

# Mental Health Meme Classification

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# Motivation

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- **Context:** Memes are increasingly being used to express personal struggles, especially mental health concerns like anxiety and depression.
- **Example:** Memes such as "When you're too anxious to text back" or "the feeling of impending doom before an exam" reflect anxiety and other symptoms.
- **Need:** There is a need for a model that can classify such meme automatically to detect mental health symptoms, which can be valuable for researchers and mental health practitioners.
- **Impact:** This classification could help in identifying mental health issues early and providing appropriate support.

# Related Work

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- **Mental Health Meme Classification:** Some recent works have attempted to classify mental health memes but struggle with complex figurative language humor, and multimodal understanding.
- **Challenges:** Existing models like BERT and DeBERTa are limited by their ability to interpret figurative language, sarcasm, and visual-textual interactions.
- **Gap:** While multimodal approaches like LLaVA and GPT-4o show promise, there's a need for better models that can understand the nuanced expressions of mental health issues in memes.

- **Multimodal Model:** Combining text (OCR-extracted text) and images (meme visuals) to classify mental health symptoms.
- **Figurative Reasoning:** Using commonsense reasoning to interpret figurative language language and humor.
- **Knowledge Fusion:** Integrating external knowledge through a Retrieval Augmented Generation (RAG) method to improve understanding.
- **Classification:** Using transformers like GPT-4o and BART for final symptom classification based on multimodal inputs.

- **OCR Extraction:** Extracting text from meme images .
- **Commonsense Reasoning:** Using GPT-4o for generating figurative and commonsense reasoning about memes .
- **RAG:** Combining relevant meme examples retrieved from a database to .  
enhance understanding before classification.



- **Fusion of Visual and Textual Features:** Combined CLIP (image features) with different textual models (BERT, Sentence Transformers, and RoBERTa) to classify anxiety-related symptoms from memes.
- **CLIP + Mental BERT:** Combined CLIP's visual features with BERT's text embeddings.
- **CLIP + Sentence Transformers:** Used sentence transformers (paraphrase-MiniLM) to process meme text.
- **CLIP + RoBERTa:** Integrated RoBERTa for better text understanding alongside CLIP for visual cues.

# Evaluation Results of Three Approaches



## Comparison of Evaluation Metrics:

Approach	Accuracy	Macro-F1	Weighted-F1
CLIP + Mental BERT	0.5367	0.4835	0.5174
CLIP + Sentence Transformer	0.5681	0.5276	0.5548
CLIP + RoBERTa	0.3881	0.3187	0.3530

Results - Anxiety Dataset:

Approach	Accuracy	Macro-F1	Weighted-F1
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# Conclusion

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- **Project Success:** Successfully demonstrated that combining CLIP with text-based models (BERT, Sentence Transformers, and RoBERTa) enhances the ability to classify mental health symptoms in memes.
- **Best Performing Approach:** CLIP + Sentence Transformer showed the best results in accuracy and F1 scores, making it the most effective model for the task.

