

CS 7633 Fall 2016 Written Case Study #3

Submit response on T-Square by Thu, Nov 17, 2016 3:00pm

The purpose of the written case studies is to assess each student's individual mastery of the HRI curriculum. Topics covered include relevant literature review, study design methodology and evaluation methodology across multiple domains. Each written response will be graded by the course instructor and the TA, with the ultimate grade reported as a ✓+, ✓ or ✓- (equivalent to 100%, 80%, 60%). Students receiving a ✓ or ✓- may resubmit (by email to the instructor) up to one updated response for reevaluation within 7 days of the original deadline.

Note that each of the case studies previously appeared on the Robotics PhD Qualifer Exam, for which CS7633 serves as a core course. Thus, for PhD students in the course the case studies serve as valuable practice for the written portion of the quals. I'm happy to arrange a time to meet outside of class for any PhD student interested in practicing the additional oral component.

The submissions system will close at 3pm on the date that the assignment is due. Late assignments will not be accepted except for pre-arranged absences or special considerations because the content of the case studies will be discussed in class on the date of submission.

You are part of a team proposal to a new Research Division of the American Insurance Association. The association is trying to decide how to deal with the advent of self-driving cars and all of the major insurers have jointly funded the new center. They are seeking research proposals on a number of topics and you have chosen to respond to the one which will address the human factor's issues with self-driving cars in states where the driver of the vehicle remains ultimately responsible for the vehicle and is therefore the responsible party should an accident occur.

You are applying for their small 5-year grant which has a budget sufficient to support your team of 4, where you are the PI. As the results of this study are imperative for the developers of self-driving cars, they have agreed to give you unlimited access to the latest cars, and full scale-car simulators, the underlying software (under strict NDAs), and all of their data thus far.

Your primary research question is: **What features of the car's functionality and driver-station layout lead to more engaged driver behavior and an ability to take over either to help in unusual situations and/or to prevent accidents?**

The RFP calls for a two phase approach:

Phase 1: Analysis of existing data/code/etc. leading to some hypotheses or results

Phase 2: Testing of your hypotheses or validation of your results (from Phase 1) leading to actionable guidance or further investigations.

As part of this proposal your colleagues are tasked with writing the following sections:

- Introduction and motivation
- Budget justification & cost proposal

- Team member capabilities
- Future work

and **you have been tasked with writing the remaining sections of:**

- Relevant literature synthesis & key insights that you will bring to bear
 - This section should describe the key challenges with this research question. Why is this hard? Can it even be done in 3 years?
 - It should further describe the key insights from the relevant literature that your research and development team will be using. The emphasis should be on synthesis of the relevant literature to support the 3-5 key insights you plan to leverage.
 - It should indicate any ways in which you feel your proposal is unique among your competitors who are primarily made up of teams with Mechatronics, Autonomy & Controls experts.
- Technical Approach – what do you intend to do & why.
 - How are you going to decompose and operationalize the overall research question?
 - This section should provide an overview what analyses you intend to perform, what data will be used, and what methods will be used.
 - Link your choices back to the relevant literature or key insights.
- Analysis of existing data
 - This section should provide more details about what analyses you intend to perform, what data and what methods will be used.
 - What data will you analyze and how?
 - What will your metrics be?
- Evaluation and/or Validation
 - This section should describe any and all evaluations of the results you have discovered.
 - Make sure to give a high level overview of
 - the evaluations that will be conducted,
 - the method by which the data will be collected,
 - the variables which will be tested and
 - the metrics that will be evaluated.
 - Also make sure to include descriptions about
 - the participants involved and
 - the tasks or part tasks that are used during the evaluation.
 - Describe the statistical methods that will be used to analyze the data and why those methods are appropriate.
- Remember that you have 5 years, so make sure to show a logical progression in your analysis and testing.