

# The Detailed Specifications

## I. PRIORITY/TRAJECTORY PREDICTION

### A. Critical Obstacle Identifying

1) *Be Aware of Your Surroundings (Section 11, Safety Driving, California Driver's Handbook):*

You should also keep a safe distance around your vehicle. This gives you time to react if another driver makes a mistake. Give yourself enough space on all sides of your vehicle to brake or maneuver if you need to.

2) *Three-second Rule (Section 16, Glossary, California Driver's Handbook):*

A driving rule that helps you estimate how closely you should follow other vehicles. When the vehicle in front of you passes a certain point, such as a sign, count three seconds. If you pass the same point before you finish counting, you are following too closely.

3) *Propositional Logic Formula:*

$$CritObst(x) := dist(av, x) < 3 \times av.spd \quad (1)$$

### B. Improper Priority Prediction

1) *Know What is Ahead of You (Section 11, Safety Driving, California Driver's Handbook):*

As you scan ahead, be alert for vehicles and hazards around you. This prepares you to react quickly to changes in the road ahead.

2) *Propositional Logic Formula:*

$$ImpropPrio(x) := CritObst(x) \wedge PrioIgn(x) \quad (2)$$

### C. Wrong Trajectory Prediction

1) *Propositional Logic Formula:*

$$WrgTrajPred(x) := CritObst(x) \wedge (Err(x.PredTraj) > Th_{err}) \quad (3)$$

## II. BEHAVIOR PLANNING

### A. Improper 'Ignore' Decision

1) *Know What is Ahead of You (Section 11, Safety Driving, California Driver's Handbook):*

As you scan ahead, be alert for vehicles and hazards around you. This prepares you to react quickly to changes in the road ahead.

2) *Propositional Logic Formula:*

$$ImpropIgnDecn(x) := CritObst(x) \wedge DecnIgn(x) \quad (4)$$

### B. Improper 'Follow' Decision

1) *Following Too Closely (Section 11, Safety Driving, California Driver's Handbook):*

Use the "three-second rule" to avoid tailgating. If you pass the same point before you finish counting, you are following too closely

2) *Propositional Logic Formula:*

$$ImpropFlwDecn(x) := CritObst(x) \wedge DecnFlw(x) \quad (5)$$

### C. Improper 'Yield' Decision

1) *Right-of-Way Rules (Section 10, Laws and Rules of the Road, California Driver's Handbook):*

Never assume that other drivers will give you the right of way. Give up your right-of-way when it will help prevent collisions.

1) Bicycles and pedestrians that get to the intersection *first* have the right-of-way. If a bicycle gets to the intersection at the same time as you, give right-of-way to the vehicle or bicycle.

2) Do not drive on a sidewalk, except to cross it to enter or exit a driveway or alley. When crossing, yield to all pedestrians.

2) *Be Aware of Your Surroundings (Section 11, Safety Driving, California Driver's Handbook):*

- Allow for more space when a tailgater is behind you.
- Check behind your vehicle before you reduce your speed.

3) *Propositional Logic Formula:*

$$ImpropYldDecn(x) := CritObst(x) \wedge (\neg av.onJct \wedge \neg av.onCswk) \wedge (x.BhndEV \vee x.BldEV) \wedge (\neg x.isPed \vee \neg x.isBcycl) \wedge DecnYld(x) \quad (6)$$

### D. Improper 'Overtake' Decision

1) *Navigating the Roads (Section 9, Navigating the Roads, California Driver's Handbook):*

Before you pass, look ahead for road conditions and traffic that could cause other vehicles to move into your lane. Only pass when it is safe. Do not pass:

- Within 100 feet of or in an intersection, bridge, tunnel, railroad crossing, or other hazardous area.
- At crossroads and driveways.

2) *Propositional Logic Formula:*

$$ImpropOvtkDecn(x) := (av.onJct \vee av.OnCswk) \wedge DecnOvtk(x) \quad (7)$$

### III. SPEED PLANNING

#### A. Improper Speed Planning

1) *Speed Limits (Section 10, Laws and Rules of the Road, California Driver's Handbook):*

- Blind Intersections: If your view is blocked, move slowly forward until you can see. The speed limit for a blind intersection is 15 mph.
- Alleys: An alley is any road no wider than 25 feet that is used to access the rear or side entrances of buildings or properties. The speed limit in any alley is 15 mph.
- Business or Residential Districts: The speed limit is 25 mph, unless otherwise posted.

2) *Law Articles:*

Vehicle Code, Section 21654, State of California:

- 1) Notwithstanding the prima facie speed limits, any vehicle proceeding upon a highway at a speed less than the normal speed of traffic moving in the same direction at such time shall be driven in the right-hand lane for traffic or as close as practicable to the right-hand edge or curb, except when overtaking and passing another vehicle proceeding in the same direction or when preparing for a left turn at an intersection or into a private road or driveway.
- 2) If a vehicle is being driven at a speed less than the normal speed of traffic moving in the same direction at such time, and is not being driven in the right-hand lane for traffic or as close as practicable to the right-hand edge or curb, it shall constitute prima facie evidence that the driver is operating the vehicle in violation of subdivision (1) of this section.

71, B(2) - RS 32:71 Subpart B, Driving on the Right side, Overtaking and Passing, etc. State of Louisiana:

- 1) In addition to the requirement of Paragraph 1 hereof, any vehicle proceeding on a multilane highway at a speed slower than *ten miles per hour* less than the posted maximum speed limit shall be driven in the right hand lane then available for traffic, or as close as practicable to the right hand curb or edge of the roadway, except when overtaking and passing a vehicle proceeding in the same direction or when preparing for a left turn at an intersection or into a private road or driveway. Persons in violation of this Paragraph shall be punished by a fine of not more than one hundred dollars, or by imprisonment for not more than thirty days, or both.

3) *Propositional Logic Formula: :*

$$\begin{aligned} ImpropSpdPlng(ev) := & (av.spd > MaxBound) \vee \\ & (av.spd < MinBound) \end{aligned} \quad (8)$$