

EE225B Projects

You need to do a term project of your choice to satisfy the requirements of the course. The report for the project is due on May 11th at 11:59pm. I need both electronic and hard copies of the report and the presentation. The electronic copy should be emailed to avz@berkeley.edu with the subject line EE225B final project, and the hard copy should be dropped outside my office.

In your project proposal which is due on April 5th, you should specify what project/algorithm you plan to implement, or what topic you would like to do a literature search on. On average you need to spend about 50 hours per person for your project. If you want to implement an image processing algorithm, you would need to read papers on that topic, choose something concrete to implement, hopefully with a new twist that was never tried before, and report on the performance of the algorithm. You can read papers in image processing conferences that are on the class web page to get inspired for ideas, or you can do a project in an area in the papers below.

In your proposal you should include some background material as to what problem you are trying to address, who has done what before you, and clearly identify your objectives for the project. If you are doing a project which is related to or part of a different project, e.g. your MS or PhD thesis, at the time of proposal, you need to delineate what pieces have already been done and what pieces remain to be done. Be specific about what you plan to accomplish this semester for this course.

The final project report should be brief report, preferably no longer than 10 pages double space. I recommend that you form groups of 2 – 4 students so that you can do a larger scale, more meaningful project.

Few Suggested Projects:

1. Train a convolutional Neural network to detect objects of interest in a building; Real time run your trained network on your phone (Android or IOS) so that when it is pointing to that object it draws a red box around it. Examples of objects to try to detect are: fire safety objects like sprinklers, Exit Signs, wifi routers, ceiling lights, smoke detectors. To do this project you need to read and understand Chapter 13 of Gonzalez and Woods

A modest goal is to train your network with 5 positive examples of a given object in Cory. Then test it on all the remaining objects of that same category.

2. Sparse Signal Approximation, Compressed Sampling:
Structured compressed sensing: From theory to applications MF Duarte, YC Eldar - IEEE Transactions on Signal Processing, 2011

Block compressed sensing of images using directional transforms **S Mun, JE Fowler - Image Processing (ICIP), 2009 16th IEEE ...**, 2009

3. 3D recognition using deep convolutional networks
 - a. Qi, C.R., Liu, W., Wu, C., Su, H., Guibas, L.J.: Frustum pointnets for 3d object detection from rgb-d data. arXiv preprint arXiv:1711.08488 (2017)
 - b. Qi, C.R., Yi, L., Su, H., Guibas, L.J.: Pointnet++: Deep hierarchical feature learning on point sets in a metric space. In: Advances in Neural Information Processing Systems. (2017)
 - c. Qi, C.R., Su, H., Mo, K., Guibas, L.J.: Pointnet: Deep learning on point sets for 3d classification and segmentation. Proc. Computer Vision and Pattern Recognition (CVPR), IEEE 1(2) (2017)
 - d. Armeni, I., Sax, S., Zamir, A.R., Savarese, S.: Joint 2d-3d-semantic data for indoor scene understanding. arXiv preprint arXiv:1702.01105 (2017)