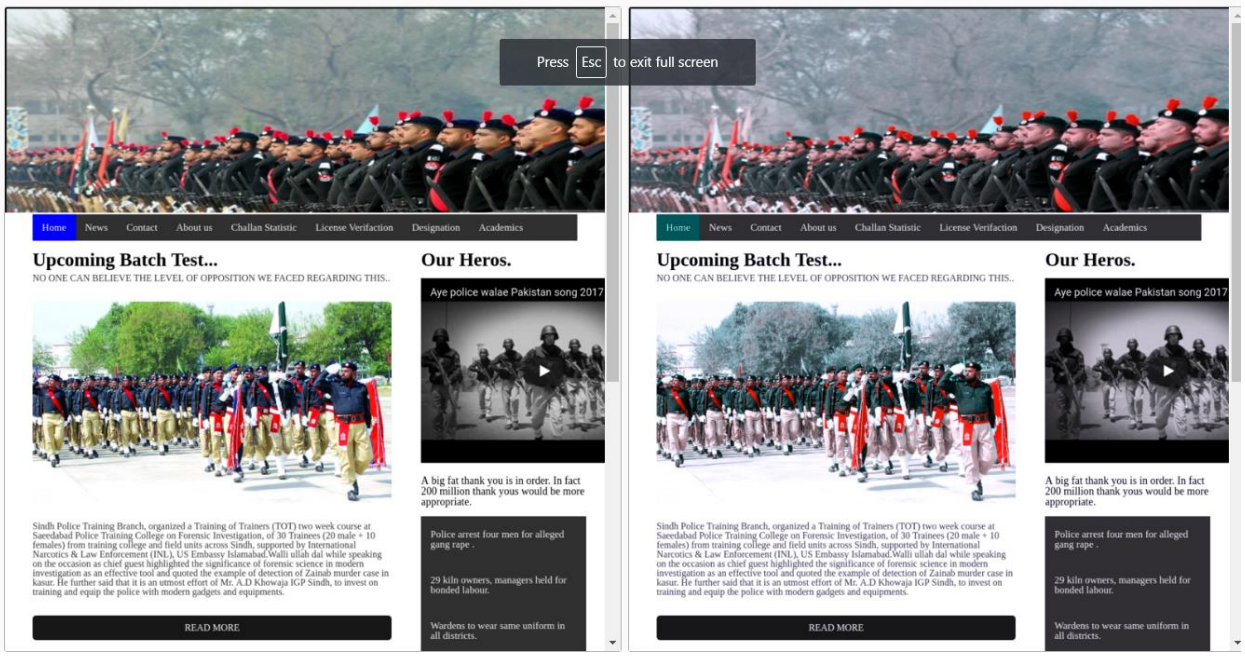


Figure 23 Accessibility Testing (Tritanopla)

7.2.24 Integration Testing

ASP.NET	R TOOL	INTEGRATION TEST
Update from ASP.NET	Updated on R tool	✓
Update from ASP.NET	Increment in Modules in R tool	✓
Upload data file.	Perform data analytics	✓

Figure 24 Integration Testing

CHAPTER 8

CONCLUSION

8.1 CONCLUSION:

Our project is an asp.net application which facilitates the academic system of Sindh Traffic Police. This automation system has helped in bringing the entire data which was previously stored in the form of paperwork, to a web-based application. It caters the problem which was faced by the Traffic Police officers, who had to dive into the previous records for extracting a particular record which was time consuming.

There are two main domains of this Traffic Police Automation System, Data Analysis of Challan and Academic System. The academic system is resolving all sorts of academic issues, such as the course offered by a teacher to the student and the course offered to the student by the teacher. The student can also look up to his/her progress over the academic system.

The verification of license- In this domain, the user can verify his/her license by inputting his/her license number which will result in a response of whether the license is valid or not.

The Data Analysis of Challan domain- In this domain, a track of the challan's occurred over time are recorded. This is used to know that which challan was accounted for which violation of rule and the number of similar or distinct challan's accounted, etc.

The goals are targets set were almost able to be achieved by us. Testing chapter is included for the verification of the design and validation of the need to meet the desired documents. Sindh Traffic Police Automation System will solve the needs of the developer will help in solving their problems.

This application greatly reduces the time taken for the production of a GUI, when compared to manual coding and designing of the GUI. The project goals are almost fulfilled. There is however, an effort being needed to make the application more user friendly and successful. However, targets have been met and most of the goals have been accomplished and implemented.

The tolerance capacity of this software was reliable. In most of the test runs, the breakdown during the normal operation as proper hardware and software protections were in place stabilized power supply, level surface and control of extreme temperatures as well as protection of the application.

The application was reliable as most of the features worked.

CHAPTER 9

FURTHUR ENHANCEMENT

9.1 ENHANCEMENT:

Our aim is to construct a bridge between the technology and the academy system. As we have accomplished many areas and our idea but as the technology is improving day by day our project would also need some enhancement. Some area could be future enhancement endless, but some of them can be enhanced by the upgrading technology as we only highlighted the areas where some extra work can be beneficial for the project. The areas where some further enhancement and modification is needed are as follow:

- Gui
- Data Analytics for all types of records
- Cloud
- Fully informative web
- Faster data entry
- Stability of academic process
- Processing loading speed
- Web security

Now a day our government should also avoid paper work and adopt latest technology, so human error can be removed and word load also be compressed by our application.

CHAPTER 10

REFERENCE AND BIBLIOGRAPHY

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CHAPTER 11

PLAGIRISM REPORT

11.1 Chap 01

Plagiarism Scan Report

Summary	
Report Genrated Date	01 Aug, 2018
Plagiarism Status	93% Unique
Total Words	854
Total Characters	5239
Any Ignore Url Used	

Content Checked For Plagiarism:

Sindh Traffic Police is a law enforcement agency which was established in 1843 under the proclamation issued by Sir Charles Naipiar, who became the Governor of the state Sindh at that time by defeating the forces of Talpur rules at battle of Miyani, near Hyderabad on March 20, 1843. This is how the police force was then first established in the Indian subcontinent. Sindh police department serves an area of 140,914 km2 and has about 105,233 police officers who are currently serving the state, with Allah Dino as the Current

11.2 Chap 02

Plagiarism Scan Report

Summary	
Report Genrated Date	01 Aug, 2018
Plagiarism Status	100% Unique
Total Words	924
Total Characters	5717
Any Ignore Url Used	

Content Checked For Plagiarism:

Traffic police exist for nearly three centuries. Road traffic began to increase during eighteen century and it has time make some legal rules, which citizens have to follow. In 1972 Lord Mayor of London, appoint three men to ensure that they control the traffic so that the traffic

11.3 Chap 03

Plagiarism Scan Report

Summary	
Report Genrated Date	01 Aug, 2018
Plagiarism Status	**100% Unique**
Total Words	253
Total Characters	1489
Any Ignore Url Used	

Content Checked For Plagiarism:

The project Sindh Traffic Police Automation System is a web based application and used by the citizens of Karachi and police officers. Development of the application includes its development requirements. Our project is a web based application so it does not need much hardware requirements; the only hardware requirement is a PC with internet connection.

11.4 Chap 04

Plagiarism Scan Report

Summary	
Report Genrated Date	01 Aug, 2018
Plagiarism Status	**97% Unique**
Total Words	973
Total Characters	6059
Any Ignore Url Used	

Content Checked For Plagiarism:

In this project, a complete module of traffic training institute academics is present, which provides to-be-police officers, those who are under training, a way to view their academic progress and information related to various undergoing awareness programs.
Modules, which shows the challan rate in different districts of Karachi. The analytics is done by data analytics of challan gathered from different districts of Karachi. The amount of challan's will be accounted, and the safety precautions will be generated looking at data analysis and statistics.

11.5 Chap 05

Plagiarism Scan Report

Summary	
Report Genrated Date	01 Aug, 2018
Plagiarism Status	100% Unique
Total Words	929
Total Characters	5594
Any Ignore Url Used	

Content Checked For Plagiarism:

The student will have to login himself/herself first, in order to register. If the student is not registered, he/she will have to register first, then login, after which three interfaces will be displayed to the student.
The candidate will have to register his/her entire profile in the first interface containing

11.7 Chap 07

Plagiarism Scan Report

Summary	
Report Genrated Date	01 Aug, 2018
Plagiarism Status	100% Unique
Total Words	575
Total Characters	3602
Any Ignore Url Used	

Content Checked For Plagiarism:

Testing is a process to analyze the system whether the system completes the requirement or not. Testing is basically a process, whereby, identification for the need of rectification of errors, missing of requirements, any gaps encountered, or errors within the system are identified in contrast to the actual requirements of the system.
This depends upon the process of the system and the associated stakeholders of the project. In the larger picture, in the IT industry, large companies have teams with responsibilities held responsible to evaluate the developed software in accordance with the context of the given requirements

11.8 Chap 08

Plagiarism Scan Report

Summary	
Report Genrated Date	01 Aug, 2018
Plagiarism Status	100% Unique
Total Words	373
Total Characters	2254
Any Ignore Url Used	

Content Checked For Plagiarism:

Our project is an asp.net application which facilitates the academic system of Sindh Traffic Police. This automation system has helped in bringing the entire data which was previously stored in the form of paperwork, to a web-based application. It caters the problem which was faced by the Traffic Police officers, who had to dive into the previous records for extracting a particular record which was time consuming.

11.9 Chap 09

Plagiarism Scan Report

Summary	
Report Genrated Date	01 Aug, 2018
Plagiarism Status	100% Unique
Total Words	137
Total Characters	784
Any Ignore Url Used	

Content Checked For Plagiarism:

Our aim is to construct a bridge between the technology and the academy system. As we have accomplished many areas and our idea but as the technology is improving day by day our project would also need some enhancement. Some area could be future enhancement endless, but some of them can be enhanced by the upgrading technology as we only

CHAPTER 12

ANNEXURES

12.1 Project Executive Summary

Sind Traffic Police Automation System, is a web-based application which will automate the manual system of the Sindh Police, which will enable:

- The need to solve things automatically, which would otherwise be manual.
- Bridge the gap between the provinces.
- The application will be very user friendly and easy to learn and use.

12.2 Project Overview

The project is a web-based application that aims automate the manual data storage and processes of the Sindh Traffic Automation System. Traditionally, this web-based application works on different modules such as online SIMS, data challan analytics and license verifier. It will also provide road safety awareness.

12.3 Project objectives

This project will meet the following objectives:

- Provide road safety awareness
- Academics System of traffic training institute/sims portal
- License fee calculation/verification
- Chalan Data Analytics through R tool

12.4 Project scope:

Citizens can easily avail the services of website anywhere, they can pay the challans from their home and check the license fee also from the home.
The scope of this project includes and excludes the following items.

12.4.1 In scope:

- Traffic training academics
- Data Analytics of Challan

- Education / awareness in educational institute and other non-professional and professional organization.
- Driving license verification

12.4.2 Out scope

- Schedule system for traffic sergeants
- Predicting crime and generate a report.
- Route map of traffic license branch

12.5 Deliverables produced

The deliverables of this project is a complete website and a responsive website and very easy to use for a person.

The details of the deliverables are given below:

- Project Deliverable 1: traffic training institute academics
- In this module we provide academic system of traffic training institute. This module will hold data of students who are enrolled in Traffic Training Institute and this data includes information concerning registration, academic progress, results and the courses.
- Project Deliverable 2: Data Analytics of Challan and Safety Awareness Programs
- Modules, which shows the challan rate in different districts of Karachi. The analytics is done by data analytics of challan gathered from different districts of Karachi.

The amount of challan's will be accounted, and the safety precautions will be generated looking at data analysis and statistics over time. A safety awareness programs road safety awareness walks for peoples who cannot understand the signs that are on the roads road safety seminars.

Project Deliverable 2: traffic license verification, fee calculation and procedure

In this module anyone who is going to give a driving test here he can give his mock exams, by giving the CNIC number of the person he can see if his license is original or not in simple

verification of the license and the last one fee calculator in this module person can calculate his license fee.

12.6 Project estimated effort/cost

We are estimating 18 hours per week for our work. Initially we cannot estimate the cost

12.7 GANTT Chart:

12.7.1 Estimated duration:

Task Name	Duration	Start	Finish
Analysis of data requirment	4 wks	Thu 20-07-17	Wed 16-08-17
Project Scope	7 days	Thu 10-08-17	Fri 18-08-17
Data gathering	13 days	Wed 30-08-17	Fri 15-09-17
SRS	7 days	Tue 05-09-17	Wed 13-09-17
All Modules lineup	7 days	Thu 14-09-17	Fri 22-09-17
GUI / Front End	14 days	Mon 25-09-17	Thu 12-10-17
UML Diagrams	10 days	Fri 13-10-17	Thu 26-10-17
Coding	52 days	Fri 27-10-17	Mon 08-01-18
Testing	10 days	Tue 09-01-18	Sat 20-01-18
Development	17 days	Mon 22-01-18	Tue 13-02-18
Integration of Modules	10 days	Wed 14-02-18	Tue 27-02-18
Reports and Book	170 days	Tue 05-09-17	Mon 30-04-18
Final Evaluation	10 days	Tue 01-05-18	Mon 14-05-18

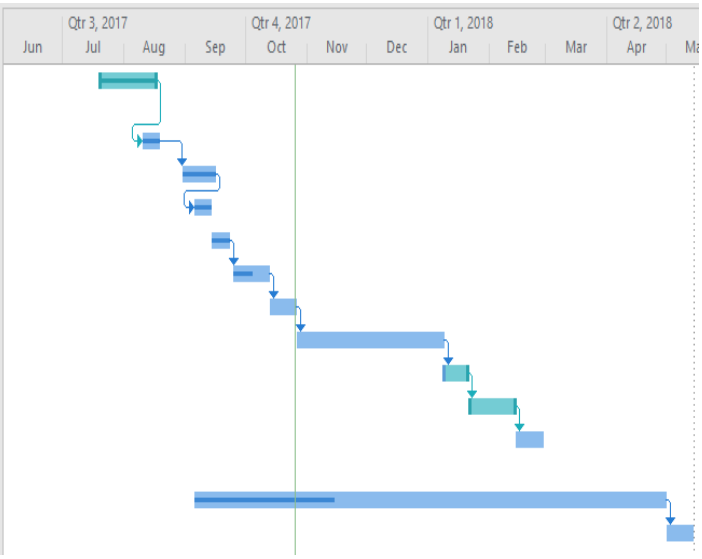

Figure 24 Gantt Chart

12.7.2 Estimated Effort: 800hrs/ 3 people

266hrs/Person

Milestone	Estimated duration	Deliverable(s) completed
Milestone 1	4 weeks	* Requirement gathering * Risk analysis * Data Gathering
Milestone 2	14 weeks	* Planning * UML * GUI
Milestone 3	20 weeks	* Coding
Milestone 4	8 weeks	* Testing
Project conclusion	4 weeks	* Deployment

12.8 Project assumptions:

- We are using R tool for data analysis because it provides better results
- We are using hosting website which provide fast speed

12.9 Project risks:

Risk of the project:

	Low	Medium	High
• **Technical risk**	☒	☐	☐
• **Timing risk**	☐	☐	☒

Risk plan

Two considerable risks include time management and technical since the ultimate goal is to develop a high-fidelity prototype.

- For technical risk we use sql server database
- For timing risk, we use hosting which provide fast speed.

12.10 Project approach

Traffic police automation system basically based on two main modules traffic challan analysis and academic system

12.11 Tools and Technologies:

Microsoft visual studio / tools

Asp.net, html, CSS, C#, Sql server

12.12 List of Similar Product available online with URL:

- http://kppolice.gov.pk/
- https://islamabadpolice.gov.pk/

12.13 Project approvals

Name:

Project Supervisor Signature

Name:

Project Supervisor Signature

Head of Department of CS Signature

FYP Coordinator, UIT Signature

Member, FYP Committee, UIT Signature

Member, FYP Committee, UIT Signature

Member, FYP Committee, UIT Signature

Member, FYP Committee, UIT Signature