CMPT 419 E200: HDCAI Spring 2024

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Human- and Data-centered AI

- Special Topics

Agenda

- Discuss readings for this week
- I'll give some of my thoughts, then we'll discuss
- Intro to readings for next week

HCML

Good and bad uses of AI – some go to examples

- auto complete
- predict malignant tumor
- deep fake
- discrimination (skin tone, gender, more)

Progress? in AI

- Deep learning "gains" don't always hold up to scrutinty

People as "objects of prediction"

- How to counter this?
- Fairness, equality, justice

Political concerns

Why is it important to "refine HCML into a unifying and interdisciplinary force across CS rather than risk fracture with each sub-field of CS taking ownership of an independent vision of HCML"

A bit of behind the scenes into CS research

- Subcommunities often run their own conference
- Drives a lot of the incentives of researchers
- This might matter for research-related jobs in industry too
- e.g., some ML jobs list NeurIps papers as a requirement, some Responsible AI jobs list FAccT,

Early HCML

- Chancellor highlights some of the history – the "HCI" community and "FAccT" community played major roles
- Information Science and STS
- CSCW

Acronym Cheatsheet thus far

- HCI: human-computer interaction. Main conference is "CHI", confusingly.
- FAccT: Fairness, Accountability, and Transparency
- CSCW: computer supported cooperative work and social computing
- STS:

What Counts as HCML?

Focusing on Practices

Four suggestions are given, i.e. what can you do when you're a software engineer, manager, research scientist, professor, etc.

- should I use ML?
- what's my "position"?
- users vs. humans
- credit other domains
- iterate on failure

Institutional actions

- new norms at conference, e.g. negative impact statements (NeurIPS)
- institutional support for interdisciplinary research
- computing (broad) vs. computer science
- support students who want to do interdisciplinary research!

Over to DCAI

Problems with data

- "Differences in labeling": do you and I agree if a pill is "scratched"? Does my hospital notes system have a different coding system than yours?
- "Emphasis on big data": what about a rare medical condition?
- "Ad hoc data curation": need to systemize?

Finding label disputes

- We might use tools to find subsets of a dataset with high label dispute
- Influence estimation provides one approach we'll see

Domain Expertise

- get the biologists to label the cells!
- get former players to provide "labels" for sports analytics
- many more examples
- this is where the DCAI argument really starts to merge with the HCAI argument

What is DataPerf

- a so-called "benchmark suite"
- focused on data tasks
- meant to be community run and led

What's a "ML benchmark?"

Conventional model-centric ML definition: "a standard, fixed dataset for model accuracy comparisons and per- formance measurement" (p2, Mazumber et al)

Some terms

- from "Probabilistic Machine Learning: An Introduction", Murphy 2022 (https://probml.github.io/pml-book/book1.html)
- task T to learn mapping f from inputs $x \in X$ to outputs $y \in Y$
- x called features (or covariates, or predictors)
- y is label (or target, or response)
- we have N input-output pairs $D = (x_n, y_n)$ for $n \in (1, N)$. D is the training set, N is the sample size.

Comparing model-centric benchmark and data-centric benchmark

- in model-centric, we have a fixed dataset D and we try a bunch of different ways to find f
- change model architecture, change training hyperparameters, change task metrics
- in data-centric, we keep all these fixed and just change D

Testable concept: is a benchmark data centric

- you might imagine a test question that describes several differents tasks and asks you to identify which one is "data-centric"