CSE 435 Elicitation Meeting Notes ADB System (Jacob Rhodes)

Meeting Summary: ADB met with Jacob Rhodes, a customer who provided feedback for questions about the system posed by the students.

Meeting Notes

- (ADB Group 1) How should the system behave when multiple vehicles are detected?
    - If there were multiple vehicles detected (going down the road, 2 lanes on each side) expectation is there should be a dark spot where the vehicles are, should be able to identity more than one vehicle at once
- (ADB Group 2) How does the system determine what is sensitive, and what should be detected from the high beams?
    - Priority is other drivers and pedestrians, don't want glare reflecting back at the driver of the vehicle, ex. Scenario 5 (dense fog, want to deactivate to stop reflections)
- (ADB Group 3) How should the system behave when sensor readings are conflicting, sensor/radar/camera?
    - Consider a fail safe mode, convert to low beam. Beneficial to alert the driver, could be something wrong with one or both of the sensors
- (ADB Group 1) What are all the scenarios in which the system should alert the driver, and what should it display? How in depth?
    - Active and inactive system, if the system is active then system goes to failure due to something is an urgent notification, something that pops up on the dash board or an audio chime, or small vibration on the steering wheel
    - Alert the driver with something more prominent for bigger issues
- (ADB Group 2) What are the minimum illumination levels, should they be different depending on the scenario?
    - Specific value don't worry too much about, good example for it varying, to demonstrate off would be 0% full 100%, if dense fog heavy precipitation demonstrate it can go to 50%
- (ADB Group 3) How should the system prioritize competing lighting demands, curve elimination?
    - Glare reduction is No. 1 priority, if you're going around a curve and a car is coming in the other detection you should turn it off in the direction of the other car
- (ADB Group 1) Should the driver manually override and disable the system itself, or just the high beams?
    - Always want to have a manual override system, an auto mode, that's when the ADB system is active, driver should still have the control to turn on manually high and low beams.
    - Follow-up question:
        - (ADB Group 2) When the system fails and reverts to the low beams does it disable the system or just go to a low beam version of the system?

-It would just go to low beam version of the system, and it would not deactivate.

- (ADB Group 2) If there's multiple different scenarios that require different changes in the beam what should take priority?
    - Glare priority, full illumination of the road, but if there is any glare reduction for drivers or pedestrians then that should take priority?
    - But if heavy precipitation and someone was oncoming, still have 50% brightness for precipitation and still have a dark spot for the vehicle for glare related
- (ADB Group 3) What sort of regulatory standards should the system be designed for, just us or other markets?
    - Just do US for now
- (ADB Group 1) Preferred required technology?
    - Up to the design of the system, lidar, cameras, different sensors to support environmental conditions, nothing from a requirement view, theres nothing that is needed, maybe try to go for the cheapest options?
- (ADB Group 2) In case of change in scenarios, how quickly should it change the settings?
    - If there are written regulatory requirements follow those but normally just follow within a second
- (ADB Group 3) Should the ADB be auto start or does the driver have to manually turn on?
    - Its the setting that the driver has to turn on manually
- (ADB Group 1) In the event of a partial subsystem failure should it still try to do partial or no?
    - Revert to low beams
- (ADB Group 2) If it’s bright enough outside and it doesn't need light should the beams shine?
    - It should allow the beams to turn off but probably something that the user wouldn't realize
- (ADB Group 3) Logging, should the logs be accessible for a driver or only the mechanic?
    - Only want mechanics to be able to access it
- (ADB Group 1) Are there specific hardware or limitations that the system should follow? What is the mechanical way that the headlights should be adjusted?
    - Nothing specific required in electric or mechanical ways, digital micro mirror, pixelated led array, whatever that you think will meet the requirements is fine
- (ADB Group 2) What level of customization should the driver be able to have?
    - Standard no real level of customization
- (ADB Group 3) Should the system adjust off the ADB mode if any headlights get an error like some small dead pixels?
    - Just fail to low beam if any LEDs go out
- (ADB Group 1) What testing environments are most critical to value for safety?
    - In the doc there are 6 scenarios, you should prioritize those, not explicitly called out in the doc, but something like if you have a combination of scenarios and your system can handle that, that would be a good thing to display/show off

    - Dense scenario 2,5 show that it can do both?
- (ADB Group 2) What method should the system use to detect oncoming vehicles, should it be expected to detect, or should it use camera and ML?
    - Should already be implemented within the vehicle, the ability to use that data from the vehicle and if the vehicle has the ability to report back, if that's something you can show it's nice
    - Follow up Q:
        - (ADB Group 2) What distance does it affect the system, like 50ft?
            - For the sake of this and developing the prototype there isn't a specific number but when a vehicle shows up in the field of view in the demo then it should be treated as the system
- (ADB Group 3) The communication between subsystems, if lose should there be built in dead man feature to turn off?
    - Yes it should go straight to low beam, if there's a failure reported by any of the modules or loss of comm it should be treated as failures as well
- (ADB Group 1) Do the sensors require heating to remove lens fog, ice? Should it just fail, or try to remove it?
    - Just fail and report that the sensor/subsystems are deactivated, up to the user to clean the sensors, enable at the next power cycle
- (ADB Group 2) If there's a cybersecurity threat detected, should it turn off?
    - It should revert to low beam, and notify the driver
- (ADB Group 3) Should the driver have the ability to force the ADB system back into high beam mode after it changes to low beam mode?
    - Can't force it back, but there will be a manually high beam switch
    - If there's a failure mode, they should not be able to force it through that
- (ADB Group 1) With the focus on cybersecurity, how do you want the updates to be given?
    - Over the air capability, remote updates, over the air updates, notify the driver that there's been a new update and install while vehicle isn’t in use
    - Follow up Q:
        - (ADB Group 1) Would the driver need to manually update or would it automatically update?
            - Should just notify the user and remind them but only have the message a couple times
- (ADB Group 2) Should the HMI alerts be received through the infotainment screen in front of the wheel or should it be up to the vehicles?
    - Up to us, some sort of icon on the instrument panel should show up, anything like a chime or vibration can be left to us
- (ADB Group 1) Should the system focus on false positives or should it prioritize false negatives failing to dim?
    - Should prioritize false positives, good to have a capability to offload that data to train based on decision-making, prioritize on the side of dimming.
- (ADB Group 1) What are the specific tags to defend against?

    - Nothing super specific, a lot of times things have gotten better, there should be checks in place to verify that it's the correct forms of communication, it's expected communications
- (ADB Group 3) Would the ADB system be able to collaborate with maps features?
    - Yes, it would be nice.
- (ADB Group 1) Is the system being installed just on new production cars, or older ones too?
    - Just on new production vehicles
- (ADB Group 3) For the system would we have to differentiate between different info? Static light versus traffic lights?
    - Yes, it would be something that's trained on. Should be able to differentiate.
- (ADB Group 1) Does the system need to avoid parked vehicles as well?
    - Not necessarily, it's difficult to know that, it's probably going to create a dark spot for that vehicle, ideally no but probably hard to do
- (ADB Group 3) If there is a recall, would that be handled with an over the air update and a notification, or how would that be adjusted?
    - Software related recall then yes over the air update, anything hardware would have to be brought into the dealership
- (ADB Group 1) Should the system behave differently based on the type of vehicles, motorcycles, semi trucks?
    - Yes it should prioritize similar behaviors, have a general radius around the objects, have a similar radius for all
- (ADB Group 3) What is the minimal-accepted detection accuracy? Pedestrians people on bikes etc, should it error on the side of caution where it chooses the one that dims the most?
    - Priority worse case scenario and adjust for that
- (ADB Group 1) Should there be different dim levels based on different objects?
    - No different intensity would be for things like heavy precipitation or dense fog
- Follow-up Question: Encryption, the communication goes through the CAN bus, is there any encryption that should be used to pass messages?
    - Standard encryption, depends on if the CAN bus is private or public the level of communication, assume to private CAN bus which loosen the amount of cybersecurity worries but still have some level of encryption
    - Follow up Q:
        - Is there a way to authorize/recognize to determining that it's a private CAN bus?
            - Always going to be on a private CAN bus. Also go through some level of body controller and passed along on a message sequence on a CAN bus (for updates)
- (ADB Group 1) Would the ADB system have a similar shutoff to the manually lights? Automatic lights?
    - Be its own separate thing, like how you can manually turn on and off high and low, it should be something to remain active and not turn off based on the environment/time of day

- (ADB Group 3) What is the level of acceptable delay to handle decryption?
    - No specific timing, usually in the millisecond to seconds range, nothing very long, pretty quick
- (ADB Group 1) When both fog/precipitation and oncoming vehicles?
    - Prioritize the glare to the other drivers/vehicles
        - If there is any precipitation or fog it should dim to 50%, and vehicle oncoming it should create a dark sport for that
- (ADB Group 2) If there's no road detected, should the beam still try to point in the direction of where the cars turning?
    - Still follow the direction its turning if it can
- (ADB Group 2) When the system fails, does it ever revert back?
    - Just revert back to standard, do some level of hysteresis? Don't want the system to repeatedly to keep going on and off, create some threshold that would reactive and deactivate.
    - Follow-up Question (ADB Group 3): Should the hysteresis vary?
        - No just standard worse case scenario.