Lab 1 – Traffic Tamer Product Description

Emily Reyna, Anthony Akintunde, Antonio Qerozi, Alexis Jones, Aaron Edwards, Caitlyn Edwards, Gavin Clendenin, Joshua Pablo Old Dominion University

CS410

Fall 2024

Professor Kennedy

October 5, 2024

Final Version

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1. Introduction

Navigating traffic laws presents a significant challenge due to their complex and varied nature across different jurisdictions. With nearly 50% of cases heard in state courts involving traffic violations (National Center for State Courts, 2024), there is an evident need for streamlined access to traffic regulations tailored to specific regions. To address this issue, we propose the development of Traffic Tamer, a web application designed to simplify and clarify traffic laws for users. Utilizing Python and advanced web scraping APIs, Traffic Tamer continuously collects and updates traffic law information from verified global sources, ensuring accuracy and relevance.

The complexity of traffic laws is compounded by significant variations between states and the use of legal jargon, creating substantial barriers to understanding and compliance for the average individual. This complexity is mirrored in the high proportion of state court cases related to traffic violations, highlighting the necessity for more accessible legal resources. Both driver improvement programs and law schools specializing in traffic law education would greatly benefit from tools that provide clear and comprehensible information.

Traffic Tamer is designed to tackle these challenges by offering a user-friendly web application that simplifies traffic law information. The application employs traffic data and machine learning algorithms to categorize and present relevant laws based on the user's state, county, local police code, and violation code. This tailored approach ensures precise and relevant delivery of legal information. For general drivers, Traffic Tamer facilitates a clearer understanding of traffic laws, aiding in the avoidance of violations and maintenance of compliance. Individuals who have committed traffic violations can use the application to better understand the specifics of their infractions and determine appropriate responses. Driver improvement class students benefit from the accessible educational tools provided by the application, which help them comprehend traffic regulations more effectively. Additionally, law students gain from the comprehensive resources available, supporting their studies in traffic law and enhancing their grasp of the subject.

Traffic Tamer converts complex legal language into layman's terms, making it easier for users to understand. The application includes an automated law lookup feature that provides straightforward explanations of relevant laws. To further assist users, Traffic Tamer offers guided questions that help clarify and assess their situations, enabling informed decision-making regarding their next steps. By integrating these features, Traffic Tamer aims to simplify the intricate landscape of traffic regulations, promoting improved road safety and legal compliance. This represents a significant advancement in making traffic law information more accessible and understandable, addressing the diverse needs of its users, and simplifying legal terminology to enhance compliance, improve road safety, and support educational initiatives in traffic law.

2. Traffic Tamer Product Description

Traffic Tamer is a web application designed to simplify the process of navigating and understanding traffic laws. It will continually analyze and update traffic laws as new regulations are enacted, organizing them by state to ensure users can easily access relevant information based on their location. By using traffic data and machine learning algorithms, Traffic Tamer will provide users with information tailored to their specific state, county, local police code, and violation code.

A key feature of Traffic Tamer is its ability to translate complex legal language into plain terms, making it easier for users to comprehend. Users will be able to look up traffic laws and receive clear, simple explanations. For additional inquiries, the application will guide users with follow-up questions to help further clarify and evaluate their situations, ensuring they fully understand the law and can determine their next steps effectively.

In essence, Traffic Tamer aims to offer a straightforward and accessible platform for understanding traffic laws. It seeks to analyze and keep up-to-date with traffic regulations, categorize them by state, provide simplified explanations, and facilitate automated law lookups. This approach is intended to help users navigate the complexities of traffic regulations and make informed decisions.

2.1. Key Product Features and Capabilities

Our software is designed to analyze existing traffic laws and continuously update itself with any new regulations as they are introduced. It will organize these laws by state, making it easy for users to locate relevant information specific to their location. To improve user comprehension, the software will provide simplified explanations of traffic laws, translating complex legal language into more accessible terms. Additionally, it will allow users to retrieve any requested traffic law, ensuring swift and straightforward access to the information they need.

2.2. Major Components (Hardware/Software)

The software will operate on a Linux system, utilizing Apache as the web server. It will manage data through MySQL and SQLite databases. For server-side programming, Node.js will be employed, while HTML, CSS, and JavaScript will handle client-side development. The front end will be developed using either React or Angular frameworks. Deployment will be managed with Docker, ensuring consistent performance across various environments. This configuration will enhance the software's efficiency, ease of maintenance, and capability to deliver current traffic law information to users.

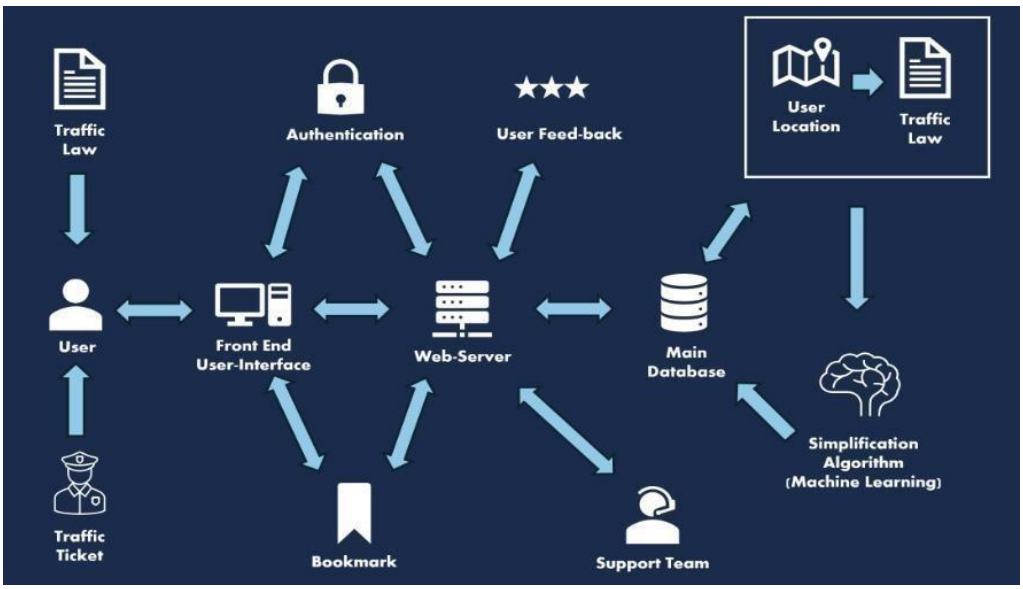

Figure 1: MFCD Diagram

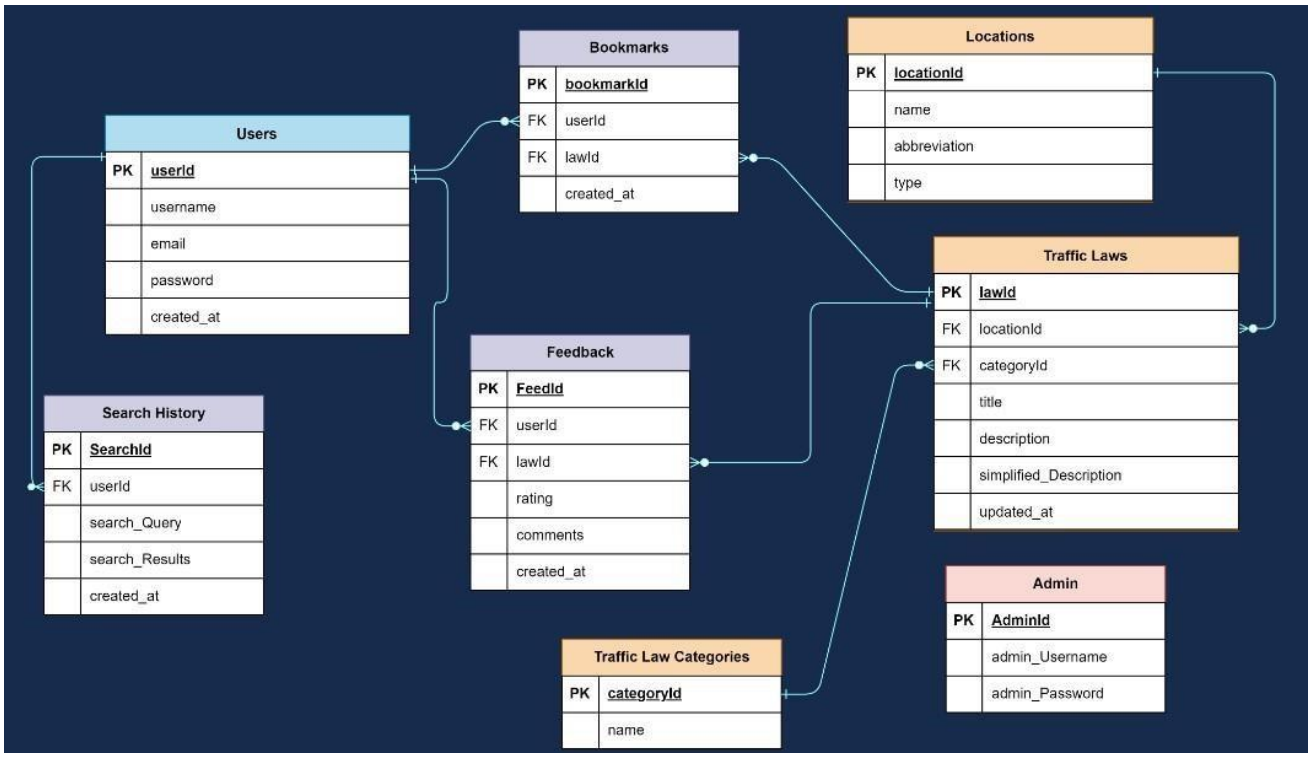

Figure 2: Database Schema

The provided database schema illustrates a system intended to manage traffic laws and user interactions. It comprises several interconnected tables. The Users table stores user information, such as usernames, emails, and passwords. The Search History table logs users' search queries and results. The Bookmarks table enables users to save specific laws, with each bookmark linked to a user and a law. The Feedback table records user ratings and comments on traffic laws. The Locations table holds information about different locations, including their names, abbreviations, and types. The Traffic Laws table contains detailed information about each law, including the associated location and category, along with a simplified description and the last update timestamp. The Traffic Law Categories table categorizes laws into different types. Finally, the Admin table manages administrator credentials. The schema is designed to facilitate easy

retrieval and management of traffic law information, user interactions, and administrative oversight.

3. Identification of Case Study

For whom is Traffic Tamer being developed?

The Traffic Tamer is being developed to help a range of different users, with a focus on general drivers, traffic violators, driver improvement class students, and law students. For general drivers, Traffic Tamer will help individuals navigate and understand traffic laws to avoid violations and ensure compliance of the law. For traffic violators, the Traffic Tamer will help those who have received traffic tickets/violations understand what they did wrong to help teach them to understand what they were lacking beforehand. For driver improvement class students, this will help the students to better understand traffic laws, as it is a complex topic to fully comprehend, especially if one is new to the road. Lastly, law students will be able to use the Traffic Tamer to help them understand the different violations which they may need to know, especially if they are focusing in an area such as traffic law.

Why is the product for them?

The Traffic Tamer is aimed to help general drivers understand the complex different traffic laws for which they may encounter, thus promoting safe driving. In addition, people who violate the law can use Traffic Tamer to learn about what they did wrong in simple ways so that the user can avoid confusion and help themselves not make the same mistake twice. Furthermore, the students in driver improvement classes can gain many benefits from using Traffic Tamer as it will help break down complex traffic laws into simple explanations, helping students stay on top of what they are learning and apply it to their own situations. Lastly, law students that require precise and up-to-date traffic law information for their studies can use Traffic Tamer as a resource to help them in their journey of understanding traffic law.

Who else would benefit from the product?

Beyond these primary user groups, Traffic Tamer can prove to be useful for legal professionals such as attorneys and paralegals specializing in traffic laws. Traffic Tamer can be a resource that these attorneys use to stay updated with the latest regulations and provide accurate advice to their clients. Additionally, insurance companies can benefit from the Traffic Tamer, using the application as a tool to help better understand traffic laws in different regions, helping with claim assessments and policy risks. On top of that, municipalities and government agencies may also look forward to using the application, as local governments and traffic enforcement agencies may use Traffic Tamer as a way to help educate the public and promote compliance, ultimately improving road safety. Driving schools may also choose to incorporate Traffic Tamer into their curriculum to provide students with reliable resources for learning traffic laws, which also makes the Traffic Tamer a great tool for researchers and policy makers choosing to study traffic regulations and their impact on public safety. Traffic Tamer could be used to analyze trends and propose improvements to existing laws.

4. Traffic Tamer Product Prototype Description

The Traffic Tamer prototype aims to simulate the final product's core functionalities while focusing on key architectural components. This prototype serves as proof of concept and lays the groundwork for the eventual deployment of a full-scale application designed to simply understand traffic laws for users.

4.1. Prototype Architecture

4.1.1. Hardware

Any device capable of traversing the internet.

4.1.2.Software

Database: MySQL, SQlite

Operating System: Linux

Web Server: Apache

IDE: VS Code

Version Control: GitHub

Project Management: Trello

Group Meeting Environment: Discord

Frontend Languages: HTML, CSS, JavaScript

Frontend Development: React/Vue.js

Frontend Frameworks: React/Angular

Backend Languages: Python

Backend Development: Django

AI and Machine Learning: PyTorch

Web Scraping: BeautifulSoup/Scrapy/Selenium

Real Time Updates: ApScheduler

4.2. Prototype Features and Capabilities

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

4.3. Prototype Development Challenges

The challenges in developing a prototype will come from ensuring that the AI can correctly identify and interpret the legal jargon into layman's terms. In addition, having to manage large volumes of scraped data from the APIs and having the application scale well with large numbers of users will pose to be a challenge, as the application's performance should not falter.

5. 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 opera1ng 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 jurisdiction 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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