

Applied Machine Learning!!!

W207 Section 9

Rasika Bhalerao

rasikabh@berkeley.edu

Aug 23: Welcome!
Nov 8 and 22: No classes

Schedule

Supervised learning methods

	Sync	Topic
2	Aug 30	Linear Regression / Gradient Descent
3	Sep 6	Feature Engineering Bonus: Naive Bayes
4	Sep 13	Logistic Regression
5	Sep 20	Multiclass classification / Eval Metrics Bonus: Reinforcement learning
6	Sep 27	Neural Networks
7	Oct 4	KNN, Decision Trees, Ensembles

Unsupervised learning methods

	Sync	Topic
8	Oct 11	KMeans and PCA
9	Oct 18	Text Embeddings Bonus: Language models
10	Oct 25	CNNs Bonus: GANs
11	Nov 1	EDA, Real data, Baselines, LDA
12	Nov 15	Fairness / Ethics
13	Nov 29	Fancy Neural Networks
14	Dec 6	Final Presentations

Assignment Schedule

Due Date	Assignment
Aug 28	HW1
Sep 4	HW2
Sep 11	HW3
Sep 18	HW4
Sep 25	HW5
Oct 2	HW6
Oct 16	Group project baseline
Oct 23	HW8
Nov 6	HW9
Nov 20	HW10
Dec 6	Final project notebook + presentation

Behavior expectations

- Healthy disagreement is expected
- Be mindful of one another's schedules
- Be a good listener
- Have fun in a professional manner
- Share related real-world experience
- Ask questions when something is confusing
- Keep it 100 but be respectful
- Be open-minded to new ideas in the real world and when coding
- On time for group meetings

How are final projects going?

Guidelines:

https://docs.google.com/document/d/1R7mIH0tYXKU8vEQzw10uofb_iK3sgimw8iZLWSTzdgg/edit?usp=sharing

What are some sources of bias in applied ML?

- Data collection method
 - Method based on ML experts' background
 - Location of data
 - Timeliness of data (recent data)
 - Frequency of data categories
 - Scarcity of data in certain contexts
- In the data (which is real historical data)
- ML experts' preconceived notions
 - Cultural background
 - How they handle data (understanding proxy features, etc)
 - How they design the model
- Labeler bias

Async Practice Quiz Questions

View options (at the top) → Annotate

Issues of Fairness in ML systems are always statistical.	True	False
The data on the web is a representative sample of the real world.	True	False
A system that predicts “criminality” from a face image is most likely detecting subtle contextual cues rather than anything inherent about a human being.	True	False

Async Practice Quiz Questions

One way to make ML systems fairer is to set prediction thresholds so that both precision and recall are matched across sub-groups.	True	False
Data augmentation can make it more difficult for the model to learn biased shortcuts in the data.	True	False
Ideally, adversarial training results in a model that is good at predicting the desired label but bad at predicted some protected category.	True	False
Understanding why models make the predictions they do is a reasonable first step towards improving fairness.	True	False

- Algorithms and Autonomy

- Tradeoff between equal outcomes and fair outcomes

Where can we find bias in non-classification ML tasks?

- Tasks involving text: <https://aclanthology.org/2020.emnlp-main.154.pdf>
 - Autocomplete
 - Speech recognition
 - Text summarization
 - Automatic captions
- Recommender systems
 - Spotify
 - Social media content
 - The order of search results
 - Amazon
- Clustering

Ethical Frameworks

- [Slides on Ethical Frameworks](#)
- [The Ethics Matrix](#)
- [Slides on Applied Ethics](#) (slide 62 onwards)