

CS578 – INTERACTIVE AND TRANSPARENT MACHINE LEARNING

TOPIC: SYLLABUS



Mustafa Bilgic



<http://www.cs.iit.edu/~mbilgic>



<https://twitter.com/bilgicm>

COURSE INFORMATION

- Date and location:
 - Tuesdays & Thursdays, 3:15pm – 4:30pm
 - Stuart Building 113
- Instructor:
 - Dr. Mustafa Bilgic
 - Research interests: machine learning, interactive learning, transparency, recommender systems
- Office location and hours:
 - SB 217C – Tuesdays 11am-12pm (or by appointment)
- TA:
 - None at the moment

- 3) INTERACTIVE
- 2) TRANSPARENT
- 1) MACHINE LEARNING

1. MACHINE LEARNING

- Algorithms that learn from data / experience
- Three subcategories
 - Supervised learning
 - Unsupervised learning
 - Reinforcement learning

EXAMPLES

- Supervised learning (from data)
 - Suggest news articles, movies, restaurants
 - Diagnose patients
 - Predict the traffic
 - Recognize faces
 - Fraud detection
 - Sentiment classification
- Unsupervised learning (in data)
 - Topic discovery in documents
 - Cluster genes based on their expression levels
- Reinforcement learning (from experience)
 - Learn to play games
 - Learn to navigate (robots inside a building, vehicles on the road, etc.)

2. TRANSPARENT

- Explain
 - The model
 - The model's prediction
- Examples
 - Movie recommendation
 - The model: “The model thinks you like action movies, movies by ..., “
 - The prediction: “The model recommends you to watch ..., because ...”
 - Medical diagnosis:
 - The model: “The model believes high cholesterol levels and old age are strongly correlated with heart disease.”
 - The prediction: “The model diagnosed you with ..., because ...”

3. INTERACTIVE

- Provide feedback and explanations to the model
- Examples
 - You explain why you like a specific movie (because it is an action movie by ...)
 - You confirm or correct the model: the model believes you like action movies; you agree / or disagree and correct it

GRADING

Assignments (~5)	15%
Quizzes (3)	15%
Project (4)	35%
Final exam	35%

ASSIGNMENTS (15%)

- Coding and analysis
- Python and Jupyter Notebooks
- Two types of assignments:
 - Transparency
 - For e.g., given a dataset, train a model, and explain what the model learned and explain some of its predictions
 - Interaction
 - Implement a few active learning approaches

PYTHON PACKAGES

- Python 3.6, 64bit <https://www.python.org/>
- Jupyter notebook <https://jupyter.org/>
- Pandas <https://pandas.pydata.org/>
- Scikit-learn <http://scikit-learn.org/stable/>
- TensorFlow <https://www.tensorflow.org/>
- Keras <https://keras.io/>

GIT AND GITHUB

- We'll use Git and GitHub for assignments and project submissions
- If you are not familiar with these tools, there are many video tutorials that you can watch

QUIZZES (15%)

- Think of them as short exams where you have access to your notes and a computer
- Three quizzes, 5% each
 - Mid February, mid March, mid April
- Quizzes will be proctored
 - In class if you are in section 01, or via IIT Online if you are in sections 02 and 03

PROJECT (35%)

- Interactive and transparent ML application
- Several phases and deliverables
 - Proposals (February)
 - Milestone report (March)
 - Presentation (April)
 - Final report (April/May)

FINAL EXAM (35%)

- A proctored, regular exam
- It will be on the final exam date set by the university

CS578 vs CS584

○ Similarities

- Same algorithms: decision trees, naïve Bayes, logistic regression, etc.

○ Differences

- Additional topics
 - Active learning, transparency, interaction
- Each algorithm discussion will have three components:
 - Foundations
 - Transparency
 - Interaction

ONLINE TOOLS

- Course Materials
 - <https://github.com/CS578-S19/CS578>
- Questions, discussions
 - Piazza
 - <https://piazza.com/iit/spring2019/cs578/>
- Assignments and project submission
 - GitHub
 - <https://classroom.github.com/classrooms/46386925-cs578-spring-2019>

LATE SUBMISSION POLICY

- Add/commit/push early
- Late submissions will be penalized 1 point per minute
- Exceptions are given only when you have a documented emergency

ACADEMIC HONESTY

- If you violate the academic honesty (such as unauthorized/undocumented collaboration, cheating, etc.), then I will report it to the university
 - Just FYI: I reported several cases to the university in the past
- Depending on the severity of the violation, it can result in
 - zero points on the respective assignment,
 - E in the course,
 - suspension of your enrollment at the university,
 - expulsion from the university.
- Full guidelines are available at: <https://web.iit.edu/student-affairs/handbook/fine-print/code-academic-honesty>

AMERICANS WITH DISABILITIES ACT (ADA) POLICY

- Reasonable accommodations will be made for students with documented disabilities. In order to receive accommodations, students must obtain a letter of accommodation from the Center for Disability Resources. The Center for Disability Resources (CDR) is located in 3424 S. State St., room 1C3-2 (on the first floor), telephone: 312.567.5744 or disabilities@iit.edu

TOPICS

- <https://github.com/CS578-S19/cs578#topics>

NEXT CLASS

- What is ML?
- TEDxIIT 2016 Talk
 - <https://www.youtube.com/watch?v=Tx3yuKG9wwY>