

Intro to Human-in-the-Loop ML.

* Goals

- ↑ accuracy of ML.
- reach the target acc faster
- combine human + machine → maximize acc.
- Assist human with ML. → increase efficiency.

* Annotation → Process of Labeling.

↳ Quality

- Random noise → OK
- Human Error → NOT Random noise → Irrecoverable Bias

* Active Learning → ↑ speed ↓ cost of training data.

↳ Process to decide which data to sample for human annotation.

↳ 3 strategies: (Sampling)

- Random - always annotate some random data.
- Uncertainty - identify unlabeled data that are near decision boundary.
- Diversity - identify unlabeled data that are underrepresented (might have rare features)

↳ names - representative/stratified/outlier/anomaly.

↳ Evaluation data (2)

- same as training data
- out of domain from a different source.

~~different source.~~

↳ When? → ① can annotate small fraction ② random will not cover.

* ML + HCI

↳ create training data

- web
- binary task.
- OK keyboard.

↳ Priming → influence annotators' decision
 - repetition priming → from previous annotations.

↳ Create Labels by evaluating ML prediction
 - Ex. ask if predicted BBox is correct.
 - Risk $\times \times$ → focus on localized model uncertainty.

↳ Principle for Annotation UI
 - Binary when possible
 - ensure that results are diverse → avoid priming
 - existing interaction conventions.
 - Use keyboard.

* ML-assisted human VS. human-assisted ML.

* ML more accurate with human

* human task ↑ with ML.

↳ Machine translation ↔ human translation.

* Transfer Learning.

* pretrained model → specifically for TL.

↳ CV

- pre-trained edge / texture detection → retrain classification.

↳ NLP

- similar words → high score in similar context.

- remove some percentage of the words in raw text
 ↳ turn them to predictive ML task.

- order of words / sentences → don't need human.

- amplify cultural bias.

Quadrant	K	U	
K	current Model	Uncertainty Samp.	solve within current model
U	Transfer L.	Diversity Samp	solve with outside current model.

address by Algo

Address by Human

How WEIRD is CHI?

- Western
- Industrialized
- Democratic.
- Educated
- Rich

* Contribution

1. Empirical Analysis of CHI participants. (Western)
2. Also industrialized + rich + democratic + educated
3. sample → us
4. actionable suggestions.
5. Available data.

* Method

- analyze CHI 2016-2020 (OR) 3,269 articles

↳ Analysis

- Western - look at participant.
- Educated - year of schooling.
- Industrialized - Use GDP
- Rich - Participants' GNI per capita. + Income.
- Democratic - political rights by country.

↳ Scheme:

↳ 1 ~~author~~ author → analyze 100 paper → get ~~data~~ type of info. to extract.

↳ Normalize by population:

↳ participant in country ratio / participant in world ratio.

~~WEIRD~~ WEIRD → EIRD

* participant → same country as author.

Finding

- ① Less weird
- ② online
- ③ ICTD

* CHI → more diverse than Psych
↳ but repeatedly the same countries.

☆ Call to Action.

- Diversify Authorship
- Online Research. → how to preserve data quality;
↳ be careful who get benefit.
- Develop methods for studying geographically diverse samples.
↳ how to reduce bias when use translator?
- Appreciating replication and extension of finding.
- Report + Track the international Breadth of participant.
- Identify the constraint on generalizability.
↳ should ack. that western study cannot be generalized.

Eliciting Tech Futures Among Black Young Adults: A Case Study of Remote Speculative Co-Design.

* Who gets to contribute to design future?

* Study: ~~imagines~~ Technology roles in imagined future.

* Speculative Design: expand imagined alternate futures for tech.

* Co-design: diverse comm. to design future

↳ who?

↳ for who?

* Motivation: to understand

- visions of tech. utopias → post pandemic

- critical reflection of ways marginalized youth contribute to tech. future.

* Speculative Design with Marginalized Pop.

↳ empathic design.

* Co-Design for Remote Engagement.

↳

* Core Questions

① Co-design support the generation of utopian future idea in what way?

② What youths' imagined a-/distopia → what is tech's role?

③ How design fiction → elicit concept of future utopia?

④ speculative codesign impacted by remote engagement?

* Methods

- extra session to Art Incubator.

- 2 h. → once a week. → 6 weeks.

① Intro:

- introduce concepts - co-design, spec. design, Afrofuturism.

- prompt for element of dis/utopia

- ideas in work book.

- feedback "I like - I learned - I wish"

② + ③ Envisioning U-/Dis-topian Future.

- * introduce tech. concepts → AI, IoT, ML...
- * provide prompts → focused on envisioning techs. that speak utopian future.
- * story board → collaboratively → their tech ideas.

④ + ⑤ Ideation + Collab Design Fiction.

- * elicit + share ideas.
- * what it would look like for their techs to exist in current + future
- * build off of one another's ideas.

speculated utopian
↓

⑥ Report Out.

- * share ideas
- * potential ways to share to larger audiences.

* Speculative Probes.

- Co-Design Guide / Workbook.
- Black Mirror Episodes as Probes.

* Findings.

- Themes of U/distopia. (3)
 - 1) Addressing Social Conditions in Chicago.
 - 2) Impact of Ongoing Global Pandemics on South Side Neighborhood.
 - ↳ greater impact on South.
 - 3) Speculative Technologies as Metaphors of Existing Oppression.

- Design Concepts

- Magnetic Rings - Passage way. - VR.

* Discussion.

- Ideas of Speculative Futures in a City Divided. → still some form of racism.
- ~~Research~~ Implications for the future of remote Spec. co-design at the Margin.
 - ↳ Engaging Marginalized Perspective of Spec. Design.
 - ↳ The value in Diverse Design Fiction Probes. → designer + non-designer comm.
 - ↳ Importance of Flexible Schedule. → Breaks.

Tangible Bits.

* Core Concept → Interactive + Graspable + Ambient.

↳ TUI: Bridges world of Bits & Atoms.

↳ Augment Physical env

* Goals:

1) Interactive Surfaces

2) Coupling of Bits & Atoms → everyday's graspable objs.

3) Ambient Media → Background interface.

* Ways to improve:

1) users → grasp & manipulate "foreground" bits

2) users → aware of "background" bits.

* meta Desk: (Foreground)

- TUI lens phicon tray phandle instrument

GUI windows icon menu handle widget.

- Tangible Geospace: App. → model of landmarks as phicon → manipulate 2D/3D map.

* ambient ROOM: (Foreground + Background)

↳ use ambient to ~~etc~~ subtly communicate info.

↳ EX. car toy as phicon → move to sink → display stats as ambient water ripple.
 rain. ↑
 ←

* trans BOARD: (Foreground)

↳ white board + interactive surface.

↳ view realtime/recorded drawing.

↳ hyperCARD (phicon) → record strokes

↳ cannot display.

* Discussions

- Optical metaphors

- active LENS — magnifying glass

- phicon — "digital shadow"

- obey optical constraints → what people expect.

At home with UbiComp - 7 challenges. (2001)

Edwards + Grinter

* Purposes

- 1) Illuminate technical change to produce domestic computing
- 2) field study on domestic tech → influence smart home.

* 7 challenges

① The "Accidentally" Smart home:

- ↳ Homes are not custom designed for being smart.
- ↳ Ex: wireless speaker (no wire) → how to debug.
- ↳ need to provide "signifier" to help user understand
 - when operate
 - potential config
 - when interact (with who)
 - Where UI?
 - boundaries
 - how to control?

② Impromptu Interoperability:

- ↳ "Impromptu" little to no planning to connect.
- ↳ must agree on sets of standard.
- ↳ Standard syntax → leave human to impose semantic. (API?)

③ No Sys Admin:

- ↳ Cannot expect users to admin their home. not interoperable
- ↳ 2 Models:
 - Appliance - 1 function → when break → expect fix
 - Utility - device contain minimal+simple front end.
 - ↳ intelligence in network. (phone)
 - ↳ can expand func.
- ↳ challenges - Appliance - how to deliver rich func. w/o losing simplicity.
- Utility - how to remote update / diagnose securely.

④ Designing for Domestic use:

- ↳ design from domestic routines. (diff. from office)
- Ex. phone → social instead of emergency.
- Use text to coordinate tel. / instant messages.

⑤ Social Implications of Aware Home Techs.

① EX. washing machine → labor saving - BUT → increase expectation for cleanliness for woman → do more work.

② TV/Phone → good parenting?

↳ cannot be reliably predicted.

⑥ Reliability: cannot crash all the time...

↳ 4 diffs to software sys.

① Dev culture → embedded sys dev focus on reliability patch with out interrupt service.

② Arch. → functionality on network. (utility) new func. → degrade gracefully (don't bring whole sys down) ↳ redundancy ++ But not simple.

③ Market expectation → consumer's expectation from media. ↳ phone / TV don't crash.

④ Regulation → insurance demand certain security...

⑦ Inference in the Presence of Ambiguity:

↳ how smart a smart home should be?

↳ when to infer?

↳ design for - users have model ^{expect} of their home → fix failure?

↳ will need to interpret sensor data. (multiple)

↳ report being in room → actually just left badge.

↳ Interface VS oracle.

limited error

never be right all the time. ^{be} (transparent)

users need to understand → provision if fail.