Lab 1 – Traffic Tamer Description

Joshua Pablo

CS411W

Professor Thomas J. Kennedy

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1. Introduction

Traffic laws are an integral part of a transportation system as without these laws the road would be an unmanageable mess that would hamper the development and stability of the current society. The topic of traffic laws eventually brings up the idea of their detail and how commuters are to understand the laws to the extent that will ensure the safety of themselves and other drivers around them despite them being complex enough that it poses a significant challenge to the average person to understand the intricacies of those laws, especially when it comes to the differing regulations between the different states and counties. According to a report conducted by the National Center for State Courts, an independent organization that works alongside judicial officers, they found that nearly fifty percent of all cases that occur in state courts are traffic-related cases. With the frequent number of traffic-related incidents that are brought up in court, it is apparent that there is a need for a solution to bring the legal jargon that is present in traffic laws to a level that can be easily understood by the average commuter.

A proposed solution to address this issue is to develop and present a web application known as Traffic Tamer to address this present problem. Traffic Tamer will be designed to aid its users in navigating through the various traffic laws and help them get to an understanding of those laws with ease. Through the planned utilization of traffic data and machine learning algorithms, the application's system will be able to use the user's inputted information of state, county, local police codes, and violation codes to identify and showcase the laws that are correlating to the information. Traffic Tamer will also have the function of simplifying traffic laws that the users may find difficult to understand due to them being complex or not detailed enough by transitioning them to layman's terms to increase the comprehension of the specified traffic law.

The application will provide the information to drivers to help them not only drive safely but also keep them out of trouble by preventing these traffic law violations from occurring.

2. Traffic Tamer Product Description

The Traffic Tamer system is a web application with the design of helping its users search for and gain a better understanding of traffic laws. Traffic Tamer will analyze the current traffic laws and stay constantly updated to remain up to date with new traffic laws enacted or already previously enacted laws are adjusted. The system will categorize the traffic laws by state and county, allowing users to find the appropriate traffic laws in their area. With the utilization of both traffic data and machine learning algorithms, the Traffic Tamer system will show associated traffic laws within the user's area and both local police violation codes.

The system will also provide the ability to simplify traffic laws that complex into a simpler text that renders them easier to understand for the user. Traffic Tamer's users will be able to search for any traffic law and obtain a straightforward explanation of the law. If there are any more concerns for the law from the user, the application will follow-up with questions that will further clarify the law and address any concerns from the user.

2.1 Key Product Features and Capabilities

The software will be capable of analyzing the current traffic laws which will keep it as one of the most up-to-date resources concerning traffic laws, as when new laws or regulations are adjusted or enacted, the system will then be updated with the most recent traffic laws. These traffic laws will then be categorized by both state and county, allowing users to find the traffic laws relevant to their location. Within the planned features and functionality (shown in Table 1) the system will also possess a search bar, filtering system, and a bookmark system, allowing the users to seamlessly find their relevant information and keep track of ones that are of interest. Upon

finding the desired traffic law, the software will then offer a straightforward explanation of the select traffic law, creating a bridge between common language and legal language.

Features and Functionality	Real World Product	Prototype
User Account Creation	Fully Implemented	Fully Implemented
User Account Deletion	Fully Implemented	Fully Implemented
Login Authentication	Fully Implemented	Simulated
Locations Updates via GPS	Fully Implemented	Not Implemented
Traffic Law Updates via Notification	Fully Implemented	Simulated
Search Bar and Filtering System	Fully Implemented	Fully Implemented
Bookmark/Quick Access System	Fully Implemented	Fully Implemented
Regional Support Team	Fully Implemented	Not Implemented

Table 1: Real World Product and Prototype Comparison

These features aim to address the issue that comes with traffic laws, the issue of complex traffic laws being a difficult scenario to understand for the average commuter. With Traffic Tamer's capabilities it will be able to bring traffic laws to a level that users can understand and take note of when on a commute. It also creates a resource that the user can use to quickly find the appropriate information in times of need compared to the current process of going through a government website that is poorly designed that creates more issues for the user than solutions.

2.2 Major Components (Hardware/Software)

Traffic Tamer's software will be running on a Linux system, utilizing Apache as its web server. The data processing and handling will be managed by the MySQL and SQLite databases. Programming on the server-side of the software will be produced by utilizing Node.js, and the client-side of programming will be utilizing HTML, CSS, and JavaScript. The frameworks of

either React or Angular will used for the development of system's front-end. For deployment handling, Docker will be utilized to manage the deployment as it will allow the software to be ran in varying environments without any issues. These planned components will allow the software to be both efficient and easy to maintain, while also providing the users consistent, updated information.

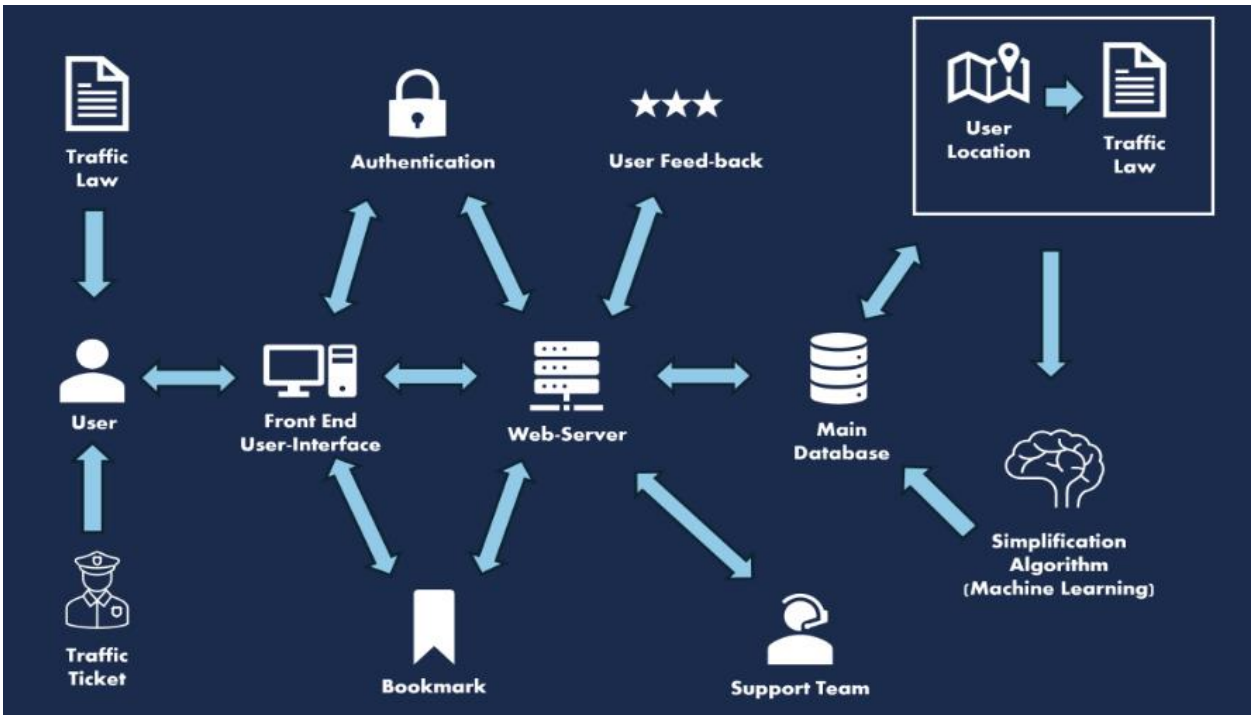

Figure 1: MFCD Diagram

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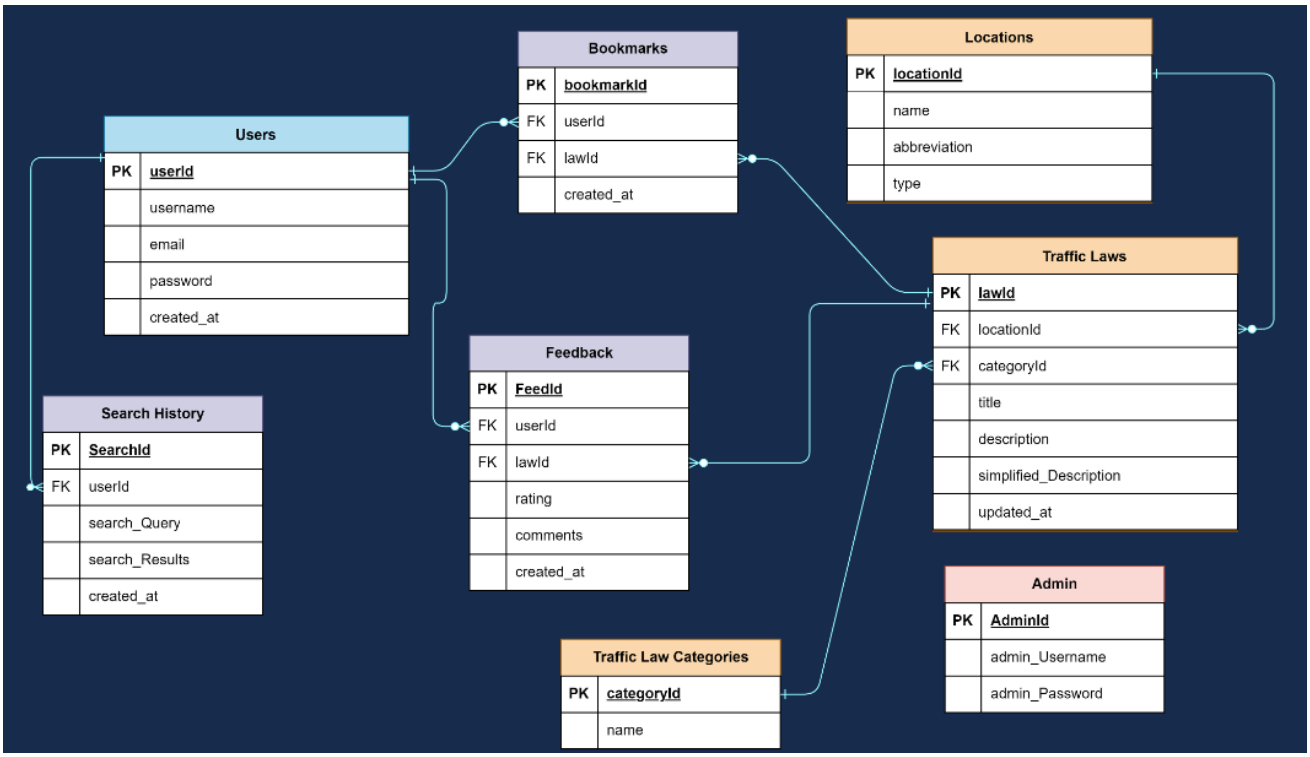

Figure 2: Database Schema

The database schema (depicted in Figure 2) showcases the system and how it will be designed to manage both the traffic laws and user interactions. Within the schema, there are several tables that are connected to each other that each possess specific pieces of information. The Users table stores the user's information which is comprised of things such as the username, email, and password. The Search History table will keep track of a user's searches and queries. Users will be able to keep track and bookmark laws through the Bookmarks table by linking the user and law together. User ratings, comments, and thoughts will be recorded from the feedback table, allowing us to view the thoughts on users and how the system could be improved. The Traffic Laws table possesses the information pertaining to each law such as the location and category they belong to and the simplified description they possess. Locations will be managed from the Locations table by keeping track of a location's name, abbreviation, and type. The Traffic Law Categories table allows the categorization of laws into distinct types. For the administrative

users, the Admin table is present for managing the administrators' username and password. The design the schema takes is to create information retrieval and management straightforward and easy.

3. Identification of Case Study

The Traffic Tamer application is being developed for four types of users: general drivers, traffic violators, driver improvement class students, and law students. General drivers are the average commuters that are looking for traffic laws to gain an understanding of them to ensure compliance with the traffic laws, and Traffic Tamer assists these users in understanding the complex traffic laws. Traffic violators are individuals that have received a traffic ticket or violation and need to understand the workings of the law to react accordingly. Traffic Tamer seeks to aid these individuals by providing explanations for their violations and the potential legal consequences they yield and guide the user through the process of handling the situation. Driver improvements class students are the people who are seeking to improve their driving abilities from a course, and an accessible educational tool regarding traffic regulations would assist them in improving their driving. The system would enhance student learning experiences and help them in getting an understanding of traffic regulations that are in place. Law students are a group of users that are actively studying the law and its intricacies, and having a resource regarding traffic laws would be beneficial in their studies as it is necessary to have the most detailed and recent information on traffic law.

Other users or groups that may benefit from this product in the future are legal professionals, insurance companies, municipalities, government agencies, driving schools, researchers, and policymakers. Legal professionals, particularly attorneys and paralegals specializing in traffic law could utilize the Traffic Tamer application as a quick reference tool as it will stay constantly updated with the latest regulations. Traffic Tamer could assist insurance companies as it will

provide the differing traffic laws in different regions which will provide them with greater information when assessing claims and policy risks. Municipalities and government agencies could use the Traffic Tamer platform as an opportunity to educate the public about road safety and promote compliance with regulations. Driving schools could implement Traffic Tamer into their education system and provide their students with a resource regarding the traffic laws and regulations. Researchers and policymakers that are studying traffic regulations could analyze the current traffic laws and view potential trends that occur with public safety to possibly propose improvements or new traffic laws.

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4. Glossary

- Apache: An open-source web server software that is widely used to serve web content over the internet.
- CSS (Cascading Style Sheets): A style sheet language used for describing the presentation of a document written in HTML or XML, defining the look and layout of a web page.
- Docker: A platform for developing, shipping, and running applications in containers. Containers are lightweight, portable, and self-sufficient environments that include all the necessary components to run a piece of software.
- HTML (HyperText Markup Language): The standard markup language used to create web pages. HTML elements are the building blocks of web pages.
- JavaScript: A programming language that enables interactive web pages and is an essential part of web applications. Along with HTML and CSS, it is one of the core technologies of the web.
- Linux: An open-source operating system based on UNIX. It is used to run servers, desktops, and mobile devices.
- Machine Learning: A branch of artificial intelligence that focuses on building systems that can learn from and make decisions based on data.
- MySQL: An open-source relational database management system (RDBMS) that uses SQL (Structured Query Language) to manage and manipulate databases.
- Node.js: A JavaScript runtime built on Chrome's V8 JavaScript engine, allowing developers to use JavaScript to write server-side code.
- React: A JavaScript library for building user interfaces, particularly single-page applications where data changes over time.

- SQLite: A C-language library that implements a small, fast, self-contained, high-reliability, full-featured, SQL database engine.
- State Court: A court that has authority over disputes with some connection to a U.S. state.
- Traffic Law: Rules and regulations that govern how vehicles operate on the roads and how road users must behave to ensure safety and order.
- Web Application: An application software that runs on a web server and can be accessed through a web browser.

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