Project Description

You will work in teams of three to form an in-depth “reading group” similar to those you might take part in during your academic career. As a group, you will select one of groups of three papers listed below. While all members should read each paper, each member will choose one paper to read carefully. You will then compare the theoretical and practical merits of each approach as a group and describe how the papers relate to the course material. Note that I do not expect you to understand every theoretical detail of your paper, but you should get a high-level picture of what the authors were able to prove and think about what tools they used to prove their results. You will then choose one paper to implement as a group in the programming language of your choice. You must test your algorithm on synthetic data and at least one real/benchmark dataset, which need not be one from the paper. You will turn in a final report at the end of the semester (template will be provided).

Grading

The grading breakdown is as follows.

<table>
<thead>
<tr>
<th>Item</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>Algorithm description and relation to course material (individual)</td>
<td>40%</td>
</tr>
<tr>
<td>Comparison of algorithms (group)</td>
<td>10%</td>
</tr>
<tr>
<td>Algorithm implementation and testing (group)</td>
<td>40%</td>
</tr>
<tr>
<td>Overall report presentation (group)</td>
<td>10%</td>
</tr>
</tbody>
</table>

Topics & Papers

Your group must choose one of the topics below unless you convince me that you have a relevant trio of papers not found here. Multiple groups may choose the same topic.

Subspace Clustering
References [1, 2, 3].

Robust Subspace Recovery
References [4, 5, 6].

Nonlinear Dimensionality Reduction
References [7, 8, 9].
Incremental Low-Rank Methods
References [10, 11, 12].

Robust PCA
References [13, 14, 15].

Dictionary Learning
References [16, 17, 18].

Stochastic Gradient Descent
References [19, 20, 21].

Low-Rank Matrix Completion
References [11, 22, 23].

References


