Final Team Project 511, Fall 2022
(50 points total)
- Everyone is required to upload a team (identical) report. A single pdf is to be uploaded (to include a video, place a link into an appropriate place in the pdf report).
- File name convention: Team#_LastName_KeyWords.

Study an end-to-end and state-of-the-art machine learning problem/tool/application/theory. You are strongly encouraged to work in areas, such as, disease diagnoses, sports, movie making, basic science, astrophysics, biology, robotics, to name some. You are also strongly encouraged to use the book "Dive into Deep Learning" or most recent, well-cited survey papers to inspire ideas for a project subject.

Goal: to duplicate a published/an established result.
- Define the application problem, its motivation, significance, and impact
- Explain the solution approach and algorithm(s) employed.
- Clearly describe 1) papers used for your reported work, how to access the dataset (specify the training and testing datasets, strongly encourage self-collected test datasets). Include results of both training and testing,
- Describe step by step how to implement the solution (include all technical details, such as system requirements, software packages and version, setup procedure…)
- In a nutshell, prepare your work to answer what, why and how questions on the subject you choose to study.

Key requirements:
- Your chosen project topic is timely, significant, and machine learning solutions are state-of-the-art. If your chosen topic is about computer vision or autonomous driving, you should select from key references published since 2020. For other topic areas, you should select from key references published since 2018.
- You're strongly recommended to look up projects from the research arms of leading tech companies such as google research, google deepmind, facebook AI, OpenAI, and more. Additional resources include kaggle.com, GitHub, arxiv. You're strongly encouraged to double check reliability of a published work.

Presentation and final report dates:
- Final project presentations (conference style, in class, 4 presentations/day, 15 minutes total leaving at least 3 minutes for Q/A, i.e., presentation should not go over 12 minutes) starting on Nov 21 thru Nov 30.
- Final report due: Dec 9, 2022, 8 am.

ASAP - Sign up your project by entering a "project title/key words" (you can update later if necessary)
NOTE – YOUR TEAM CAN CHOOSE OPTION 1 OR 2 FOR THE FINAL PROJECT
        OPTION 1 – no extra credit
        OPTION 2 – extra credit of 5 points on a 100-point scale

(5 points) Problem statement due: Sept 16 (Friday) 11:59pm
Format: 3-page ppt to include
- Concise description of the problem/application, motivation, significance, and impact…
- Specific references: 1. Papers and/or book chapters, 2. online open-source datasets, 3. System requirement to run simulations, 4. code…
- Address one of the following two aspects: 1) justify your chosen reference(s) is/are reliable (venue of publication, comprehensive results and discussions, good literature review and related work, citation, …), or 2) justify if you need a plan B in case you run into computation bottlenecks or you cannot acquire the dataset in a timely manner or some other problems. If you do, propose alternatives.
OPTION 1 – all in the above
OPTION 2 – additional requirement below

- Sign up in google sheets of your presentation date (either 9/19 or 9/21) and presentation order.
- Present your project in class (total 10 minutes: 6 for presentation & 4 Q/A). Professor will grade the work.

(9 points) PC#1. Progress check 1 due on October 14 (Friday) 11:59pm
1. Provide a concise, concrete and clear problem formulation (can be updated from previous version). Describe your expected results and how you'll show it to the class (innovative and exciting show-and-tell, use illustrations and video clips to help convey your message efficiently…).
2. Identify key literature, datasets, implementation code (can be updated from previous version)…
3. Describe procedures you take to set up simulations in your chosen system to establish the computation platform in order to demonstrate your project by answering the following questions: 1. What is the computing platform to perform the computation, 2. How to install needed software environment, 3. Have you test run the code successfully (if the answer is no, there will be point deductions). Provide clear evidence when answering the above questions in the report (screen snapshots, video clips of program running…).
4. Clearly map out activities toward the end product (milestones, timelines, and individual responsibilities.)

OPTION 1 – report results meeting above requirements in 5-page ppt
OPTION 2 – report results meeting above requirements in no more than 3 pages in IEEE article template (https://journals.ieeeauthorcenter.ieee.org/create-your-ieee-journal-article/authoring-tools-and-templates/tools-for-ieee-authors/ieee-article-templates/).

(9 points) PC#2. Progress check 2 due on November 11 (Friday) 11:59pm
- At this point, your key ingredients that go into the final report should be completely in place, although they may not in the most polished form yet.
- Flesh out section by section your work to include 1) abstract, 2) introduction, 3) methods, 4) implementation and simulation, 5) results, 6) references. Some of those sections may not be completely polished. Take section 5 as an example - you should have obtained all the expected results but they may not be totally complied and organized yet to emulate those figures in the paper/book. As another example, some sections in this report may be improved later but your outline of the section should be complete and in place.
- You should clearly specify what is still remaining to be done for the final report.

OPTION 1 – report results in 10-page ppt.
OPTION 2 – a 4 to 5-page report in IEEE article template format.

(2 points) Turn in your final project presentation ppt file on Nov 15 (Tuesday) 11:59pm
Expected from all teams, not just those presenting on the first presentation day.
Remember to upload your ppt to the google sheets and provide an accessible link to it.

(15 points) Final project presentation evaluated by peers and professor (50% each)
- Sign up in google sheets of your presentation date and presentation order.

Presentation time allowance: a total 15 minutes allotted within which at least 3 minutes for Q/A. Recommended page length between 12-15. Keep in mind of the following evaluation rubric.

Evaluation rubric:

Project key words	give 1-5 pts/question
Evaluation by team #	5 is the highest score
Signed by	
was the problem statement clear, did the team achieve their goal of duplicating/demonstrating RL in robotics problem?	
do you understand the key algorithms/approaches needed to solve the problem?	
Do you think you will be able to duplicate the results of the project (installing software, implementing algorithms step by step, handling data, tabulating results…)?	
how do you rate the presentation in terms of clarity and depth?	
how do you rate the presentation in terms of creativity and effort going into its preparation?	
1) Presenting Team # 2) Total Score	

(10 points) Final report, Dec 9, 8 am

What to submit:

- Your final complete report. Write-up: a 6-page report in IEEE format to include 1) abstract, 2) introduction, 3) methods, 4) implementation and simulation, 5) results, 6) discussions & conclusions (important to discuss your personal or team's experience during this project, lessons learned, how you may do better in the future…), 7) references, 8) statement of contributions (need to be specific. Use examples such as: Person A wrote Sections 2-3, Person B debugged the code at what specific stage, Person C ran the code and generated Fig. 2…). The contribution section of each person needs to be cross-signed by each and every member of the team).
- Your clearly annotated code (include a readme if needed) to show how to use your code.
- The ppt file used in your final presentation (can be updated).