EECS 469 / ME 495: Machine Learning and Artificial Intelligence for Robotics
Assignment #3: Machine Learning Comparison
Slides due: Nov. 28th   **Presentation due:** Nov. 29th or Dec. 1st   **Writeup due:** Dec. 2nd

This assignment will focus on a comparison between two learning algorithms and learning aims. The goal is to switch learning aims with your partner, assess the performance of each new aim-algorithm combination, and to understand the underlying algorithmic and problem structures that account for any variations in performance.

For each group, one report PDF and one slides PDF should be submitted.

Implementation

There should be no new code to write for this assignment: however if there were deficiencies in your prior algorithm implementation that you would like to correct, this is allowed and encouraged. It also may be that a given problem formulation needs to be slightly recast to be usable with the other learning algorithm.

Assessment

This assignment should focus on a *comparison* between the assessment metrics used in the previous assignment. That is, the assessments performed for the previous assignment should be replicated for the new aim-algorithm combinations, but the bulk of the analysis (and reporting) should go into comparing these assessments.

Code

No code needs to be submitted with this report, unless significant changes were made to the implementation of a filtering or learning algorithm. If submitted, the code should include an executable run.m/run.py file and clear commenting, as in previous assignments.

Write-up

To be created with the following content:

1. Learning Aims
Describe the two learning aims.

2. Learning Algorithms
Provide a comparative description of the two learning algorithm. (That is, how they differ.)

3. Learning Algorithms Applied to the Aims
Explain thoroughly, and with clean consistent maths, all design decisions (dataset computations, how parameters were set, etc...) in the application of each learning algorithm to its new learning aim.

[For the two new aim-algorithm combinations of this assignment only. No need to mention such details for the

aim-algorithm combinations already reported in the last assignment, unless to provide a particularly noteworthy comparison.]

4. Assessments and Discussion
Report all assessments, with a particular focus on comparisons. Whenever differences are observed, explain why and ground these explanations in the mathematics of the algorithms (and/or the learning aims / content of the datasets). Whenever no differences are observed, it is sufficient to simply state as much and provide a brief (~1 line) statement as to why.

5. Conclusion
Summarize the differences you saw, and the algorithmic reasons behind these differences.

Remember to label all plot axes, title all plots, provide captions for any figures, include (as appropriate) units for all reported numbers, etc. Language counts – specifically with respect to clarity. If you use other sources, be sure to cite them.

The target length for the write-up is **no more than 10 pages.** There is a hard limit of 15, and any pages over 15 will not be graded.

Slides

A 15 minute presentation will accompany this report. Please budget for 10-12 minutes for slides presentation and 3-5 minutes for questions. All group members are expected to contribute equally to the oral presentation. Submit slides as a PDF file (by the assignment due date). **It is not permitted to use a late pass on the slides submission. It also is a requirement that you present *exactly* the slides that were submitted.**

Be kind to your fellow students and offer clear and insightful information. **The content of these presentations will be included in the final exam.**