Robomania: Self Driving Car

Marks Distribution and Problem Statement for Avishkar'20

Robotics Club, MNNIT

Hello, enthusiasts!

This document (hopefully) will be a comprehensive guide for you to attempt the SDC (Self Driving Car) problem under Robomania, this Avishkar.

Deep learning models and Data are your only friends here.

STRUCTURE AND MARKING SCHEME:

There are three rounds, all of whose scores count towards the event.
100 marks are split as:

MARKS	DESCRIPTION
10	**Round 1:** Quiz
60	**Round 2:** Model Testing in Carla Simulator
30	**Round 3:** Interview
TOTAL: 100	

PROBLEM STATEMENT:

Inspired by initiatives of Govt. of India, Tesla is now expanding to India and hence recruiting for bright minds who can make self-driving cars possible in the highly stochastic environments of India. You being smart (obviously, since you are interested in robotics) have managed to clear multiple rounds of the selection procedure, and now Mr. Musk wants you to take a step forward and apply all your knowledge and engineering skills to automate a car in real using Behaviour Cloning, to choose the best out of few remaining candidates.

Do you have what it takes to work with Mr. Musk? Well, let's find it out with this problem statement.

ROUND 1: QUIZ (10 marks)

Total of 10 multiple choice questions on Self Driving Car technology, Machine Learning,

Deep Learning, CNN, etc.

ROUND 2: MODEL TESTING IN CARLA SIMULATOR (60 marks)

For this round, you have to automate your car to drive autonomously in the race track environment of the CARLA Simulator using Behaviour Cloning. You will 1st chauffer the car in the arena and generate the dataset, train on it using any model of your choice and then run the car using your output on the same track. The one to do with maximum accuracy and in the least time shall win.

Note:

1) You have to use the CARLA version shared by us only(link below), you will be disqualified for using any other version of CARLA.

https://drive.google.com/drive/folders/1lCRj_JWeF8iZxuOG921Nht2-tK8qMFjT?usp=sharing

It's a modified version of Carla 0.8.4.

2) The maximum speed limit for this task is 80 kmph, there is a penalty of (-10) for every 10 seconds you break the speed limit, (-5) for each time you break the speed limit for less than 10 seconds.

MARK DISTRIBUTION:

1) **For track covered:** (+1) *(percentage track cover)
2) **Time Taken:** (-1)* (total time in seconds/20)
3) **Time outside the road :** (-4) *(total time outside the lane in seconds/30)
4) **For Manual interference:** -10 each time (**max 5 times**)
5) **Bonus** (for completing the track) +20 marks

Total marks:= marks/2

Video submission:

You have to make a video for this round, screen recording+phone, or using a phone only, but the entire screen should be visible for the entire duration of the run time, else your submission will not be evaluated. The recording should start before you execute your script and should stop only after the task is completed. The entire recording should be done as one recording and no editing should be made before submission.

Just before you execute the script, you should start a stopwatch (either in a phone, or computer or a clock) and stop the stopwatch the moment you consider your task complete, and both the timings **as well as stopwatch as well your entire keyboard should be visible for the entire duration of the task.** Also, the stopwatch should not cover any relevant portion of the screen.

INTERVIEW (30 marks)

Based on task implementation, your code, Deep learning, and other concepts related to Autonomous Vehicles or used in tasks.

DEADLINES:

Deadline for registration: October 20th, 2020, 23:59:59

Round 2: October 30th, 2020, 23:59:59 {Penalty of (-30) each day after this till 1 November }

Additional Round: Will be carried out in between Avishkar dates only if needed to select the best. It will be similar to Round 2 with some modifications, which will be told on the spot.

Dates for Quiz and Interview shall be shared later.

VIDEO AND REPORT SUBMISSIONS:

You have to submit a video for round-2 without time forwarding, well-commented codes, a zip file of your final dataset, and a 1-2 page pdf explaining your approach to data generation, the deep learning model you chose, and why, and overall approach to the task.

Videos that need to be submitted will first be uploaded on YouTube as an unlisted video (compulsory), and then the links shall be shared with us, before the deadline. There are penalties for not adhering to the deadlines for the submissions.

You will also be required to run your code and share screen, also we can run your codes on our system to test them. Needless to say, any form of cheating will lead to instant disqualification.

For round2 you have to make a folder containing pdf, codes, dataset(zip file), and link to an unlisted youtube video, and a doc containing your team name and team member

details and compress all into a single zip folder of your team name. Mail this zip folder to roboticsclub@mnnit.ac.in with the subject “SDC_SUBMISSION_TeamName” before the deadlines.

We highly encourage you to use the FB page Robotics Club for discussions.

RESOURCES:

1) Carla Documentation
2) Andrew NG Deep Learning course

Let’s see who can really automate their cars, and who’s car just ends up doing hit and run!

QUERIES?

DM any of the coordinators on Whatsapp or Gmail.

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---------ALL THE BEST!---------