Depression Detection

- Week 17

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Duration of the presentation: ~10 minutes

Agenda

1. **Reinforcement Learning Method: Qualitative Reward Function**
2. **Creation of Top n Responses – PHQ Questions**
3. **General Purpose LLM based method**
    1. Overall Methodology
    2. Results
4. **Data Augmentation: Easy data Augmentation**
5. **Tentative Plan for next week**

Reinforcement Learning: Qualitative Reward Function

[1] Mining and Summarizing Customer Reviews, (Hu et al, 2004) | Paper

Table 1: Results showing variations on modifications to reinforcement algorithm – Metrics obtained with Yuxin's Model

	Accuracy	F1	Recall	Precision
Full transcript	0.64	0.65	0.67	0.63
Reinforcement texts	0.56	0.65	0.82	0.54
Reward Modification (1 + 2)	0.53	0.61	0.73	0.52
Reward Modification (1 + 2 + 3)	0.44	0.61	0.88	0.47

Reward Modification Tried:

- **Aim**: To include Qualitative Features
- **Features:**
  1. Lexical Diversity
  2. Emotionally relevant keywords
  3. Readability

Creation of Top n Responses – PHQ Questions

Fig 1: Methodology to select top n responses

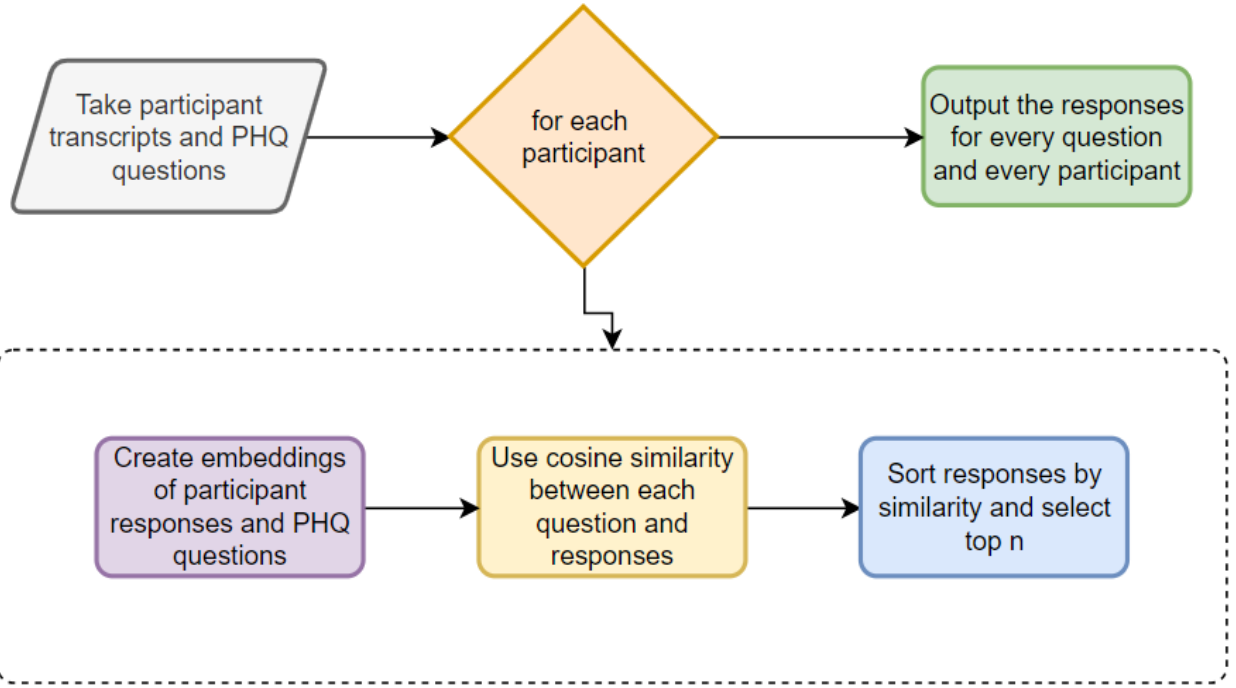
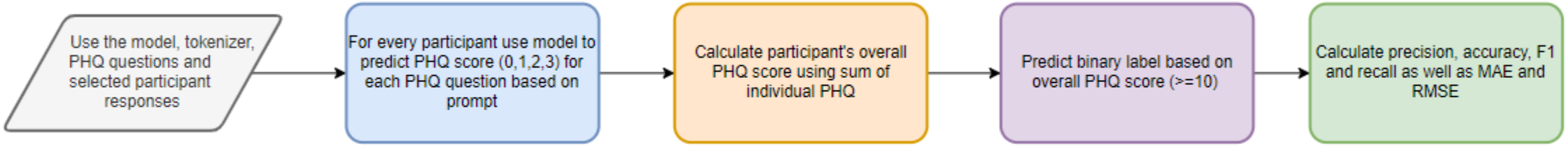


Table 2: Example Showing selected responses for a participant

Participant id	phq2	phq6
491	a feeling of emptiness and loneliness and isolation and. oh just dealing with my siblings and my family and. yeah when i went through that divorce um and my mother passed that i was really depressed. um when my mother was sick to be her primary caretaker put all my dreams and aspirations on hold. fatigued tired uh	like i said i'm overwhelmed but i can't stop doing what i need to do. <sigh> lately it's been so difficult 'cause school and finals and midterms and all that is coming up. health issues. my outlet is riding my bike or either going swimming. i no matter what i did i couldn't get any enjoyment just

General Purpose LLM based method

Fig 2: Methodology of the LLM model



Details:

Model: Intel's open source – Neural – Chat 7b
Prompt: This is a set of selected responses from interviews with a participant. If you were a clinician providing a diagnosis for the PHQ symptom: {question} \n Participant Response: {response} \n Based on the level provide only a single number 0, 1, 2 or 3 as a response.

General Purpose LLM based method: Results

Table 3: Example representing output from the LLM model

personId	PHQ1	PHQ2	...	PHQ8	PHQ Score	Label
476	0	2		0	2	0

Table 4: Metrics for the LLM model classification

Accuracy	F1	Recall	Precision	TP, TN, FP, FN
0.58	0.50	0.68	0.40	72, 38, 61, 18

Table 5: Metrics for the LLM model regression

RMSE	MAE
6.82	5.55

Data Augmentation: Easy data Augmentation

[2] EDA: Easy Data Augmentation Techniques for Boosting Performance on Text Classification Tasks, (Wei et al, 2019) | Paper

Fig 3: Steps in Augmentation

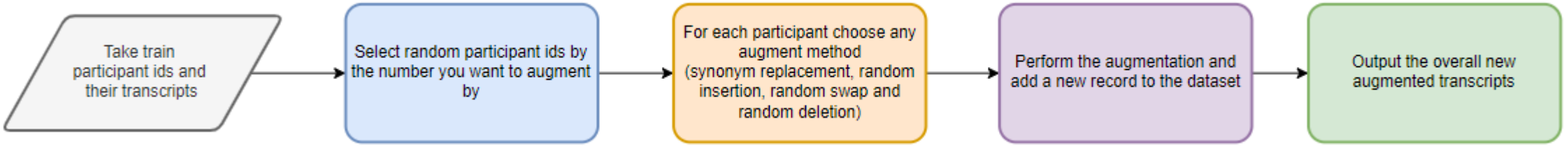


Table 6: Data distribution before and after augmentation

Dataset	D	ND	Total
Original	30	77	107
Augmented	100	77	177

Table 7: Comparison of performance of augmented transcript on Yuxin's model

	Accuracy	F1	Recall	Precision
Raw Transcript	0.64	0.65	0.67	0.63
Augment Transcript	0.65	0.58	0.48	0.73

Tentative Plan

Plan for next week

1. Work further on LLM ideas – overall binary prediction and few shot learning
2. Iteratively improve on the variables of Data augmentation method and try on other versions of the data.
3. Continue writing literature review paper

Relevant Links

1. Overall project plan and timeline: Link
2. Analysis and notes from relevant papers: Link
3. GitHub documenting everyone's presentations and codes: Link
4. Overleaf document for the literature review: Link

End