

# DeepPHQ: Predicting Depression Severity from Interview Transcripts

Team: DeepPHQ

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## Project Summary

Depression detection is an important problem in computational psychology and mental health research. The **Patient Health Questionnaire (PHQ-8)** is a clinically validated survey used to assess the severity of depressive symptoms. In this project, we aim to predict participants' PHQ-8 scores from transcribed interview text using the **Distress Analysis Interview Corpus – Wizard of Oz (DAIC-WOZ)** dataset. The dataset contains clinical interviews between a virtual agent and human participants, each labeled with a PHQ-8 depression score. Our goal is to develop and evaluate deep learning models that can infer an individual's depression level from linguistic patterns in their spoken responses.

## Approach

We will formulate this as a supervised regression problem where input features are text transcriptions and the target variable is the PHQ-8 score. We plan to experiment with multiple neural architectures, including **LSTM-based recurrent models** and **Transformer-based models**, to compare their ability to capture semantic and contextual cues in natural language. Each model will be trained with dropout regularization and Adam optimization, and we will evaluate the trade-offs between model capacity and overfitting. Pretrained embeddings will be used for initialization, followed by fine-tuning on the DAIC-WOZ dataset. Metrics such as Mean Squared Error (for regression) and classification accuracy (for discretized PHQ categories) will be reported. Our analysis will focus on how model architecture and data representation influence depression prediction performance.

## Resources / Related Work

Prior research has demonstrated the feasibility of using linguistic and acoustic features for depression detection. *Gratch et al. (2014)* introduced the DAIC-WOZ corpus, establishing a multimodal benchmark for distress analysis. Recent studies such as *Yang et al. (2020)*, “*Detecting Depression from Text Using BERT*” and *Tzirakis et al. (2021)*, “*Multimodal Depression Estimation Using DAIC-WOZ*” have shown that contextual embeddings from Transformer models outperform traditional feature engineering methods. Our project builds upon these works by focusing exclusively on the textual modality, aiming to systematically compare deep sequence architectures and analyze their interpretability in this clinical setting. All implementation will be done in PyTorch, and model training will be performed on Colab or Georgia Tech PACE GPU resources.

## Dataset

We will use the **DAIC-WOZ dataset** (<https://dcapswoz.ict.usc.edu/wwwdaicwoz/>), which includes audio, video, and textual transcripts of clinical interviews along with PHQ-8 depression scores for each participant. In our project, we will exclusively use the *text transcripts* as model input and the *PHQ-8 score* as the regression label. The dataset is widely adopted in affective computing and provides sufficient samples for training and evaluation without the need for manual data collection or annotation.

## Team Members

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