Lab 1 – Traffic Tamer Product Description

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Collaborative Outline

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1. Introduction

Understanding the complexity of traffic law poses a significant challenge for the average individual due to the intricate and varied nature of these regulations across different states and regions. With nearly half of all cases heard in state courts pertaining to traffic violations, the need is evident for simplified access to traffic laws tailored to individual jurisdictions. Using advanced AI and real-time updates from

verified global websites, our web application ensures accurate and relevant information. Built using Python and powerful web scraping APIs, it continuously gathers the latest traffic laws.

Nearly half of all state-court cases relate to traffic violations (National Center for State Courts, 2024). The complexity of traffic laws, with their significant variance across state lines, can be daunting for the average individual. Legal jargon further complicates the understanding of these laws, making simplified explanations essential for compliance and safety. Driver improvement classes would benefit from educational tools that students can access at any time. Additionally, law schools focusing on traffic law education seek comprehensive resources to aid their students.

The proposed solution entails the development of a web application, Traffic Tamer, designed to assist users in navigating and understanding traffic laws with ease. Leveraging traffic data and utilizing machine learning algorithms, the application will categorize and present relevant laws based on the user's specified state, county, local police code, and violation code. Traffic Tamer is intended for a diverse range of users. General drivers will benefit from the application by gaining a clearer understanding of traffic laws, helping them avoid violations and ensure compliance. Traffic violators can use the application to grasp the specifics of the laws they have breached, enabling them to respond appropriately to their violations. Driver improvement class students will find the accessible educational tools provided by Traffic Tamer invaluable for better comprehending traffic regulations. Additionally, law students will appreciate the comprehensive resources offered by the application to aid in their studies of traffic law. By catering to these varied user groups, Traffic Tamer aims to simplify the complex landscape of traffic regulations and promote better road safety and legal compliance.

The application will feature a function to simplify complex laws into layman's terms, enhancing comprehension for users encountering difficulty. The application provides an automated law

lookup and a simplified explanation of the relevant laws. If users have additional questions, the application offers guided questions to further clarify and assess their situation, ensuring users can understand the law and decide on their next steps effectively.

2. Traffic Tamer Product Description

Traffic Tamer is a web application designed to help users easily navigate and understand traffic laws. The application will analyze current traffic laws and stay updated with new ones as they are enacted. It will categorize these laws by state, ensuring users can quickly find the information they need based on their location. By utilizing traffic data and machine learning algorithms, Traffic Tamer will present relevant laws based on the user's specified state, county, local police code, and violation code.

One of the key features of Traffic Tamer is its ability to simplify complex laws into layman's terms, making them easier to understand. Users can look up any traffic law and receive a straightforward explanation. If users have additional questions, the application will guide them with follow-up questions to further clarify and assess their situation. This ensures that users can understand the law and decide on their next steps effectively.

In summary, Traffic Tamer aims to provide an accessible and user-friendly platform for understanding traffic laws. Its goals are to analyze and stay updated with traffic laws, categorize them by state, offer simplified explanations, and provide automated law lookups. By doing so, Traffic Tamer helps users make informed decisions and better navigate the complexities of traffic regulations.

2.1. Key Product Features and Capabilities

Our software will analyze current traffic laws, ensuring that it remains updated with any new regulations as they are enacted. It will categorize these laws by state, allowing users to easily find relevant information based on their location. To enhance user understanding, the software will offer simplified explanations of traffic laws, making the legal language more accessible. Additionally, it will provide the capability to output any requested traffic law, ensuring that users have quick and easy access to the information they need.

2.2. Major Components (Hardware/Software)

The software will run on a Linux system and use Apache as the web server. It will handle data with MySQL and SQLite databases. Node.js will be used for server-side programming, while HTML, CSS, and JavaScript will be used for the client-side. The front-end will be built with either React or Angular frameworks. Docker will manage the deployment, ensuring the software runs smoothly in different environments. This setup will make the software efficient, easy to maintain, and able to provide up-to-date traffic law information to users.

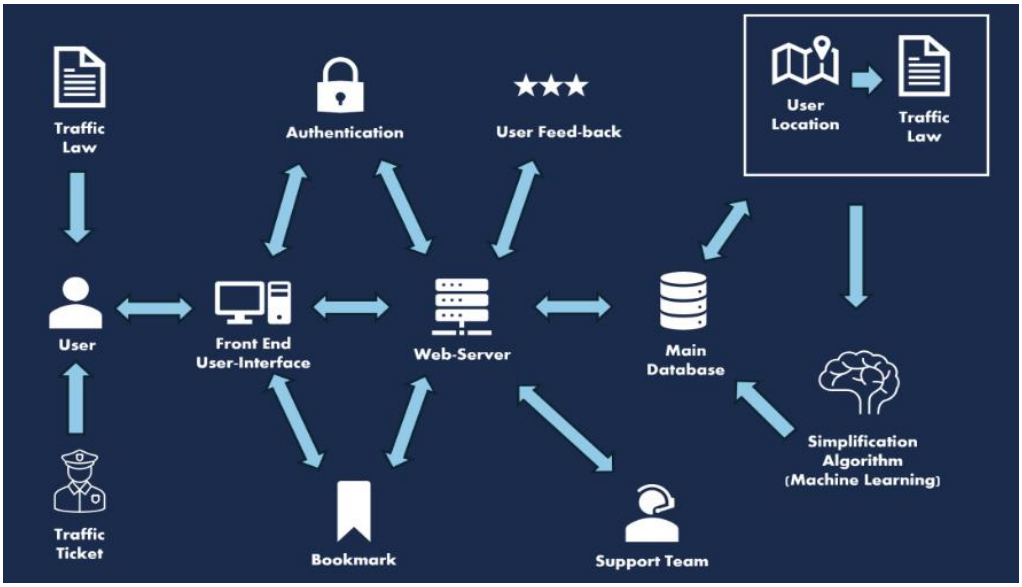

Figure 1: MFCD Diagram

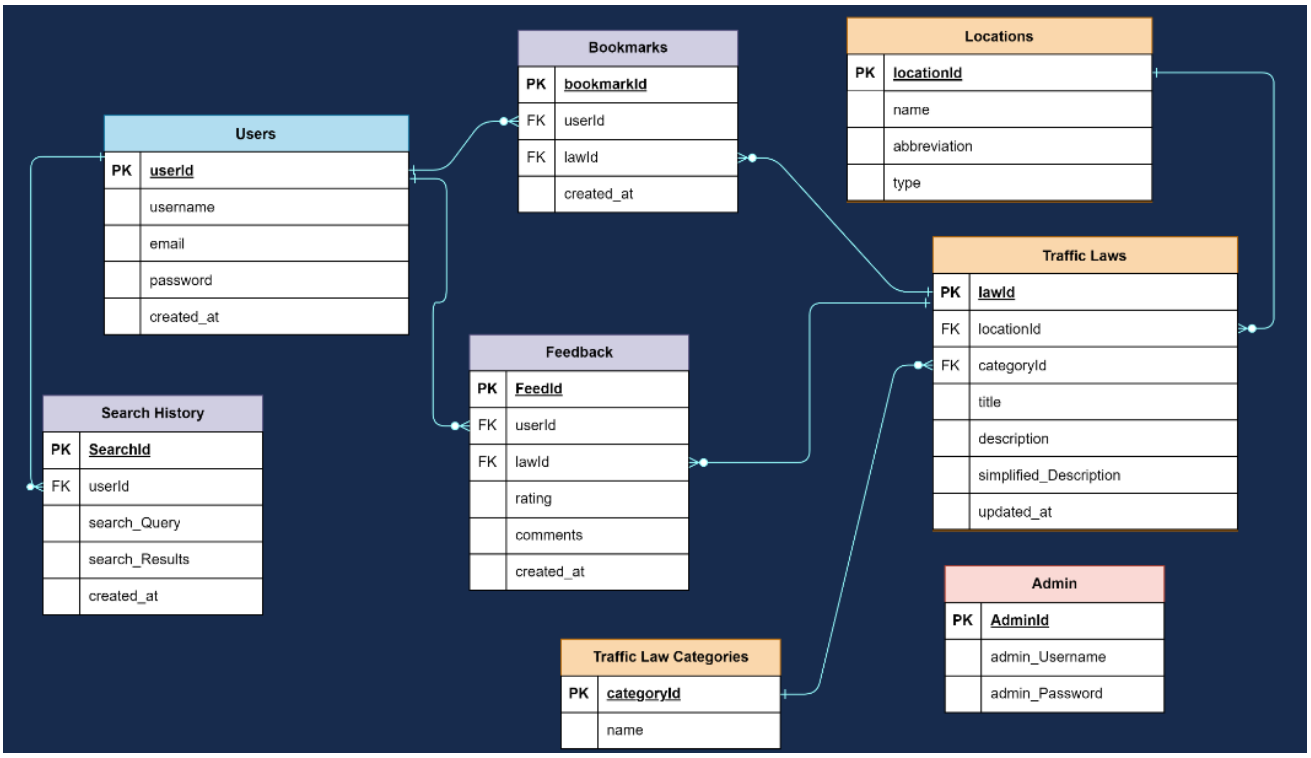

Figure 2: Database Schema

The provided database schema depicts a system designed to manage traffic laws and user interactions. It consists of several interconnected tables. The Users table stores user information such as username, email, and password. The Search History table logs users' search queries and results. The Bookmarks table allows 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, & types. The Traffic Laws table contains detailed information about each law, including the associated location and category, along with a simplified description and last update timestamp. The Traffic Law Categories table categorizes laws into different types. Lastly, 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?

- **General Drivers** – Individuals who need to navigate and understand traffic laws to avoid violations and ensure compliance
- **Traffic Violators** – Those who have received a traffic ticket or violations that require a clear understanding of the law to respond appropriately
- **Driver Improvement Class Students** – Students in driver improvement courses who need accessible education tools to better understand traffic regulations
- **Law Students** – Law students specializing in traffic law who need comprehensive resources to aid their education and research.

Why is the product for them?

- **General Drivers –** Understanding traffic laws can be challenging due to their complexity and variation across different regions. Traffic Tamer simplifies these laws, making them easier for drivers to comprehend and follow, thereby promoting safe driving practices.
- **Traffic Violators** – Individuals who have violated the law need clear explanations to understand their infractions and navigate the legal consequences. Traffic Tamer provides straightforward explanations and guides them through the necessary steps to address their situation.
- **Driver Improvement Class Students** – These students benefit from a tool that offers accessible explanations of traffic laws, enhancing their learning experience and helping them grasp the nuances of traffic regulations.
- **Law Students** – Law students require detailed and up-to-date information on traffic laws for their studies. Traffic tamer offers a comprehensive resource that categorizes and simplifies these laws, supporting their academic endeavors.

Who else would benefit from the product?

- **Legal Professionals** – Attorneys and paralegals specializing in traffic law may use Traffic Tamer as a quick reference tool to stay updated with the latest regulations and provide accurate advice to their clients.

- **Insurance Companies** – Insurance agents and companies can use Traffic Tamer to better understand the traffic laws in different regions, allowing them to assess claims and policy risks more accurately.
- **Municipalities and Government Agencies** – Local governments and traffic enforcement agencies may use the platform to educate the public, promote compliance, and improve road safety.
- **Driving Schools** – Driving schools may incorporate Traffic Tamer into their curriculum to provide students with reliable resources for learning traffic laws.
- **Researchers and Policy Makers** – Academics and policymakers studying traffic regulations and their impact on public safety could use Traffic Tamer 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 the understanding of 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

- Ensuring the AI can correctly identify and interpret the legal jargon into layman's terms
- Managing large volumes of scraped data

- Having the application scale well with large numbers of users, making it so that the performance of the application will 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 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 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.

6. References

Aghayari, H., Kalankesh, L. R., Sadeghi-Bazargani, H., & Feizi-Derakhshi, M.-R. (2021, August 2). Mobile applications for Road Traffic Health and safety in the mirror of the Haddon's Matrix - BMC Medical Informatics and decision making. BioMed Central. Retrieved June 11, 2024, from https://bmcmedinformdecismak.biomedcentral.com/articles/10.1186/s12911-021-01578-8

Online legal services and legal advice. LegalShield. (2024, June 6). Retrieved June 11, 2024, from https://www.legalshield.com/

Traffic attorneys in North Carolina. iTicket.law - Powered by Hatley Law Office. (n.d.). Retrieved June 11, 2024, from https://www.iticket.law/

Traffic Caseload Highlights. (2024, April). National Center for State Courts. Retrieved June 11, 2024, from https://www.courtstatistics.org/__data/assets/pdf_file/0029/99920/Traffic-CLHL.pdf

Web Application Security: Risks, Technologies & Best Practices." CyCognito, Retrieved June 26, 2024, from www.cycognito.com/learn/application-security/web-application-security.php

Odnoletkov, Pavel. "Top 8 Web Application Security Threats and How to Mitigate Them." MBC Managed IT Services, 9 Aug. 2023, www.mbccs.com/web-application-security-threats/

"7 Common Web Security Threats for an Enterprise." Fortinet, Retrieved June 26, 2024, from www.fortinet.com/resources/cyberglossary/web-security-threats