<CS3001 Advanced Topics in Computer Science CS3606 Advanced Topics in Business Computing>
Topic 1: Autonomous Vehicles 2021/2022

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INTRODUCTION

The main purpose of each seminar in the module is to give you an opportunity to further explore the topic covered in the corresponding lecture through a structured session that will facilitate the exploration and exchange of the main ideas and issues in the topic. The seminar activities are directly related to the way that the topics will be covered in the examination, so preparing for the seminars, and engaging fully with them, will be an important first phase in your exam preparation.

BEFORE THE SEMINAR

You must prepare for the seminar – it will only be effective if you do. A set of core references might be provided at the end of this sheet, but you must undertake further background research, and be prepared to talk about your research and answers to the question during the seminar.

ATTENDANCE AND PARTICIPATION

It is in your interest to prepare for, attend and participate in the seminar, as it will help you to prepare for the examination. You are reminded that attendance and participation in the seminars might be monitored. Please refer to the study guide for more information.

AUTONOMOUS VEHICLES

Part A:

Review lecture notes, in particular:
1. Levels of automation
2. Research advantages and disadvantages of different sensor types for autonomous vehicles
3. Kalman Filters
4. Autonomous car system architecture

Part B:

STARTER QUESTIONS

This set of questions will form the basis of the discussion during the seminar. We may discuss them all together, or may split into break-out groups, and bring the results together during the seminar.

Please read the following articles and think about the questions below:

[1] Awad, E., Dsouza, S., Kim, R., Schulz, J., Henrich, J., Shariff, A., Bonnefon, J.F. and Rahwan, I., 2018. The moral machine experiment. *Nature*, *563*(7729), pp.59-64. (Available on blackboard TheMoralMachine.pdf)

Questions:

1) What is the moral machine experiment?
2) In how many countries was the experiment deployed? How many respondents did they have?
3) Are the experiment results in line with legislation?
4) Are there cultural variations in the human preferences concerning autonomous cars?
5) Why such an experiment is important for the field of autonomous vehicles?
6) Should policy makers use the experiment to pass legislation?

[2] Feng, S., Yan, X., Sun, H., Feng, Y. and Liu, H.X., 2021. Intelligent driving intelligence test for autonomous vehicles with naturalistic and adversarial environment. *Nature communications*, *12*(1), pp.1-14. (Available on blackboard IntelligenceTestForAutonomousVehicles.pdf, pages 1-11)

Questions:

7) Why is there a need for an intelligence test for autonomous vehicles?
8) What is the approach proposed by [2]?
9) What are the car manoeuvres considered for these tests?
10) What is NDE and what is NADE?
11) What is the SPMD database?
12) What are the drawbacks and limitations of the proposed intelligence test?