SVL Simulation

Deliverable #2A

Project Assignment – AV Test Project

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Group 1

San Jose State University

CMPE 287 - **SW Qual Assur Test**

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Team Member Contribution

Sudha Vijayakumar:

Section 1: Table #1: Test plan #1
Section 2: AV-01 Encountering a passenger in the crosswalk in the right of way.
Section 3: Table #3: Test scenario #1

Prit Lakhani

Section 1: Table #6: Test plan #2
Section 2: AV-04 Encountering a school bus in front of the vehicle.
Section 3: Table #9: Test scenario #4

Huyen Nguyen:

Section 1: Table #12: Test plan #3
Section 2: AV-04 Encountering a broken traffic light that only blinks red
Section 3: Table #14: Test scenario #3

Richard Ngo

Section 1: Table #17: Test plan #4
Section 2: AV-04 Encountering a school bus in front of the vehicle.
Section 3: Table #19: Test scenario #4

Test Scenario-1: Encountering a passenger in the crosswalk in the right of way

Section 1 – AI Function Test Requirement Analysis

Section 1.1 - AI function test requirements

Table 1: Test Plan #1	
ID	AV Test-01
Creator	Sudha Vijayakumar
Date	Apr 22, 2022
Scenario Type	A pedestrian crosses the crosswalk after the vehicle enters the intersection. Vehicle is in the right of way.
Location	**Starting point:** Borregas Ave, Sunnyvale, CA **Destination**: Hindu Temple & Community Center, 450 Persian Dr, Sunnyvale, CA 94089
Route	**Total Distance:** 0.4 mile **Travel time:** 1 min **Directions** 174 ft → Head north on Borregas Ave toward Persian Dr 0.3 mi → Turn right onto Persian Dr 144 ft → Turn right
Map	Sunnyvale, CA

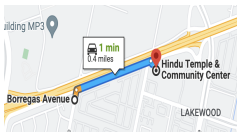


Figure 1: Map View	Figure 2: Satellite View	Figure 3: Street View

Section 1.2 - AI function test requirements modeling

Table 2: Test Scenario #1	
ID	AV Test-01.1
Creator	Sudha Vijayakumar
Date	Apr 22, 2022

Scenario Type	A pedestrian crosses the crosswalk after the vehicle enters the intersection. Vehicle is in the right of way.
Location	**Starting point:** Borregas Ave, Sunnyvale, CA **Destination**: Hindu Temple & Community Center, 450 Persian Dr, Sunnyvale, CA 94089
Route	**Total Distance:** 0.4 mile **Travel time:** 1 min **Directions** 174 ft → Head north on Borregas Ave toward Persian Dr 0.3 mi → Turn right onto Persian Dr 144 ft → Turn right

AGENT CONFIGURATIONS

Ego Speed	Weather	# of other vehicles	Other vehicles' position	Motorcycle	# of pedestrians	Pedestrian's position
25mph	Clear , daylight	> 2	Front, back, left side, parking	Street parking	> 2	Crossing, waiting

Scenario Description	• Ego is modeled to drive along a two-way road in Borregas Avenue in Sunnyvale. • Ego has to make a right turn in the upcoming intersection on one end (toward Persian Dr.) of Borregas Avenue. • Ego has to make a right turn again in 144 ft to reach the destination.
Test Purpose	To test whether the ego can detect the pedestrians entering into the crosswalk and make the right decision to turn safely without harming the pedestrian.

Initial Condition	

- All the agents including ego vehicles, other vehicles and pedestrians will be initialized in their static positions and orientations.
- Goal of the Ego is to navigate safely, make 2 right-turns giving way to pedestrians and merge into the traffic.
- Position of the agents are as follows:

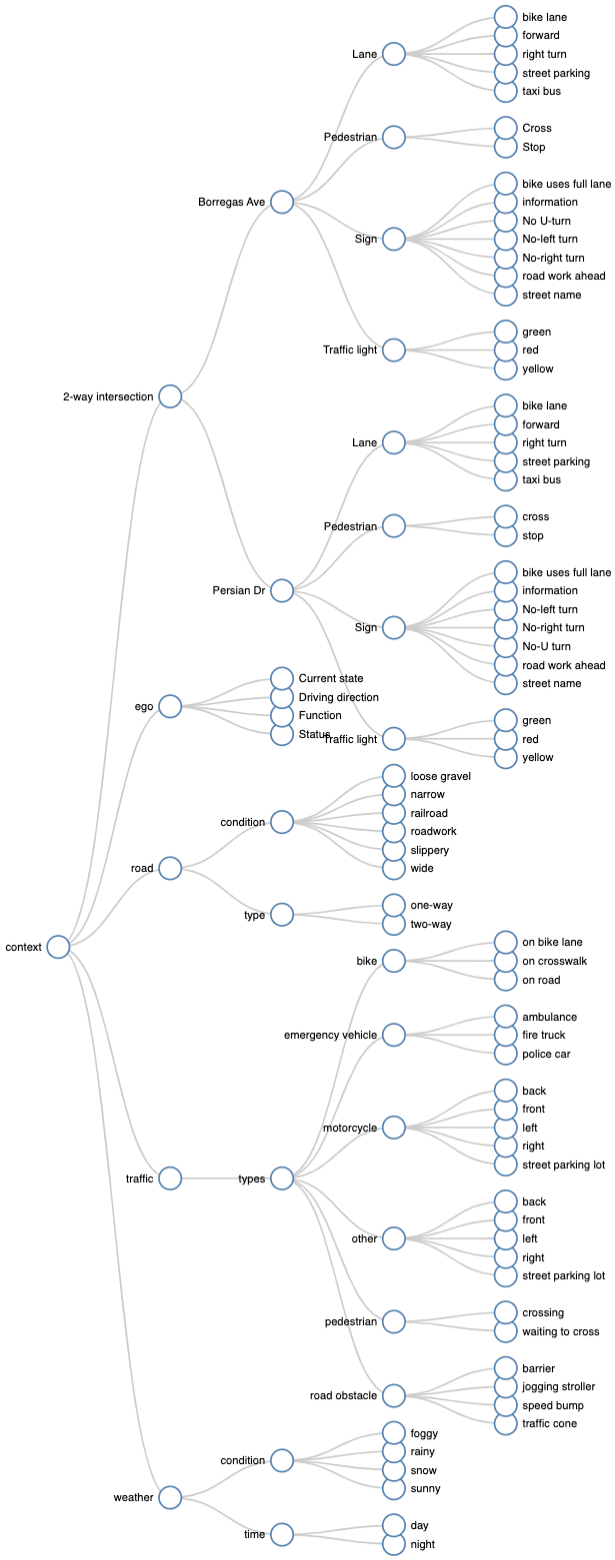
Street	Agent	Count	Position
Borregas Ave	Ego	1	1121-1101 Borregas Ave.
	Vehicle-1	1	In front of Ego.
	Vehicle-2	1	Behind Ego.
	Vehicle-3	1	In the opposite lane.
	Vehicle-4	3	In the intersection (Persian Dr).
	Pedestrian	1	Middle of the cross-walk near the right-turn into Persian Dr from Borregas Avenue.
	Signal	0	0 → No Signal
Persian Dr (after 1st right-turn)	Vehicle-5	2	In front of Ego.
	Vehicle-6	1	In front of Ego in the temple parking lot (destination).

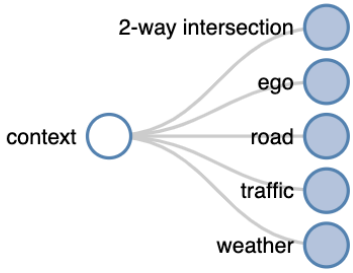
Evaluation Metrics	**Success criterias:** ● Ego has to maintain a safe distance with the lead vehicles. ● Ego has to signal right to indicate the right turn. ● Ego has to stop and detect pedestrians in the crosswalk and wait until no pedestrian on the cross-walk. ● Ego has to merge safely into the straight traffic(Persian Dr) while completing the right turn. ● Stop and park safely in a parking spot.

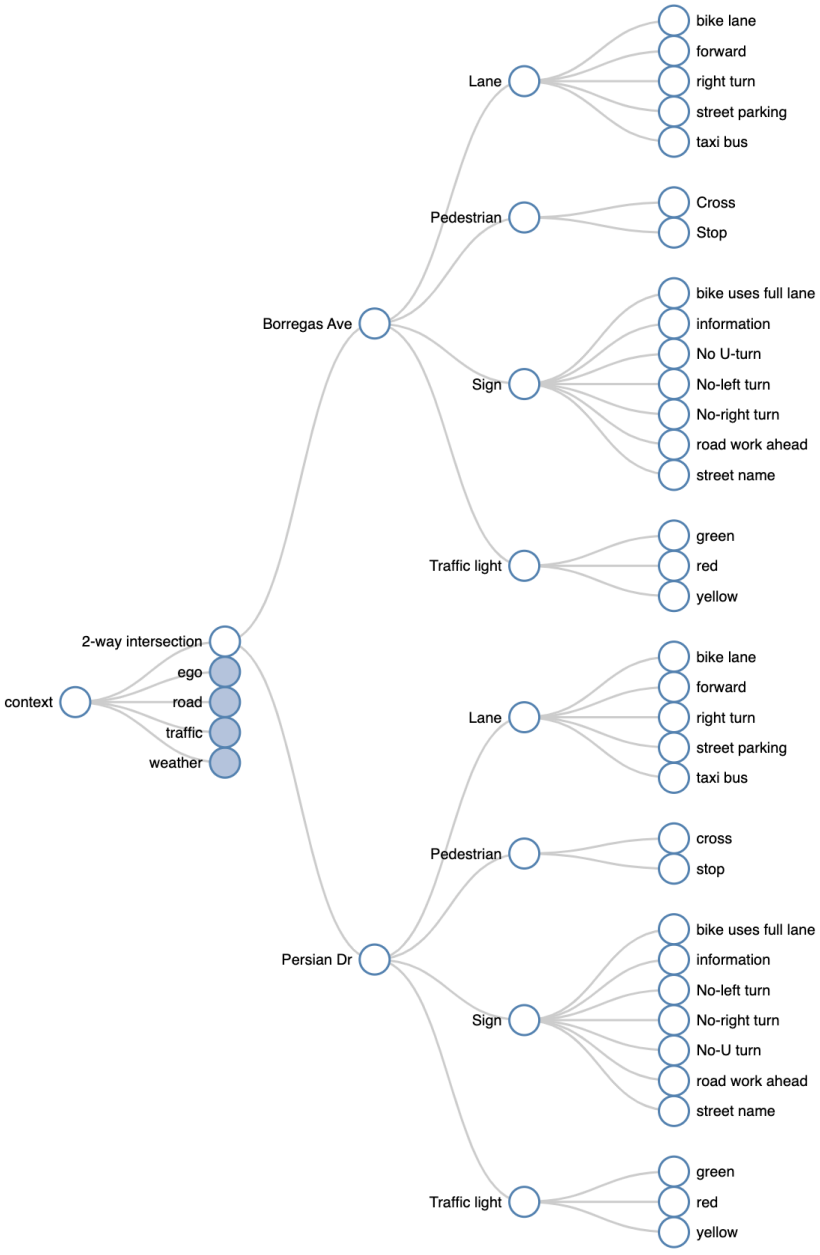
EGO RESPONSE WITH RESPECT TO OTHER AGENTS	
Event	Expected Response
vehicle in front decelerating	Reduce speed
vehicle in front turning right	Reduce speed and then STOP
Intersection	Reduce speed, STOP, YIELD
Pedestrian crossing road	Yield, Reduce speed, STOP
Ego turning right	Reduce speed, SIGNAL, CHECK, STOP

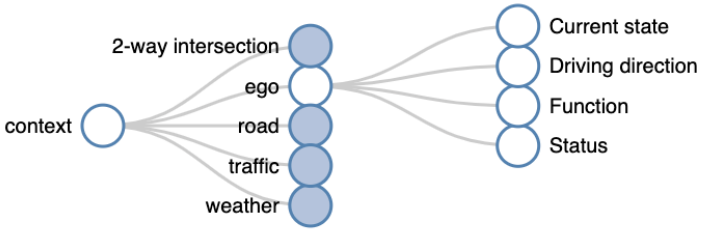
Section 2 – AI Test Modeling for Selected AI Features

Section 2.1 Context modeling for each selected AI-powered function/feature

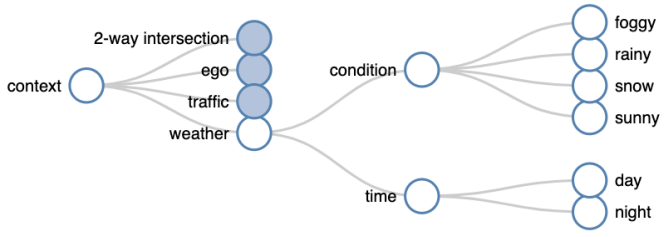

context
2-way intersection
Borregas Ave
Lane
bike lane
forward
right turn
street parking
taxi bus
Pedestrian
Cross
Stop
Sign
bike uses full lane
information
No U-turn
No-left turn
No-right turn
road work ahead
street name
Traffic light
green
red
yellow
Persian Dr
Lane
bike lane
forward
right turn
street parking
taxi bus
Pedestrian
cross
stop
Sign
bike uses full lane
information
No-left turn
No-right turn
No-U turn
road work ahead
street name
Traffic light
green
red
yellow
ego
Current state
Driving direction
Function
Status
road
condition
loose gravel
narrow
railroad
roadwork
slippery
wide
type
one-way
two-way
traffic
types
bike
on bike lane
on crosswalk
on road
emergency vehicle
ambulance
fire truck
police car
motorcycle
back
front
left
right
street parking lot
other
back
front
left
right
street parking lot
pedestrian
crossing
waiting to cross
road obstacle
barrier
jogging stroller
speed bump
traffic cone
weather
condition
foggy
rainy
snow
sunny
time
day
night

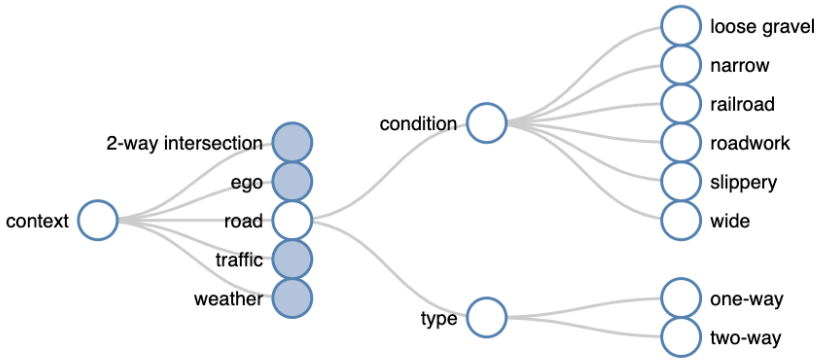

2-way intersection
ego
context
road
traffic
weather


bike lane
forward
Lane
right turn
street parking
taxi bus
Cross
Pedestrian
Stop
bike uses full lane
information
Borregas Ave
No U-turn
Sign
No-left turn
No-right turn
road work ahead
street name
green
Traffic light
red
yellow
2-way intersection
ego
context
road
traffic
weather
bike lane
forward
Lane
right turn
street parking
taxi bus
cross
Pedestrian
stop
bike uses full lane
information
Persian Dr
No-left turn
Sign
No-right turn
No-U turn
road work ahead
street name
green
Traffic light
red
yellow

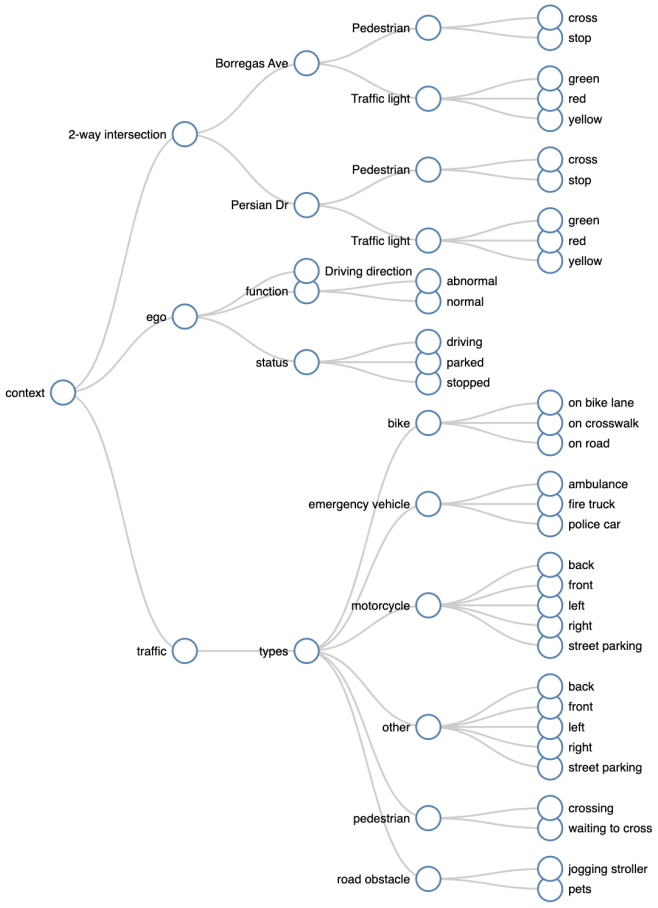

context
2-way intersection
ego
road
traffic
weather
Current state
Driving direction
Function
Status


context
2-way intersection
ego
traffic
weather
types
bike
on bike lane
on crosswalk
on road
emergency vehicle
ambulance
fire truck
police car
motorcycle
back
front
left
right
street parking lot
other
back
front
left
right
street parking lot
pedestrian
crossing
waiting to cross
road obstacle
barrier
jogging stroller
speed bump
traffic cone

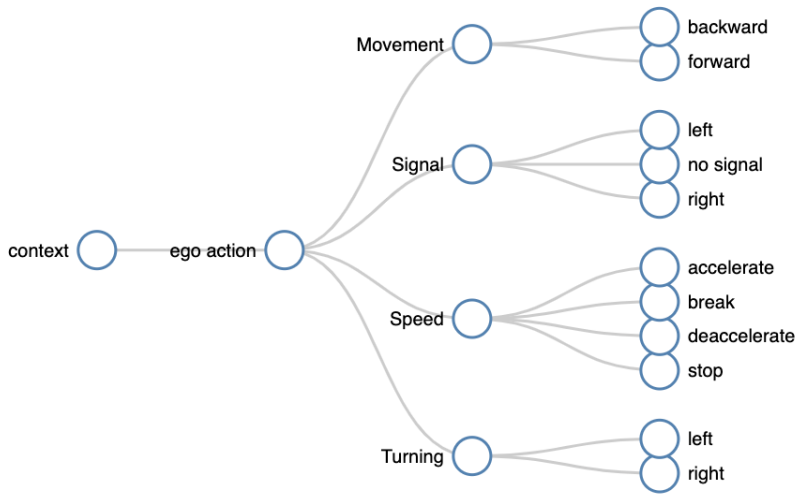

context
2-way intersection
ego
traffic
weather
condition
foggy
rainy
snow
sunny
time
day
night



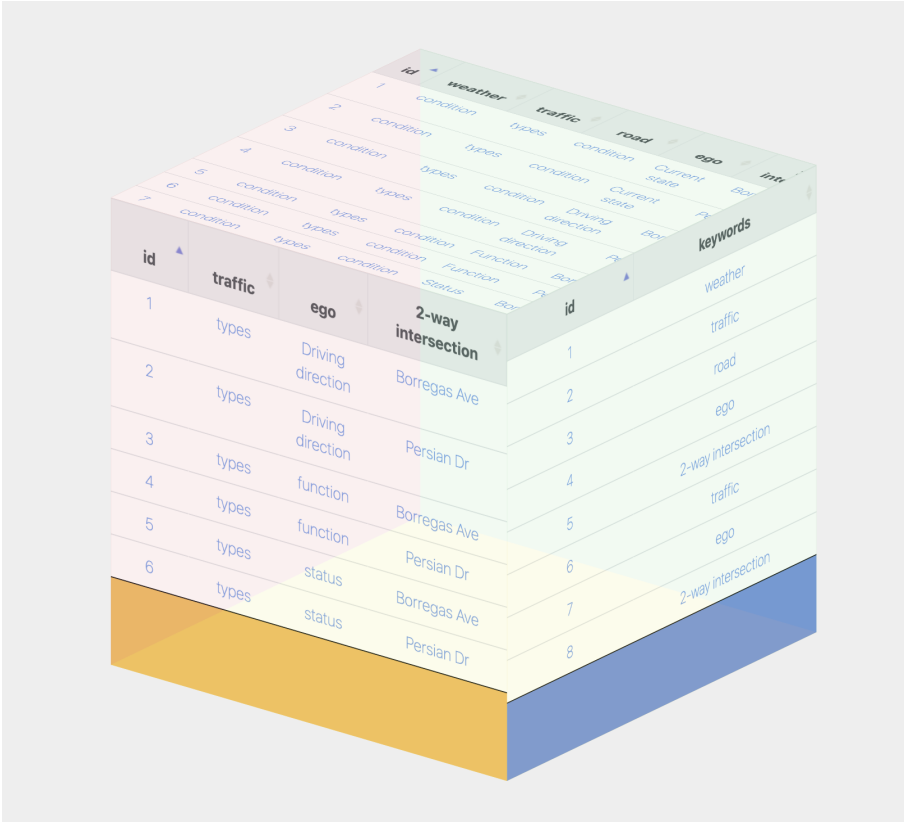
Section 2.2. AI-powered function input classifications



Section 2.3. AI-powered function output/event/action classifications



Section 2.4. AI-powered function classification decision tables



Section 2.4.1 Context Decision Table

Table #3

id	weather	traffic	road	ego	2-way intersection
1	condition	types	condition	Current state	Borregas Ave
2	condition	types	condition	Current state	Persian Dr
3	condition	types	condition	Driving direction	Borregas Ave
4	condition	types	condition	Driving direction	Persian Dr
5	condition	types	condition	Function	Borregas Ave
6	condition	types	condition	Function	Persian Dr
7	condition	types	condition	Status	Borregas Ave
8	condition	types	condition	Status	Persian Dr
9	condition	types	type	Current state	Borregas Ave
10	condition	types	type	Current state	Persian Dr
11	condition	types	type	Driving direction	Borregas Ave
12	condition	types	type	Driving direction	Persian Dr
13	condition	types	type	Function	Borregas Ave
14	condition	types	type	Function	Persian Dr
15	condition	types	type	Status	Borregas Ave
16	condition	types	type	Status	Persian Dr
17	time	types	condition	Current state	Borregas Ave
18	time	types	condition	Current state	Persian Dr
19	time	types	condition	Driving direction	Borregas Ave
20	time	types	condition	Driving direction	Persian Dr
21	time	types	condition	Function	Borregas Ave
22	time	types	condition	Function	Persian Dr
23	time	types	condition	Status	Borregas Ave
24	time	types	condition	Status	Persian Dr
25	time	types	type	Current state	Borregas Ave
26	time	types	type	Current state	Persian Dr
27	time	types	type	Driving direction	Borregas Ave
28	time	types	type	Driving direction	Persian Dr
29	time	types	type	Function	Borregas Ave
30	time	types	type	Function	Persian Dr
31	time	types	type	Status	Borregas Ave
32	time	types	type	Status	Persian Dr

Section 2.4.2 Input Decision Table

Table #4

id	traffic	ego	2-way intersection
1	types	Driving direction	Borregas Ave
2	types	Driving direction	Persian Dr
3	types	function	Borregas Ave
4	types	function	Persian Dr
5	types	status	Borregas Ave
6	types	status	Persian Dr

Section 2.4.3 Output Decision Table

Table #5

id	keywords
1	weather
2	traffic
3	road
4	ego
5	2-way intersection
6	traffic
7	ego
8	2-way intersection

Test Scenario-2: Encountering a school bus in front of the vehicle

Section 1 – AI Function Test Requirement Analysis

Section 1.1 - AI function test requirements

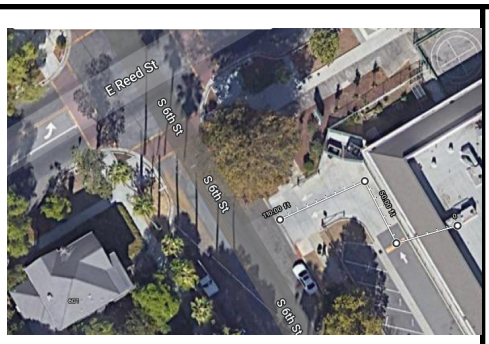
Table 6: Test Plan #2	
ID	AV Test-02
Creator	Prit Lakhani
Date	Apr 24, 2022
Scenario Type	Bob is driving in the school zone 110 ft away from the school bus.
Location	**Starting point:** Lowell Elementary School, 625 S 7th St, San Jose, CA 95112. (37° 19’ 45.85122”,-121° 52’ 40.656”) **Destination**: Lowell Elementary School, 625 S 7th St, San Jose, CA 95112. (37° 19’ 45.84”, -121° 52’40.656”)
Route	**Total Distance:** 110.78 ft **Travel time:** 4 min **Directions** 30 ft → Turn right from S 7th St 80 ft → Turn right onto S 7th St
Map	San Jose, CA
	
	

Figure 1: Map View	Figure 2: Satellite View	Figure 3: Street View

Section 1.2 - AI function test requirements modeling

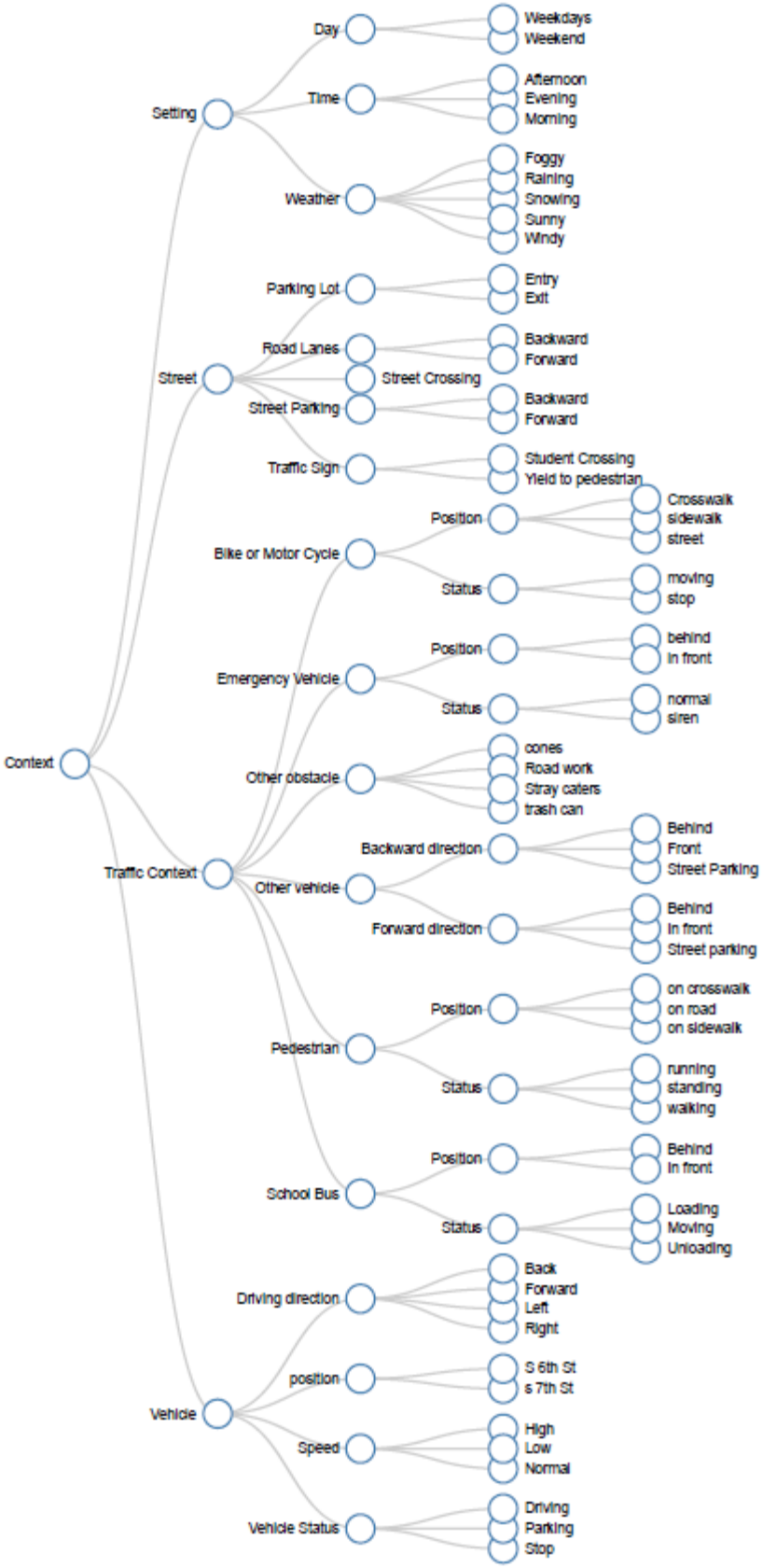
Table 7: Test Plan #2	
ID	AV Test-02
Creator	Prit Lakhani
Date	Apr 24, 2022
Scenario Description	Bob is driving the car in the school zone during the morning of a school day, the school bus on the opposite lane. The bus stopped in front of the st crossing to drop off scholars. Lastly, other vehicles on both lanes must stop whilst the school bus turns on a stop signal.
Test Purpose	In order to test Bob's car can identify a school bus and react to a school bus stop signal. Car must have a minimum amount of safe distance from the school bus.
Initial Condition	1. Bob's car, School Bus, and pedestrian initialize in desired locations. 2. School bus started to move forward before Bob's car.
Evaluation Metrics	Test is successful if Bob's car passes below cases. 1. Maintain a safe distance away from the school bus. 2. Let pedestrian cross the the street. 3. Wait for the school bus to turn the signal green. 4. Again, continue to drive till the destination arrives.

Table #8

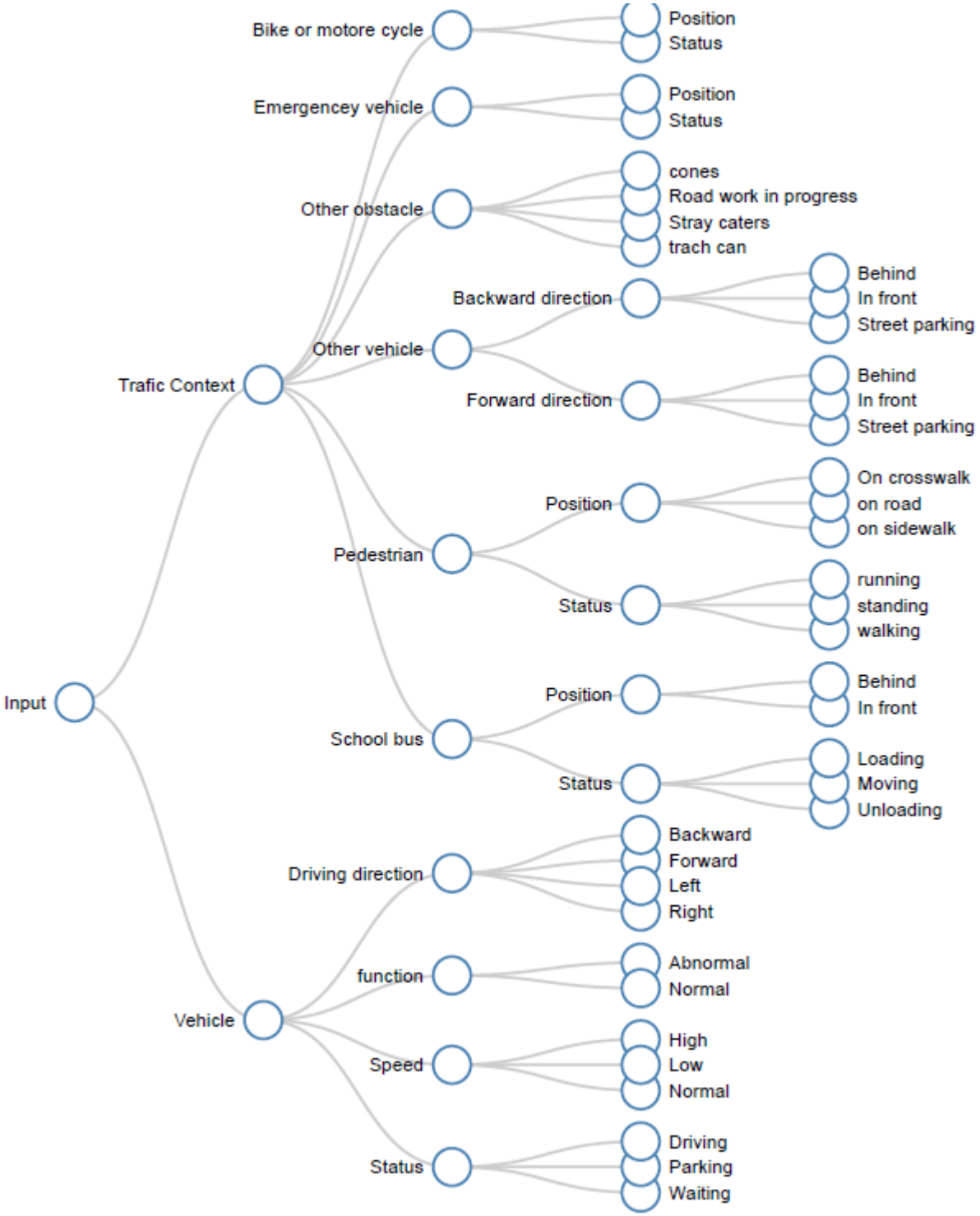
Events	Expected reaction
School bus has turned on the stop signal	Slow down the car, Stop, and yields
Pedestrian crossing the road	Wait and yield
School bus has turned off the stop signal	Resume driving till the destination.

Section 2 – AI Test Modeling for Selected AI Features

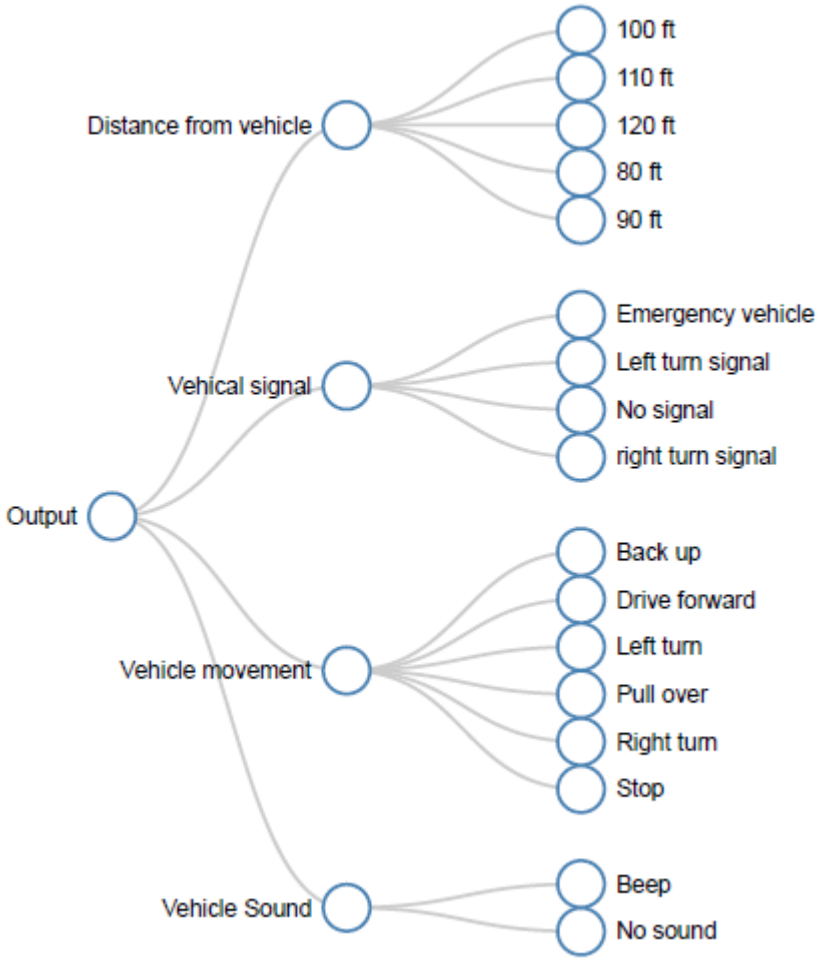
Section 2.1 Context modeling for each selected AI-powered function/feature


Context
Setting
Day
Weekdays
Weekend
Time
Afternoon
Evening
Morning
Weather
Foggy
Raining
Snowing
Sunny
Windy
Street
Parking Lot
Entry
Exit
Road Lanes
Backward
Forward
Street Crossing
Street Parking
Backward
Forward
Traffic Sign
Student Crossing
Yield to pedestrian
Traffic Context
Bike or Motor Cycle
Position
Crosswalk
sidewalk
street
Status
moving
stop
Emergency Vehicle
Position
behind
In front
Status
normal
siren
Other obstacle
cones
Road work
Stray caters
trash can
Other vehicle
Backward direction
Behind
Front
Street Parking
Forward direction
Behind
In front
Street parking
Pedestrian
Position
on crosswalk
on road
on sidewalk
Status
running
standing
walking
School Bus
Position
Behind
In front
Status
Loading
Moving
Unloading
Vehicle
Driving direction
Back
Forward
Left
Right
position
S 6th St
s 7th St
Speed
High
Low
Normal
Vehicle Status
Driving
Parking
Stop

Section 2.2. AI-powered function input classifications



Section 2.3. AI-powered function output/event/action classifications



Section 2.4. Classification decision tables

Section 2.4.1 Context Decision Table

Table #9

Table Context				
Context	Setting	Day	Weekdays	
			Weekends	
		Time	Morning	
			Afternoon	
			Morning	
		Weather	Foggy	
			Raining	
			Snowing	
			Sunny	
			Windy	
	Street	Parking Lot	Entry	
			Exit	
		Road Lanes	Backward	
			Forward	
		Street Crossing		
		Street Parking	Backward	
			Forward	
		Traffic Sign	Student Crossing	
			Yield to pedestrian	
	Traffic Context	Bike or motorcycle	Position	Crosswalk
				sidewalk
				street
			Status	moving

				stop
		Emergency vehicle	Position	Behind
				in front
			Status	normal
				siren
		Other obstacle	cones	
			Road works	
			Stray caters	
			Trash can	
		Other vehicle	Backward direction	Behind
				Front
				Street Parking
			Forward direction	Behind
				Front
				Street Parking
		Pedestrian	Position	On crosswalk
				On road
				On sidewalk
			status	running
				standing
				walking
		School bus	position	behind
				In front
			status	Loading
				Moving
				Unloading
	Vehicle	Driving direction	back	
			forward	
			left	

			right	
		position	S 6th St	
			S 7th St	
		Speed	High	
			Low	
			Normal	
		Vehicle Status	Driving	
			Parking	
			Stop	

Section 2.4.2 Input Decision Table

Table #10

Input	Traffic Context	Bike or motorcycle	Position	
			Status	
		Emergency vehicle	Position	
			Status	
		Other obstacle	cones	
			Road works	
			Stray caters	
			Trash can	
		Other vehicle	Backward direction	Behind
				Front
				Street Parking

			Forward direction	Behind
				Front
				Street Parking
		Pedestrian	Position	On crosswalk
				On road
				On sidewalk
			status	running
				standing
				walking
		School bus	position	behind
				In front
			status	Loading
				Moving
				Unloading
	Vehicle	Driving direction	backward	
			forward	
			left	
			right	
		position	S 6th St	
			S 7th St	
		Speed	High	
			Low	
			Normal	
		Vehicle Status	Driving	
			Parking	
			Stop	

Section 2.4.3 Output Decision Table

Table #11

Output	Distance from vehicle	110 ft
		100 ft
		120ft
		80 ft
		90ft
	Vehicle Signal	Emergency Vehicle
		Left turn signal
		No signal
		Right turn signal
	Vehicle movement	Back up
		Drive forward
		Left turn
		Pull over
		Right turn
		Stop
	Vehicle sound	Beep
		No sound

Test Scenario - 3: Encountering a broken traffic light that only blinks red

Section 1 – AI Function Test Requirement Analysis

Section 1.1 - AI function test requirements

Table 12: Test Plan #3	
ID	AV Test-03

Creator	Huyen Nguyen
Date	Apr 25,2022
Scenario Type	The traffic light is not working appropriately and blinking red, which means every car needs to fully stop at the light and wait for its turn manually before it processes.
Location	**Starting point:** Sunnyvale Place Apartments - 786 Reseda Dr, Sunnyvale, CA 94087 **Destination**: Sunnyvale Municipal Tennis Center - 755 S Mathilda Ave, Sunnyvale, CA 94087
Route	**Total Distance:** 0.8 mile **Travel time:** 3 minutes **Directions:** 69 ft → Head west toward Reseda Dr 108 ft → Turn left onto Reseda Dr 282 ft → Turn right onto Danforth Dr 0.2 mi → Turn right at the 1st cross street onto Hollenbeck Ave 0.2 mi → Turn right onto El Camino Real 0.2 mi → Turn right onto S Mathilda Ave 456 ft → Turn right onto Tennis Center
Map	Sunnyvale, CA

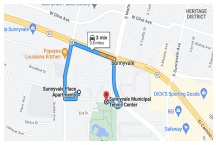


Figure 1: Map View

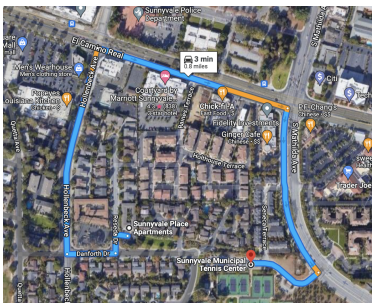


Figure 2: Satellite View

Figure 3: Street View

Section 1.2 - AI function test requirements modeling

Table 13: Test Plan #3	
ID	AV Test-04
Creator	Huyen Nguyen
Date	Apr 25, 2022
Scenario Type	The traffic light is not working appropriately and blinking red, which means every car needs to fully stop at the light and wait for its turn manually before it processes.
Location	**Starting point:** Sunnyvale Place Apartments - 786 Reseda Dr, Sunnyvale, CA 94087 **Destination**: Sunnyvale Municipal Tennis Center - 755 S Mathilda Ave, Sunnyvale, CA 94087
Route	**Total Distance:** 0.8 mile **Travel time:** 3 minutes **Directions:** 69 ft → Head west toward Reseda Dr 108 ft → Turn left onto Reseda Dr 282 ft → Turn right onto Danforth Dr 0.2 mi → Turn right at the 1st cross street onto Hollenbeck Ave 0.2 mi → Turn right onto El Camino Real 0.2 mi → Turn right onto S Mathilda Ave 456 ft → Turn right onto Tennis Center

Agent Configurations

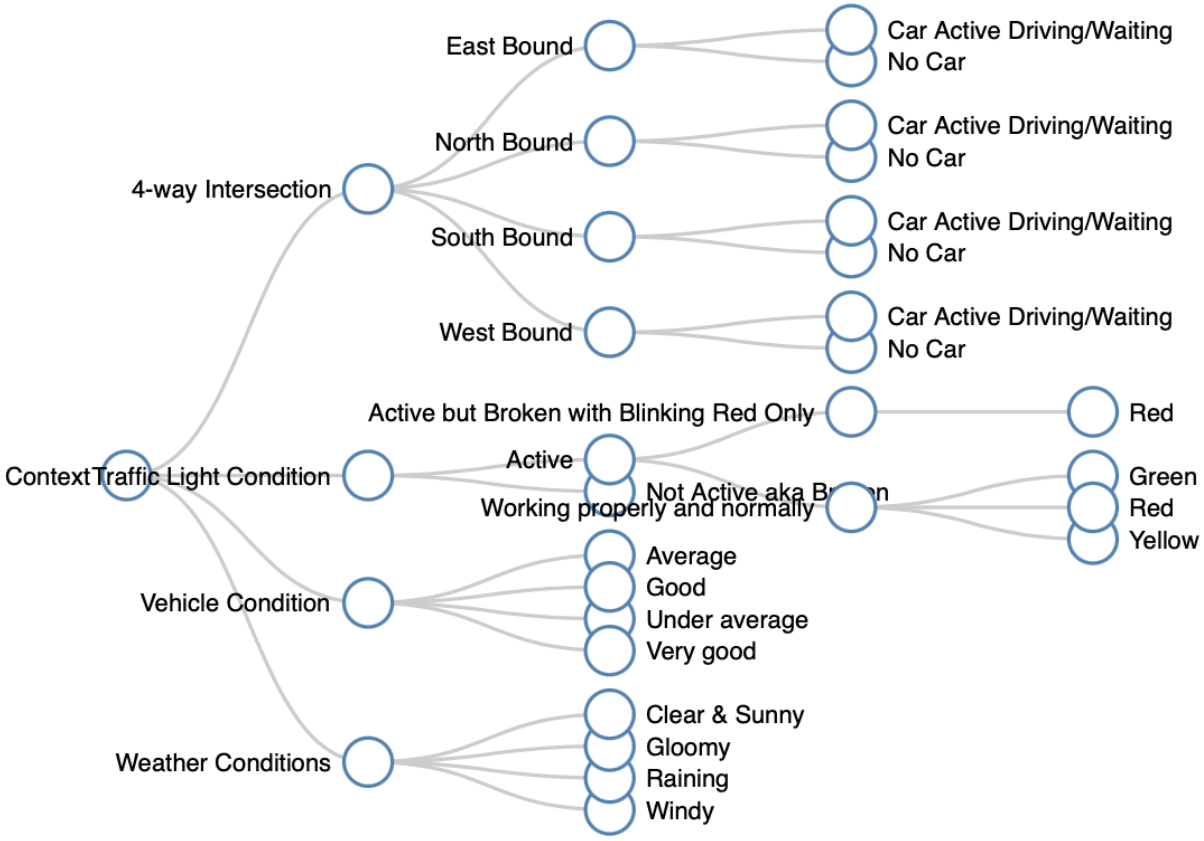
Vehicle Speed	Weather	# of other Vehicles	Other Vehicles Position	# of Pedestrians
0mph - 45 mph	Morning with clear sunny weather	7 vehicles	2 vehicles are in North Lane, 1 vehicle is in West Lane and 3 vehicles are in East Lane	0

Scenario Description	• The vehicle is modeled to be driving from south bound from Reseda Dr. to head over Tennis Center. • Since the path is locally, the vehicle is modeled to meet with some traffic lights. However, one of the traffic lights is broken and blinking red on all bounds' lights. Based on the rule, every car must fully stop and take turns to go.
Test Purpose	This is to test the AV ability to act and make critical decisions when it meets unexpected conditions.
Initial Conditions	• The time is in the morning with clear sunny weather. The vehicle is modeled to drive and make a left on Reseda Dr. Then, it will need to make a right on Danford Dr. However, the traffic light on Danford Dr. is not working properly and blinking red. The vehicle needs to access all bounds and make a full stop before continuing. • On Danford Dr, the testing vehicle is on the right line of the South Lane, the Vehicle #1 and #2 are stopping at North Lane, Vehicle #3 is stopping at West Lane and Vehicle #4,#5 and #6 are stopping at East Lane.
Evaluation Metrics	Success Criterias: • Testing vehicle needs to know what to do when it sees a broken traffic light. The vehicle must process to the light and make a full stop. Then process by waiting for its turn to go manually since the light is not working. • Vehicles on the West and East sides proceed to go straight since they are there first. Then vehicles on the South and North bounds go straight with the testing vehicle turning right on the South bound.

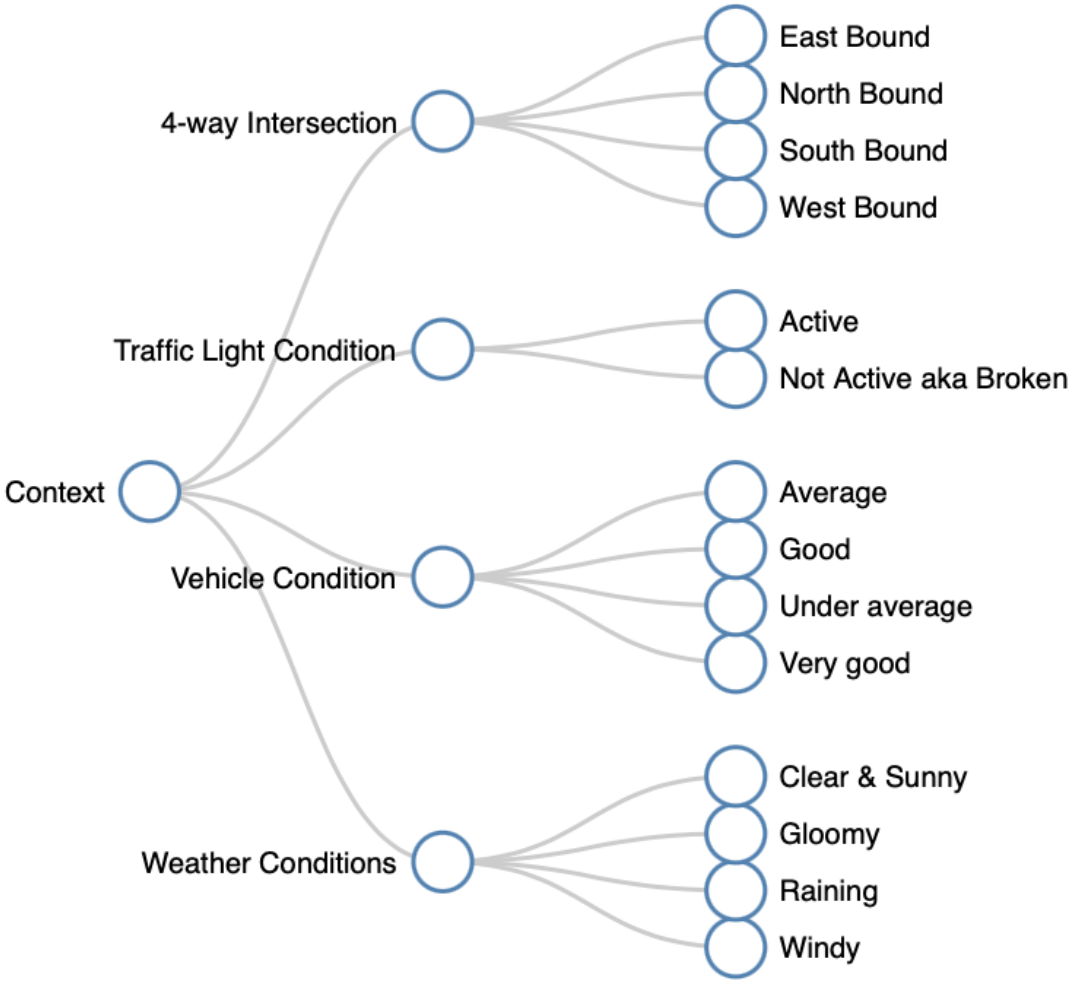
Event	Expected Response
Traffic light is not working properly and only blinks red	Reduce speed and make a full stop
First come first go strategy - Vehicles that wait ahead have the right to go first.	Wait for other vehicles to proceed and only go when it is turn to go.

Section 2 – AI Test Modeling for Selected AI Features

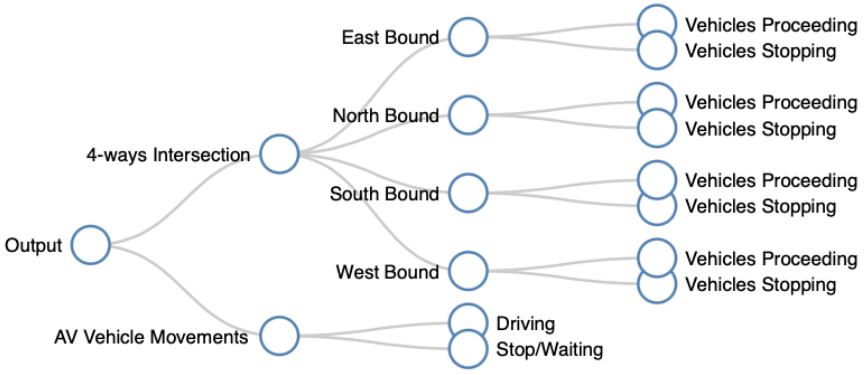
Section 2.1 Context modeling for each selected AI-powered function/feature


Context
Traffic Light Condition
4-way Intersection
East Bound
Car Active Driving/Waiting
No Car
North Bound
Car Active Driving/Waiting
No Car
South Bound
Car Active Driving/Waiting
No Car
West Bound
Car Active Driving/Waiting
No Car
Active but Broken with Blinking Red Only
Red
Active
Working properly and normally
Green
Red
Yellow
Vehicle Condition
Average
Good
Under average
Very good
Weather Conditions
Clear & Sunny
Gloomy
Raining
Windy

Section 2.2. AI-powered function input classifications



Section 2.3. AI-powered function output/event/actions classification



Section 2.4. AI-powered function classification decision tables

Section 2.4.1 Context Decision Table

Table #14

Context				Yes?
4-way Intersection	East Bound	Car Active Driving/Waiting		X
		No Car		
	North Bound	Car Active Driving/Waiting		X
		No Car		
	West Bound	Car Active Driving/Waiting		X
		No Car		
	South Bound	Car Active Driving/Waiting		X
		No Car		
Traffic Light Conditions	Active	Power On with Blinking Red Only	Red	X

		Working Properly	Green	
			Red	
			Yellow	
	Not Active			
Vehicle Conditions	Very Good			X
	Good			
	Average			
	Under Average			
Weather Conditions	Clear & Sunny			X
	Gloomy			
	Raining			
	Windy			

Section 2.4.2 Input Decision Table

Table #15

4-way Intersection	East Bound
	North Bound
	West Bound
	South Bound
Traffic Light Conditions	Active
	Not Active
Vehicle Conditions	Very Good
	Good

	Average
	Under Average
Weather Conditions	Clear & Sunny
	Gloomy
	Raining
	Windy

Section 2.4.3 Output Decision Table

Table #16

4-way Intersection	East Bound	Vehicles Proceeding
		Vehicles Stopping/Waiting
	North Bound	Vehicles Proceeding
		Vehicles Stopping/Waiting
	West Bound	Vehicles Proceeding
		Vehicles Stopping/Waiting
	South Bound	Vehicles Proceeding
		Vehicles Stopping/Waiting
AV Movements	Waiting/Stopping	
	Driving	

Test Scenario - 4: Encounter a blocked route

Section 1 – AI Function Test Requirement Analysis

Section 1.1 - AI function test requirements

Table 17: Test Plan #4	
ID	AV Test-02
Creator	Richard Ngo
Date	Apr 22, 2022
Scenario Type	Automatic Rerouting due to traffic conditions
Location	**Starting point:** City of Sunnyvale Water Pollution Control Plant: 1444 Borregas Ave Sunnyvale, CA 94089 **Destination**: United States Post Office on 209 E Java Dr, Sunnyvale, CA 94089
Route	**Total Distance:** 0.8 mile **Travel time:** 2 min **Directions** 0.4 mi → Head south on Borregas Ave toward Caspian Dr 0.2 mi → Turn left onto East Java Dr. 0.2 mi → Make a U-Turn at Geneva Dr. Destination will be on the right at the corner of E Java Dr and Borregas Ave **Alternative Route:** 1.3 miles Travel Time: 3 min **Directions** 62ft → Head south on Borregas Ave towards W Caribbean Dr. 0.2 mi → Turn left onto East Caribbean Dr. 0.4 mi → Turn right onto Geneva Dr 0.2 mi → Turn right onto E Java Dr Destination will be on the right at the corner of E Java Dr and Borregas Ave
Map	Sunnyvale, CA

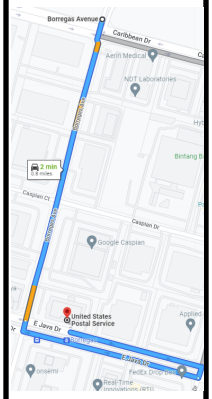
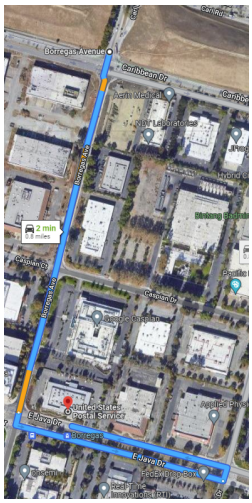
	

Figure 1: Map View	Figure 2: Satellite View	Figure 3: Street View

Section 1.2 - AI function test requirements modeling

Table 18: Test Plan #4	
ID	AV Test-02
Creator	Richard Ngo
Date	Apr 22, 2022
Scenario Type	Automatic Rerouting due to traffic conditions
Location	**Starting point:** City of Sunnyvale Water Pollution Control Plant: 1444 Borregas Ave Sunnyvale, CA 94089 **Destination**: United States Post Office on 209 E Java Dr, Sunnyvale, CA 94089
Route	**Total Distance:** 0.8 mile **Travel time:** 2 min **Directions** 0.4 mi → Head south on Borregas Ave toward Caspian Dr 0.2 mi → Turn left onto East Java Dr. 0.2 mi → Make a U-Turn at Geneva Dr. Destination will be on the right at the corner of E Java Dr and Borregas Ave

	Alternative Route: 1.3 miles Travel Time: 3 min **Directions** 62ft → Head south on Borregas Ave towards W Caribbean Dr. 0.2 mi → Turn left onto East Caribbean Dr. 0.4 mi → Turn right onto Geneva Dr 0.2 mi → Turn right onto E Java Dr Destination will be on the right at the corner of E Java Dr and Borregas Ave

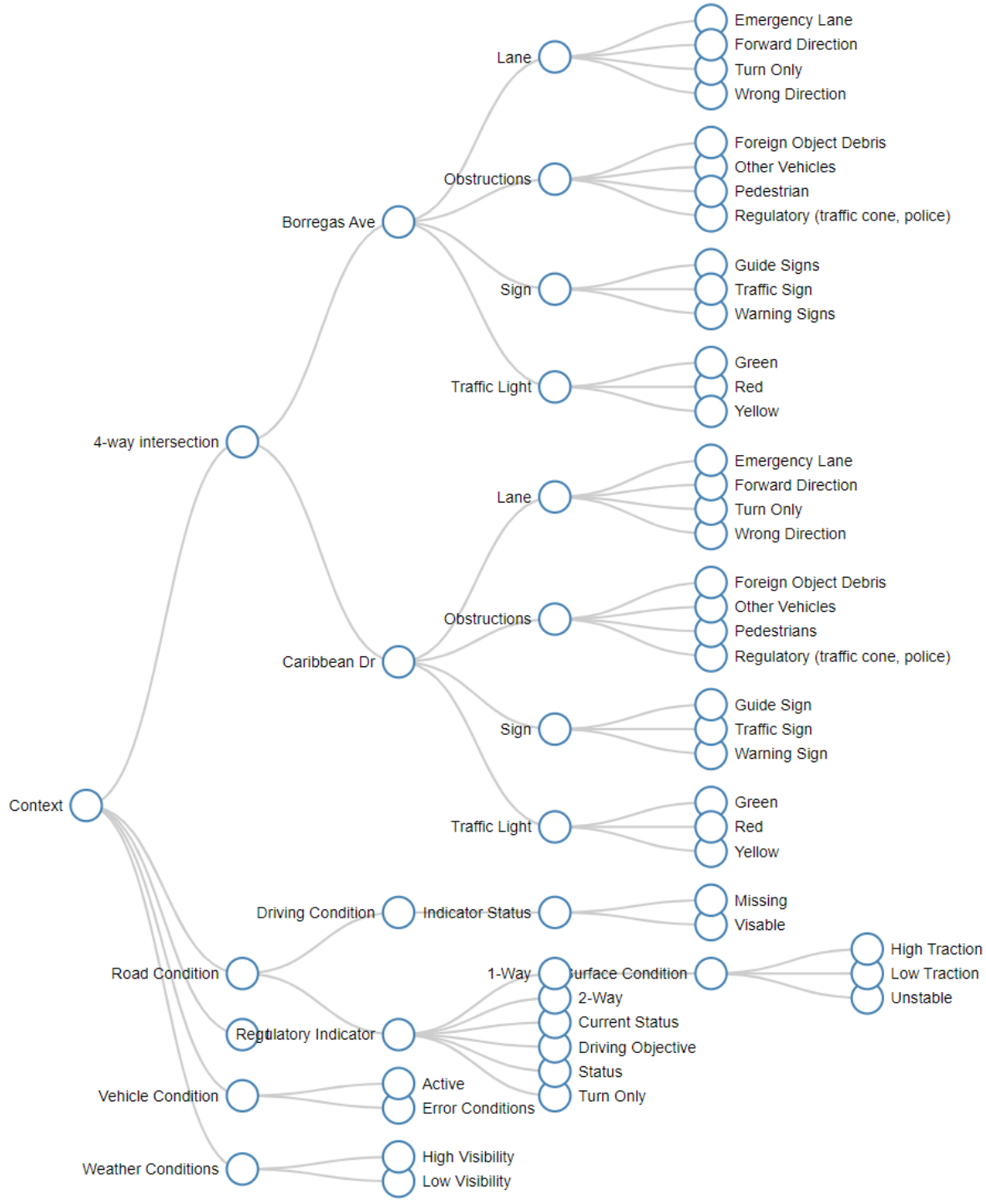
Agent Configurations

Ego Speed	Weather	# of other Vehicles	Other Vehicles Position	# of Pedestrians
0mph - 45 mph	"high noon" daylight. Clear day	3 vehicles	In front and across the intersection on Borregas	0

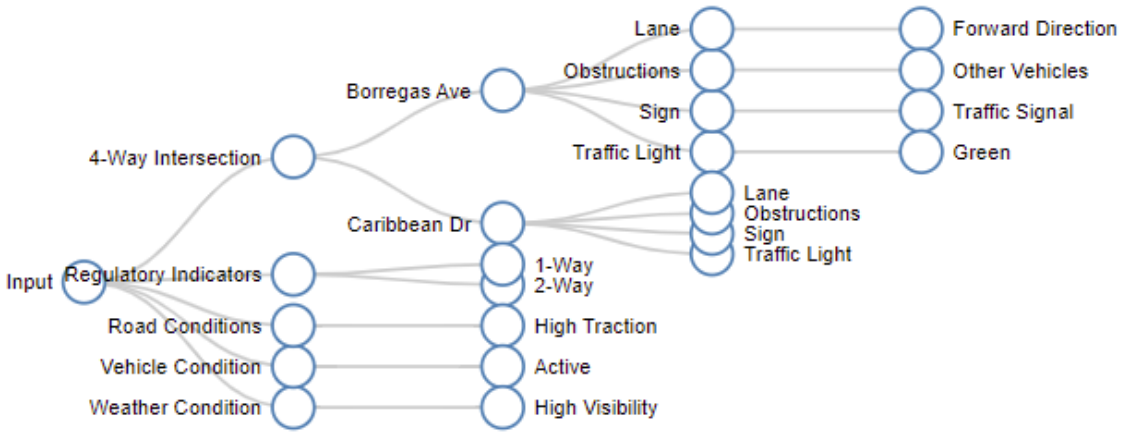
Scenario Description	• The vehicle is modeled to be driving south bound at the northernmost end of Borregas Ave near the sewage processing plant. • The Vehicle is at the Intersection of Borregas and Caribbean Dr. • The vehicle needs to continue southbound on Borregas to continue the journey • There are vehicles at the other end of the intersection which appear to not be moving.
Test Purpose	This is to test the AV ability to determine if a route is inaccessible and automatically reroute to a different route
Initial Conditions	Vehicle Spawn Location: • Northernmost end of intersection between Borregas and Caribbean Dr. In the lane that is intending to go southbound on Borregas Ave. Weather • It will be a clear day with the sun directly overhead. Road Conditions • Roads are clear with no major defects in the lane markings Other Vehicle Spawn Locations • 3 vehicle, starting from the southern end of Borregas on the western side (blocking the southbound traffic on Borregas)
Evaluation Metrics	Success Criterias: • After a maximum of 15 minutes the vehicle should identify that the road is blocked ahead • Vehicle should either prompt for alternative routes or make a left hand turn onto Caribbeans to navigate around the obstacle.

Section 2 – AI Test Modeling for Selected AI Features

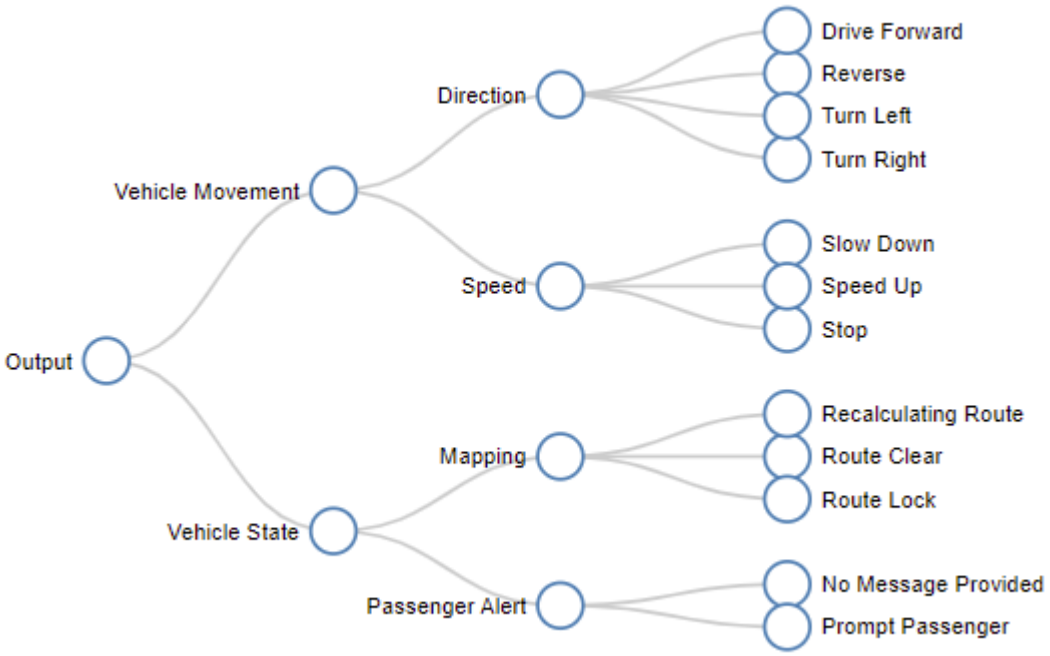
Section 2.1 Context modeling for each selected AI-powered function/feature



Section 2.2. AI-powered function input classifications



Section 2.3. AI-powered function output/event/action classifications



Section 2.4. Classification decision tables

Section 2.4.1 Context Decision Table

Table #19

Context			
4-way intersection	Borregas Ave	Lane	Emergency Lane
			Forward Direction
			Turn Only
			Wrong Direction
		Obstructions	Foreign Object Debris
			Other Vehicles
			Pedestrian
			Regulatory (traffic cone, police)
		Sign	Guide Sign
			Traffic Sign
			Warning Sign
		Traffic Light	Green
			Yellow
			Red
	Caribbean Dr	Lane	Emergency Lane
			Forward Direction
			Turn Only
			Wrong Direction
		Obstructions	Foreign Object Debris
			Other Vehicles
			Pedestrian
			Regulatory (traffic cone, police)
		Sign	Guide Sign
			Traffic Sign
			Warning Sign
		Traffic Light	Green
			Yellow
			Red
Road Condition	Driving Condition	Indicators Status	Missing
			Visable
	Regulatory Indicator	Turn Only	
		Cross Traffic	
		Parallel Traffic	
	Surface Condition	High Traction	
		Low Traction	
		Unstable	
Vehicle condition	Objective	Direction	
		Heading	
		Route	
	Status	Active	
		Inactive	
Weather Condition	High Visability		
	Low Visability		

Section 2.4.2 Input Decision Table

Table #20

Input				Input Parmeters
4-way Intersection	Borregas Ave	Lane	Forward Direction	Yes
			Turn Option	Yes
		Obstructions	Other Vehicles	Yes
		Sign		None
		Traffic Light	Green	Yes
			Yellow	
			Red	
	Caribbean Dr	Lane	Forward Direction	Yes
			Turn Only	
		Obstructions	Foreign Object Debris	
		Sign	Guide Sign	
		Traffic Light	Green	
			Yellow	
			Red	
Road Condition	Driving Condition	Indicators Status	Missing	
			Visable	Yes
	Regulatory Indicator	Turn Only		
		Cross Traffic		Yes
		Parallel Traffic		
	Surface Condition	High Traction		Yes
		Low Traction		
		Unstable		
Vehicle condition	Objective	Direction		Yes
		Heading		Yes
		Route		Yes
	Status	Active		Yes
		Inactive		
Weather Condition	High Visability			Yes
	Low Visability			

Section 2.4.3 Output Decision Table

Table #21

Output		
Vehicle Movment	Direction	Drive Forward
		Turn left
		Turn Right
		Reverse
	Speed	Speed up
		Slow Down
		Stop
Internal State	Mapping	Route Lock
		Recalculating Route
		Route Clear
	Passenger Alert	Prompt Passenger
		No message provided