

Epic: Adaptive Cruise Control

Description:

We want to create adaptive cruise control software that will utilize sensor inputs such as radars and cameras to monitor the distance and speed of vehicles ahead. The software will calculate the safe following distance based on the driver's preferred settings and dynamically adjust the vehicle's speed by automatically braking or accelerating to maintain this distance. The ACC system will incorporate advanced algorithms to filter sensor data, predict vehicle trajectories, and adapt to changing traffic conditions in real-time. Additionally, the software will interface with other vehicle systems, such as collision avoidance and lane keeping, to enhance safety and provide a smoother driving experience. Moreover the system will perform traffic jam assist, assisting drivers in managing their vehicle's lane position, speed adjustments, stopping, and starting during slow-moving traffic congestion. This feature will function as a slower-speed adaptation of Adaptive Cruise Control, tailored for lower speeds typically encountered in traffic situations below 40 mph, in contrast to ACC's focus on highway driving at higher speeds.

Investment Themes:

New Offerings:

1. Develop and integrate Adaptive Cruise Control with existing features like self-parking and lane-changing to create a comprehensive driving experience:
 - Allocate resources towards seamless integration of ACC with self-parking and lane-changing functionalities.
 - Focus on enhancing user experience by optimizing automated parking maneuvers and smooth lane transitions enabled by ACC.
2. Explore new features or enhancements, such as integrating ACC with horn honking for advanced safety alerts or communication in traffic scenarios:
 - Invest in research and development to integrate ACC with horn honking functionality for improved driver communication and safety.
 - Differentiate the company's product offerings by leveraging ACC's capabilities for enhanced traffic awareness and responsiveness based on situation.

Existing Offerings:

1. Enhance and optimize the self-parking feature to work effectively in coordination with ACC:
 - Allocate resources to improve self-parking algorithms based on ACC sensor inputs for precise and adaptive parking maneuvers.
 - Ensure seamless integration of ACC with self-parking for enhanced convenience and safety during parking.
2. Improve the lane changing feature's responsiveness and accuracy when used in conjunction with ACC:

- Invest in refining lane changing algorithms to complement ACC's adaptive speed adjustments and traffic awareness.
- Enhance lane changing functionality to ensure smooth and safe transitions between lanes, enhancing overall driving experience with ACC.

Futures:

1. Invest in advanced algorithms and sensor technologies to enhance the predictive capabilities of ACC, self-parking, and lane-changing features:
 - Allocate resources towards research and development of predictive algorithms to optimize ACC's adaptability to various driving conditions.
 - Continuously refine sensor technologies to improve accuracy and reliability of ACC functionalities for future enhancements.
2. Research and develop innovative ways to integrate horn honking functionality with ACC to enhance driver communication and safety:
 - Explore novel approaches to integrate horn honking with ACC for advanced safety alerts and traffic communication.
 - Differentiate the company's product offerings by leveraging integrated ACC features for enhanced driver awareness and response capabilities.

Sunset:

1. Evaluate legacy systems or technologies related to cruise control or parking assistance that may be phased out or replaced by the more advanced ACC system:
 - Assess existing cruise control and parking assistance technologies to identify systems that can be sunsetted in favor of ACC.
 - Plan for the transition and retirement of legacy systems, aligning with the enterprise's roadmap for technology evolution and product innovation.

Strategic Direction

Integrated Driver Assistance System:

1. Develop a unified driver assistance system integrating Dynamic Speed Adaptation, Traffic Jam Assist, ACC, collision avoidance, and lane keeping for enhanced safety and user experience.

Advanced Sensor Fusion and AI:

2. Implement advanced sensor fusion and AI algorithms to accurately perceive surroundings, predict vehicle trajectories, and make adaptive decisions in real-time.

Safety and Efficiency Focus:

3. Prioritize safety with robust collision detection and avoidance systems. Optimize traffic flow and efficiency using Traffic Jam Assist and Dynamic Speed Adaptation.

Scalable and Future-Proof Design:

4. Design a scalable architecture adaptable to emerging technologies and evolving industry regulations.

Customer-Centric Innovation:

5. Gather customer feedback to drive continuous improvement. Collaborate with partners to position the technology as a premium offering that enhances brand reputation.

Features:

Dynamic Speed Adaptation:

Dynamic Speed Adaptation is a feature that optimizes vehicle speed based on real-time traffic conditions and driver preferences, enhancing both efficiency and safety during highway driving.

Description: Optimize vehicle speed based on real-time traffic conditions and driver preferences, enhancing both efficiency and safety during highway driving.

Traffic Jam Assist:

Traffic Jam Assist is a feature that extends the capabilities of Adaptive Cruise Control to manage vehicle movement in slow-moving or congested traffic conditions, typically encountered at speeds below 40 mph.

Description: Extend capabilities of Adaptive Cruise Control to manage vehicle movement in slow-moving or congested traffic conditions, typically encountered at speeds below 40 mph.

Release #1: Dynamic Speed Adaptation

Dynamic Speed Adaptation v1.0 is a cutting-edge software feature that optimizes vehicle speed in real-time based on live traffic data and driver preferences during highway driving. This release enhances driving efficiency and safety by dynamically adjusting speeds to maintain optimal traffic flow, providing a smoother and more responsive driving experience.

User Stories:

Real-Time Traffic Monitoring

As a driver, I want Dynamic Speed Adaptation to adjust my vehicle's speed based on real-time traffic conditions, so that I can maintain a safe following distance without manual intervention.

- Description: Develop a feature that automatically adjusts vehicle speed in response to changes in traffic flow and road conditions.
- Acceptance Tests:
 - Activate Dynamic Speed Adaptation while driving on a highway with varying traffic speeds.
 - Confirm that the system adapts vehicle speed smoothly to maintain a safe distance.
- Acceptance Criteria:
 - Speed adjustments should be timely and responsive to traffic changes.
 - The driver should feel confident in the system's ability to optimize speed for safety.
- Story Points: 5
- Priority: High

Task: Implement Sensor Data Processing

- Title: Implement sensor data processing for real-time traffic monitoring.
- Description: Develop algorithms to process sensor inputs and detect changes in traffic conditions.
- Acceptance Criteria:
 - System accurately interprets sensor data to identify variations in traffic flow and density.
 - Real-time traffic monitoring provides reliable inputs for speed adjustment.

Speed Limit Detection and Alerts

As a driver, I want Dynamic Speed Adaptation to provide proactive alerts for speed limit changes, so that I can adhere to road regulations more effectively.

- Description: Implement a feature that notifies the driver of upcoming speed limit changes and adjusts vehicle speed accordingly.
- Acceptance Tests:
 - Drive on roads with varying speed limits while Dynamic Speed Adaptation is active.
 - Validate that the system accurately detects and responds to speed limit signs.
- Acceptance Criteria:
 - Alerts should be timely and clear, indicating the need to adjust speed.
 - System should smoothly transition to the new speed limit without sudden changes.
- Story Points: 3
- Priority: Medium

Task: Develop Speed Limit Detection Algorithm

- Title: Develop algorithm for speed limit detection using GPS and camera data.
- Description: Design algorithms to detect and interpret speed limit signs and road markings to determine applicable speed limits.
- Acceptance Criteria:
 - System accurately identifies and interprets speed limit information from GPS and camera inputs.
 - Detected speed limits are displayed to the driver in real-time.
 - Alerts assist the driver in adhering to road regulations and maintaining safe driving speeds.

Manual Speed Override

As a driver, I want Dynamic Speed Adaptation to allow manual override for speed adjustments, so that I can maintain control in unpredictable driving situations.

- Description: Enable drivers to manually adjust vehicle speed while Dynamic Speed Adaptation is active, providing flexibility and control.
- Acceptance Tests:
 - Attempt to override the system's speed adjustment during active Dynamic Speed Adaptation.
 - Ensure that manual inputs override the system's automatic speed control.
- Acceptance Criteria:
 - Manual override should be intuitive and responsive.
 - System should revert to automatic mode when manual control is released.
- Story Points: 2
- Priority: Medium

Task: Design User Interface for Manual Speed Control

- Title: Design user interface for manual speed override feature.
- Description: Create intuitive controls within the vehicle's interface to enable manual adjustment of vehicle speed during Dynamic Speed Adaptation.
- Acceptance Criteria:
 - Manual speed controls are easily accessible and clearly displayed to the driver.
 - The driver can seamlessly switch between automatic and manual speed control modes.

Integration with Navigation System

As a driver, I want Dynamic Speed Adaptation to integrate with navigation systems for predictive speed adjustments, so that I can anticipate speed changes along my route.

- Description: Integrate Dynamic Speed Adaptation with GPS navigation data to anticipate upcoming road conditions and adjust vehicle speed preemptively.
- Acceptance Tests:

- Plan a route using the navigation system while Dynamic Speed Adaptation is active.
- Validate that the system adjusts speed based on upcoming road segments and conditions.
- Acceptance Criteria:
 - Predictive adjustments should be accurate and aligned with route information.
 - The driver should experience smoother transitions between different speed zones.
- Story Points: 4
- Priority: High

Task: Integrate Navigation Data Processing

- Title: Integrate navigation data processing with Dynamic Speed Adaptation.
- Description: Develop algorithms to process GPS navigation data and extract relevant road information such as speed limits, upcoming road segments, etc.
- Acceptance Criteria:
 - Navigation data is accurately interpreted to anticipate road conditions and speed adjustments.
 - Dynamic Speed Adaptation seamlessly integrates with the navigation system for enhanced route awareness.

Real-Time Fuel Efficiency Display

As a driver, I want Dynamic Speed Adaptation to provide feedback on fuel efficiency improvements, so that I can optimize my driving habits for better fuel economy.

- Description: Implement a feature that displays real time feedback on fuel consumption based on speed adjustments made by Dynamic Speed Adaptation.
- Acceptance Tests:
 - Monitor fuel efficiency metrics displayed while Dynamic Speed Adaptation is active.
 - Evaluate changes in fuel consumption based on system-controlled speed adjustments.
- Acceptance Criteria:
 - Fuel efficiency feedback should be informative and actionable.
 - The driver should be able to make informed decisions to optimize driving habits.
- Story Points: 3
- Priority: Medium

Task: Develop Fuel Efficiency Calculation Algorithm

- Title: Develop algorithm to calculate real time fuel efficiency based on speed adjustments.

- Description: Design algorithms to compute fuel consumption rates and display real time fuel efficiency metrics.
- Acceptance Criteria:
 - System accurately calculates fuel efficiency based on vehicle speed and driving conditions.
 - Fuel efficiency metrics are updated and displayed continuously during Dynamic Speed Adaptation.

Release #2: Traffic Jam Assist

Traffic Jam Assist v1.0 extends the capabilities of Adaptive Cruise Control to effectively manage vehicle movement in slow-moving or congested traffic conditions encountered at speeds below 40 mph. This release reduces driver workload and enhances comfort by automating acceleration, braking, and steering tasks in stop-and-go traffic scenarios, improving overall traffic flow and driver experience.

User Stories:

Automatic Speed Control in Traffic

As a driver, I want the Traffic Jam Assist feature to automatically control braking and acceleration in heavy traffic, so that I can navigate congestion more safely and comfortably.

- Description: When encountering slow-moving traffic, the system should autonomously adjust the vehicle's speed by braking and accelerating as needed to maintain a safe distance from the car ahead.
- Acceptance Tests:
 - Start Traffic Jam Assist while driving in slow-moving traffic.
 - Observe the system smoothly adjust vehicle speed based on the distance to the vehicle in front.
- Acceptance Criteria:
 - System should maintain a safe following distance without abrupt braking or acceleration.
 - The driver should feel a reduction in stress and effort required to manage the vehicle in traffic.
- Story Points: 5
- Priority: High

Task: Develop Speed Adjustment Algorithm

- Title: Develop algorithm for automatic speed adjustment in traffic.
- Description: Design and implement the logic to adjust vehicle speed based on sensor inputs and traffic conditions, ensuring smooth and safe operation.

- Acceptance Criteria:
 - System adjusts vehicle speed based on distance to the vehicle ahead and traffic conditions.
 - Speed adjustments are gradual and responsive, avoiding abrupt braking or acceleration.

Lane-Keeping Assistance in Traffic

As a driver, I want Traffic Jam Assist to assist with lane-keeping during congestion, so that I can navigate traffic without constant manual steering.

- Description: Enable Traffic Jam Assist to actively keep the vehicle centered within the lane while navigating slow-moving traffic.
- Acceptance Tests:
 - Activate Traffic Jam Assist in a congested area.
 - Confirm the system effectively keeps the vehicle centered within the lane.
- Acceptance Criteria:
 - System should maintain lane position without abrupt swerving or drifting.
 - The driver should experience reduced need for constant steering inputs.
- Story Points: 3
- Priority: Medium

Task: Implement Lane Detection and Positioning

- Title: Implement lane detection and positioning functionality.
- Description: Develop the capability to detect lane markings and accurately position the vehicle within the lane during slow-moving traffic conditions.
- Acceptance Criteria:
 - System reliably detects lane markings and maintains accurate vehicle positioning within the lane.
 - Lane-keeping assistance operates seamlessly with Traffic Jam Assist to enhance driving comfort.

Alert System for Manual Intervention

As a driver, I want Traffic Jam Assist to provide clear alerts when manual intervention is required, so that I can stay engaged and responsive in traffic situations.

- Description: Implement audible or visual alerts to notify the driver when manual control is needed due to complex traffic conditions.
- Acceptance Tests:
 - Trigger a scenario where manual intervention is required such as sudden lane change by a nearby vehicle.
 - Verify that the system promptly alerts the driver to take control.
- Acceptance Criteria:
 - Alerts should be noticeable and not distracting.

- Driver should be able to respond quickly to the system's prompts.
- Story Points: 2
- Priority: Medium

Task: Design Alert System Interface

- Title: Design user interface for manual intervention alerts.
- Description: Create visual and/or audible alert components to notify the driver when manual intervention is required due to complex traffic situations.
- Acceptance Criteria:
 - Alert system provides clear and noticeable notifications to the driver.
 - Alerts are triggered appropriately based on system detection of challenging driving conditions.

Smooth Speed Transitions in Traffic

As a driver, I want Traffic Jam Assist to engage smoothly when traffic slows down, so that I can maintain a steady and safe pace without sudden jerks or stops.

- Description: Ensure that Traffic Jam Assist transitions seamlessly from higher speeds to slower speeds as traffic congestion increases.
- Acceptance Tests:
 - Activate Traffic Jam Assist on a highway approaching congested traffic.
 - Confirm that the system gradually reduces speed without abrupt braking.
- Acceptance Criteria:
 - Smooth transitions should feel natural and comfortable to the driver.
 - Vehicle should maintain a safe distance from other cars during slowdowns.
- Story Points: 4
- Priority: High

Task: Develop Smooth Speed Transition Algorithm

- Title: Develop algorithm for smooth speed transitions in traffic.
- Description: Design algorithms to smoothly transition vehicle speed between different traffic conditions to ensure comfort and safety for the driver.
- Acceptance Criteria:
 - System transitions speed seamlessly when entering or exiting congested traffic zones.
 - Driver experiences minimal disruption and maintains control over the vehicle during speed changes.

Customization Settings for Traffic Jam Assist

As a driver, I want Traffic Jam Assist to be configurable based on my preferences, so that I can tailor the system to suit my driving style and comfort level.

- Description: Provide options in the vehicle settings menu to customize parameters like following distance and responsiveness of Traffic Jam Assist.
- Acceptance Tests:
 - Access the settings menu to adjust Traffic Jam Assist preferences.
 - Verify that changes made to settings reflect the behavior of the system.
- Acceptance Criteria:
 - Customization options should be intuitive and easy to adjust.
 - Changes should be applied promptly without requiring system restarts.
- Story Points: 3
- Priority: Medium

Task: Design User Interface for Customization Settings

- Title: Design user interface elements for Traffic Jam Assist customization.
- Description: Create user-friendly interface components to allow drivers to customize Traffic Jam Assist settings such as following distance and responsiveness.
- Acceptance Criteria:
 - Customization settings are intuitive and accessible within the vehicle's control interface.
 - Drivers can easily navigate and adjust Traffic Jam Assist preferences.