Self-Driving Car Requirements

# Software Development 2 – Homework 2

## Matthew Meyer

1. The system shall be developed to comply with the latest safety standards (currently ISO/TR 4804:2020).
2. The system shall comply with all local traffic laws.
3. The system shall use 12 ultrasonic sensors for short range detection.
4. The system shall use 1 forward facing radar system for detecting oncoming objects at a longer range.
5. The system shall use 8 cameras facing all directions.
6. The system shall incorporate AI and neural networks to interpret the inputs from the ultrasonic, radar, and camera sensors.
7. The system shall constantly monitor for emergency vehicles.
8. The system shall remain connected to a GPS system at all times for navigation purposes.
9. The system shall accept user input for the destination.
10. The system shall use the GPS system to calculate the most efficient route to the inputted destination.
11. The system shall not place the vehicle in motion until all passengers have fastened their seatbelts.
12. The system shall engage the door locks before beginning the journey.
13. The system will come to a stop as quickly and as safely as possible if it detects an open door or unfastened seatbelt before the destination has been reached.
14. When the AI detects a stop sign the vehicle will come to a complete stop just before the stop bar. If no stop bar exists, the front of the vehicle shall not extend into the intersection.
15. The system shall not accelerate from the stop sign until it determines that it can continue its route safely given any oncoming traffic.
16. If the system detects another vehicle stopped at the same intersection within quick succession (such as with a 4-way stop) the system shall allow a human driver to proceed first.
17. When the vehicle is approaching an intersection and it detects a green light, if the route is to go straight it shall remain at its current speed.
18. When the vehicle is approaching an intersection and it detects a green light, if the route is to turn, the system shall signal for the turn at 200ft away or in accordance with the local regulations, whichever is greater.
19. When the vehicle is approaching an intersection and it detects a yellow light, the system shall begin slowing to a stop if it is safe to do so.
20. If the system determines it is not safe to slow down, it shall continue at current speed monitoring the vehicles around it. Especially those in front of it and those on the perpendicular road.
21. If the system detects a red light, it shall safely come to a complete stop at the intersection or behind the closest vehicle in front of it if one exists.
22. Upon arriving at the destination, the vehicle shall come to a complete stop and disengage the engine before unlocking the doors.
23. In the event of critical system failure or traffic accident, the system shall disengage the door locks to allow passengers to escape.