CS882 Fall 2019: Machine Learning in Bioinformatics

Bin Ma
Course Info.

• Location: DC2568,
• Time: Thursday 2:30-5:20 pm.
• Instructor: Bin Ma (binma)
• Office hour: DC3345, Wednesday 3-4pm.
• Course website: https://cs.uwaterloo.ca/~binma/cs882
• No textbook
Topics (Tentative)

• Brief overview of bioinformatics/proteomics (4 lectures)
• Brief overview of machine learning (2 lectures)
• Student lectures (20 lectures)
Student lectures

• Each student will pick (be assigned) a research paper on solving a bioinformatics problem with machine learning technique.

• He/she reads the paper and related paper; prepares a one-hour lecture about the research problem and solutions.

• The paper only serves as a start point for you to prepare. You are encouraged to include other related material – such as background knowledge to prepare the audience not in related area.

• The goal of the lecture is to teach the class. So, the clarity, accessibility, accuracy, comprehensiveness and self-sufficiency are very important.

• You also submit the slides of your presentation.

• Students will rank all other students’ lectures. Your slides help students remember your lectures at end of the semester.
Credits received by a lecture

• Each lecture earns up to 90 credits.
• Up to 60 credits were assigned by the professor.
• Peer evaluation assigns the other 30.
  • Suppose there are N+1 students.
  • Each student ranks all other lectures from 1 to N.
  • The total of the ranks a lecture receives is normalized with a monotonic function to be determined later, such that the lowest lecture receives 30, and a total rank of N*N receives 0.
Lecture prepared by a team

• A team of 4 are involved in preparing each student lecture:
  • A presenter prepare and deliver the lecture.
  • A coach assists the preparation.
  • Two helpers gives feedbacks.

• Suggested workflow:
  • 1. Presenter reads material and prepare lecture.
  • 2. Presenter presents in front of coach and revise the lectures together. This step can be repeated multiple times.
  • 3. Presenter presents in front of helpers to receive feedbacks. Coach makes observations.
  • 4. Coach and presenter improve lectures further.

• 90 credits of a lecture will be proportionally assigned to each member of a team:
  • 60 to presenter
  • 20 to coach
  • 5 to each helper
Evaluation

• Student lecture 90%
  • Presenter: 60%
  • Coach: 20%
  • Helper: 5%
  • Helper: 5%

• Class participation 10%
  • Attend all lectures (unless otherwise agreed by the professor)
  • Ask at least 10 meaningful questions in 10 different student lectures.
Team formation

• Each student needs to perform once as presenter, once as coach and twice as helpers in 4 different lectures.
• Presenter-coach relation is symmetric. I.e. if A coaches B, then B will coach A.
• You form the presenter-coach team by yourselves.
• Two two-person teams are randomly matched to help each other.
Lecture Selection

• A list of papers will be provided at https://cs.uwaterloo.ca/~binma/cs882/papers.html.

• If you are interested in learning a certain topic, let me know asap and I may add it in my list.

• Choices of lecture topics are made in the first-present-first-choose order.

• You give me a number between 0 to 1 about your preference in presentation order. 0 means to choose/present first. A tie is broken randomly.

• Moreover, the first few presenters have the option to choose their own topics not listed in my list (subject to my approval)