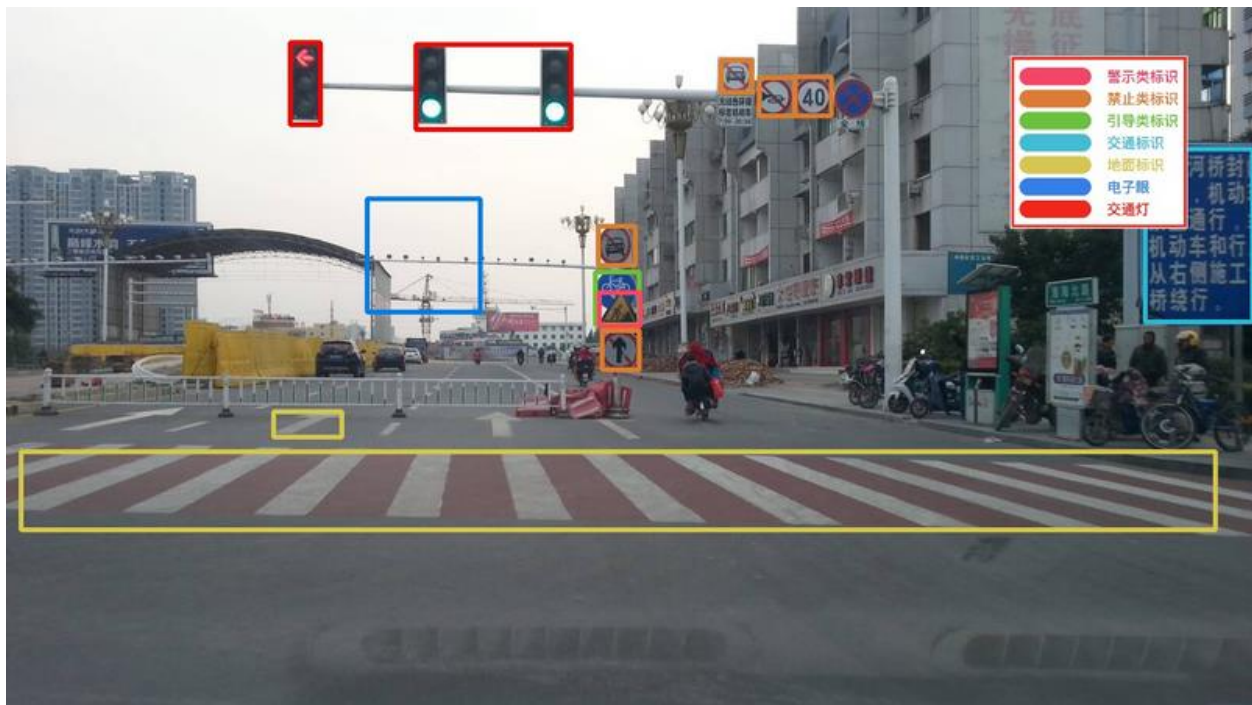


Project Introduction



Source: [Develop Paper](#)

The project in this course is to provide a hands-on opportunity to develop a machine learning application. The application can be in any area of your choosing with the **requirement that the performance can be easily validated** on a 30-60 second demonstration.

Some examples of valid projects include:

- Develop an algorithm that can process dashcam videos to identify traffic signs, pedestrians, or perform various kinds of filtering that can be used to guide the driver.
- Create video game assistant that will provide the user with warnings/guidance to improve their performance.
- Pose estimation from dancing or workout videos.
- Image or audio search in lengthy videos.
- Video or audio captioning.
- Convert ultrasound recording into an MRI
- Identify people not wearing personal protective equipment (PPE) from video sequences.
- and many more...

Three are just a few of the many possibilities. Be creative and select something that you can be proud of. This is a great opportunity to take on a full engineering project that is

much closer to real-world engineering. While this project has some structure, you will be required to deal with the ambiguity and significant decision making that make up the life of a real engineering practitioner.

Completing an open-ended project comes with significant benefits:

- The only way to really become an engineer is to do what real engineers do, which includes understanding the difficulties of open-ended goals and projects. Even if it does not go well, and you spend time reflecting on why that was so, you will be taking an important step towards becoming a professional engineer.
- You will have an opportunity to practice the ever-crucial oral communication skills that an engineer needs to operate successfully. You might not think that communication is important, but if so, you're wrong!
- When you will be interviewed for full-time jobs or internships, the most important question you will be asked is to discuss a major project you did, and the challenges faced. This is such a project.
- If you were to have a video of yourself presenting your project, and you think that video has sufficient quality, you can put a link to it on your personal LinkedIn page. LinkedIn has taken the place of a personal CV or resume, and such a video would be a compelling statement of what you are capable of. Rather than the usual simple listings of skills and previous jobs, it brings who you are to life.

Project Rules

- Projects must be done in groups of 3-4.
- The project must make use of machine learning, as taught in this course, and the training, validation and testing of some kind of ML system should form an important part of the project.
- There are several suggested project topics that you can choose from, or you can pick a custom project. The project does not have to be unique within the class, but the approach taken will need to differ from other groups.
- There should be some data collection or cleaning that is a meaningful part of the training process. You can repurpose a data set, combine data sets, or collect your own data.
- University of Toronto rules on plagiarism apply. We are aware that there are many machine learning projects already posted on the internet, and these will be checked for plagiarism.

Timeline and Deliverables

The project has several steps and deliverables, listed in the table below. The following sections provide more detail.

Component	Weight	Deadline
Team Formation	1%	Week 3
Project Selection and Approval	1%	Week 5
Progress Report	5%	Week 10
Presentation and Demonstration	10%	Week 11
Project Submissions	8%	Week 12
Total Course Grade	25%	

Team Formation

Please enroll in the same group with your team members on Quercus Group page by 11:00pm on Friday, October 1st (the earlier the better).

Once you have formed a team, you should brainstorm ideas for what your project topic should be or select/modify one of the suggested projects. Before selecting your project you should have an answer to the following:

- knows what the goals and motivations for your project are.
- knows what dataset you will use to train your model.
- has a rough idea of the type of neural network(s) you will use.
- has a rough idea of the relate work that you can build on.
- has a reasonable idea of how you will measure success of your model, your project.
- has a clear idea of how you will work together, and how to distribute work fairly.

Project Selection and Approval

Once your team is set up you will be required to complete the Quercus Quiz titled “Request for Project Approval”.

In the quiz you will be asked to provide your team number, team members’ names and a short 3-4 sentence description of the project idea you wish to work on. The dataset(s)

that you plan on using, the number of samples available, and how you plan to obtain new samples and demonstrate the performance of your model.

The teaching team will review each submission and respond with “your project has been approved” or with some suggestions on how to modify the project to meet the requirements.

Progress Report

The project progress report is a check-in to show that you are on track to complete your project. By the project progress date, you should have collected all the data and produced at least one result from training your neural network model.

Each team will submit an html showing their code and results highlighting the best results obtained thus far.

Project Presentation

The team will make a final video presentation describing the project goals, the machine learning model, and a demonstration of the models' performance. There will be some additional time reserved for questions from the class.

Project Submissions

Step-by-Step Guide

An html submission to Quercus providing a step-by-step walkthrough highlighting all the steps from data loading to final predictions. This submission does not need to show all the work done on the project, only the steps required to prepare and demonstration a working model. As part of the submission please include a link to the code on GitHub or Google Collab.

The submissions will be assessed on clarity, so make sure to comment your work.

Team Contribution

Each member will be required to complete a survey to answer questions on their personal contributions to the project and evaluate the contributions of their team members.