

# MENTAL HEALTH SUPPORT WITH MACHINE LEARNING: A PREDICTION-BASED CHATBOT FOR COLLEGE STUDENTS.

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## INTRODUCTION

Mental health problems and illnesses affect millions globally, including college students. Their mental health awareness is considered to be higher than in previous generations, nonetheless, they are still faced with stigmas, peer pressures, and socio-cultural barriers that hinder them from seeking the proper, adequate, safe, affordable, accessible, and professional mental health support that they need in the university.

Early screening in assessing their problems and needs, followed by prompt, continuous, and personalized support is critical in improving their mental health status and academic performance. Recent advancements in machine learning offer promising solutions by enabling the development of more accessible, cost-effective, safe, and scalable tools for mental health support.

## OBJECTIVE

This study aims to design and develop a prediction-based chatbot for mental health support for college students and later integrate them as a part of a mental health system intervention on campus. It leverages machine learning algorithms to identify emotional states, predict mental health risks, and deliver real-time tailored support.

## METHODOLOGY

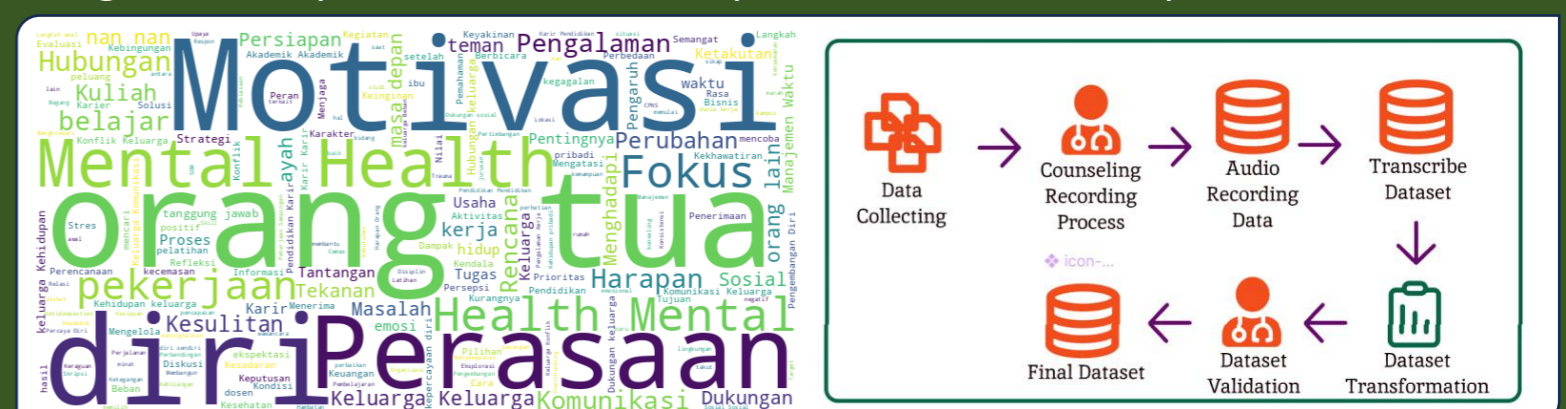
We are building a mental health chatbot for college students using four main phases. In the initial phase, we finalize the mental health support tools needed by college students and set boundaries for ethical consideration in healthcare and psychology while conducting the research. The second phase is the data collection phase, where we collect the data, categorize, and label them.

The next phase is to fine-tune the LLM model with our collected data, this process will help the model learn about context, terminology, and tone specific to our data. This will ensure the chatbot can generate accurate, context-aware, and user-friendly responses. The last step will be the validation, trial, and integration phase, the chatbot will be validated and tested by mental health professionals and tested in a smaller population. If the model is deemed fit, it will be integrated into the main campus mental health screening and support system to be used for the students.

## RESULT

The first phase was conducted through discussions with experts from mental health practitioners and the bioethical field. After several rounds of discussions, we modified some of the data collection methods and set proper boundaries for the use of the chatbot as a supportive tool, not for diagnosis or intervention purposes, added linguistic experts to the team for the end of the second phase, and prepared to set-up a certain prompt in certain 'dangerous' keywords, like self-harm or suicide, for safety. The first phase highlighted some important reminders on how to ethically and mindfully approach the use of AI in healthcare.

Data collection for the second phase was conducted through five batches of campus counseling sessions, resulting in 125 audio recordings, averaging 45 minutes each, which were transcribed into text comprising 92,000 words. The text was analyzed, coded, labeled, and transformed into a chatbot-ready dataset. This process resulted in over 7,800 structured conversation records. The linguist experts helped to explore the conversation records and highlighted synonymous languages in local languages and dialects, slang words, and popular terms used by teenagers. They also helped to identify and find synonymous words for 'dangerous' keywords that will be processed differently.



Currently, this dataset is being processed by our Large Language Model (LLM) to train the chatbot, which is fine-tuned to enhance its ability to understand user inputs and generate more accurate, empathetic, and context-aware responses that address mental health concerns relevant with students' needs. The model is trained in batches, where its weights are updated based on the data, and its performance is evaluated to ensure the quality of the chatbot.

## CONCLUSION

This study tried to set up a chatbot for mental health support. The data collection phase successfully processed 125 counseling session recordings into a structured dataset containing over 7,800 conversation records, labeled and categorized with emotional annotations. We are starting the third phase of fine-tuning and training the chatbot using the database and additional databases from linguist teams. Once the prototype chatbot is ready, it will be validated by mental health professionals and further tested for its usability.