

MLiS II Performance Marking

Dr Maggie Lieu, Dr Adam Moss, Dr Simon Dye

The performance of your model will contribute **20%** towards your final mark. This will be split **equally** between the Kaggle challenge and live testing.

1 Kaggle Challenge

The formula we will use to calculate your Kaggle mark is

$$100 - 800 \times \text{private leaderboard score} \quad (1)$$

A private leaderboard score of 0.03, for example, will result in a mark of 76%. In most cases last year the private leaderboard score was only marginally worst than the public score.

2 Live Testing

There is training data for all the driving scenarios within the Kaggle data. However, some of these are intentionally under-represented.

2.1 Driving Scenarios

The scenarios that will be tested are:

1. Keeping in lane driving along the straight section of the T-junction track, as shown in Fig. 1.

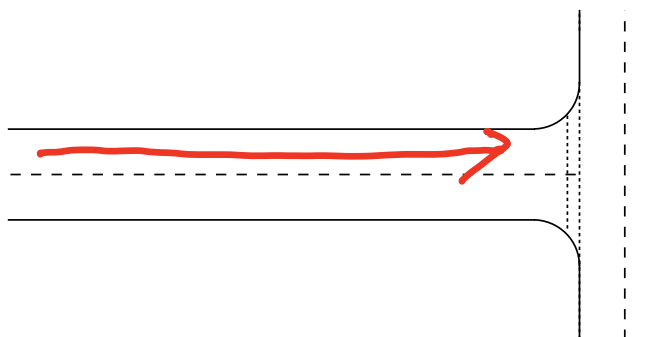


Figure 1: Scenario 1.

2. As (1), but driving as normal if pedestrians or other objects are on the side of (but not in) the road, as shown in Fig. 2.
3. As (1), but stopping if a pedestrian is in the road, as shown in Fig. 3.

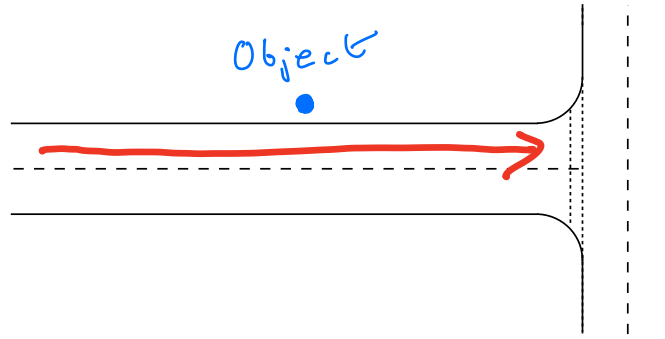


Figure 2: Scenario 2.

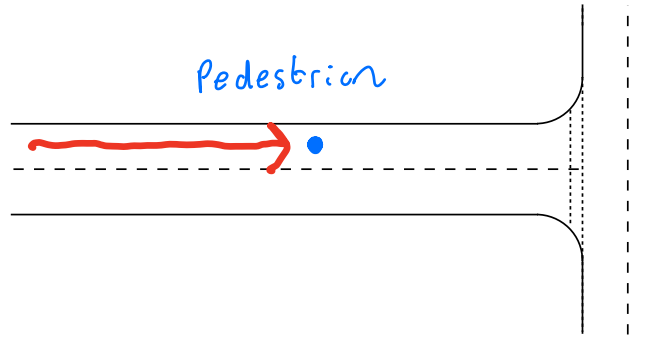


Figure 3: Scenario 2.

4. Driving around the oval track in both directions, as shown in Fig. 4.
5. As (4), but driving as normal if pedestrians or other objects are on the side of (but not in) the road, as shown in Fig. 5.
6. As (4), but stopping if a pedestrian is in the road, as shown in Fig. 6.
7. Driving around the figure-of-eight, continuing straight at the intersection, as shown in Fig. 7.
8. Stopping due to an object in the center of the intersection, as shown in Fig. 8.
9. Stopping due to a red traffic light at the intersection, then continuing when it changes to green, as shown in Fig. 9.
10. Performing a left turn at the T-junction, in response to a traffic sign, as shown in Fig. 10. We will place 2 left turn signs at positions indicated in the figure.
11. Performing a right turn at the T-junction, in response to a traffic sign, as shown in Fig. 11. We will place 2 right turn signs at positions indicated in the figure. Note this ‘unprotected’ right (left in the USA) has been a major difficulty in the Tesla autonomous beta testing program.
12. Driving round the oval track, as (4), but at a speed of 50. Can your car respond fast enough at this speed?

We will **only** consider these scenarios in the live testing. **Note we will only consider UK driving rules, i.e. driving on the left-hand side.**

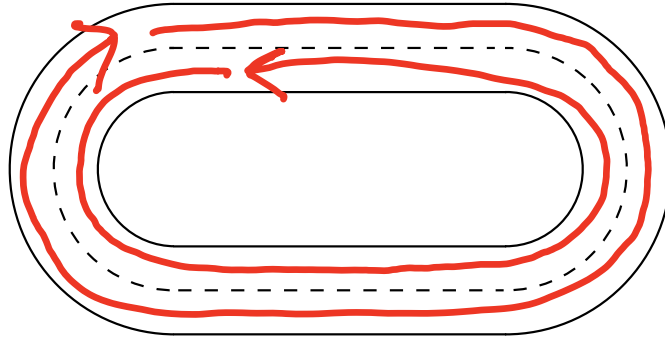


Figure 4: Scenario 4.

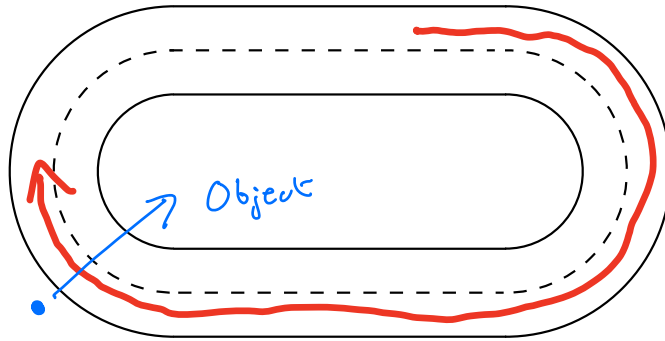


Figure 5: Scenario 5.

2.2 Scoring

Each scenario will be scored out of 3, decided by Dr Moss, Lieu and Dye (as guest judge). The total score available is 36. Due to the unpredictability of how cars perform in live testing, it isn't possible to give a definitive mark scheme. However, they will be scored according to

- 3 points: perfect execution of task
- 2 points: minor infractions (e.g. veering out of lane but correcting itself, requiring a nudge at the traffic lights but then moving on its own)
- 1 point: major infractions (e.g. veers off track and requires manual intervention to correct it)
- 0: fail (does not complete any aspect of the task)

2.3 Notes

- If your car does something legitimate (e.g. steers around an object in the road) that isn't listed here we will give credit.
- If it is necessary to run your car at a lower speed than the default of 35 (e.g. due to longer inference times), this is acceptable. However, this will mean it will likely fail task 12.

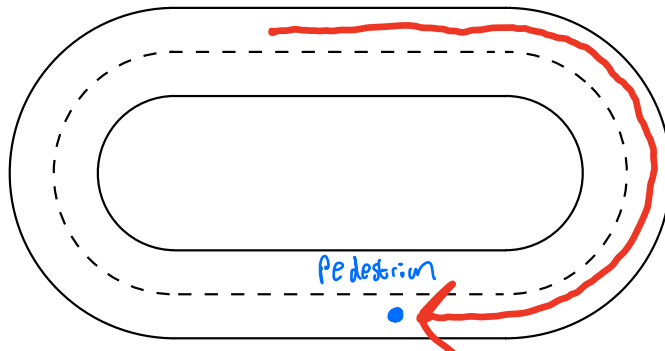


Figure 6: Scenario 6.

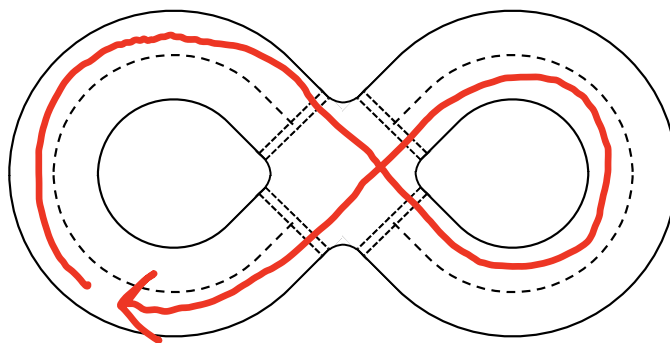


Figure 7: Scenario 7.

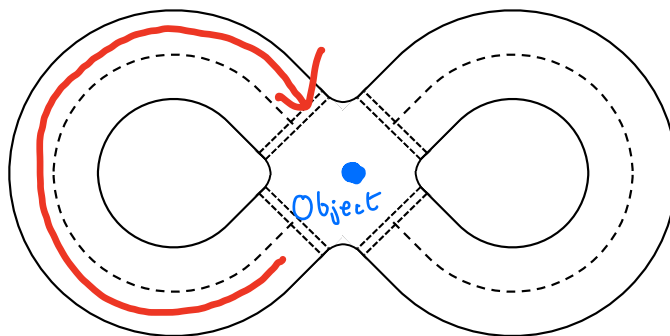


Figure 8: Scenario 8.

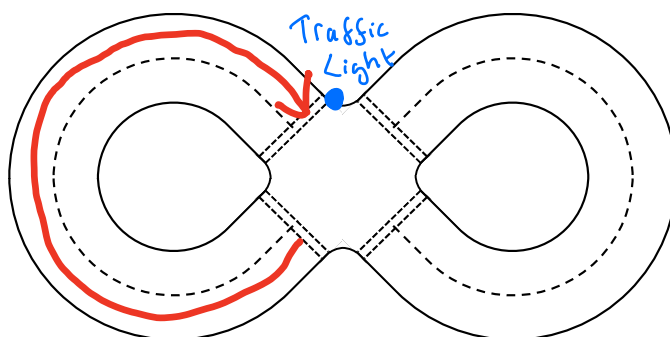


Figure 9: Scenario 9.

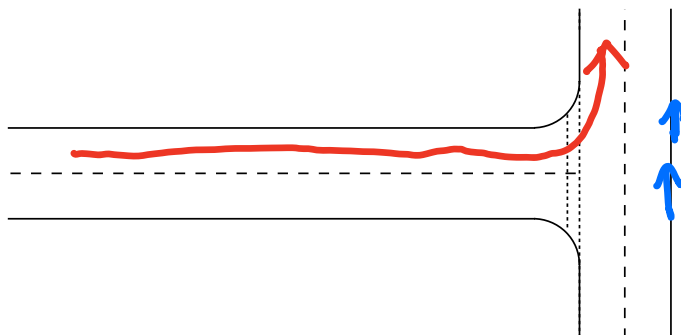


Figure 10: Scenario 10.

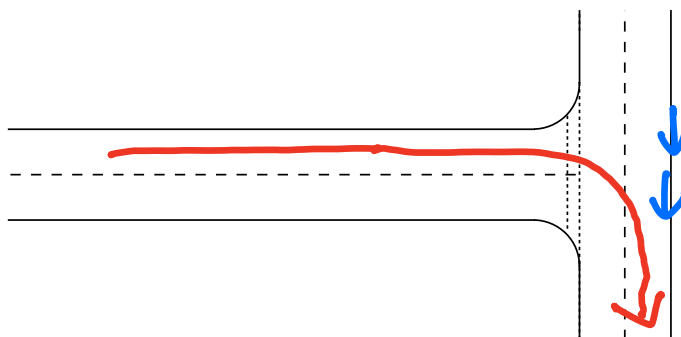


Figure 11: Scenario 11.