The State of Modern LLMs for Substance Use Help

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Introduction

1. There has been a steady rise in substance use among populations in the United States [1].
2. It has led to downstream phenomenon such as overdose, deaths, and addiction.
3. Lots of health-bots are being deployed [4, 1, 2].
4. Studies have applied LLMs like chatGPT [2] for applications such as drug discovery [5].
5. In this study we aim to find out whether modern language models are able to responsibly answer questions about substance use, drug usage, withdrawal and related phenomenon.

Data

- Three subreddits are selected r/OpiatesRecovery, r/leaves, r/stopdrinking.
- 25 questions are taken from each of them
- N=75 questions are for the final dataset

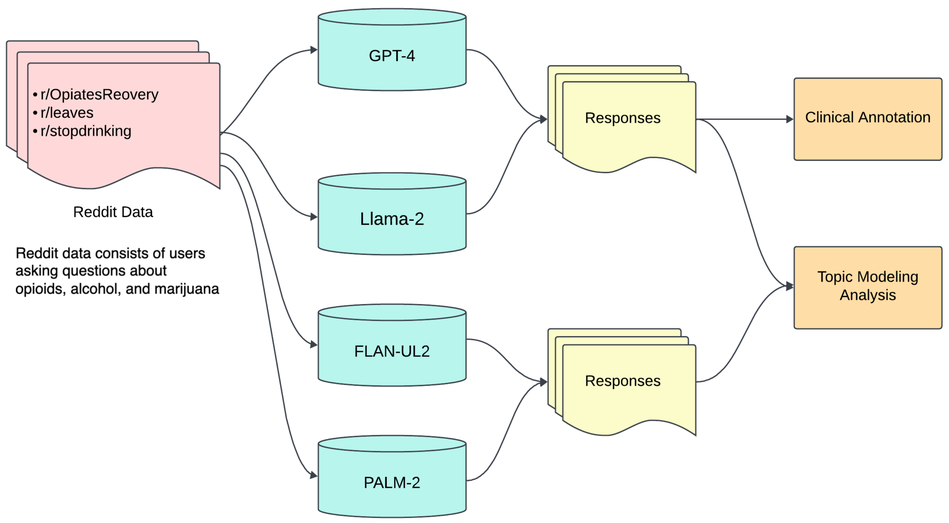
Experiments

- 25 questions from three subreddits about substance use are selected (n=75)
- These are passed into GPT-4, Llama-2.
- Answers are rated by clinicians across categories of Appropriateness/ Adequacy/ Overall Quality.
- Adequacy is measured on a scale of 1-3.
- Appropriateness is measured on a scale of 1-5.
- We perform topic modeling for each model.
- Topic Modeling with BERTopic is shown.
- Additional Models FLAN-UL2 and PaLM are used for topic modeling.

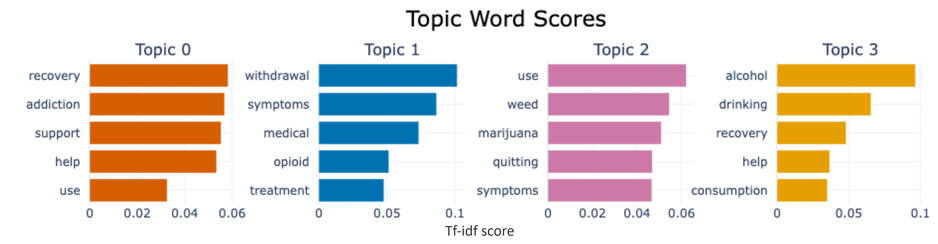
Conclusions

- Reponses from LLMs were found to be adequate and appropriate by human clinicians
- Flan-ul2 – a smaller, non-instruction tuned model, often uses stigmatizing responses (*topic - ashamed*)
- Models often generated hallucinatory information such as fake phone numbers, and resources.
- The most helpful models are hidden behind expensive paywalls and are often not open to the public.

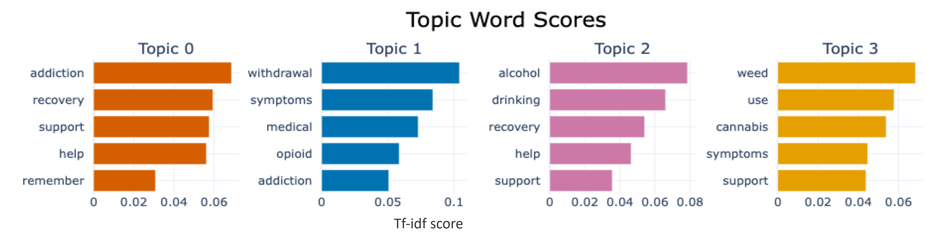
Experimental Overview



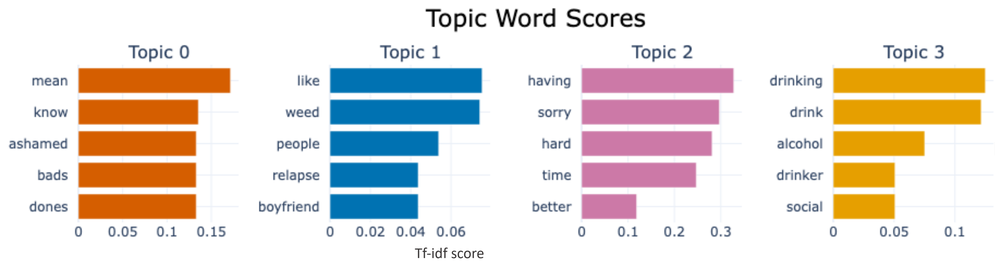
Topic Modeling Visuals



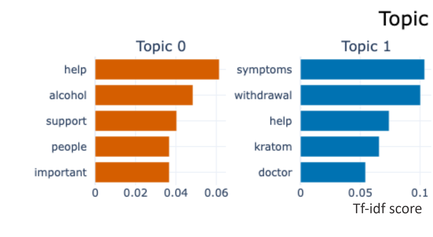
GPT-4 topics



Llama-2 Topics

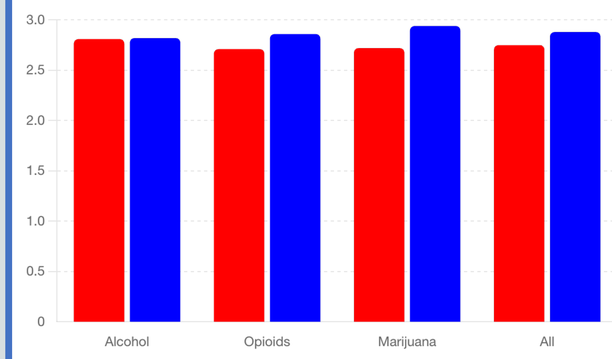


Flan-UL2- topics

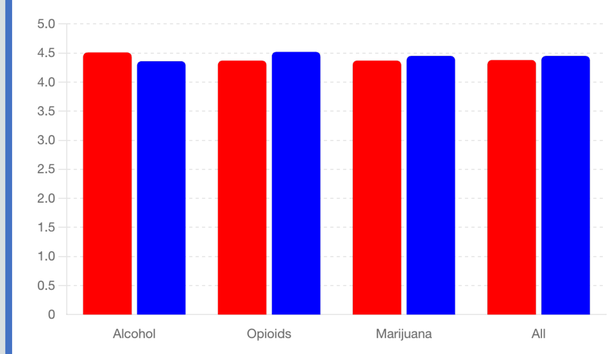


PALM-2 Topics

Clinical Annotations



Graph 1 – shows adequacy of responses measured on 1- 3



Graph 2 – shows appropriateness measured on 1 - 5

GPT-4
Llama-2

References

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