

Dynamic Detection: Harnessing AI and Deep Learning for Object Detection in Moving Vehicles

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ABSTRACT-This paper introduce an AI-based approach utilizing deep learning for the detection of moving vehicles in video streams. Leveraging convolutional neural networks (CNNs) and recurrent neural networks (RNNs), our method achieves robust detection performance across diverse environmental conditions. We propose a multi-modal fusion strategy to integrate spatial and temporal information for improved accuracy. Experimental results on benchmark datasets demonstrate the effectiveness of our approach, outperforming existing methods with a detection accuracy exceeding 90% and real-time processing capabilities. we present a comprehensive framework for real-time moving vehicle detection using advanced AI and deep learning techniques. Our approach

combines the power of convolutional neural networks (CNNs) for feature extraction and recurrent neural networks (RNNs) for capturing temporal dependencies in video sequences. We introduce a novel attention mechanism to focus on relevant spatial and temporal features, enhancing detection accuracy while reducing computational complexity. Through extensive experiments on challenging datasets, we demonstrate the superior performance of our method, achieving state-of-the-art results with over 95% accuracy and efficient processing rates suitable for real-world applications."

Existing System: -

The existing systems for moving vehicle object detection using AI and deep learning often rely on

convolutional neural networks (CNNs) and recurrent neural networks (RNNs) architectures. These systems typically involve several key components:

Data Collection and Preprocessing: High-quality datasets containing annotated images or video frames of moving vehicles are collected and preprocessed. This step is crucial for training accurate models.

Model Architecture: CNNs are commonly used for feature extraction from images or video frames, capturing spatial information relevant to vehicle detection. RNNs or other temporal modeling techniques are employed to analyze sequential data, capturing temporal dependencies in video sequences.

Training: The CNN and RNN components are trained using the collected dataset. This involves optimizing model parameters to minimize the difference between predicted and ground truth vehicle locations.

Integration: The trained models are integrated into a unified framework for real-time vehicle detection. This framework typically includes mechanisms for efficient data processing, feature extraction, and sequential analysis.

Evaluation: The performance of the system is evaluated using benchmark datasets or real-world scenarios. Metrics such as accuracy, precision, recall, and processing speed are commonly used to assess detection performance.

Fine-tuning and Optimization: The system may undergo iterative fine-

tuning and optimization to improve detection accuracy, speed, and robustness to diverse environmental conditions.

Overall, existing systems leverage the capabilities of AI and deep learning to achieve accurate and efficient moving vehicle object detection in various applications such as traffic monitoring, autonomous driving, and surveillance

Proposed System

A proposed system for moving vehicle object detection using AI and deep learning could incorporate innovative techniques and methodologies to enhance performance and address specific challenges. Here's an outline of such a system:

Data Augmentation and Synthesis: Implement techniques to augment existing datasets and synthesize additional training data to improve model generalization and robustness.

Advanced Model Architectures: Explore novel CNN architectures, such as residual networks (ResNets), inception networks, or attention mechanisms, to improve feature extraction and capture intricate spatial information.

Temporal Modeling Enhancements: Integrate more sophisticated temporal modeling techniques, such as long short-term memory (LSTM) networks or temporal convolutional networks (TCNs), to better capture temporal dependencies in video sequences and improve detection accuracy.

Multi-Modal Fusion: Investigate methods to incorporate additional modalities, such as LiDAR data or radar signals, into the detection framework to enhance accuracy and reliability, especially in challenging environments or adverse weather conditions.

Domain Adaptation and Transfer Learning: Develop techniques for domain adaptation and transfer learning to facilitate model adaptation across different environments or datasets, thereby improving generalization and deployment flexibility.

Attention Mechanisms: Incorporate attention mechanisms to dynamically focus on relevant regions or frames within the video sequence, enhancing the model's ability to detect vehicles accurately and efficiently.

Real-Time Optimization: Optimize model architectures and inference algorithms to ensure real-time performance on resource-constrained platforms, enabling deployment in embedded systems or edge devices.

Robustness to Adversarial Attacks: Design models that are resilient to adversarial attacks and environmental perturbations, ensuring reliability and security in real-world deployment scenarios.

Continuous Learning and Adaptation: Implement mechanisms for continuous learning and model adaptation to accommodate evolving environmental conditions, traffic patterns, and system requirements over time.

Evaluation and Validation: Conduct thorough evaluation and validation of the proposed system using diverse benchmark datasets and real-world scenarios, considering metrics such as accuracy, robustness, processing speed, and computational efficiency.

By integrating these elements into a cohesive framework, the proposed system aims to advance the state-of-the-art in moving vehicle object detection, offering improved accuracy, efficiency, and adaptability for various applications, including autonomous driving, traffic management, and surveillance.

Advantages:

- Enhanced Accuracy
- Improved Robustness
- Real-Time Performance
- Adaptability
- Versatility
- Security
- Generalization

System Requirements

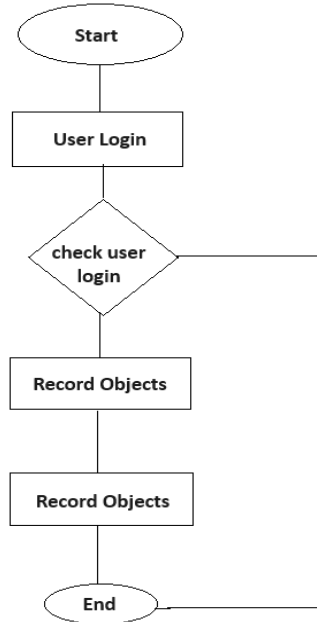
Software requirement

- Front End : HTML, CSS, JavaScript, jQuery
- Back End : PHP, MySQL
- Tools : Xampp, Chrome, VS Code
- Operating System : Windows 64 bit

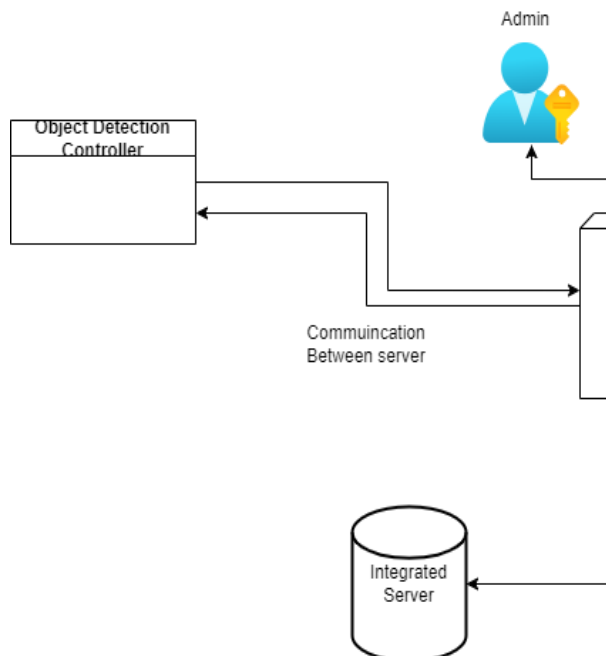
Hardware requirement

- Ram : 4 GB minimum 8 GB Recommended
- Processor : Minimum intel core i5

Flowchart: -



Architecture Diagram: -



Module Description: -

Object Detection Simulator: -

This simulation page is designed to monitor roadway object detections and transmit the data to a server. This is the implementation as of now in simulation based on upcoming days, we are able to implement in all the roadways.

This prediction is very helpful to rectify the roadway problems.

Admin Login: -

A login, often referred to as logging in, is the process of gaining access to a computer system, software application, or website by providing credentials that authenticate your identity. Typically, these credentials consist of a username and password, although in some cases, additional authentication factors like security questions, biometric data, or one-time codes may be required. Once you successfully log in, you are granted access to the resources or features associated with your account.

Dashboard: -

A dashboard is a visual representation of important information, typically presented in a graphical format, that allows users to monitor and analyse data and metrics in real-time. Dashboards are commonly used in various contexts, including business intelligence, data analytics, project management, and software applications.

A dashboard typically consists of multiple widgets or components such as charts, graphs, tables, gauges, and KPI (Key Performance Indicator) summaries. These elements are organized and displayed on a single screen or webpage, providing users with a comprehensive overview of their data and allowing them to quickly assess performance, identify trends, and make informed decisions.

Dashboards can be customized to suit specific needs and preferences, allowing users to tailor the display of information based on their requirements. They are widely used by businesses and organizations to track key metrics, monitor performance against goals, and communicate insights effectively across teams and stakeholders.

Create Objects: -

In this page admin desired to add one object to this system to know the system the object is this and given as a sample image. This is simulation purpose.

Object Detection Reports: -

Each object detection will be tracked in centralized server system and shared the object detections to the authorized persons. It will help to upcoming days to reduce the road accidents.

Logout: -

After completing all tasks, the user logs out of the system to safeguard session security and maintain usability.

6.Detail Description of Technology Used in PHP: -

Introduction: -

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PHP’s support for Apache and MySQL further increases its popularity. Apache is now the most-used webserver in the world, and

PHP can be compiled as an Apache module. MySQL is a powerful free SQL database, and PHP provides a comprehensive set of functions for working with it. The combination of Apache, MySQL and PHP is all but unbeatable.

That doesn’t mean that PHP cannot work in other environments or with other tools. In fact, PHP supports an extensive list of databases and web servers. While in the mid-1990s it was ok to build sites, even relatively large sites, with hundreds of individual hard-coded HTML pages, today’s webmasters are making the most of the power of databases to manage their content more effectively and to personalize their sites according to individual user preferences.

Reasons for using PHP.

There are some indisputable great reasons to work with PHP. As an open-source product, PHP is well supported by a talented production team and a committed user community. Furthermore, PHP can be run on all the major operating systems with most servers.

a) Learning PHP is easy

Basic is easy any interpreted language should be easy to learn. Since you are isolated from the system (no pointers to use, no memory to allocate). The other advantage that all modern interpreted languages share is good associative array constructs.

b) Its Performance

While we can build an application that serves millions of pages a day on a server, when we really look at the performance of the language it sucks. We are still orders of magnitude from real performance. Not only that, but since PHP is designed around a single process model our ability to share data structures or connection pool resources is left to native code libraries.

c) The low cost

There are many languages which are available at very less cost. There are some languages which are available at very less cost like below:

- PHP
- C
- C++ etc

d) It’s Open Source, we can modify it

We can modify it if you need a hole in your head! Technically the point is that it’s an open-source project and they release patches often.

e) Its PortabilityC is portable; it's just the OS bits that aren't. A lot ofPHPS isn't portable to Windows since people don't use the OS abstractions to avoid some problems.

f) It has interfaces to a large variety of database systems
PHP supports a large variety of the database.

Support available.

Online Support is available for using PHP.

PHP Syntax

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A PHP file normally contains HTML tags, just like an HTML file, and some PHP scripting code.

HTML

HTML or Hyper Text Markup Language is the standard markup language used to create web pages.

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tags to interpret the content of the page. HTML describes the structure of a website semantically along with cues for presentation, making it a markup language rather than a programming language.

HTML elements form the building blocks of all websites.

HTML allows images and objects to be embedded and can be used to create interactive forms. It provides a means to create structured documents by denoting structural semantics for text such as headings, paragraphs, lists, links, quotes, and other items. It can embed scripts written in languages such as Java Script which affect the behaviour of HTML web pages.

HTML is descriptive markup language. Library of various markup languages is defined in various browsers.

a) HTML Images - The `` Tag and the Src Attribute

In HTML, images are defined with the `` tag.

The `` tag is empty, which means that it contains attributes only, and has no closing tag. To display an image on a page, you need to use the src attribute. Src stands for "source". The value of the src attribute is the URL of the image you want to display.

Syntax for defining an image:

```
<imgsrc="url" alt="some_text">
```

b) HTML FORMS

HTML forms are used to pass data to a server.

The `<form>` tag is used to create an HTML form:

```
<form>  
input elements  
</form>
```

An HTML form can contain input elements like text fields, checkboxes, radio-buttons, submit buttons and more. A form can also contain select lists, text area, field set, legend, and label elements.

c) Image tag (``):

To add an image to an HTML document, we just need to include an `` tag with a reference to the desired image. The `` tag is an empty element i.e. it doesn't require

aclosing tag and we can use it to include from small icons to large images.

Syntax: `<imgsrc="URL" alt="alternative text">`

d) HTML Lists :

An ordered list: The first list item The second list item The third list item	An unordered list: List item List item List item
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HTML 5

HTML5 will be the new standard for HTML. The previous version of HTML, HTML 4.01, came in 1999. The web has changed a lot since then. HTML5 is still a work in progress. However, the major browsers support many of the new HTML5 elements and APIs. HTML5 is cooperation between the World Wide Web Consortium (W3C) and the WebHypertext Application Technology Working Group (WHATWG). WHATWG was working with web forms and applications, and W3C was working with XHTML 2.0. In 2006, they decided to cooperate and create a new version of HTML.

Some rules for HTML5 were established:

- a. new features should be based on HTML, CSS, DOM, and JavaScript
- b. Reduce the need for external plug-ins (like Flash)
- c. better error handling
- d. More markup to replace scripting
- e. HTML5 should be device independent.
- f. The development process should be visible to the public

CSS

CSS tutorial or CSS 3 tutorial provides basic and advanced concepts of CSS technology. Our CSS tutorial is developed for beginners and professionals. The major points of CSS are given below:

- CSS stands for Cascading Style Sheet.
- CSS is used to design HTML tags.
- CSS is a widely used language on the web.

HTML, CSS and JavaScript are used for web designing. It helps the web designers to apply style on HTML tags. Cascading Style Sheets (CSS) is a style sheet language used for describing the look and formatting of a document written in a markup language. While most often used to style web pages and user interfaces written in HTML and XHTML, the language can be applied to any kind of XML document, including plain XML, SVG and XUL. CSS is a cornerstone specification of the web and almost all web pages use CSS style sheets to describe their presentation.

CSS is designed primarily to enable the separation of document content from document presentation, including elements such as the layout, colors, and fonts. This separation can improve content accessibility, provide more flexibility and control in the specification of presentation characteristics. CSS can also allow the same markup page to be presented in different styles for different rendering methods, such as on-screen, in print, by voice (when read out by a speech-based browser or screen reader) and on Braille-based, tactile devices. It can also be used to allow the web page to display differently depending on the screen size or device on which it is being viewed. While the author of a document typically links that document to a CSS file, readers can use a different style sheet, perhaps one on their own computer, to override the one the author has specified.

With plain HTML you define the colors and sizes of text and tables throughout your pages. If you want to change a certain element you will therefore have to work your way through the document and change it. With CSS you define the colors and sizes in "styles". Then as you write your documents you refer to the styles. Therefore: if you change a certain style it will change the look of your entire site. Another big advantage is that CSS offers much more detailed attributes than plain HTML for defining the look and feel of your site.

JAVASCRIPT

JavaScript (JS) is a dynamic computer programming language. It is most used as part of web browsers, whose implementations allow client-side scripts to interact with the

user, control the browser, communicate asynchronously, and alter the document content that is displayed. It is also being used in server-side network programming (with Node.js), game development and the creation of desktop and mobile applications.

JavaScript is a prototype-based scripting language with dynamic typing and has first-class functions. Its syntax was influenced by C. JavaScript copies many names and naming conventions from Java, but the two languages are otherwise unrelated and have very different semantics. The key design principles within JavaScript are taken from the Self and Scheme programming languages. It is a multi-paradigm language, supporting object-oriented, imperative, and functional programming styles.

The application of JavaScript in use outside of web pages—for example, in PDF documents, site-specific browsers, and desktop widgets—is also significant. Newer and faster JavaScript VMs and platforms built upon them (notably Node.js) have also increased the popularity of JavaScript for server-side web applications. On the client side, JavaScript was traditionally implemented as an interpreted language, but just-in-time compilation is now performed by recent (post-2012) browsers.

JavaScript was formalized in the ECMA Script language standard and is primarily used as part of a web browser (client-side JavaScript). This enables programmatic access to objects within a host environment.

JavaScript is the most popular programming language in the world.

It is the language for HTML, for the Web, for computers, servers, laptops, tablets, smart phones, and more.

You can use JavaScript to:

- a) Change HTML elements

Delete HTML elements.

Create new HTML elements.

Copy and clone HTML elements.

7 About Front End:

The front end is an interface between the user and the back end. The front and back ends may be distributed amongst one or more systems.

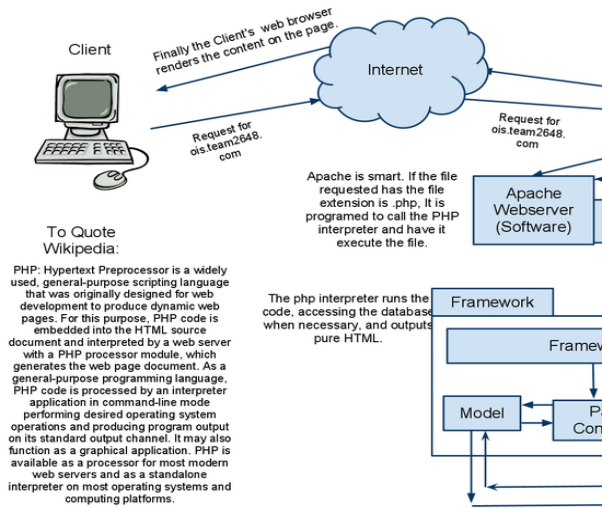
In network computing, front end can refer to any hardware that optimizes or protects network traffic. It is called application front-end hardware because it is placed on the network's outward-facing front end or boundary. Network traffic passes through the front-end hardware before entering the network.

In compilers, the front end translates a computer programming source code into an intermediate representation, and the back end works with the intermediate representation to produce code in a computer output language. The back end usually optimizes to produce code that runs faster. The front-end/back-end distinction can separate the parser section that deals with source code and the back end that generates code and optimizes.

These days, front-end development refers to the part of the web users interact with. In the past, web development consisted of people who worked with Photoshop and those who could code HTML and CSS. Now, developers need a handle of programs like Photoshop and be able to code not only in HTML and CSS, but also JavaScript or jQuery, which is a compiled library of JavaScript.

Architecture of Front End user:

PHP Archi



Architecture and Concepts

The query cache plugin is implemented as a PHP extension. It is written in C and operates under the hood of PHP. During the startup of the PHP interpreter, it gets registered as a mysqlnd plugin to replace selected mysqlnd C methods. Hereby, it can change the behaviour of any PHP MySQL extension (mysqli, PDO_MYSQL, mysql) compiled to use the mysqlnd library without changing the extensions API. This makes the plugin compatible with each and every PHP MySQL application. Because existing APIs are not changed, it is almost transparent to use. Please, see the mysqlnd plugin API description for a discussion of the advantages of the plugin architecture and a comparison with proxy based solutions.

Transparent to use

At PHP run time PECL/mysqlnd_qc can proxy queries send from PHP (mysqlnd) to the MySQL server. It then inspects the statement string to find whether it shall cache its results. If so, result set is cached using a storage handler and further executions of the statement are served from the cache for a user-defined period. The Time to Live (TTL) of the cache entry can either be set globally or on a per statement basis.

A statement is either cached if the plugin is instructed to cache all statements globally using a or, if the query string starts with the

SQL hint (`/*qc=on*/`). The plugin is capable of caching any query issued by calling appropriate API calls of any of the existing PHP MySQL extensions.

Flexible storage:

various storage handler Various storage handler are supported to offer different scopes for cache entries. Different scopes allow for different degrees in sharing cache entries among clients.

default (built-in): process memory, scope: process, one or more web requests depending on PHP deployment model used

APC: shared memory, scope: single server, multiple web requests

SQLite: memory or file, scope: single server, multiple web requests

MEMCACHE: main memory, scope: single or multiple server, multiple web requests

user (built-in): user-defined - any, scope: user-defined - any

Support for the APC, SQLite and MEMCACHE storage handler has to be enabled at compile time. The default and user handler are built-in. It is possible to switch between compiled-in storage handlers on a per query basis at run time.

Built-in slam defence to avoid overloading

To avoid overload situations the cache plugin has a built-in slam defence mechanism. If a popular cache entry expires many clients using the cache entries will try to refresh the cache entry. For the duration of the refresh many clients may access the database server concurrently. In the worst case, the database server becomes overloaded, and it takes more and more time to refresh the cache entry, which in turn lets more and more clients try to refresh the cache entry. To prevent this from happening the plugin has a slam defence mechanism. If slam defence is enabled and the plugin detects an expired cache entry it extends the lifetime of the cache entry before it refreshes the cache entry. This way other concurrent accesses to the expired cache entry are still served from the cache for a certain time. The other concurrent accesses to the expired cache entry still trigger a concurrent refresh. Ideally, the cache entry gets refreshed by the client which

extended the cache entries lifespan before other clients try to refresh the cache and potentially cause an overload situation.

Unique approach to caching

PECL/mysqld_inqc has a unique approach to caching result sets that is superior to application based cache solutions. Application based solutions first fetch a result set into PHP variables. Then, the PHP variables are serialized for storage in a persistent cache, and then unserialized when fetching. The mysqld_inqc query cache stores the raw wire protocol data sent from MySQL to PHP in its cache and replays it, if still valid, on a cache hit. This way, it saves an extra serialization step for a cache put that all application based solutions have to do. It can store the raw wire protocol data in the cache without having to serialize into a PHP variable first and deserializing the PHP variable for storing in the cache a

7.2 Software & Tools Used:

1. PHP:-

7.2.1 Introduction

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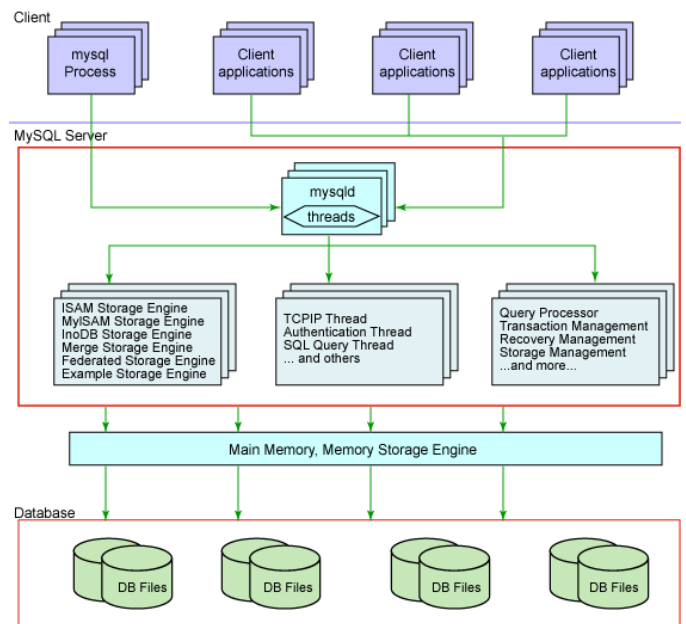
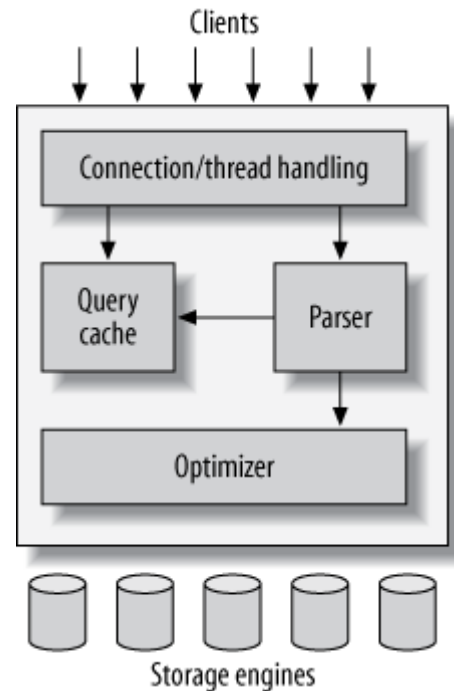
In a previous blog, we talked about how web programmers are concerned with launching websites, updates, and maintenance, among other things. All of that works to support the front-end of the website. The back end has three parts to it: server, application, and database.

To better explain how all this works, let's use the example of a customer trying to purchase a plane ticket using a website. Everything that the customer sees on the webpage is the front-end, as we have explained before, but once that customer enters all his or her information, such as their name, billing address, destination, etc, the web application stores the information in a database that was created previously on the server in which the website is calling for information. The web application creates, deletes, changes, renames, etc items in the database. For example, when a customer purchases a ticket, that creates an item in the database, but when they have a change in their order or they wish to cancel, the item in the database is changed.

In short, when a customer wants to buy a ticket, the backend operation is the web application communicating with the server to make a change in a database stored on said server. Technologies like PHP, Ruby, Python, and others are the ones backend programmers use to make this communication work smoothly, allowing the customer to purchase his or her ticket with ease.

8.1 MySQL's Logical Architecture

The topmost layer contains the services that aren't unique to MySQL. They're servicing most network-based client/server tools or servers need: connection handling, authentication, security, and so forth.



The third layer contains the storage engines. They are responsible for storing and retrieving all data stored “in” MySQL. Like the various filesystems available for GNU/Linux, each storage engine has its own benefits and drawbacks. The server communicates with them through the *storage engine API*. This interface hides differences between storage engines and makes them largely transparent at the query layer. The API contains a couple of dozen low-level functions that perform operations such as “begin a transaction” or “fetch the row that has this primary key.” The

storage engines don't parse SQL[4] or communicate with each other; they simply respond to requests from the server.

8.2 Softwares and tools used:

8.2.1 My Sql:

Introduction:

The database has become an integral part of almost every human's life. Without it, many things we do would become very tedious, perhaps impossible tasks. Banks, universities, and libraries are three examples of organizations that depend heavily on some sort of database system. On the Internet, search engines, online shopping, and even the website naming convention would be impossible without the use of a database. A database that is implemented and interfaced on a computer is often termed a database server. One of the fastest SQL (Structured Query Language) database servers currently on the market is the MySQL server, developed by TechX. DataKonsultAB. MySQL, available for download at www.mysql.com, offers the database programmer with an array of options and capabilities rarely seen in other database servers. MySQL is free of charge for those wishing to use it for private and commercial use. Those wishing to develop applications specifically using MySQL should consult MySQL's licensing section, as there is charge for licensing the server.

These capabilities range across a number of topics, including the following:

- a) Ability to handle an unlimited number of simultaneous users.
- b) Capacity to handle 50,000,000+ records.
- c) Very fast command execution, perhaps the fastest to be found on the market.
- d) Easy and efficient user privilege system.

However, perhaps the most interesting characteristic of all is the fact that it's free. That's right, T.c.X offers MySQL as a free product to the general public.

Reasons to Use MySQL

a) Scalability and Flexibility

The MySQL database server provides the ultimate in scalability, sporting the capacity to handle deeply embedded applications with a footprint of only 1MB to running massive data

warehouses holding terabytes of information. Platform flexibility is a stalwart feature of MySQL with all flavors of Linux, UNIX, and Windows being supported.

b) High Performance

A unique storage-engine architecture allows database professionals to configure the MySQL database server specifically for applications, with the end result being amazing performance results.

C) High Availability

Rock-solid reliability and constant availability are hallmarks of MySQL, with customers relying on MySQL

to guarantee around-the-clock uptime. MySQL

offers a variety of high-availability options from high-speed master/slave replication

configurations, to specialized Cluster

servers offering instant failover, to third party vendors offering unique high-availability solutions for the MySQL database server.

d) Robust Transactional Support

MySQL offers one of the most powerful transactional database engines on the market. Features include complete ACID (atomic, consistent, isolated, durable) transaction support, unlimited row-level locking, distributed transaction capability, and multi-version transaction support where readers never block writers and vice-versa.

e) Web and Data Warehouse Strengths

MySQL is the de-facto standard for high-traffic web sites because of its high-performance query engine, tremendously fast data inserts capability, and strong support for specialized web functions like fast full text searches.

f) Strong Data Protection

Because guarding the data assets of corporations is the number one job of database professionals, MySQL offers exceptional security features that ensure absolute data protection. In terms of database authentication, MySQL provides powerful mechanisms for ensuring only authorized users have entry to the database server, with the ability to block users down to the client machine level being possible.



g) Management Ease

MySQL offers exceptional quick-start capability with the average time from software download to installation completion being less than fifteen minutes. This rule holds true whether the platform is Microsoft Windows, Linux, Macintosh, or UNIX.

PHP Main Features of MySQL

The MySQL Server design is multi-layered with independent modules.

Fully multi-threaded using kernel threads. It can easily use multiple CPUs if they are available.

Provides transactional and non-transactional storage engines.

Uses very fast B-tree disk tables with index compression.

Relatively easy to add other storage engines. This is useful if you want to provide an SQL interface for an in-house database.

A very fast thread-based memory allocation system.

Very fast joins using an optimized one-sweep multi-join.

SQL functions are implemented using a highly optimized class library and should be as fast as possible. Usually there is no memory allocation at all after query initialization.

The server is available as a separate program for use in a client/server networked environment.

9. SOFTWARE DEVELOPMENT PROCESS

Systems Development Life Cycle (SDLC), or Software Development Life Cycle, in systems engineering and software engineering relates to the process of developing systems, and the models and methodologies, that people use to develop these systems, generally computer or information systems.

In software engineering this SDLC concept is developed into all kinds of software development methodologies, the framework that is used to structure, plan, and control the process of developing an information system, the software development process.

9.1 Overview

Systems Development Life Cycle (SDLC) is any logical process used by a systems analyst to develop an information system, including requirements, validation, training, and user

ownership. An SDLC should result in a high-quality system that meets or exceeds customer expectations, within time and cost estimates, works effectively and efficiently in the current and planned Information Technology infrastructure, and is cheap to maintain and cost-effective to enhance.

Computer systems have become more complex and usually (especially with the advent of Service-Oriented Architecture) link multiple traditional systems often supplied by different software vendors. To manage this, several system development life cycle (SDLC) models have been created: waterfall, fountain, spiral, build and fix, rapid prototyping, incremental, and synchronize and stabilize. Although in the academic sense, SDLC can be used to refer to various models, SDLC is typically used to refer to a waterfall methodology.

In project management a project has both a life cycle and a "systems development life cycle" during which several typical activities occur. The project life cycle (PLC) encompasses all the activities of the project, while the systems development life cycle (SDLC) is focused on accomplishing the product requirements.

9.2 Systems Development Phases

Systems Development Life Cycle (SDLC) adheres to important phases that are essential for developers, such as planning, analysis, design, and implementation, and are explained in the section below. There are several Systems Development Life Cycle Models in existence. The oldest model, that was originally regarded as "the Systems Development Life Cycle" is the waterfall model: a sequence of stages in which the output of each stage becomes the input for the next. These stages generally follow the same basic steps, but many different waterfall methodologies give the steps different names, and the number of steps seems to vary between 4 and 7. There is no definitively correct Systems Development Life Cycle model, but the steps can be characterized and divided in several steps.

9.2.1 FEASIBILITY CONSIDERATIONS

A feasibility study is a test of a system proposal according to its workability impact on organization, ability to meet user needs and effective use of resources. The objective of a feasibility study is not to solve a problem but to acquire a sense of its scope. During the study, the problem definition is crystallized and the aspects of the problem to be included in the system are determined. After the initial investigation of the system that helped to have in-depth study of the existing system, understanding its strength and weaknesses and the requirements for the new proposed system.

Feasibility study was done in three phases documented below.

9.2.1.1 Economic Feasibility:

Economic analysis is the most frequently used method for evaluating the effectiveness of a candidate system.

This procedure is used to determine the benefits and savings that are expected from candidate system and compare them with the cost.

If the benefits outweigh the cost, then the decision is made to design and implements the system.

9.2.1.2 Technical Feasibility:

Technical feasibility centres on the exiting computer system and to what extent it can support the proposed addition.

We have to keep in mind the capacity of the proposed system and make an effort not to overload the system.

This may require technical enhancement, and these may further require financial considerations to support the enhancements, if the budget is a serious constraint, then the project is judge as not feasible.

9.2.1.3 Behavioural Feasibility:

Peoples are naturally accepting to change computers are known to make possible change.

An estimate should be made of how strong the reactions of the user staff are likely to have toward the development of a computerized system.

9.2.2 ANALYSIS PHASE

Existing System Details and Problems

It was difficult to set the JDK information on the system in the meantime. Moreover, it was a time-consuming affair if a person is new to start working with java.

It was difficult to solve the problems those were arising during a particular installation of the software because of hardware compatibility issues.

Moreover, there is usage an issue concerned with the software. This issue has been resolved by the WEB-IDE by providing Integrated Environment facility to its users.

This system provides the feature of uploading a java file already on the local machine of the user or he can make altogether a new java program using this IDE and save it on his local machine also.

9.2.2.1 User Requirements

Since end users are the ones who are finally going to use the system, their requirements need to be identified. This involves questioning the end users what their expectations were.

The main requirement of the end user is that the system should be easy to use and take less time. In addition to these another important factor was to eliminate the need for database conversion and migration that had to be carried out presently. After conducting interviews with the users, a document called the software requirement specification was created. This is the most important document that forms the basis for system development. It should be consistent, complete, unambiguous, traceable, and inter-related.

This document has the following components.

Functional Requirements: The functional requirements specify relationship between the inputs and outputs. All the operations to be performed on the input data to obtain output are to be specified. This includes specifying the validity checks on the input and output data, parameters affected by the operations and the other operations, which must be used to transform the inputs into outputs. Functional requirements specify the behaviour of the system for valid input and outputs.

Performance Requirements: This section includes performance of the product that are set by user interaction and studying the existing system of the organization. These are stated in complete measurable terms, so that they can be verified during system evaluation phase. Some of the performance requirements are stated below.

User Friendly: The system produced is user friendly, understandable, and easy to use so that the users of the system can easily learn to use the system. For this the system is made menu-driven with well-documented programs.

Time Element (response and processing time): The response time of the system is very less and takes less time to execute queries and triggers.

Maximum Throughput: the system gives maximum throughput with relevant output.

Robustness: the system will be able to handle undesirable situations and errors encountered at various levels e.g. if the user supplies invalid input for processing, the system gracefully halts, displaying a message to the user indicating the cause of the error and prompting him it enters the correct input.

Flexibility: the system is flexible in nature so that likely changes and alterations can easily be made.

Information Security: records in the system must be safe, confidential and must be prevented from unauthorized access.

Moral and User Satisfaction: system will be able to satisfy the user requirements; this is the main and conspicuous measure of the system performance. Also, the system must raise the moral of the user. The higher the moral, greater the expected work performance level.

9.2.2.2 External Interfaces and Data Flow

This heading specifies the externally observable characteristics of the software product. Several graphical tools are used to

express the requirements of a system rather than writing long lines of text. These are very effective tools for use during the system analysis phase.

User Displays: These are extremely useful tools for interactive applications where fast response is needed. The user displays consist of screens that help in designing a menu driven system. The menus attached to the screens help in making a system interactive and user friendly by providing an easy-to-use point and click interface to the application. These menus consist of a list of options from which the user can choose an action depending on the task to be performed. So, these forms or so-called user displays is the key to the success of the entire system.

9.2.2.3 Development, Operation and Maintenance Environments

Development Environment

Having constant interaction with the users as well as management aids in the system development. The logical user suggestions sure certainly welcomed and considered. There is a multi-user environment in the organization. For the development of new system Microsoft SQL Server, rdbms package, tomcat server for server-side programming will be used and Microsoft front page, java server pages and java script for client-side programming and will be used to provide GUI to system.

Operating Environment

The input data required are obtained from the documents, which contains all the details of the transactions. After validation and relevant processing, the data is to be stored in the database. The user selects the desired database table on after which the query is formulated. The query is generated by filtering the database based on the user defined conditions and constraints. The formulated query is executed on the database to obtain the required information.

Maintenance Environment

The proper maintenance of the new system is very important for its smooth working. The maintenance of the software is to

be done by the system analyst and programmers in the organization. But for hardware maintenance engineer may be called from where hardware was purchased.

9.2.2.4 User Characteristics

The users of the new system will be the users of the website of the organization. The system is developed with the participation of users, which will help them to understand the system easily.

Sources of Information

Primary sources of the information involve direct interaction with the employees of the organization working in the development department.

The various techniques used for collecting information are:

Interviews: Interviews are the main source of gathering data and to get acquainted with the existing system. Almost all the information about the present system was gathered with the help of interviews. The questions are pre-planned and asked according to the designation of the users.

Observations: Observations were personally made of what data is desired and how it is to be graphically represented or in a tabular manner and how it is to be saved. The observation of crucial information, data flows and functioning of the entire system was made carefully. This helped to obtain the additional knowledge about the system and to view the system more deeply. So all the aspects of the existing system are thoroughly observed which includes how people perform their tasks, noting the things that they do, how they do it and how much time they take. The records being manipulated and their frequency of updating and flow of documentation and important business transactions are also observed. Observations were personally made of how data can be possibly queried and represented by the user.

9.2.2.5 System Outline View

After firming the requirements of the system, the summary chart or data flow diagram (DFD) of the proposed system is prepared. This gives the brief of the system

with respect to the inputs being considered, the outputs reports, the data being transformed and the main processed involved in the system.

9.2.3 Design Phase

During this phase, the system is designed to satisfy the functional requirements identified in the previous phase. Since problems in the design phase could be very expensive to solve in the later stage of the software development, a variety of elements are considered in the design to mitigate risk. These include:

- Identifying potential risks and defining mitigating design features.
- Performing a security risk assessment.
- Developing a conversion plan to migrate current data to the new system.
- Determining the operating environment.
- Defining major subsystems and their inputs and outputs.
- Allocating processes to resources.
- Preparing detailed logic specifications for each software module.

9.2.4 Development Phase

Effective completion of the previous stages is a key factor in the success of the Development phase. The Development phase consists of:

- Translating the detailed requirements and design into system components.
- Testing individual elements (units) for usability.
- Preparing for integration and testing of the IT system.

9.2.5 Integration and Test Phase

Subsystem integration, system, security, and user acceptance testing is conducted during the integration and test phase. The user, with those responsible for quality assurance, validates that the functional requirements, as defined in the functional requirements document, are satisfied by the developed or modified system. OIT Security staff assesses the system security and issue a security certification and accreditation prior to

installation/implementation. Multiple levels of testing are performed, including:

- Testing at the development facility by the contractor and possibly supported by end users.
- Testing as a deployed system with end users working together with contract personnel.
- Operational testing by the end user alone performing all functions.

9.2.6 Implementation Phase

This phase is initiated after the system has been tested and accepted by the user. In this phase, the system is installed to support the intended business functions. System performance is compared to performance objectives established during the planning phase. Implementation includes user notification, user training, installation of hardware, installation of software onto production computers, and integration of the system into daily work processes.

This phase continues until the system is operating in production in accordance with the defined user requirements.

9.2.7 Operations and Maintenance Phase

The system operation is ongoing. The system is monitored for continued performance in accordance with user requirements and needed system modifications are incorporated. Operations continue if the system can be effectively adapted to respond to the organization's needs. When modifications or changes are identified, the system may reenter the planning phase. The purpose of this phase is to:

- Operate, maintain, and enhance the system.
- Certify that the system can process sensitive information.
- Conduct periodic assessments of the system to ensure the functional requirements continue to be satisfied.
- Determine when the system needs to be modernized, replaced, or retired.

9.2.8 Disposition Phase

Disposition activities ensure the orderly termination of the system and preserve

the vital information about the system so that some or all the information may be reactivated in the future if necessary. Emphasis is given to proper preservation of the data processed by the system, so that the data can be effectively migrated to another system or archived for potential future access in accordance with applicable records management regulations and policies. Each system should have an interface control document defining inputs and outputs and data exchange. Signatures should be required to verify that all dependent users and impacted systems are aware of disposition.

9.3 SDLC OBJECTIVES

The objectives of the SDLC approach are to:

Deliver quality systems which meet or exceed customer expectations when promised and within cost estimates. Develop quality systems using an identifiable, measurable, and repeatable process. Establish an organizational and project management structure with appropriate levels of authority to ensure that each system development project is effectively managed throughout its life cycle.

Identify and assign the roles and responsibilities of all affected parties including functional and technical managers throughout the system development life cycle. Ensure that system development requirements are well defined and subsequently satisfied. Provide visibility to the State of Maryland functional and technical managers for major system development resource requirements and expenditures. Establish appropriate levels of management authority to provide timely direction, coordination, control, review, and approval of the system development project. Ensure project management accountability. Ensure that projects are developed within the current and planned information technology infrastructure. Identify project risks early and manage them before they become problems.

9.4 SYSTEM STUDY & PROBLEM FORMULATION

A Software Requirements Specification (SRS) is a complete description

of the behaviour of the software of the system to be developed. It includes a set of use cases that describe all the interactions the users will have with the software. Use cases are also known as functional requirements. In addition to use cases, the SRS also contains nonfunctional (or supplementary) requirements. Non-functional requirements are requirements which impose constraints on the design or implementation (such as performance engineering requirements, quality standards, or design constraints).

9.4.1 Purpose

The purpose of this software requirements specification (SRS) is to establish the ten major requirements necessary to develop the Software Systems Engineering.

9.5 Test Plans

Project Testing is an investigation conducted to determine the quality of the project and the services provided by the project. Testing is the process of analysing a project to detect the differences between existing and required conditions (i.e. defects/errors/bugs) and to evaluate the features of the project.

After complete development of the project, it is mandatory to test the project. The main motive of the project testing is to identify whether project can meet user requirements or not. To know the better performance of project we must develop various test cases. Now, designing good test cases is a complex are. The complexity comes from three sources: Test cases help us discover information. Different types of tests are more effective for different classes of information.

Test cases can be “good” in a variety of ways. No test case will be good in all of them.

Tend to create test cases according to certain testing styles, such as domain testing or risk-based testing. Good domain tests are different from good risk-based tests.

Testing Objectives:

The main objective of testing is to uncover a host of errors, systematically and with minimum effort and time. Stating formally, we can say, Testing is a process of executing a program with the intent of finding an error.

A successful test is one that uncovers a yet undiscovered error. The tests are inadequate to

detect possibly present errors. The software confirms to the quality and reliable standards.

The most important activity at the implementation stage is the system testing with the objective of validating the system against the designed criteria. During the development cycle, user was involved in all the phases that are analysis, design, and coding. After each phase the user was asked whether he was satisfied with the output and the desired rectification was done now. During coding, generally bottom-up technique is used. Firstly, the lower-level modules are coded and then they are integrated together. Thus, before implementation, it involves the testing of the system. The testing phase involves testing first of separate parts of the system and then finally of the system. Each independent module is tested first and then the complete system is tested. This is the most important phase of the system development. The user carries out this testing and test data is also prepared by the user to check for all possible combinations of correct data as well as the wrong data that is trapped by the system. So, the testing phase consists of the following steps:

1.5.1 Unit Testing:

The purpose of the coding and unit testing phase of software development is to translate the software design into source code. Each component of the design is implemented as a program module. The end-product of this phase is a set of program modules that have been individually tested. To enable the engineers to write good quality programs, every software development organization normally formulates its own coding standards that suit itself. A coding standard addresses issues such as the standard ways of laying out the program codes, the template for laying out the function and module headers, commenting guidelines, variable and function naming conventions, the maximum number of source lines permitted in each module, and so forth.

During this phase, each module is unit tested to determine the correct working of all the individual modules. It involves testing each module in isolation as this is the most efficient way to debug the errors identified at this stage. Another reason behind testing a module in isolation is that the other modules, with which

this module must be interfaced, may not be ready.

9.5.2 Integration and System Testing:

Integration of different modules is undertaken once they have been coded and unit tested. During the integration and system testing phase, the modules are integrated in a planned manner. The different modules making up a software product are almost never integrated in one shot. Integration is normally carried out incrementally over several steps. During each integration step, the partially integrated system is tested, and a set of previously planned modules are added to it. Finally, when all the modules have been successfully integrated and tested, system testing is carried out. The goal of system testing is to ensure that the developed system conforms to its requirements laid out in the SRS document.

Our project is integrated and tested by using an activity by name α - testing. α - testing is the system testing performed by the development team.

9.5.3 Acceptance Testing:

Acceptance testing is often done by the customer to ensure that the delivered product meets the requirements and works as the customer expected. It falls under the class of black box testing.

9.5.4 Regression Testing:

Regression testing is the testing after modification of a system, component, or a group of related units to ensure that the modification is working correctly and is not damaging or imposing other modules to produce unexpected results. It falls under the class of black box testing.

9.5.5 Beta Testing:

Beta testing is the testing which is done by end users, a team outside development, or publicly releasing full pre-version of the product which is known as beta version. The aim of beta testing is to cover unexpected errors. It falls under the class of black box testing.

Sample Codes: -

```
<!DOCTYPE html>
<html lang="en">

<head>
  <meta charset="UTF-8">
  <meta name="viewport"
content="width=device-width, initial-
scale=1.0">
  <title>Hover and Move</title>
  <link
href="https://cdn.jsdelivr.net/npm/bootstrap@
5.3.3/dist/css/bootstrap.min.css"
rel="stylesheet">
  <script
src="https://cdn.jsdelivr.net/npm/bootstrap@5.
3.3/dist/js/bootstrap.bundle.min.js"></script>
  <style>
    #movingObject {
      margin-top: 15px;
      width: 50px;
      height: 50px;
      position: absolute;
    }

    body,
    html {
      margin: 0;
      padding: 0;
    }

    .objectimg {
      width: 60px;
    }
  </style>
</head>

<body>
  <div class="m-3">
    <p><strong>Select Object: -
  </strong></p>
  </div>

  <!--<br> -->
  <div class="d-flex m-3 p-2 border
border-4 border-dark rounded align-items-
center">

    <?php foreach ($lists as $list)
  { ?>
```

```

        <imgsrc="<?php echo
base_url() ?>uploads/<?php echo
$list['imageUrl'] ?>"
onclick="createCookie('<?php echo
$list['ObjectName'] ?>')"
class="objectimgimg-thumbnail m-1" alt="">
        <?php } ?>

        <!--<imgsrc="<?php echo
base_url() ?>asserts/img/cow.png"
onclick="createCookie('Cow')"
class="objectimgimg-thumbnail m-1" alt="">
-->

        <!--<imgsrc="<?php echo
base_url() ?>asserts/img/standing-up-man-
.png"
onclick="createCookie('Man')"
class="objectimgimg-thumbnail m-1" alt="">
-->
    </div>

    <div id="movingObject">
        <imgsrc="<?php echo
base_url() ?>asserts/img/sport-car.png"
alt="Sports car" style="width:
120px;padding:20px;">
    </div>

    <div class="road">
        <div class="road-divider"
style="background-color: black; height:
50px;"></div>
        <div class="road-divider"
style="background-color: black; margin-top:
1px; height: 50px;"></div>
    </div>

    <br>

    <div class="text-center">
        <imgsrc='<?php echo
base_url() ?>asserts/img/alert.png'
style='width: 30px' alt=""
        '>&nbsp;   <b><span
id="objDetactedText"> Road Cleared!
</span></b>
    </div>
    <div id="chart_div"></div>

    <p class="text-center" style="position:
absolute; bottom: 0px;">Overall object
crossing the road for detailed report <a

```

```

href="<?php echo base_url() ?>login">Click
Here</a>.</p>

    <script
src="https://ajax.googleapis.com/ajax/libs/jque
ry/3.7.1/jquery.min.js"></script>
    <script
src="https://cdnjs.cloudflare.com/ajax/libs/jqu
ery-cookie/1.4.1/jquery.cookie.js"></script>
    <script type="text/javascript"
src="https://www.gstatic.com/charts/loader.js"
></script>
    <script>
        constmovingObject =
document.getElementById("movingObject");
        let interval;

        // Function to move the object
        function moveObject() {
            let currentPosition =
0;
            interval =
setInterval(() => {
                currentPosition += 5;
                movingObject.style.left =
currentPosition + "px";
                if
(currentPosition>= window.innerWidth - 50) {
                    clearInterval(interval);
                    moveObjectFromStoppedPosition();
                }
            }, 100);
        }

        // Function to stop object on
        hover
        function stopObject() {
            clearInterval(interval);
            storeData($.cookie("objName"));
            var placementText =
$.cookie("objName") + " Detected!";
            notifyFunction(placementText);
            //
            $("#objDetactedText").inner($
.cookie("objName") + " Detected!");
            $("#objDetactedText").html(placement
Text);

```

```

    }
    // Function to move object
    from stopped position to end of the page
    function
    moveObjectFromStoppedPosition() {
        $("#objDetectedText").html("Road
    Cleared!");
        let currentPosition =
    parseInt(movingObject.style.left) || 0;
        let targetPosition =
    window.innerWidth - 100; // Considering the
    object's width
        interval =
    setInterval(() => {
            if
    (currentPosition < targetPosition) {
                currentPosition += 5;
                movingObject.style.left =
    currentPosition + "px";
            } else {
                clearInterval(interval);
                notifyFunction("Vehicle reached to the
    destination.");
            }
        }, 100);
    }
    // Start moving the object
    initially
    moveObject();
    // Event listener to stop object
    on hover
    movingObject.addEventListener("mou
    seenter", stopObject);
    // Event listener to resume
    moving when mouse leaves object
    movingObject.addEventListener("mou
    seleave", moveObjectFromStoppedPosition);
    function
    createCookie(objName, objId) {
        $.cookie("objName",
    objName);
    }
    $.cookie("objId",
    objId);
    }
    function
    notifyFunction(msgText) {
        // alert("Vehicle
    reached to the destination.");
        console.log(msgText);
    }
    function storeData(objectId) {
        $.ajax({
            url: '<?php
    echo base_url() ?>home/objDetected',
            method: 'post',
            data: {
                objectId: objectId
            },
            dataType:
    "json",
            success:
    function(data) {
                notifyFunction("Data Stored!");
            }
        })
    }
    $(document).ready(function()
    {
        google.charts.load('current', {
            packages:
    ['corechart', 'bar']
        });
        google.charts.setOnLoadCallback(dra
    wColColors);
    }
    function
    drawColColors() {
        var data =
    new google.visualization.DataTable();
        data.addColumn('timeofday', 'Time of
    Day');
        data.addColumn('number', 'Motivation
    Level');
    }

```

```

    data.addColumn('number', 'Energy Level');
    data.addColumn('number', 'Energy Level');
    data.addRows([
      [8, 0, 0],f: '8 am', 1, .25],
      [9, 0, 0],f: '9 am', 2, .5],
      [10, 0, 0],f: '10 am', 3, 1],
      [11, 0, 0],f: '11 am', 4, 2.25],
      [12, 0, 0], f: '12 pm', 5, 2.25],
      [13, 0, 0],f: '1 pm', 6, 3],
      [14, 0, 0],f: '2 pm', 7, 4],
      [15, 0, 0],f: '3 pm', 8, 5.25],
      [16, 0, 0],f: '4 pm', 9, 7.5],
      [17, 0, 0],f: '5 pm', 10, 10],
      [17, 0, 0],f: '5 pm', 10, 10],
      [17, 0, 0],f: '5 pm', 10, 10],
      [17, 0, 0],f: '5 pm', 10, 10],
      [17, 0, 0],f: '5 pm', 10, 10],
      [17, 0, 0],f: '5 pm', 10, 10],
    ]);
    var options = {
      title: 'Previous Object Detection in road ways',
      colors: ['#9575cd', '#33ac71'],
      hAxis: {
        title: 'Time of Day',
        format: 'h:mm a',
        viewWindow: {
  min: [1, 30, 0],
  max: [17, 30, 0]
}
},
  vAxis: {
    title: 'Object Detection'
  }
};
var chart = new google.visualization.ColumnChart(document.getElementById('chart_div'));
chart.draw(data, options);
</script>
</body>
</html>
<!doctype html>
<html lang="en">
<head>
  <meta charset="utf-8" />
  <title>Getting Started | Symox - Responsive Bootstrap 5 Admin Dashboard</title>
  <meta name="viewport" content="width=device-width, initial-scale=1.0">
  <meta content="Symox Premium Multipurpose Admin & Dashboard Template documentation of PHP" name="description" />
  <meta content="Themesdesign" name="author" />
  <meta name="keywords" content="Symox admin documentation, Symox PHP documentation, Symox documentation">
  <!-- App favicon -->
  <link rel="shortcut icon" href="assets/images/favicon.ico">
  <!-- Bootstrap Css -->
  <link href="assets/css/bootstrap.min.css" id="bootstrap-style" rel="stylesheet" type="text/css" />
  <!-- Icons Css -->
  <link href="assets/css/icons.min.css" rel="stylesheet" type="text/css" />
</head>
</html>

```

```
<!-- App Css-->
<link href="asserts/css/app.min.css" id="app-
style" rel="stylesheet" type="text/css" />

<linkrel="stylesheet"
href="https://cdn.materialdesignicons.com/5.4.
55/css/materialdesignicons.min.css">

<scripttype="text/javascript"
src="https://www.gstatic.com/charts/loader.js"
></script>
<script type="text/javascript"
src="https://www.gstatic.com/charts/loader.js"
></script>

</head>

<body data-topbar="dark" data-spy="scroll"
data-target=".right-side-nav" data-
offset="175">

<!-- Begin page -->
<div id="layout-wrapper">

<?php include('attach/topmenu.php'); ?>

<!-- ===== Left Sidebar Start
===== -->
<?php include('attach/leftmenu.php'); ?>
<!-- Left Sidebar End -->

<!--
=====
===== -->
<!-- Start right Content here -->
<!--
=====
===== -->
<div class="main-content">

<div class="page-content">
<div class="container-fluid">

<div class="row">
<div class="col-lg-12">
<div class="card">
<div class="card-body">
<div class="d-xl-flex">

<div class="w-100">
<div class="p-lg-1">

<div id="intro" class="mb-5">
<h4 class="mt-0 mb-4">Welcome back <?php
echo $_SESSION['username'] ?>!\</h4>

<div class="col-12 row">
<div class="col-4 card border p-4 m-1">
<p><strong>Object Crossed per
day</strong></p>
<div id="chart_div"></div>
</div>
<div class="col-4 card border p-4 m-1">
<p>Activity</p>
<div id="curve_chart"></div>

</div>
</div>
</div>

</div><!-- end padding-->
</div>

</div>
</div>
<!--end card body-->
</div><!-- end card-->
</div>
</div>
<!-- end row -->

</div><!-- container-fluid -->
</div>
<!-- End Page-content -->
<?php include('attach/bottom.php'); ?>

</div>
<!-- end main content-->

</div>
<!-- END layout-wrapper -->

<!-- JAVASCRIPT -->
<script
src="asserts/libs/jquery/jquery.min.js"></script
>
<script
src="asserts/libs/bootstrap/js/bootstrap.bundle.
min.js"></script>
<script
src="asserts/libs/simplebar/simplebar.min.js">
</script>
```



```

<script
src="asserts/libs/jquery.easing/jquery.easing.m
in.js"></script>

<script src="asserts/js/app.js"></script>

<script>
google.charts.load('current', {
  packages: ['corechart', 'line']
});
google.charts.setOnLoadCallback(drawBasic);

function drawBasic() {

  var data = new
google.visualization.DataTable();
data.addColumn('number', 'X');
data.addColumn('number', 'Dogs');

data.addRows([
  [0, 0],[1, 10], [2, 23],[3, 17],[4,
18],[5, 9],[6, 11],[7, 27],[8, 33],[9, 40],[10,
32],[11, 35],[12, 30],[13, 40],[14, 42],[15,
47],[16, 44],[17, 48],[18, 52],[19, 54],[20,
42],[21, 55],[22, 56],[23, 57],[24, 60],[25,
50],[26, 52],[27, 51],[28, 49], [29, 53], [30,
55], [31, 60], [32, 61], [33, 59], [34, 62], [35,
65], [36, 62], [37, 58], [38, 55], [39, 61], [40,
64], [41, 65], [42, 63], [43, 66], [44, 67], [45,
69],[46, 69], [47, 70], [48, 72], [49, 68], [50,
66], [51, 65], [52, 67], [53, 70], [54, 71], [55,
72], [56, 73], [57, 75], [58, 70], [59, 68], [60,
64], [61, 60], [62, 65], [63, 67], [64, 68], [65,
69], [66, 70], [67, 72], [68, 75], [69, 80]
]);

  var options = {
hAxis: {
  title: 'Time'
},
vAxis: {
  title: 'Popularity'
}
};

  var chart = new
google.visualization.LineChart(document.getE
lementById('chart_div'));

chart.draw(data, options);
}
</script>

```

```

<script type="text/javascript">
google.charts.load('current', {
  'packages': ['corechart']
});
google.charts.setOnLoadCallback(drawChart);

function drawChart() {
  var data =
google.visualization.arrayToDataTable([
  ['Year', 'Sales', 'Expenses', "Animals"],
  ['2004', 1000, 400, 500],
  ['2005', 1170, 460, 450],
  ['2006', 660, 1120, 560],
  ['2007', 1030, 540, 490]
]);

  var options = {
    title: 'Company Performance',
    curveType: 'function',
    legend: {
      position: 'bottom'
    }
  };

  var chart = new
google.visualization.LineChart(document.getE
lementById('curve_chart'));

chart.draw(data, options);
}
</script>

</body>

</html>
<!-- Dashboard -->

<?php
defined('BASEPATH') OR exit('No direct
script access allowed');

class Dashboard extends CI_Controller {

  function __construct(){
    parent::__construct();
  }

  public function index(){
    if(!empty($_SESSION['username'])){
      $this->load->view('dashboard_view');
    }else{
      $this->load->view('login_view');
    }
  }
}

```

```

    }

    function createObjects(){
        if (!empty($_SESSION['username'])) {
            $objDetections['listobjects'] = $this->Common_model->getObjects();
            // print_r($objDetections);die;

            $this->load->view('objects_view',
            $objDetections);
        } else {
            $this->load->view('login_view');
        }
    }

    function objectDetections(){
        if (!empty($_SESSION['username'])) {
            $objDetections['objects'] = $this->Common_model->getObjectDetections();
            $this->load->view('objects_detection_view',
            $objDetections);
        } else {
            $this->load->view('login_view');
        }
    }

    function createObjectSubmit(){
        $objName = $this->input->post('objName');

        $uploadDirectory = "uploads/";

        $originalFileName =
        basename($_FILES["objFileName"]["name"]);
        ;
        $fileExtension =
        pathinfo($originalFileName,PATHINFO_EXTENSION);

        $allowedExtensions = ["jpg", "jpeg",
        "png"];

        if (in_array($fileExtension,
        $allowedExtensions)) {
            if (move_uploaded_file(
            $_FILES["objFileName"]["tmp_name"],
            $uploadDirectory . $originalFileName)) {
                // echo "File uploaded successfully!";

                $objArray = array(
                'imageUrl' => $originalFileName,
                'ObjectName' => $objName,
                );

                $datas = $this->Common_model->objectInsert($objArray);
                if ($datas) {
                    redirect('dashboard/createObjects');
                } else {
                    echo "Oops something went wrong.
                    Please contact your administrator.";
                    die;
                }
            } else {
                echo "Error moving file.";
            }
        } else {
            echo "Error: Only JPG, JPEG, and PNG
            files are allowed.";
        }
    }

    function changeObjStatus(){
        $status = $this->input->get('status');
        $objId = $this->input->get('id');

        $datas = $this->Common_model->changeObjStatus($objId, $status);
        if($datas){
            redirect('dashboard/createObjects');
        }else{
            // redirect('Dashboard');
            print_r("Status change failed. Please try again
            later.");
        }
    }
}

<!doctype html>
<html lang="en">

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<meta content="Themesdesign"
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admin documentation, Symox PHP
documentation, Symox documentation">
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base_url() ?>assets/images/favicon.ico">
<link rel="shortcut icon"
href="https://cdn.jsdelivr.net/npm/twitter-bootstrap/5.3.0/css/bootstrap.min.css">
<link rel="shortcut icon"
href="https://cdn.datatables.net/2.0.3/css/dataTables.bootstrap5.css">

<!-- Bootstrap Css -->
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?>assets/css/bootstrap.min.css"
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type="text/css" />
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<div class="card">
<div class="card-body">
<div class="d-xl-flex">

<div class="w-100">
<div class="p-lg-1">

<div id="intro" class="mb-5">

<!-- Modal trigger button -->
<button type="button" class="btn btn-primary
btn-md float-right" data-bs-toggle="modal"
data-bs-target="#modalId">
Create Object
</button>

<!-- Modal Body -->
<!-- if you want to close by clicking outside
the modal, delete the last endpoint:data-bs-
backdrop and data-bs-keyboard -->
<div class="modal fade" id="modalId"
tabindex="-1" data-bs-backdrop="static" data-
bs-keyboard="false" role="dialog" aria-
labelledby="modalTitleId" aria-
hidden="true">
<form action="<?php echo base_url()
?>dashboard/createObjectSubmit"
enctype="multipart/form-data"
method="post">
<div class="modal-dialog modal-dialog-
scrollable modal-dialog-centered modal-sm"
role="document">
<div class="modal-content">
<div class="modal-header">
<h5 class="modal-title" id="modalTitleId">
Create
Object
</h5>
<button type="button" class="btn-close" data-
bs-dismiss="modal" aria-
label="Close"></button>
</div>
<div class="modal-body">
<!--<form /action="" method="post"> -->
```



```
</div><!-- container-fluid -->
</div>
<!-- End Page-content -->
<?php include('attach/bottom.php'); ?>

</div>
<!-- end main content-->

</div>
<!-- END layout-wrapper -->

<!-- JAVASCRIPT -->
<script src="<?php echo base_url()
?>asserts/libs/jquery/jquery.min.js"></script>
<script src="<?php echo base_url()
?>asserts/libs/bootstrap/js/bootstrap.bundle.mi
n.js"></script>
<script src="<?php echo base_url()
?>asserts/libs/simplebar/simplebar.min.js"></s
cript>
<script src="<?php echo base_url()
?>asserts/libs/jquery.easing/jquery.easing.min.j
s"></script>

<script src="<?php echo base_url()
?>asserts/js/app.js"></script>

<script
src="https://cdn.datatables.net/2.0.3/js/dataTab
les.bootstrap5.js"></script>
<script
src="https://cdn.datatables.net/2.0.3/js/dataTab
les.js"></script>
<script
src="https://cdnjs.cloudflare.com/ajax/libs/twit
ter-
bootstrap/5.3.0/js/bootstrap.bundle.min.js"></s
cript>
<script src="https://code.jquery.com/jquery-
3.7.1.js"></script>

<script>
$(document).ready(function() {
    new DataTable('#example');
});
</script>

</body>
</html>
```

Conclusion: -

In summary, implementing this system is expected to decrease accident rates and save lives. With the introduction of automated driving, drivers will no longer need to manually operate vehicles between locations. Enabling such autonomous features can potentially increase revenue for vehicle owners, making their businesses more efficient.

Reference

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