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INTERNET PROGRAMMING AND MOBILE DEVELOPMENT

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Requirement Analysis Document: Road State & Road Sign App (DriveSafe)

1. Introduction

In requirement analysis, we have to categorize, define and prioritize requirements.
1) Categorize the requirements:
Functional requirements, non-functional requirements, system requirements business requirements.
2) Define the requirements
3) Prioritize the Requirements:
The third stage is to prioritize which requirements are critical to the success of the software and which are simply nice to have. To carry out requirements analysis we applied a software engineering concept known as criticality analysis.

What is Criticality analysis

Criticality refers to the assessment of how essential a particular function, component, or system is achieving the overall mission or purpose. It involves the evaluating the impact of a failure or malfunction on the ability of the software or system to fulfill its intended objectives.

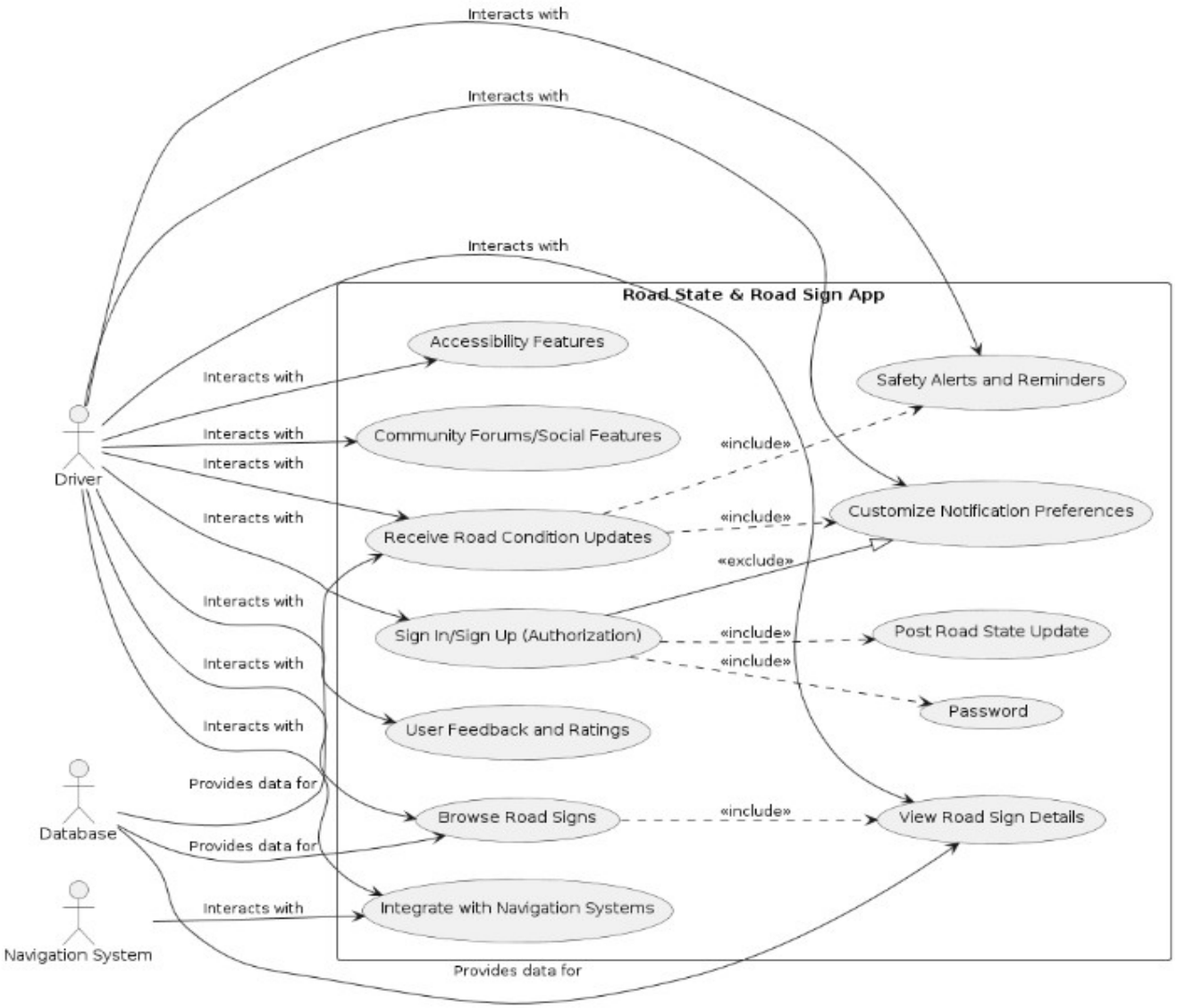
We came to the conclusion that MTN MOMO, Orange MOMO were not critical to the functioning of the app.
The minimum viable product will not include these services MVP.
However, the authentication and authorization system using Firebase, the database using MongoD, integration with Google Maps are very critical to the functioning of the application

After applying the principles above, we came up with the Requirement Analysis document below(RAD)

Requirement Analysis techniques:

There are many requirement analysis techniques; gap analysis, flow chart, Business Process Model and the Unified Modeling language, UM L.
We used the Unified Modeling Language to carry out our requirements analysis.

There are many types of UML diagrams; activity diagram, state machine diagram, use case diagram, class diagram just to name a few.
We used a use case diagram to refine our functional requirements as shown below:



1) The description

The Road State & Road Sign App is a mobile application designed to provide drivers with comprehensive information about road signs and real-time updates on road conditions. The app aims to enhance driver awareness, improve safety, and facilitate smoother navigation on highways and roads.

2. Functional Requirements

2.1 User Management

- **Sign In/Sign Up**: Users should be able to create an account or sign in to access the app's features.
- **Profile Management**: Users should be able to manage their profiles, including personal information and notification settings.

2.2 Road Sign Information

- Browse Road Signs: Users can browse through a database of road signs on major highways.

- View Road Sign Details: Users can view detailed information about specific road signs, including their meanings, significance, and regulatory implications.

2.3 Real-Time Updates

- Receive Road Condition Updates: Users receive real-time updates on road conditions, including traffic congestion, accidents, weather-related hazards, and road closures. Updates may include text-based alerts, map overlays, and push notifications.

2.4 Notification Preferences

-Customize Notification Preferences: Users can customize their notification preferences based on specific types of road signs, road conditions, geographical areas, and time preferences. Customization options include frequency of updates, preferred notification channels, and filtering criteria.

2.5 Navigation Integration

-Integrate with Google Maps: The app integrates seamlessly with Google Maps, allowing users to access road sign information and road state updates within the Google Maps app. Integration features include real-time overlays, route suggestions, and voice-guided navigation.

3.6 Community Engagement

-Community Forums/Social Features: Users can participate in community forums or social features to share tips, experiences, and local knowledge about road conditions and road signs. Features may include discussion boards, user-generated content sharing, and event notifications.

3.7 User Feedback

- **Submit User Feedback**: Users can provide feedback on the app's features, usability, and overall experience. Feedback may include suggestions for improvements, bug reports, and general comments.

4. Non-Functional Requirements

4.1 Performance

- The app should provide fast and responsive performance, ensuring timely delivery of real-time updates and information. Response times for critical alerts and notifications should be minimized to enhance user experience.

4.2 Usability

- The user interface should be intuitive and user-friendly, optimized for use on smartphones and tablets. Accessibility features such as voice-guided navigation, text-to-speech functionality, and high contrast mode should be provided to accommodate users with diverse needs.

4.3 Reliability

- The app should be reliable and stable, minimizing crashes and downtime during usage. Server-side components should be resilient to traffic spikes and system failures, ensuring uninterrupted service availability.

4.4 Security

- User data should be securely stored and protected against unauthorized access. Secure authentication mechanisms such as multi-factor authentication and encryption should be implemented for user sign-in/sign-up processes. Additionally, data transmission between the app and external servers should be encrypted to prevent interception and tampering.

5. Constraints

- The app must comply with relevant privacy regulations regarding the collection and handling of user data. Data privacy policies and consent mechanisms should be implemented to inform users about data collection practices and obtain their consent for processing personal information.
- Integration with external data sources such as traffic cameras, weather sensors, and road infrastructure databases may be subject to availability and access permissions. Collaboration with government agencies, private organizations, and third-party service providers may be required to access and integrate these data sources into the app.

6. Assumptions

- Users have access to a stable internet connection for receiving real-time updates. Offline functionality such as cached data access and offline maps may be provided to mitigate connectivity issues in remote areas or areas with poor network coverage.
- The app's database of road signs and real-time data sources is regularly updated and maintained for accuracy. Automated data synchronization processes and manual data validation procedures may be employed to ensure data quality and reliability.

7. Dependencies

- The app's functionality may depend on external APIs and data sources for real-time updates and road sign information. Integration with third-party APIs, data feeds, and web services may be required to access and retrieve relevant data for display within the app's interface.

Conclusion

The Road State & Road Sign App aims to provide drivers with essential information and updates for safer and more informed driving experiences. By fulfilling the outlined requirements and leveraging an intuitive user interface design, the app seeks to enhance road safety, improve navigation, and foster community engagement among users. Implementation of robust security measures, seamless integration with Google Maps, and user-centric design principles are essential for the success and effectiveness of the app in addressing the needs of drivers and enhancing overall road safety.