

Math 285: Classification with Handwritten Digits

Guangliang Chen

March 21, 2016

Final project: Description and instructions

This course ends with a project that is 30% of your grade and aims to provide you with the culminating experience. The topic and content of the final project is to be determined between you and the instructor. Below is a description of how the project runs (please read them carefully!):

- **No groups** will be formed, that is, each of you needs to select and work on a different project.
- You will need to submit a **1-page proposal** that describes what you intend to do in your project, and you must get the approval from the instructor before you start. To maximize the chance of your proposal getting approved, it should be as clear as possible while providing all necessary information for evaluation, such as:
 - The title of your project;
 - What problem you intend to work on;
 - The main reference paper(s) your project will be based on;
 - What is new/significant in your proposed work;
 - What are the potential applications of your proposed work;
 - How you plan to report your findings (oral or poster; see next bullet);

Your proposal is due **Tuesday, April 19**, but you should select a project as early as possible, because projects will be available on a first-propose, first-get basis and you also need enough time to work on your project. Your proposal will be graded together with your final presentation (see below).

- You may report your results through a **15-minute oral presentation** in class or on a **poster** that is to be displayed in the last class.
 - We will reserve the last two classes (and also the scheduled final exam time if necessary) for your presentations.

- Your poster has to be written using your own language (copying from other places is strictly prohibited and will be given a zero point). In addition, it needs to contain a clear structure with the following parts: Title, Author, Abstract, Introduction, Your proposed method (or review of an existing method), Experiments, Conclusions, and References.
 - Your presentation (oral or poster) will be graded based on clarity, completeness, correctness and originality.
- **Examples of a good project** for this course are the following (not an exhaustive list):
 - **Introducing a new classification method** that is not covered in class. You must describe the method clearly (with sufficient detail) and demonstrate it on both toy and real data.
 - **Nontrivial improvement of an algorithm** learned in this course. You must demonstrate the performance of your implementation on several data sets, and compare with the old implementation.
 - **A novel and nontrivial application** of a method learned in this course to a (large!) real, interesting data set (you may refer to the course webpage for some well-known databases, or simply google to find your own data set).
 - **An empirical study of several algorithms** using a few data sets to study their strength and weakness and compare their performance. A specific example would be to compare different dimensionality reduction algorithms for LDA/QDA using the handwritten digits.

I hope you will learn a lot through the projects and obtain more experience with real data. Feel free to discuss with me any questions you have about the project.