Domain Research for Scalable Cruise Control System

Example System 1: Chrysler Adaptive Cruise Control

Common Features:
- Feature can be turned on/off
- Vehicle will stop (apply brakes) if driver fails to react
- Driver can set distances
- Vehicle slows down from set distances

Differences:
- If stop is brief, the vehicle maintains movement by itself
- Vehicle has a resume button if vehicle is stopped for more than a few seconds
- If a slow vehicle in front leaves the lane, the system accelerates to normal speed

Example System 2: Cruise control system from What When How that illustrates an example of a “closed loop” system, similar to what we will be using in our Scalable Cruise Control System.

Common Features:
- Both the system I found online and our system will hold the vehicle speed the user selected
- Speed can be increased or decreased by button presses
- Both allow you to end cruise control by applying the brake

Differences:
- Our system can suspend cruise control temporarily, retaining its speed in memory, while the other one does not allow this
- Our system will have Following Distance Management, managing how close we get to nearby cars during cruise control, while the other one does not
- Our system can automatically brake in a dangerous situation, while the other system cannot and relies on the driver

Example System 3: Uber Self Driving Car

Common Features:
- Adaptive Cruise Control
- Emergency brake assist
- Emergency Response

Differences:
- Blind-spot detection/side assist
- Lane departure warning
- Rollover prevention
- Adaptive headlights
- Rearview camera

Example System 4: Nissan Intelligent Cruise Control System
Common Features:

- Both systems offer the ability to set the following distance to the vehicle ahead. The options for this following distance range from short to long in Nissan’s system and from small to large in our system.
- Both systems make use of radar technology in order to detect moving vehicles.
- Basic control functionality is nearly identical between the two systems and includes some of the following features: exceeding the set speed through throttle inputs, cancelling the feature through a button press or pressing the brake, resuming the previously set speed by a button press, and increasing/decreasing the set speed while active through button presses.

Differences:

- Nissan’s intelligent cruise control system can function across all range of speeds, as opposed to our system that requires the vehicle to be traveling at least 25 mph in order for the scalable cruise control to be enabled.
- Nissan’s intelligent cruise control system contains the functionality to modulate vehicle speed in anticipation of the next curve on the road when no vehicle is in front of the car, our system does not require this capability. The system accomplishes this by gradually decelerating to account for the curve and then upon clearing the curve accelerates back to the speed that was set by the driver.
- Nissan’s intelligent cruise control system has the ability to come to a complete stop if traffic comes to a standstill. The intelligent cruise control remains active for 3 seconds in this type of situation before it requires the application of the break by the driver in order to keep the vehicle stationary, and subsequent setting of the cruise speed again if the driver wants to resume cruise control.
- Nissan’s system lacks a camera to further enhance vehicle detection capabilities, while our system requires one.
- Though our cruise control system is supposed to function with or without automatic emergency breaking, Nissan’s system does not offer this capability of automatically breaking to avoid hitting a pedestrian or object because their system sensors are not meant to detect stationary vehicles, pedestrians, or other objects in the first place.
Works Cited

