



No Questions are Stupid, but some are Poorly Posed: Understanding Poorly-Posed Information-Seeking Questions

Neha Srikanth
University of Maryland
nehasrik@umd.edu

Rachel Rudinger
University of Maryland
rudinger@umd.edu

Jordan Boyd-Graber
University of Maryland
jbg@.umiacs.umd.edu

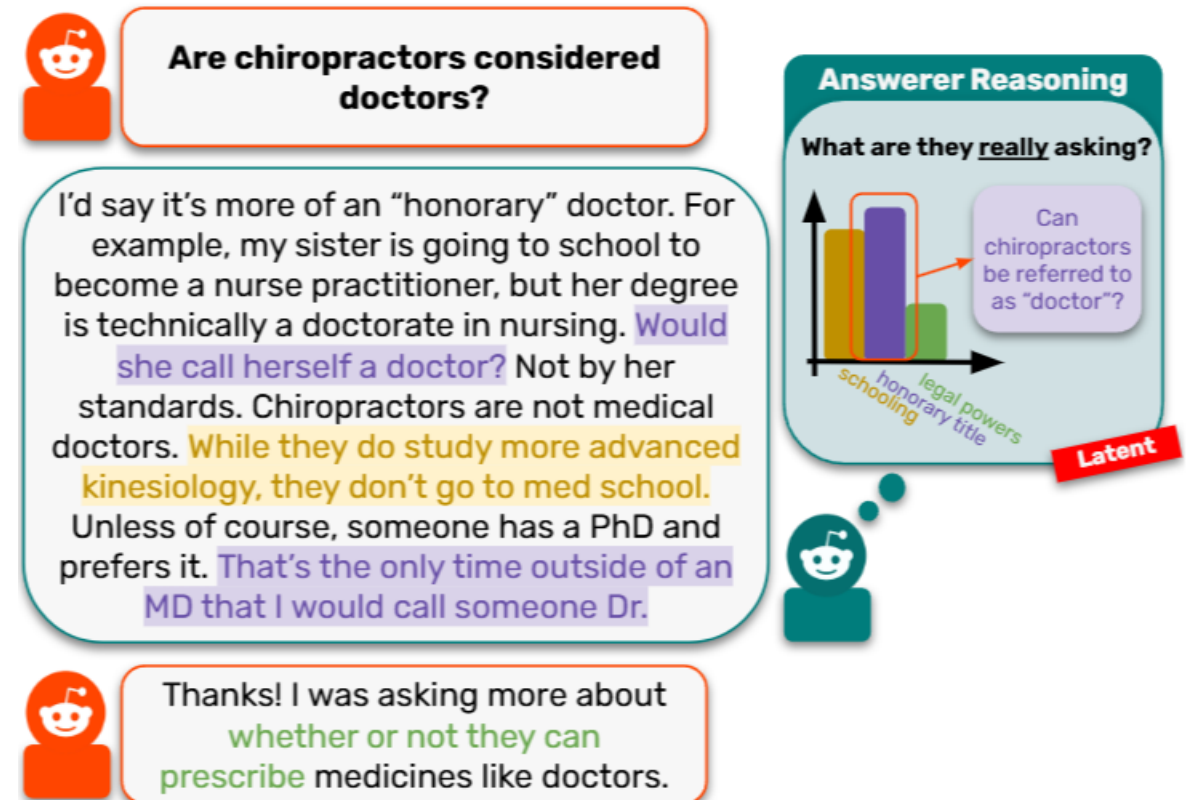
HUMANE Lab 석사과정 김태균

2025 ACL

2025.09.04

Introduction

- When the question is poorly posed, answerers may struggle to answer the question



does not align with the asker's original need ->

Poorly-posed question

- Process of asking a question
 - unexpressed need for information, arising from some dissatisfaction
 - identify a description of their dissatisfaction but do not know much about what they are asking about
 - formalize their need as a question
 - reformulate their question in the previous stage, taking into account whom it will be asked

Poorly-posed question

- Definition
 - answerers cannot identify a dominant interpretation of the question

Then what information is needed?

Dataset construction

- Source
 - r/NoStupidQuestions: ask questions about any topic at any level
- Filtering
 - less than four characters, less than five upvotes, ...

Dataset construction

- Structure (Q, A, R)
 - question, answer
 - reply: comment from the original asker addressing answer
 - classification: **met** / **not met** / not determinable
 - 500 samples (100:met, 400:not met)

← r/NoStupidQuestions • 27 min. ago
According-Strike2298

Why do some people say being neurodivergent isn't an excuse to be socially awkward?

I mean... doesn't being socially awkward tend to be a huge symptom of neurodivergence?

↑ 2 ↓ 5 🔔 Share

Best ▾ 🔍 Search Comments

East-Bike4808 • 21m ago • Edited 16m ago
Top 1% Commenter

Neurodivergence isn't a disease. It's an umbrella term for basically anyone whose brain functions "differently". It's a non-medical term. A lot of conditions/syndromes/etc. are included in it, but it's not the reason you have it: it's just a *term for having it*. It's like saying my excuse for having a favorite color is that there is a color which I like more than others. Or my excuse for having a cold is having a viral infection from a cold virus.

Having a headache is my excuse for my head feeling pain from the inside. No... that's just what a headache is. The thing you got goin' on which causes your social anxiety is why you'd be considered neurodivergent.

⊖ ↑ 2 ↓ Reply Award Share ...

According-Strike2298 OP • 10m ago

I just used neurodivergent as an umbrella term, but I mostly see this criticism towards autistic people...

⊖ ↑ 1 ↓ Reply Award Share ...

East-Bike4808 • 8m ago
Top 1% Commenter

Being autistic is totally an excuse for being socially-awkward.

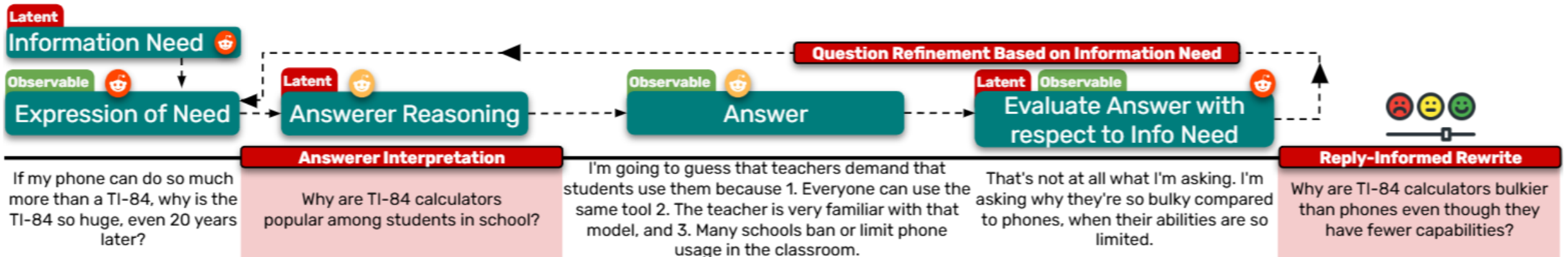
...Well, it's a *reason* for being socially-awkward. There are still social situations where being socially-awkward just isn't gonna fly even if there's a valid explanation for why it's happening.

If I was leading a board meeting at work and started... peeing uncontrollably because of some bizarre medical condition caused by eating bad pineapple or something, that's the reason I'm doing it. But let's still get me out of the board room and have someone else do the meeting: it doesn't excuse it and mean I can carry on.

↑ 2 ↓ Reply Award Share ...

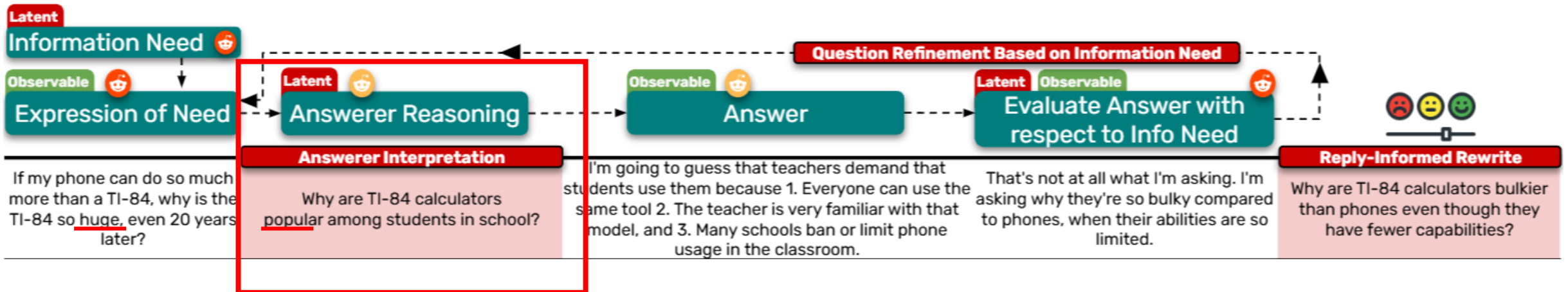
Dataset construction

- Expert annotation
 1. reconstructing answerer interpretations
 2. reply-informed question reformulation



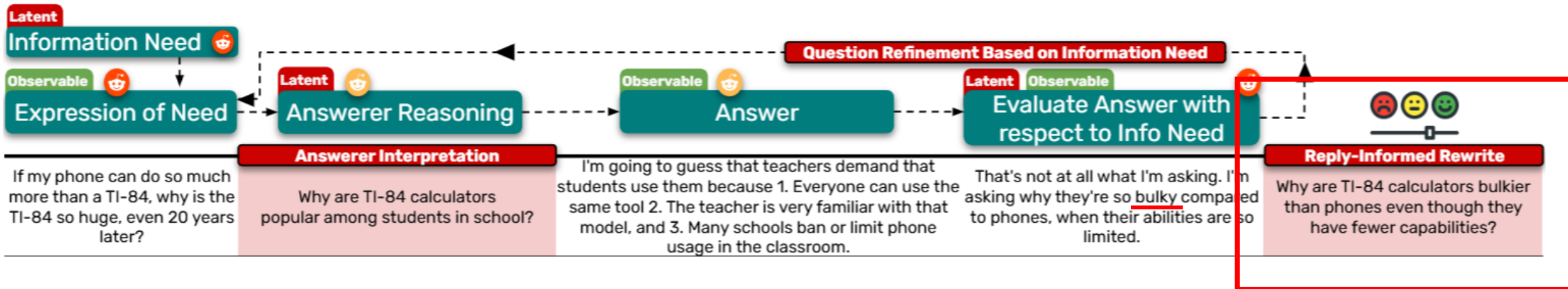
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Dataset construction

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Question interpretations

- Identifying likely interpretations of a question is the first step in building a distribution of which interpretations answerers choose

- $I_1, I_2, \dots, I_n \in S_I$

=> How to build space of valid interpretations?

Question interpretations

1. Interpretation generation

- prompt LLM to generate interpretation for each question

2. Deduplicating interpretations

- embed each I and then compute pairwise cosine similarity
- interpretations with high similarity are grouped into a single clique
- for each group, one representative interpretation(S_I) is selected

Identifying poorly-posed questions

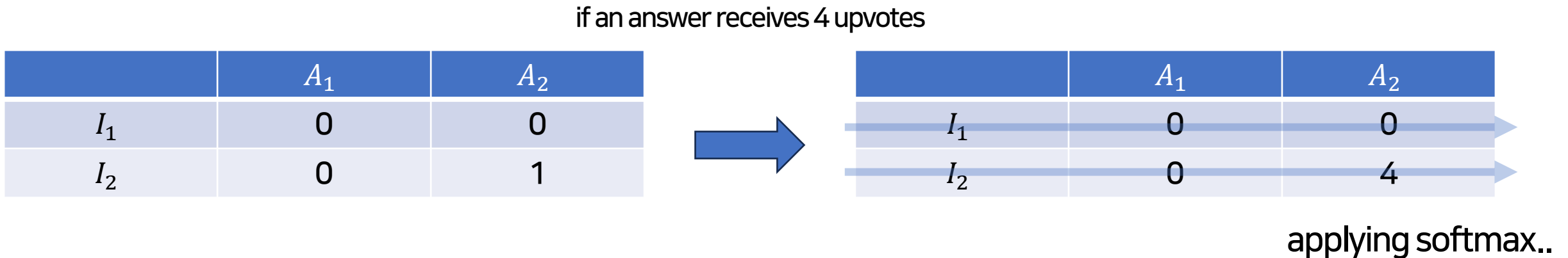
- Measuring poorly-posedness from interpretation distributions
- Asker replies and poorly-posed questions

Identifying poorly-posed questions

- Measuring poorly-posedness from interpretation distributions
 - an answer adopts interpretation if it contains the information necessary to answer
 - use flan-t5-xxl to match answers with interpretation (extractive QA setup)

Identifying poorly-posed questions

- Measuring poorly-posedness from interpretation distributions
 - an answer adopts interpretation if it contains the information necessary to answer
 - construct an interpretation-answer matrix



Identifying poorly-posed questions

- Measuring poorly-posedness from interpretation distributions
 - an answer adopts interpretation if it contains the information necessary to answer
 - construct an interpretation-answer matrix
 - compute the entropy of the distribution
 - high entropy: indicating a poorly-posed question
(e.g., [5, 5, 5, 5, 1] -> [0.24, 0.24, 0.24, 0.24, 0.01])

Identifying poorly-posed questions

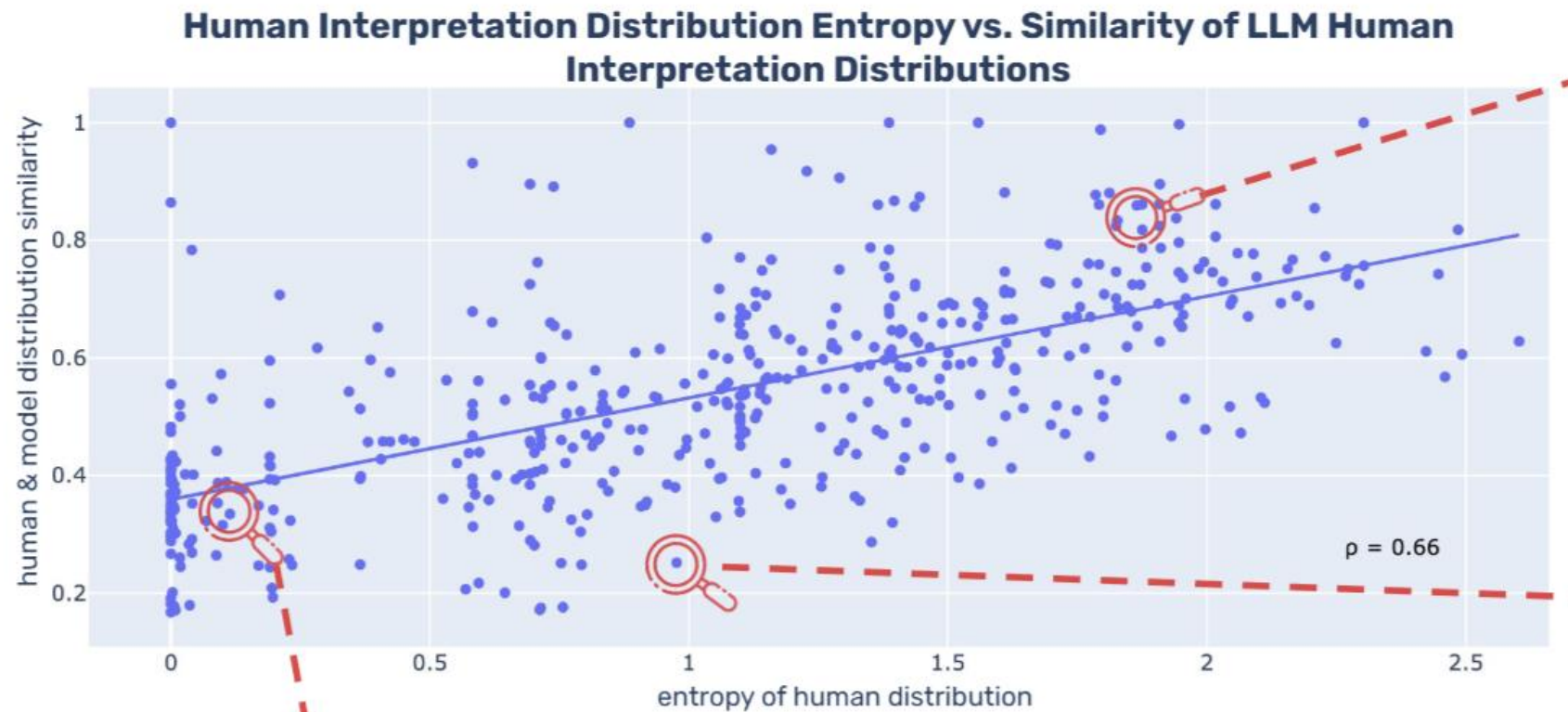
- Asker replies and poorly-posed questions
 - asker replies are more likely to leave
 - asker replies are more likely to be positive
 - non-dominant interpretations are more likely to receive positive asker replies

Contrasting human and machine answers

- Experiment with computing distributions over interpretations chosen by LLMs on questions
 - models are prompted to respond in five sentences or less, forcing them to adopt their likely interpretations

Contrasting human and machine answers

- Models produce high entropy interpretation distribution on poorly-posed questions



Contrasting human and machine answers

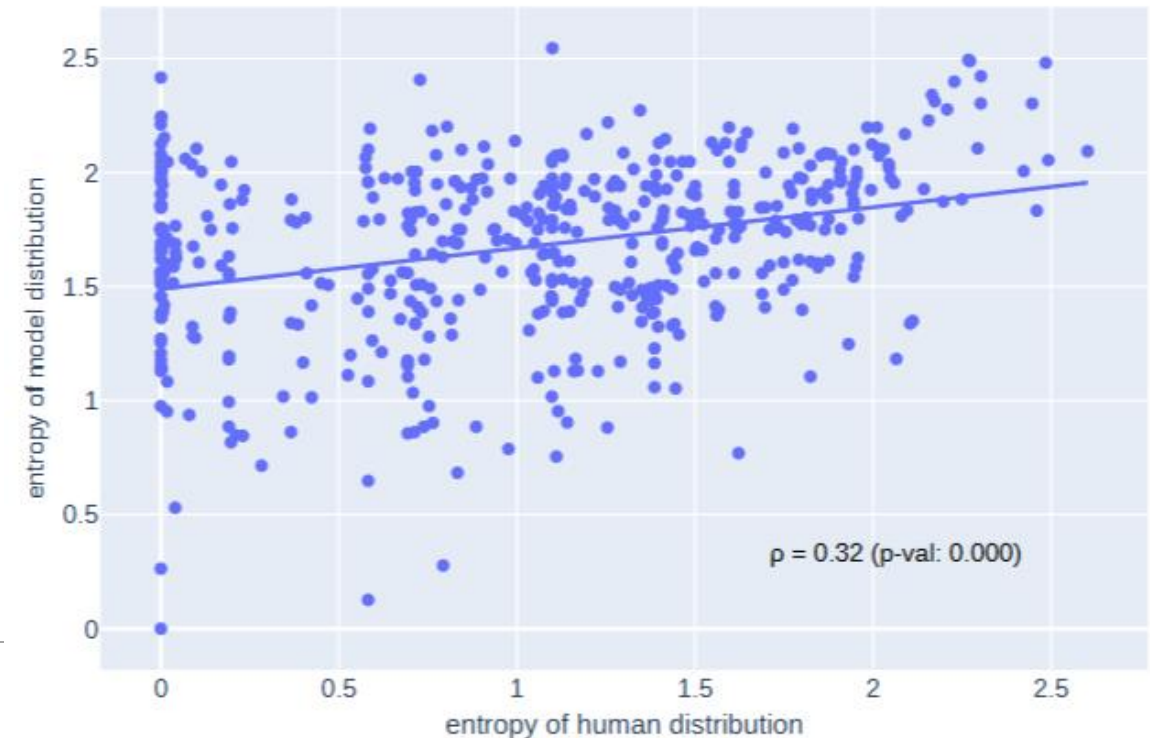
- When they do converge, models and humans converge on different interpretations
 - human: reason about the intent behind the question

Q : "Why can't I get drunk?"

A_H : "Am I consuming alcohol in a way that does not lead to intoxication?"

A_M : "legal drinking age or medications that may interact with alcohol..."

Human Interpretation Distribution Entropy vs. Model Distribution Entropy



Contrasting human and machine answers

- Models are recall-oriented answerers
 - human: focus on specific interpretations
 - model: attempt comprehensive coverage by addressing many interpretations

Question	Human-Written Interpretations	Model-Generated Interpretation Space
Do doctors (M.D., D.O., etc.) work outside their specialty under any circumstance?	<p>(1) Do hospitals limit when and how doctors can work outside of their specialty?</p> <p>(2) Do insurance companies limit payment for specialties to doctors trained in that area?</p> <p>(3) Do doctors trained in one specialty have the skills to work outside of that specialty?</p> <p>(4) Why won't my (x specialty doctor) do (thing I want that y specialty doctors do)?</p> <p>(5) If I am studying (x branch of medicine), will I still be allowed to do (y thing I enjoy doing)?</p> <p>(6) Do doctors have knowledge outside of their specialties?</p> <p>(7) When can I trust my doctor?</p>	<p>(1) Are doctors (M.D., D.O., etc.) legally allowed to work outside their specialty in emergency situations?</p> <p>(2) Can doctors (M.D., D.O., etc.) choose to work outside their specialty if they have additional training or certification in another area?</p> <p>(3) Do doctors (M.D., D.O., etc.) ever work outside their specialty due to staffing shortages or in rural areas?</p> <p>(4) Are there any regulations or guidelines that permit doctors (M.D., D.O., etc.) to practice outside their specialty in certain healthcare settings?</p> <p>(5) How often do doctors (M.D., D.O., etc.) work outside their specialty in practice, and what are the common reasons for doing so?</p> <p>(6) Can a doctor who specializes in, for example, cardiology, ever perform surgery?</p> <p>(7) Do doctors ever collaborate with specialists outside their own area of expertise?</p> <p>(8) Are there instances where a doctor might be required to provide care outside their specialty due to an emergency situation?</p> <p>(9) Is it common for doctors to work in multidisciplinary teams that involve other specialties?</p> <p>(10) Can a doctor with a medical degree work in a general practice setting, even if they have specialized training?</p>

Conclusion

- A poorly-posed question occurs when answerers cannot identify a dominant interpretation
- Poorly-posedness is measured via interpretation distributions to compare how humans and models recognize such questions