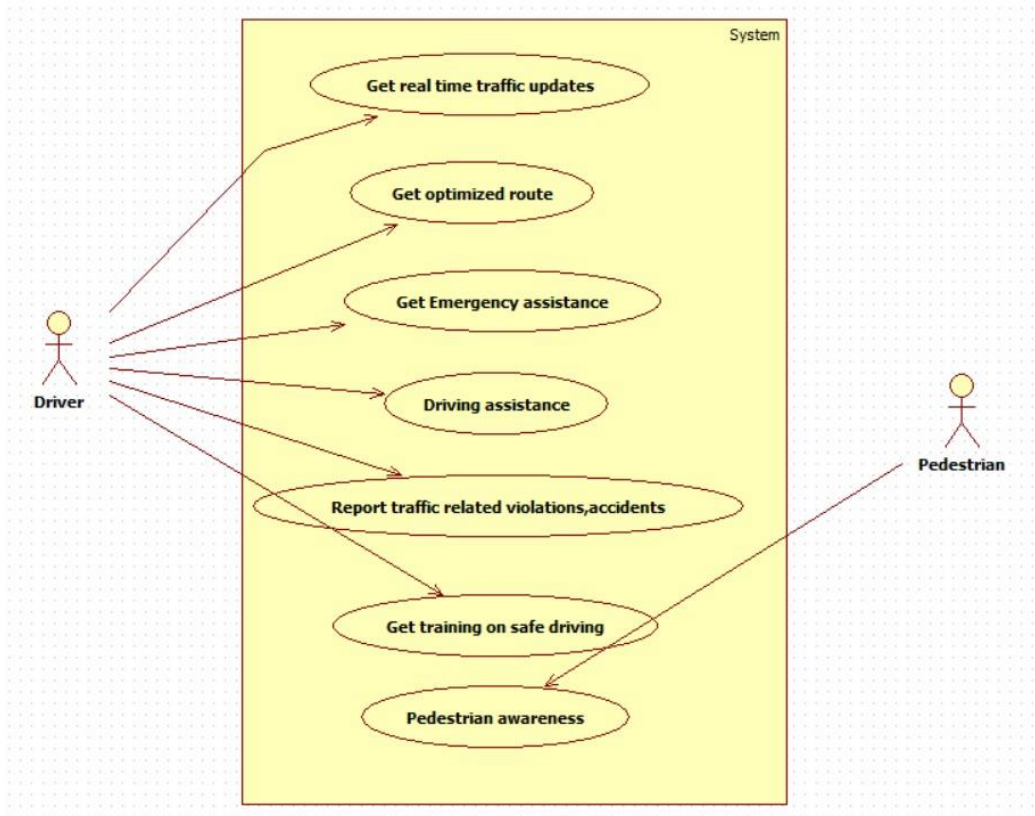
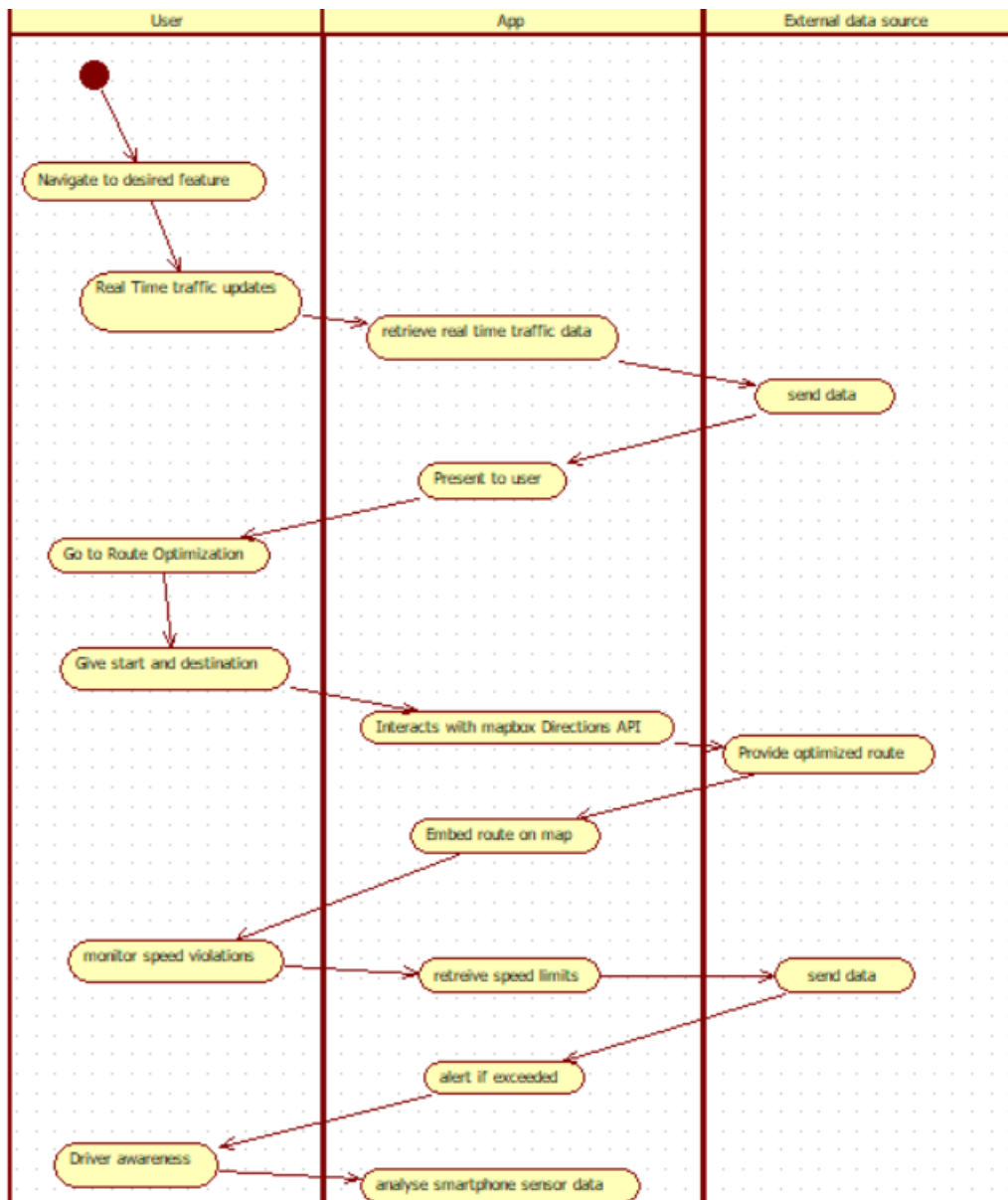
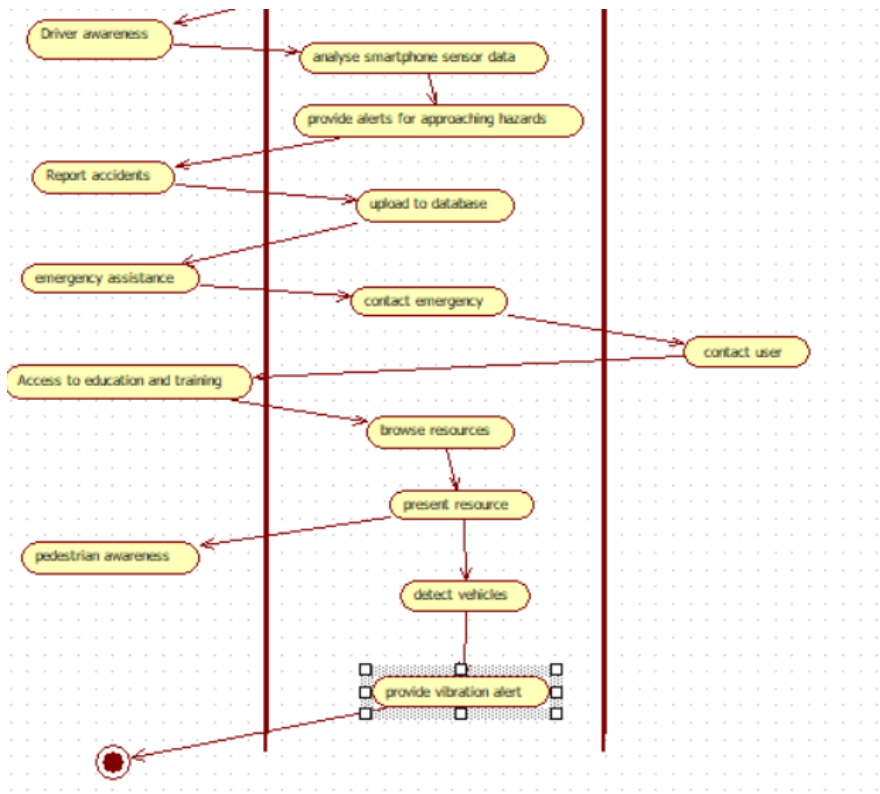


Use Case flow

K. Meher Sai
(21MCME07)
S. Manikanta
(21MCME20)







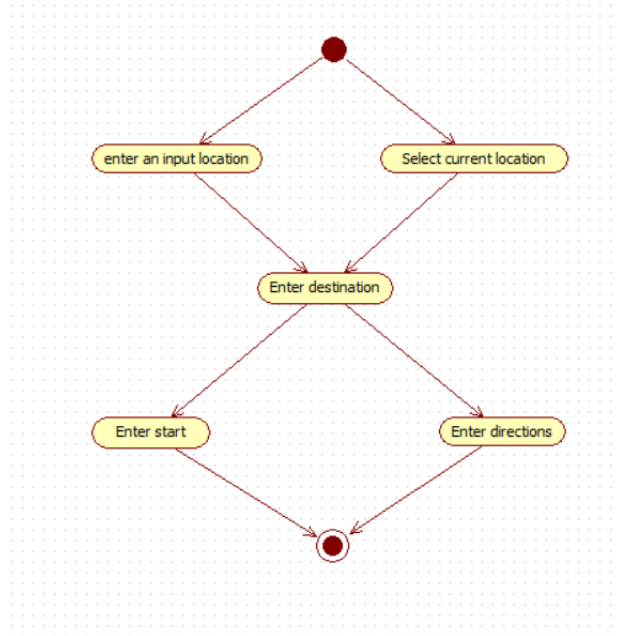
Use case specifications

| | | | |
|----------------|--------------------------------|--------------------|--------------------------------|
| Use Case ID: | 3 | | |
| Use Case Name: | Route Optimization | | |
| Created By: | K. Meher Sai, S Manikanta | Last Updated By: | K. Meher Sai, S Manikanta |
| Date Created: | 18 th February 2024 | Date Last Updated: | 18 th February 2024 |

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|--------------------|--|
| Actors: | Driver |
| Description: | Route optimization from initial to destination based on traffic updates and incident-aware routing. |
| Preconditions: | The user should login to the system. |
| Post conditions: | The optimized route map will be continuously updated as the location of user through GPS is tracked. |
| Normal Flow: | <ol style="list-style-type: none"> 1. The input location is filled by the current location of user or user can choose an initial location. 2. User enters destination to go. 3. If user enters start, then live navigation is displayed[A-1] Else just the route on the map is displayed. |
| Alternative Flows: | A-1: If the destination is not entered, the user will be prompted to enter the destination or If stop button is clicked during live navigation it gets stopped. |

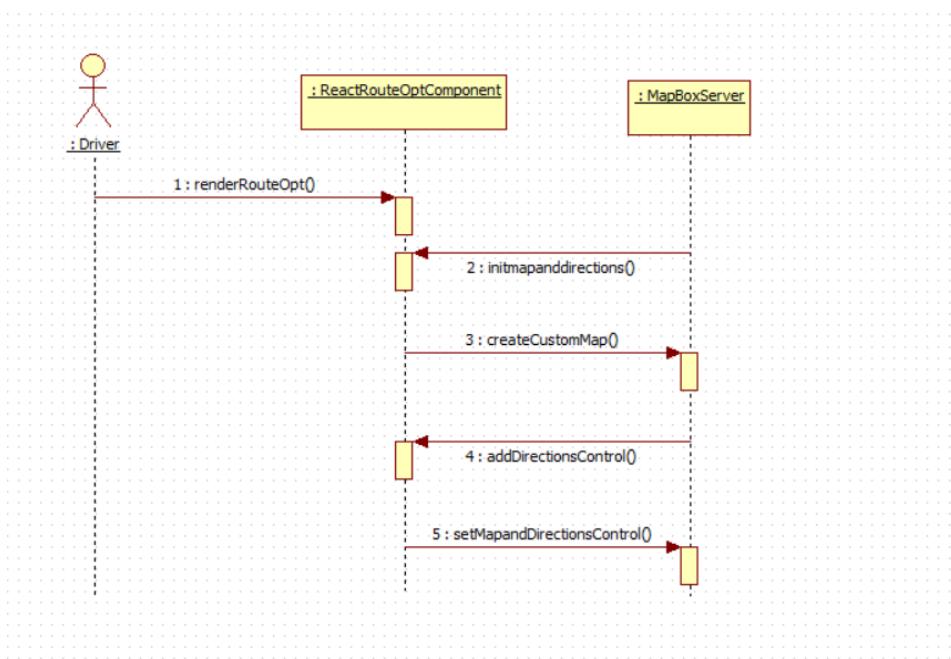
| | |
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| Exceptions: | If internet connection is not there then live navigation is stopped. |
| Includes: | |
| Priority: | High |
| Frequency of Use: | High |
| Business Rules: | |
| Assumptions: | - |

Activity Diagram:



Sequence Diagram:

Nouns are user, location, map.

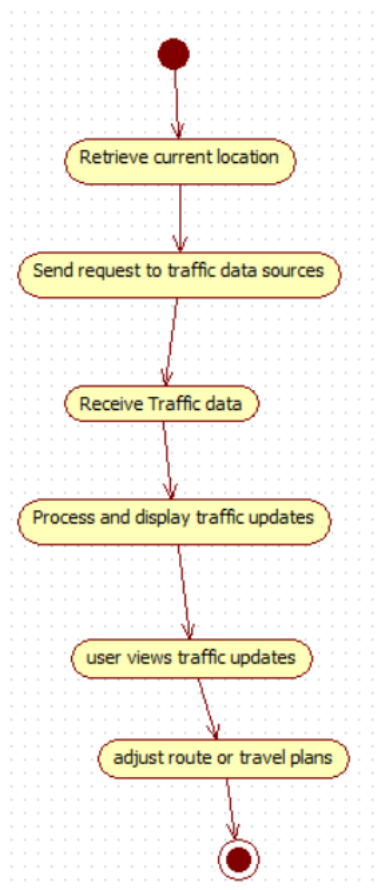


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|----------------|--------------------------------|--------------------|--------------------------------|
| Use Case Name: | Real Time Traffic Updates | | |
| Created By: | K. Meher Sai, S. Manikanta | Last Updated By: | K. Meher Sai, S. Manikanta |
| Date Created: | 19 th February 2024 | Date Last Updated: | 19 th February 2024 |

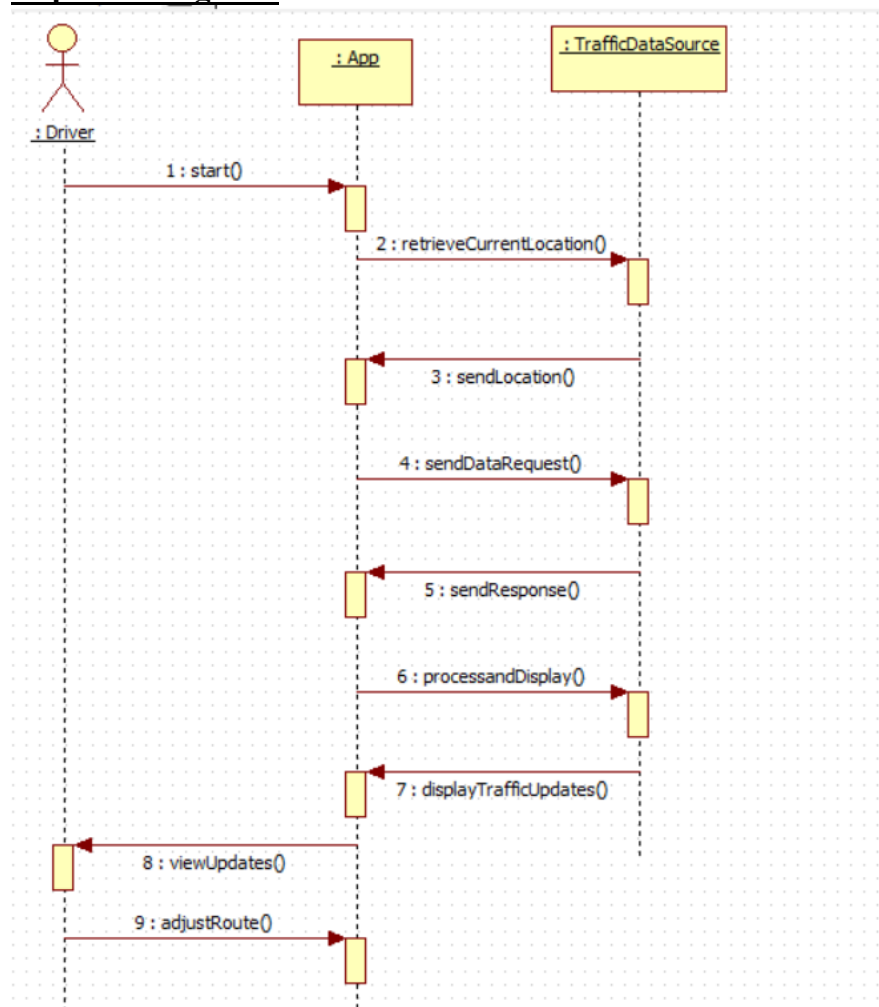
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| Actors: | Driver |
| Description: | Integrating with traffic data sources to provide users with real time updates on traffic conditions, accidents, road closures, and other incidents that may affect their route. |
| Preconditions: | <ul style="list-style-type: none"> The user has the smartphone app installed and running. The user's smartphone has access to internet connectivity. Traffic data sources are accessible and up-to-date. |
| Post conditions: | <ul style="list-style-type: none"> The user receives real-time updates on traffic conditions. The user can make informed decisions regarding their route and travel plans. |
| Normal Flow: | <ol style="list-style-type: none"> The user launches the smartphone app. The app retrieves the user's current location using GPS data.[A-1] The app sends a request to traffic data sources for real-time updates based on the user's location. Traffic data sources respond with relevant information, including traffic congestion, accidents, road closures, and other incidents.[A-2] The app processes the received data and displays real-time updates on the user's device. The user views the updated traffic information on the app's interface. Based on the received updates, the user adjusts their route or travel plans as necessary to avoid traffic congestion or incidents.[A-3] |
| Alternative Flows: | <ol style="list-style-type: none"> The user may choose to enable notifications for automatic updates, allowing the app to push real-time traffic updates to the user's device without manual retrieval. The user may interact with the map interface provided by the app to visualize traffic conditions along their route and nearby areas. |

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| Exceptions: | <p>A-1: If the app fails to retrieve the user's current location it displays an error message notifying the user of the issue.</p> <p>A-2: If traffic data sources are inaccessible or fail to respond it notifies the user that real-time updates are unavailable at the moment.</p> <p>A-3: If the user decides to ignore the real-time updates and continues the current route without making adjustments.</p> |
| Includes: | - |
| Priority: | High |
| Frequency of Use: | High |
| Business Rules: | <ul style="list-style-type: none"> • The system should prioritize real-time traffic data from reliable sources to ensure accuracy and reliability. • Updates provided to users should be timely and reflect the most current traffic conditions available. • User location should be tracked on consent from the user. • In the event of emergencies, such as accidents or road closures, priority should be given to delivering critical information to users to ensure their safety. |
| Assumptions: | <p>Stable internet connectivity</p> <p>Sufficient hardware support</p> <p>Users expected to follow traffic laws and regulations.</p> |

Activity Diagram:



Sequence Diagram:



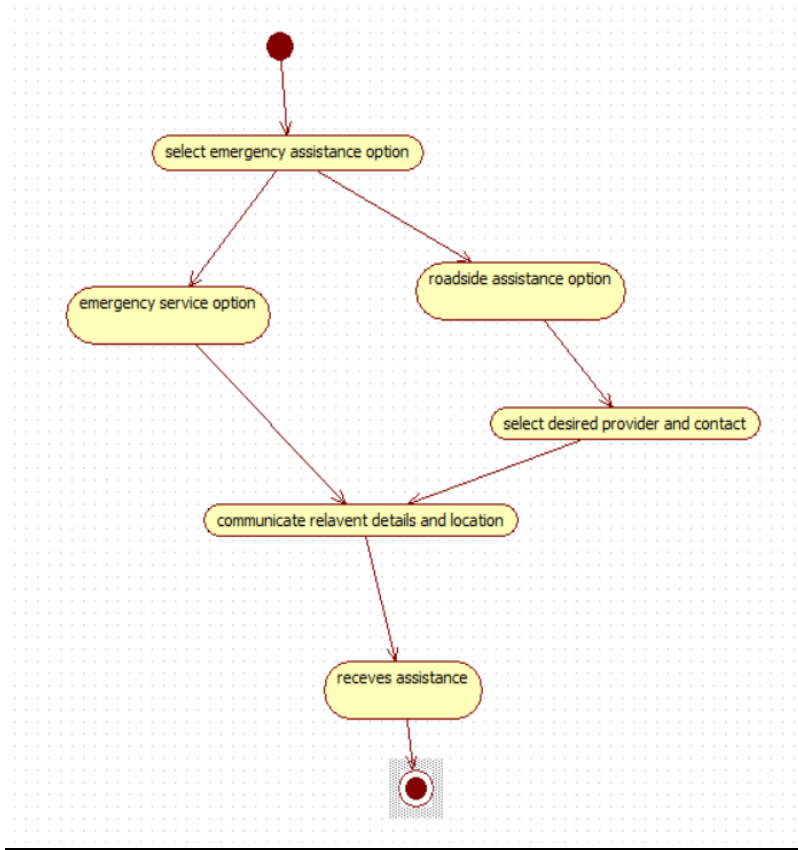
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|----------------|--------------------------------|--------------------|--------------------------------|
| Use Case ID: | 82 | | |
| Use Case Name: | Emergency Assistance | | |
| Created By: | K. Meher Sai, S. Manikanta | Last Updated By: | K. Meher Sai, S. Manikanta |
| Date Created: | 19 th February 2024 | Date Last Updated: | 19 th February 2024 |

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|---------------------|---|
| Actors: | Driver |
| Description: | Allows users to quickly contact emergency services or roadside assistance in the event of an accident or breakdown. |
| Preconditions: | <ol style="list-style-type: none"> 1. The user has the smartphone app installed and running. 2. The user's smartphone has access to internet connectivity. 3. The user has encountered an emergency situation such as an accident or breakdown. |
| Post conditions: | <ol style="list-style-type: none"> 1. The user has successfully contacted emergency services or roadside assistance for help. 2. Relevant information about the emergency situation is conveyed to the appropriate authorities. |
| Normal Flow: | <ol style="list-style-type: none"> 1. The user launches the smartphone app. 2. The user will navigate to the emergency assistance feature in the app. [1a] 3. The app gives options for contacting emergency services or roadside assistance. 4. The user selects the appropriate option based on the nature of the emergency: 5. If the user selects emergency services: a. The app initiates a call to the local emergency services number (e.g., 911)[4a]. b. The user communicates relevant details about the emergency to the emergency dispatcher.[2a] 6. If the user selects roadside assistance: a. The app provides a list of available roadside assistance providers or contacts previously saved providers. b. The user selects the desired provider and initiates contact through a phone call or message. 7. The user communicates their location and relevant details about the emergency situation to the emergency services or roadside assistance provider. [5a] 8. Emergency services or roadside assistance provider acknowledges receipt of the request and dispatches appropriate assistance to the user's location. |

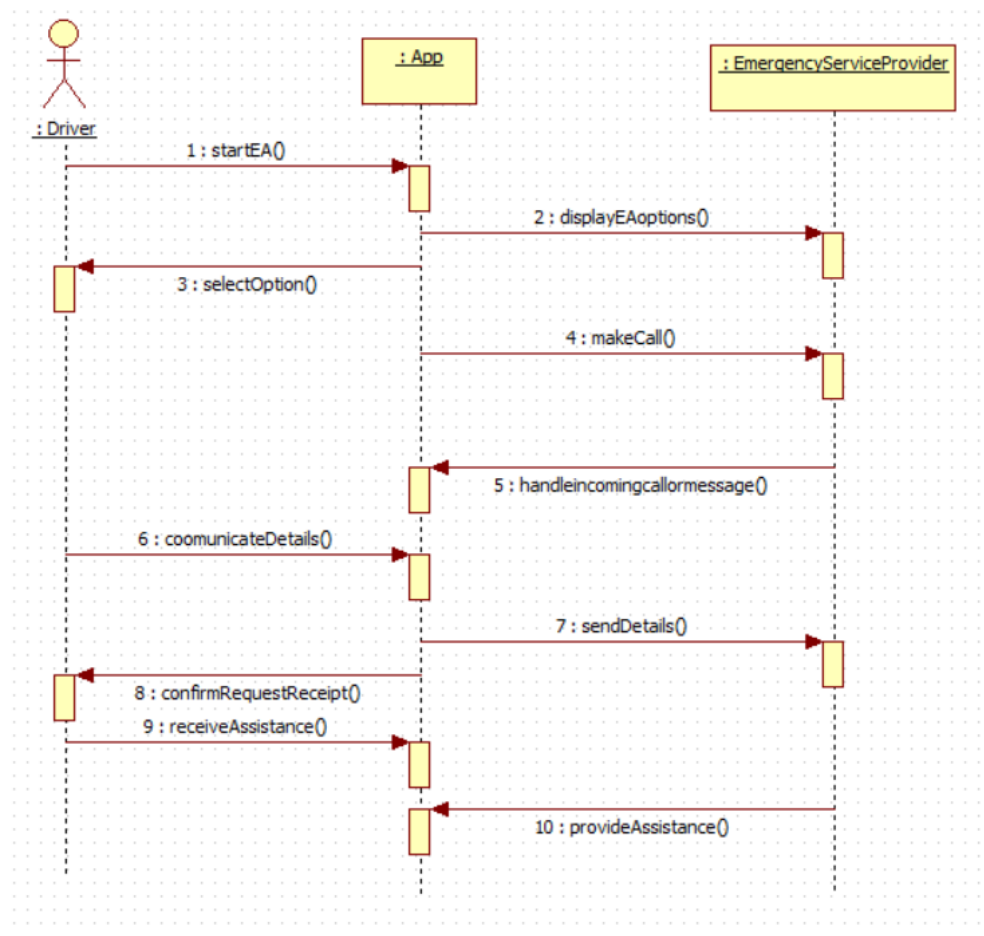
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| | <p>9. The user receives assistance from emergency services or roadside assistance provider, resolving the emergency situation.</p> |
| Alternative Flows: | <ol style="list-style-type: none"> 1. The user may choose to enable automatic location sharing(GPS) with emergency services or roadside assistance providers, allowing them to quickly locate the user in the event of an emergency. 2. The app may include additional features such as sending emergency alerts to predefined contacts or displaying safety tips for handling emergency situations while waiting for assistance. |
| Exceptions: | <p>1-a. If the user encounters difficulty accessing the emergency assistance feature:</p> <ol style="list-style-type: none"> 1. The user may navigate to the app's main menu to locate the feature. 2. The app may provide guidance to assist the user in accessing the emergency assistance feature. <p>2a. If the user is unable to communicate verbally with emergency services:</p> <ol style="list-style-type: none"> 1. The app may include options for sending text messages to emergency services. <p>3a. If the user is unable to contact roadside assistance due to lack of network connectivity:</p> <ol style="list-style-type: none"> 1. The app may display previously saved contact information for roadside assistance providers. 2. The user may attempt to contact roadside assistance using alternative methods such as another phone or seeking assistance from nearby individuals. <p>4a. If the user mistakenly initiates contact with the wrong emergency service:</p> <ol style="list-style-type: none"> 1. The user may end the call and initiate contact with the correct emergency service. 2. The app may provide guidance on contacting the appropriate emergency service based on the user's location and the nature of the emergency. <p>5a. If emergency services or roadside assistance cannot locate the user's precise location:</p> |

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| | <ol style="list-style-type: none"> 1. The user may provide additional information about their location, landmarks, or nearby street names to assist in locating them. 2. The app may utilize GPS data or triangulation methods to estimate the user's location and convey it to the service provider. |
| Includes: | Login, Contact Information Management. |
| Priority: | High |
| Frequency of Use: | Medium(Not frequent) |
| Business Rules: | <ol style="list-style-type: none"> 1. Up-to-date contact information for emergency services (e.g., police, fire department, medical services) based on the user's location. 2. The system must provide reliable road assistance services to respond properly to user needs. 3. User consent for location sharing. 4. Location data shared with emergency services or roadside assistance providers must be handled in compliance with relevant data privacy laws and regulations. 5. Users will be required to confirm their identity or provide additional information to validate the urgency of the situation. |
| Assumptions: | <p>Availability of network connection.</p> <p>Correct contact information in the app.</p> <p>User is ready to share location and nature of the emergency.</p> |

Activity Diagram:



Sequence diagram:



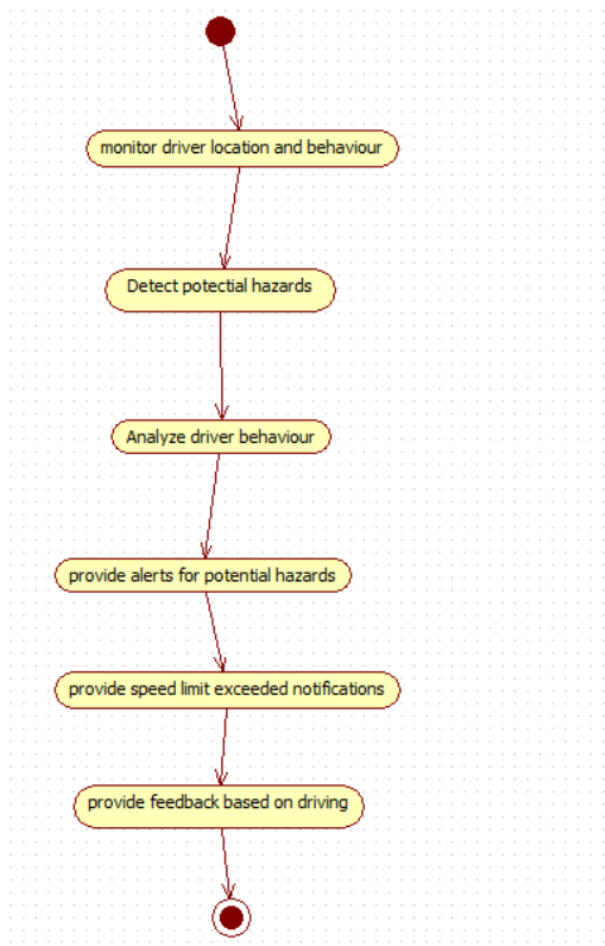
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|----------------|--------------------------------|--------------------|--------------------------------|
| Use Case ID: | 95 | | |
| Use Case Name: | Driving Assistance | | |
| Created By: | K. Meher Sai, S. Manikanta | Last Updated By: | K. Meher Sai, S. Manikanta |
| Date Created: | 19 th February 2024 | Date Last Updated: | 19 th February 2024 |

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| Actors: | Driver |
| Description: | The Driver Assistance feature aims to enhance driver safety and awareness by providing real-time alerts for potential hazards approaching intersections, sharp curves, pedestrian crossings, speed limit violations, and feedback on driving behavior. |
| Preconditions: | <ol style="list-style-type: none">1. The driver has the smartphone app installed and running on their device.2. The smartphone app has access to GPS data and accelerometer data for monitoring the driver's location and driving behavior. |
| Post conditions: | The driver receives timely alerts for potential hazards and speed limit violations, along with feedback on |

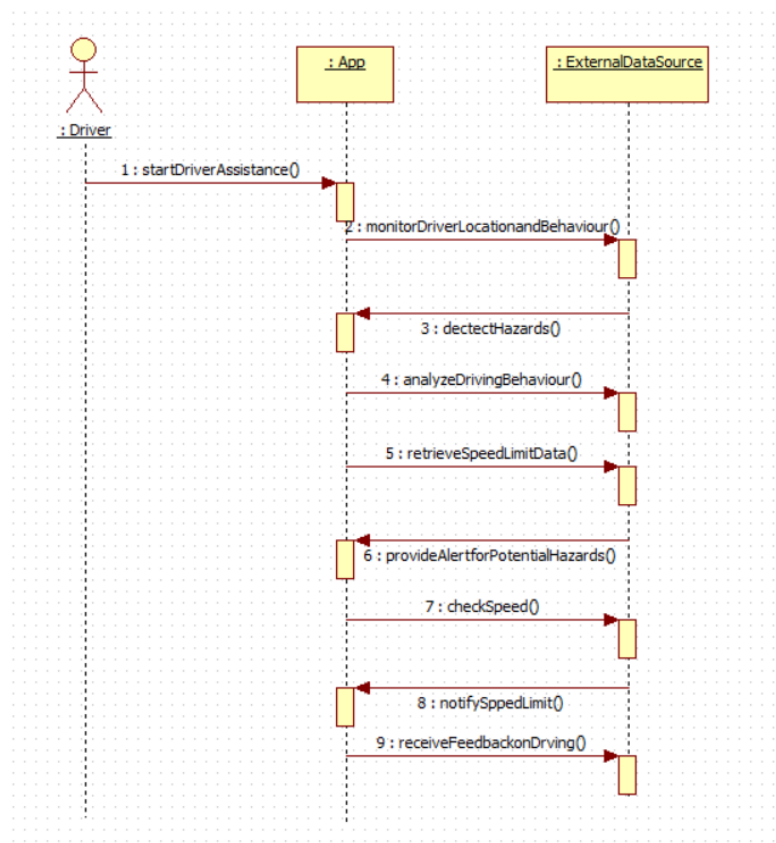
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| | driving behavior, promoting safer driving habits and reducing the risk of accidents. |
| Normal Flow: | <ol style="list-style-type: none"> 1. The driver initiates the Driver Assistance feature within the app. 2. The app continuously monitors the driver's GPS location and driving behavior using accelerometer and GPS data.[1a] 3. As the driver approaches intersections, sharp curves, pedestrian crossings, or other potential hazards, the app provides visual and/or auditory alerts to notify the driver and encourage attentiveness.[2a,3a] 4. If the driver exceeds the speed limit, the app triggers a speed limit notification alert using GPS data to inform the driver and encourage safer driving habits.[2a,3a] 5. The app analyzes driving behavior, including harsh braking, rapid acceleration, and sharp turns, using accelerometer and GPS data. 6. Based on the analysis, the app provides feedback to the driver, highlighting areas for improvement in driving habits and promoting safer driving practices. 7. The driver acknowledges the alerts and feedback provided by the app and adjusts their driving behavior accordingly. |
| Alternative Flows: | <ul style="list-style-type: none"> • The driver may choose to customize the settings for alerts and feedback within the app, such as adjusting alert sensitivity levels or opting out of specific notifications. • The app may integrate with in-car systems or wearable devices to provide hands-free access to alerts and feedback, minimizing distractions for the driver while on the road |
| Exceptions: | <p>1a. If the app fails to access GPS or accelerometer data:</p> <ul style="list-style-type: none"> • The app notifies the driver of the technical issue • The app may continue to operate without real-time GPS or accelerometer data, but certain features such as speed limit notifications and driver behavior analysis may be temporarily disabled. <p>2a. If the driver ignores or dismisses the alerts and feedback:</p> <ul style="list-style-type: none"> • The app may escalate the alert level or provide more frequent notifications to draw the driver's |

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| | <p>attention to potential hazards or driving behavior issues.</p> <ul style="list-style-type: none"> • The app may prompt the driver to confirm their acknowledgment of the alerts and commitment to safer driving practices. <p>3a. If the driver experiences difficulty understanding or responding to the alerts and feedback:</p> <ul style="list-style-type: none"> • The app may provide additional guidance or explanations to help the driver interpret and act upon the information provided. • The app may offer resources such as articles, videos, or quizzes to educate the driver about safe driving practices and the importance of attentiveness and adherence to speed limits. |
| Includes: | Education and Training, Speed limit notification |
| Priority: | High |
| Frequency of Use: | High |
| Business Rules: | <ol style="list-style-type: none"> 1. Driver should adhere to traffic laws and regulations. 2. The results of potential hazards should be accurate. 3. Alerts should be clear and concise without causing distraction to user. 4. User are responsible for their actions, the app is just a guide to safe driving habits. |
| Assumptions: | <ol style="list-style-type: none"> 1. Internet connectivity. 2. User hasn't disable notifications from the app. |

Activity Diagram:



Sequence Diagram:



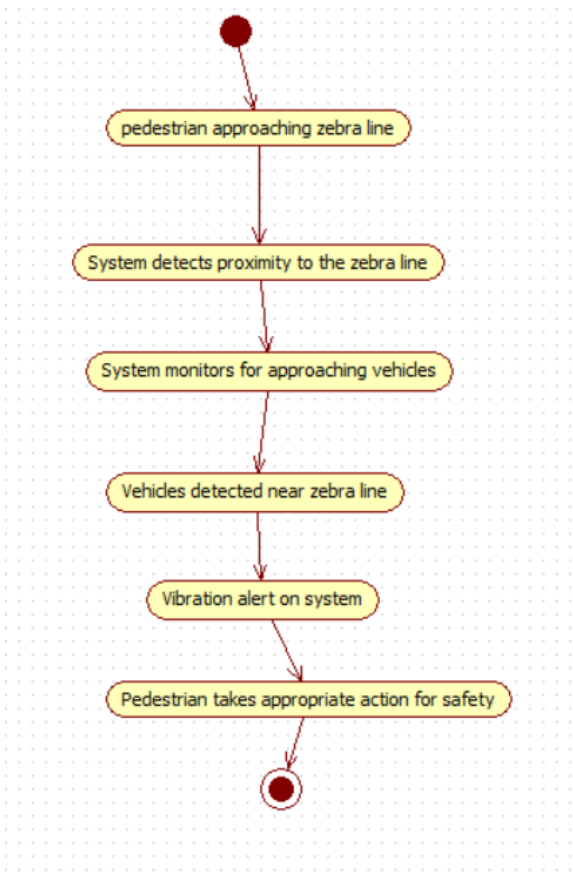
Here external data source are traffic data sources, Map services, Weather services to provide info bad weather, speed limit apis, traffic signal data, smartphone data to track pedestrians or bicycles, historical driving data.

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|----------------|--------------------------------|--------------------|--------------------------------|
| Use Case ID: | 62 | | |
| Use Case Name: | Pedestrian awareness | | |
| Created By: | K. Meher Sai, S. Manikanta | Last Updated By: | K. Meher Sai, S. Manikanta |
| Date Created: | 19 th February 2024 | Date Last Updated: | 19 th February 2024 |

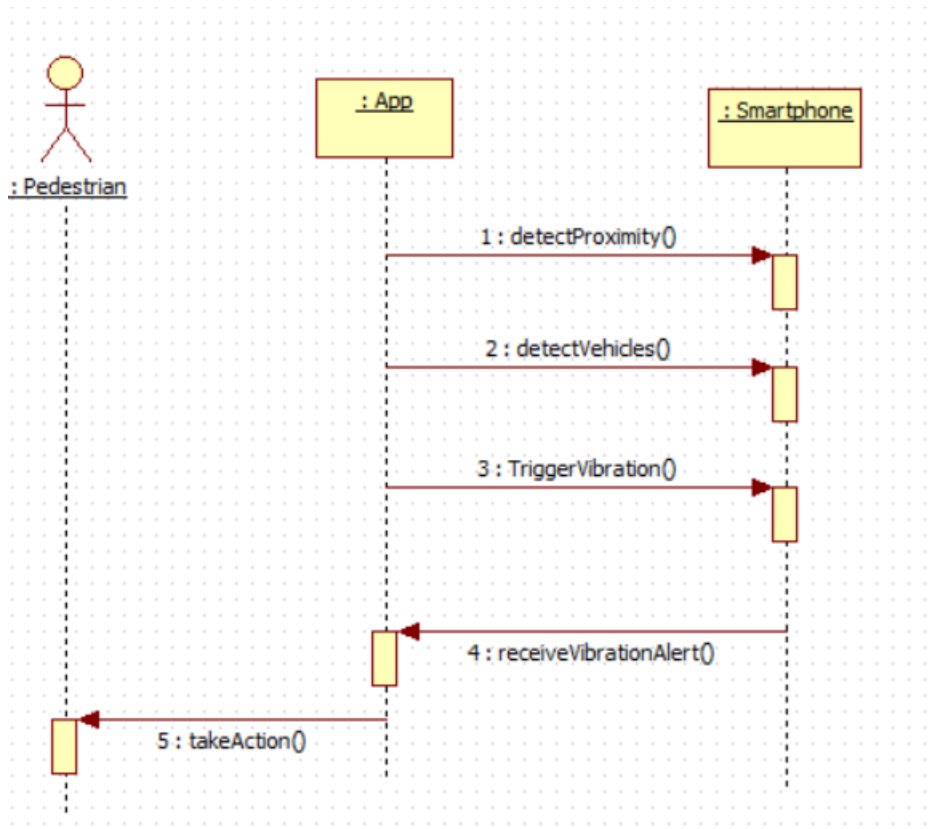
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| Actors: | Pedestrian |
| Description: | Indicating pedestrians when vehicles are approaching at the zebra line through vibration alerts, enhancing pedestrian safety at crosswalks. |
| Preconditions: | <ol style="list-style-type: none"> 1. Pedestrian has a smartphone or wearable device capable of receiving vibration alerts. 2. The pedestrian is near a zebra crossing where vehicles may approach. |
| Post conditions: | <ol style="list-style-type: none"> 1. The pedestrians receiving vibration alert when vehicles are approaching at the zebra line. |
| Normal Flow: | <ol style="list-style-type: none"> 1. Pedestrian is crossing at traffic junction on zebra line. 2. The pedestrian's mobile device or wearable device detects the proximity to the zebra line.[2a] 3. The system monitors for approaching vehicles using sensors or communication with nearby vehicles.[3a] 4. When a vehicle approaches the zebra line, the system will give a vibration alert on the pedestrian's device. 5. The pedestrian receives the vibration alert, indicating the presence of an approaching vehicle.[5a] 6. The pedestrian takes appropriate action to ensure safety, such as pausing before crossing or waiting for the vehicle to pass. |
| Alternative Flows: | <p>2a: If the app is unable to detect the proximity to the zebra line then the pedestrian has to solely to rely on visual cues.</p> <p>3a: If the app fails to detect approaching vehicles then it should provide some voice message to look for vehicles that approaching.</p> |

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| | 5a: Due to external environmental disturbances, the vibrations may not be experienced by the pedestrians so the alert intensity can be increased in case of that. |
| Exceptions: | False positive vibration alerts leading to unnecessary alerts. |
| Includes: | - |
| Priority: | High(Pedestrian safety is critical at traffic junctions) |
| Frequency of Use: | Depends on volume of traffic and number of zebra crosswalks. |
| Business Rules: | <ol style="list-style-type: none"> 1. The vibration alerts should be sufficiently strong to attract the pedestrian's attention without causing discomfort. 2. The system should prioritize accuracy in detecting approaching vehicles to minimize false alerts and ensure pedestrian trust in the system. 3. Pedestrians should be educated about the meaning of the vibration alerts and instructed on how to respond appropriately when receiving them. |
| Assumptions: | <p>Pedestrians have smartphone or wearable devices capable of receiving vibration alerts.</p> <p>The app has access to reliable sensor data or vehicle communication technology to detect approaching vehicles.</p> |

Activity Diagram:



Sequence Diagram:

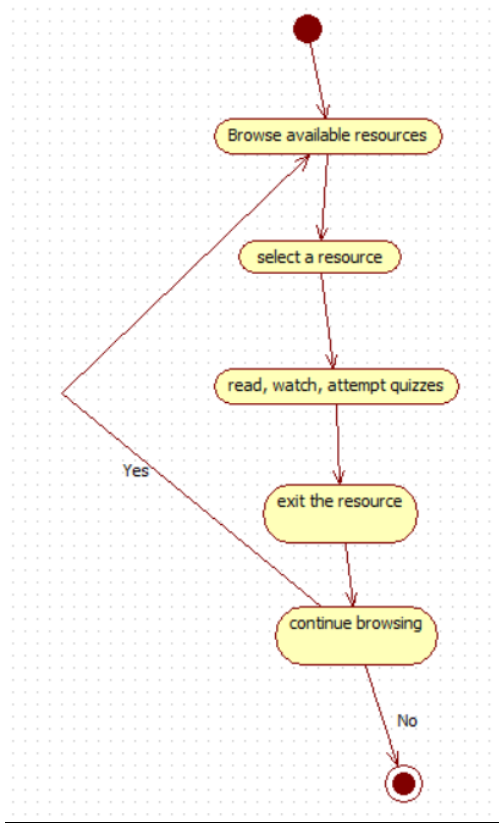


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|----------------|--------------------------------|--------------------|--------------------------------|
| Use Case ID: | 43 | | |
| Use Case Name: | Education and Training | | |
| Created By: | K. Meher Sai, S. Manikanta | Last Updated By: | K. Meher Sai, S. Manikanta |
| Date Created: | 19 th February 2024 | Date Last Updated: | 19 th February 2024 |

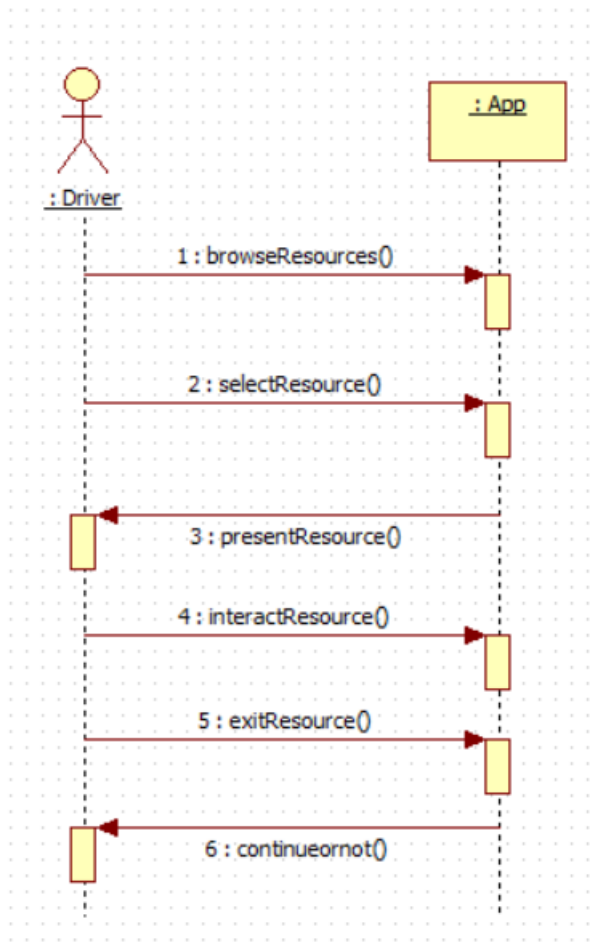
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| Actors: | Driver |
| Description: | Providing resources such as articles, videos, and quizzes to educate users about safe driving practices, traffic laws, and emergency procedures. |
| Preconditions: | <ul style="list-style-type: none">The user has access to the mobile app with the Education and Training feature enabled.The user is interested in learning about safe driving practices, traffic laws, or emergency procedures. |
| Post conditions: | <ul style="list-style-type: none">The user has accessed educational resources and potentially gained knowledge about safe driving practices, traffic laws, and emergency procedures. |
| Normal Flow: | 1. The user navigates to the Education and Training section within the mobile app. |

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| | <ol style="list-style-type: none"> 2. The user browses through available resources, including articles, videos, and quizzes. 3. The user selects a specific resource to view or interact with. 4. The system presents the selected resource to the user. 5. The user reads, watches, or interacts with the resource to learn about the relevant topic. 6. After reviewing the resource, the user may choose to: <ul style="list-style-type: none"> • Continue browsing other resources. • Exit the Education and Training section. |
| Alternative Flows: | If the user encounters technical issues while accessing or interacting with educational resources, they may choose to report the issue to the app support team or retry accessing the resources later. |
| Exceptions: | If there are no educational resources available due to maintenance or updates, the system may display a notification informing the user of the temporary unavailability and prompt them to check back later. |
| Includes: | - |
| Priority: | Medium priority, as providing education and training resources contributes to enhancing user knowledge and promoting safer driving practices. |
| Frequency of Use: | Depends on the user's interest in learning about safe driving practices, traffic laws, and emergency procedures. |
| Business Rules: | <ol style="list-style-type: none"> 1. Educational resources should be regularly updated to ensure that users have access to current and relevant information. 2. The app may track user interactions with educational resources to personalize recommendations and improve the user experience. |
| Assumptions: | Users have access to a stable internet connection. |

Activity Diagram:



Sequence Diagram:



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|----------------|---|--------------------|--------------------------------|
| Use Case ID: | 48 | | |
| Use Case Name: | Report traffic accidents and violations | | |
| Created By: | K. Meher Sai, S. Manikanta | Last Updated By: | K. Meher Sai, S. Manikanta |
| Date Created: | 19 th February 2024 | Date Last Updated: | 19 th February 2024 |

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| Actors: | Driver |
| Description: | Allowing users to report accidents, hazards, or traffic violations they encounter while traveling. These reports contribute to a real-time database that benefits other users by providing them with up-to-date information about road conditions. |
| Preconditions: | <ul style="list-style-type: none"> The user has access to the mobile app with the feature enabled. The user is currently traveling or observing road conditions. |
| Post conditions: | <ul style="list-style-type: none"> The user's report is successfully submitted to the crowdsourced database. Other users may access and benefit from the reported data. |
| Normal Flow: | <ol style="list-style-type: none"> The user encounters an accident, hazard, or traffic violation while traveling on the road. The user accesses the Crowdsourced Data Reporting section within the mobile app. The user selects the option to report an incident. The user provides details about the incident, including its type (accident, hazard, or traffic violation), location, description, and any additional relevant information. The user submits the report. The system verifies and processes the report. The reported incident is added to the real-time crowdsourced database. |
| Alternative Flows: | If the user encounters technical issues or connectivity problems while trying to submit a report, they may choose to retry the submission or save the report as a draft for later submission. |
| Exceptions: | <ul style="list-style-type: none"> If the reported incident does not meet certain criteria or is deemed irrelevant or false by the system, it may be rejected or flagged for further review by moderators. In case of abuse or misuse of the reporting feature, such as submitting fraudulent reports or spam, the user may be subject to account suspension or other penalties. |
| Includes: | - |

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| Priority: | Medium to high priority, as providing crowdsourced data contributes to enhancing user safety and improving the overall quality of the app's services. |
| Frequency of Use: | The frequency of use depends on the user's travel patterns and the prevalence of incidents encountered on the road. |
| Business Rules: | <ol style="list-style-type: none"> 1. User-reported incidents should be verified and validated before updating database. 2. Users should be encouraged to provide detailed and factual information when reporting incidents to enhance the usefulness of the crowdsourced data. 3. The crowdsourced database should be regularly updated and maintained |
| Assumptions: | Users have access to a stable internet connection. |

Activity Diagram:

