Final Project

Schedule
April 18 — Related work section Due
May 2 - 4 -- Project proposal
May 30, 31, June 1, 2 — Project Presentations
June 8 -- Final Project Write-up Due

Goal
This team-based (5 students per team) project is designed to give the students an experience of research in machine learning.
Projects can be one of following:
1. Replicating an existing paper and then making meaningful improvements to the machine learning solution
2. Taking a problem from an existing paper and proposing an alternative machine learning solution

Grading (toward final course grade)
10% Related work section
10% Project proposal presentations
20% Project Write-Up
20% Project Presentation

Related work section
1) Choose papers: Choose papers from the following (make sure papers are about machine learning; ask TAs/professor if unsure)
   • Machine learning conferences: NIPS, ICML
   • Machine learning journals: JMLR, MLJ, JAIR, IEEE TPAMI
   • NLP/Computer vision conferences (only choose those that feature substantial contributions in machine learning): ACL, EMNLP, ICCV, CVPR
   • Data mining conferences: KDD, CIKM, WSDM
   • Others (consult with teaching staff)
2) Write paper reviews for at least 5 related papers (see below for Paper Review Form)
3) Write a 2- or 3-paragraph related work section as follows:
   • Paragraphs should be about
     • 1 paragraph about the problem and approaches: Describe the problem you are tackling, and describe papers that approach the problem in different ways (e.g., deep neural network, SVM, graphical model, etc.)
     • 1 or more paragraph about approaches in the same direction as your solution: Describe several papers that approach the problem in the same direction as your
solution. For example, if your approach is to use deep learning (e.g., convolutional neural network), describe other papers that also used deep learning.

**Project Proposal Presentation**

Give a 5-minute presentation that includes the following:

- **Problem**: In your own words, what is the problem for this task? What is most challenging?
- **Related work**: What existing papers have tackled this problem? What were their approaches?
- **Solution**: What ML method will you use to solve the problem? How will you differentiate your solution from previous papers in the related work section?
- **Data**: Describe the dataset you will use. Explain whether you will use openly available data, crawl data from the Web, or collect data from users on your own.
- **Plan**: Explain a week-by-week plan of completing this project, clearly indicating which tasks will be done by which team member, and which tasks will be done together.

**Final Project Write-Up and Presentation**

Your write-up should be about 4~6 pages (single-spaced, 10 pt font) and should contain the following content. Your presentation should be about 15 minutes and should contain the same content but in a presentation (powerpoint or similar) style. **All project team members should participate in the presentation (speak for at least a few minutes each).**

- **Problem** -- background and motivation of the problem
- **Related work** — previous approaches for solving this problem and how your approach differs
- **Approach** -- your approach for solving the problem
- **Experimental setup** -- data, model, algorithm, comparisons to baseline models, etc
- **Results** -- show the raw results: use graphs, tables, whatever is most appropriate to present your results
- **Interpret results** -- how do the results answer your research problem?
- **Discussion** -- what is your novel contribution? what are the limitations?

**Paper Review Form**

Author(s):
Title:
Year:
Publication Venue:

Generally, what is this paper about?
Specific problem being tackled:
Importance of problem:
Other attempts described and their shortcomings:

Contributions of this work:

New model, technique, or approach proposed:

Advantages of the proposed solution:

Limitations of the proposed solution:

Results presented:

Grading Scale (Out of 5)

5 : well-thought responses
4 : clear understanding demonstrated
3 : reasonable attempt
<2 : more effort needed
0 : no submission

Peer Evaluation
You will be asked to evaluate the other teams according to the following criteria:

2. Summarize the presentation and give an overall score (10 points)

3. Evaluate the quality of the research project (20 points)
   In deciding the number of points, consider the following details. (You do not have to answer all of them)
   • Is the problem well-explained?
   • Is the machine learning approach appropriate and well-explained?
   • Do the results make sense?
   • If not, what went wrong?

4. Evaluate the quality of the presentation (20 points)
   In deciding the number of points, consider the following details. (You do not have to answer all of them)
   • Was the presentation well-structured overall?
   • Did you feel you learned something from the presentation?
   • Did you feel the project team gained a valuable experience in this project?
   • Were the problem and approach clearly expressed?
   • Were the results presented in easily understandable format?
   • Were graphs, tables, and other visualization of results appropriate?
   • Were the slides readable and understandable?
   • Did the speaker talk clearly?
   • Did the speaker respond to questions well?
   • Was the speaker engaging, convincing, and confident?