Scenario 1

Problem statement:- 2 cars were parked at a very steep turn due to which the car coming from behind was likely to crash.

According to the problem statement above, the AV car must detect cars ahead of it that are parked at a sharp turn with passengers and maintain the car's speed at the turning point.

In our Tesla model automobile, we used slip angle, camera, and radar sensors based on the requirements and safety factors. The side slip angle of the car in the specified position is measured by slip angle. The camera we utilised provides 360-degree view around the car with a range of up to 200 metres. For blind spot identification, lane change assistance, collision mitigation, and the rear cross traffic feature, we used radar sensors.

Object detection and localisation by camera and radar

Data acquisition and fusion

Estimation

Motion control in steering and brakes by slip angle

No of sensors used	4
Sensor Type	1. Camera 2. Slip Angle 3. Radar
Purpose of the sensor	
Sensor Name (As in CM Vehicle Data Set)	1. CA01 (camera) 2. SL_Param (Slip Angle) 3. RA00 (Radar) 4. RA01 (Radar)

Specified Sensors Name	Field of View (H/V) (in deg)		Range of Detection (in m)		Mounting Position on Vehicle (x,y,z)	Resolution (H/V) [px]	
CA01	50.0	28.0	1	100		1280	960
RA00	40.0	30.0	0.0	200.0		-	
RA01	40.0	30.0	0.0	200.0		-	
SL_Param					(2.107,0.0,0.497)	-	

No of sensors used	4					

Scenario 2

Problem statement

In the way of the car route some cars and people are stucked in the middle of the road, due to which the coming car may collide with them and look for the right path of its remaining way of journey.

In this we have applied Camera (CA00 and CA01), Object (OB00), Inertial (IN00) and Slip angle (SL_Param) sensors in our virtual vehicle.

For object and cross traffic detection and road sign recognition we used camera sensors here, To provides information on current vehicle location and orientation inertial sensors has been used and Slip angle is a measurement of the car's side slip angle in the specified position.

Scenario 4 :-
 Problem statement :- the two lane road is full packed with vehicles and suddenly appeared objects which creates trouble for AV car to complete it's path under the safety factors.

Scenario 7:-
Problem statement:- A bike suddenly changed its path in the opposite direction when that bike, AV car and the other vehicles were crossing the four way intersection road.

Scenario 8 :-

Problem statement: - the car may collide with the moving truck and complete the rest of the way by focusing on the next moving car and pedestrian or cyclist at the sidewalk of the two lane road.

Scenario 9 :-

Problem statement: - the road construction is going on the one lane road which makes difficulties for the AV car in understating the traffic and overtaking the vehicles considering traffic rules and safety measurements.

Scenario 10 :-

Problem statement: - A man suddenly appeared on the empty road in front of the moving AV car that may lead to the accident.

Scenario 15 :- For a high speed car, the situation is complicated when the accompanying vehicle is also moving at the high speed and some animals are passing suddenly which may lead to a crash.

Scenario 16:- in a one way tunnel, newly improved road creates more ruskus when the vehicle is passing through the tunnel at the normal speed

As per the problem statement, to avoid collision camera(CA00), object(OB00), slip angle(SL_Param) and inertial(IN00) sensors are used in this condition. The camera and object sensors detects that a bike is coming to the car that may cause accident so that slip angle sensors make the movement of the car in slight left direction to avoid collision. The object sensor detects that the bike is too close to the car hence inertial sensor is worked immediately on it and stops the car at that instant. After looking that situation is under controlled and bike has gone, the car start again to its path. In the end the car detects the another vehicle which is in the middle of the road and after detecting it stop behind it.