TREDENCE

MentaLink ⟶

A Multimodal AI Solution for Enhanced Mental Health Monitoring presented by ~ *MindTechies*

#BeyondPossible

Problem Statement

The **global mental health crisis** is growing, but solutions are fragmented and insufficient.

Traditional methods like self-reporting and clinical assessments are **subjective** and **social stigma** stops many from seeking timely help.

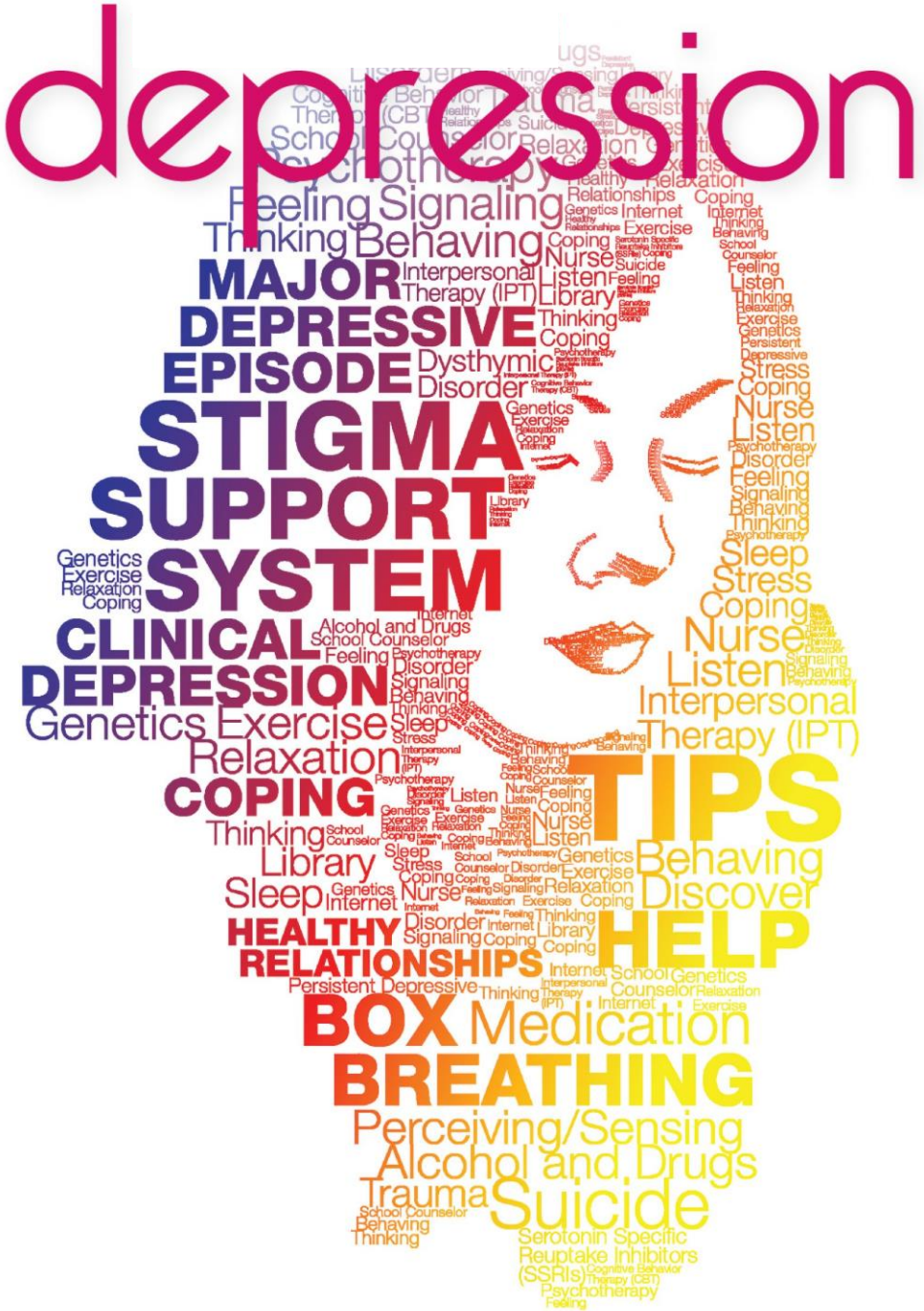
Text-based tools miss key cues like **tone** and **facial expressions.**

Why this?

1 in 4 people face mental health challenges. (WHO).

Mental health costs the global economy **$1 trillion/year** in lost productivity (WHO).

Text-based tools miss key cues like **tone** and **facial expressions.**



Our Solution – MentaLink

MentaLink is a multimodal AI system designed to address Mental Health challenges by combining speech, facial expressions, and text analysis to predict mental health deterioration in real-time.

- **Mental Health Questionnaire**

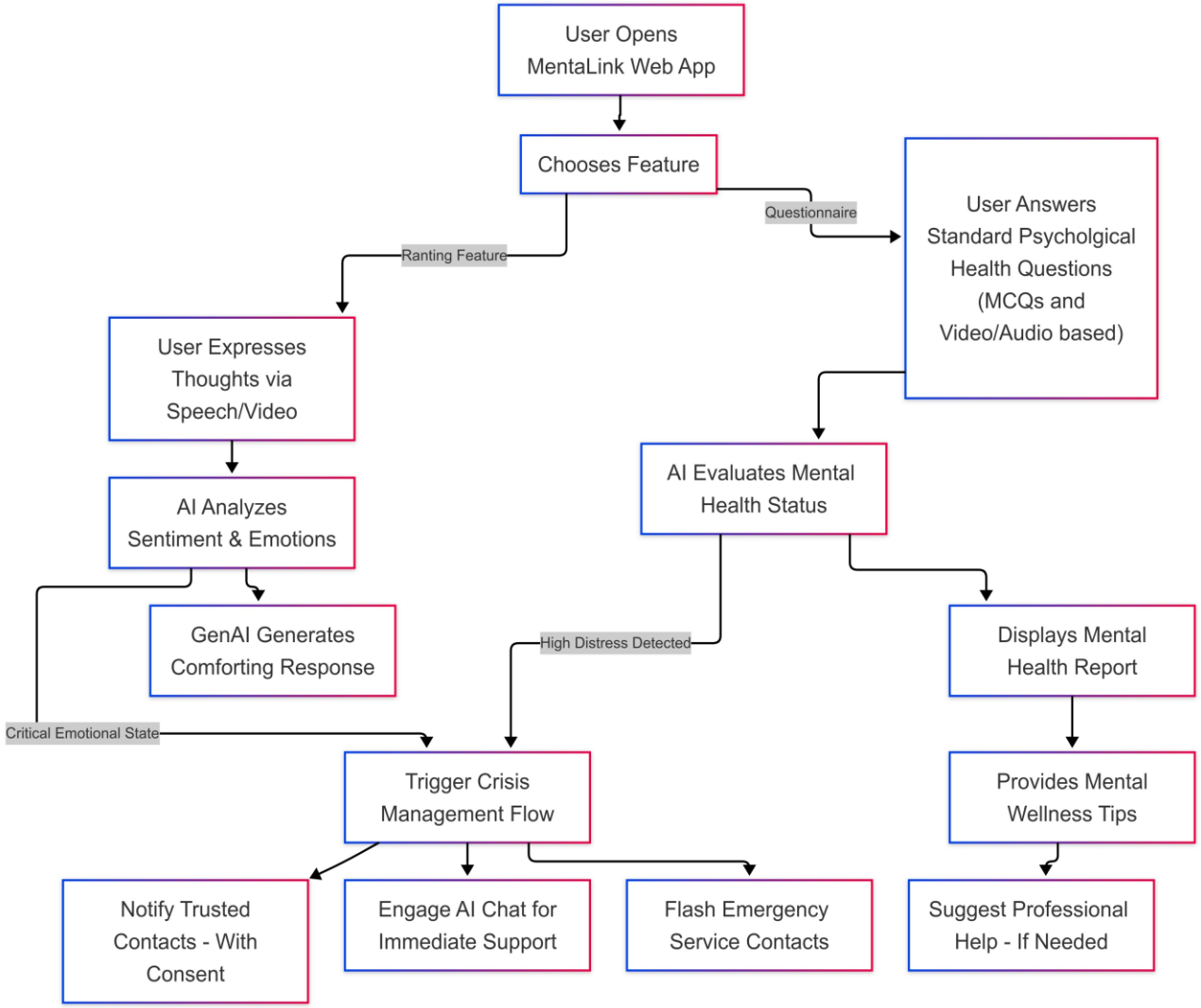
  Users can complete a questionnaire to assess their current mental health status. The AI model analyzes the responses to provide immediate feedback and recommendations.

- **Ranting Feature**

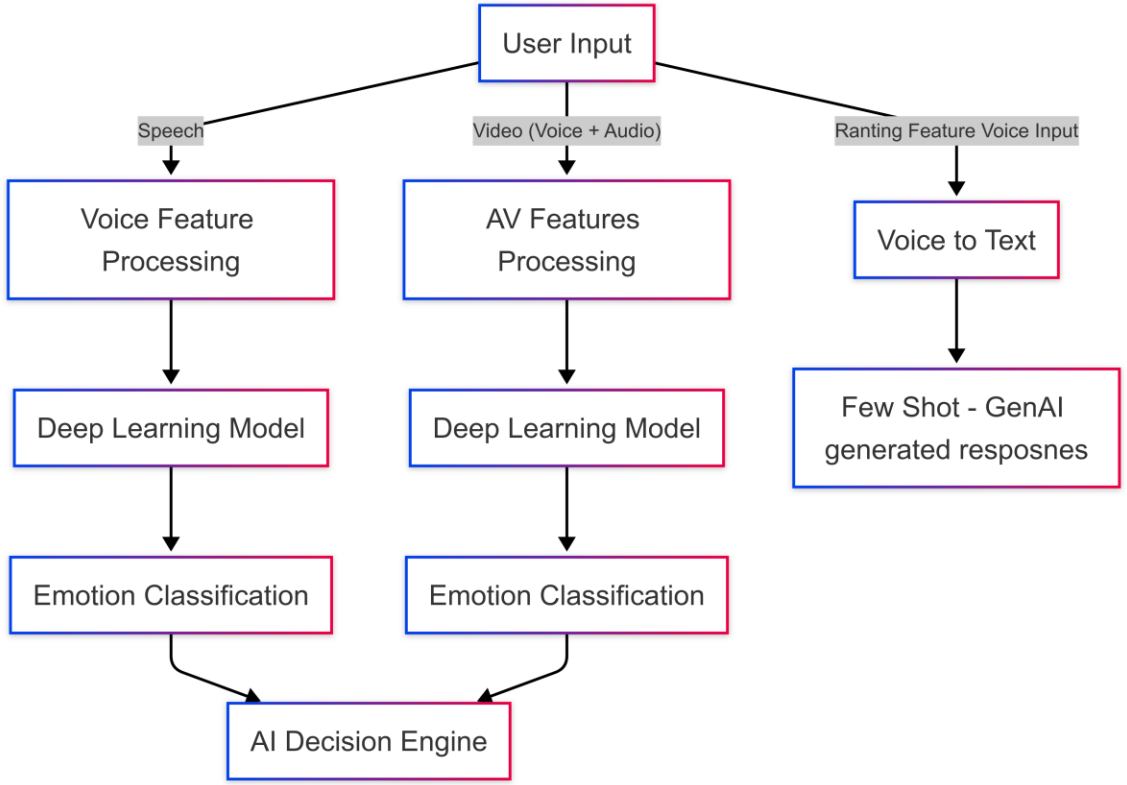
  Users can express their feelings through text, speech and facial recognition (optional), and the AI system that provides a sympathetic ear to problems and responds with empathetic responses and advices.

High Level Architecture

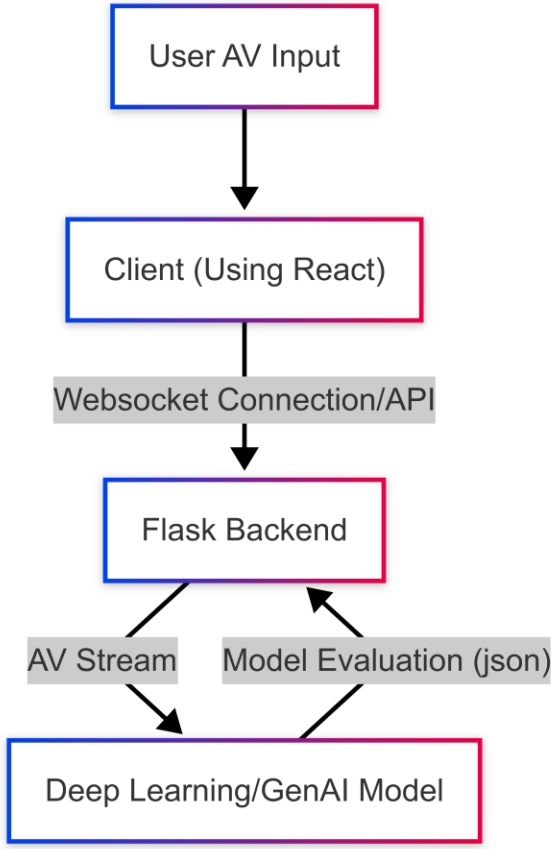
The user opens MentaLink and selects either the Questionnaire or Ranting Mode. The Questionnaire evaluates their mental health based on responses, while Ranting Mode analyzes speech or text sentiment to provide comforting advice



Technological Architecture



Decision Model



Data Flow Architecture

Implementation Plan

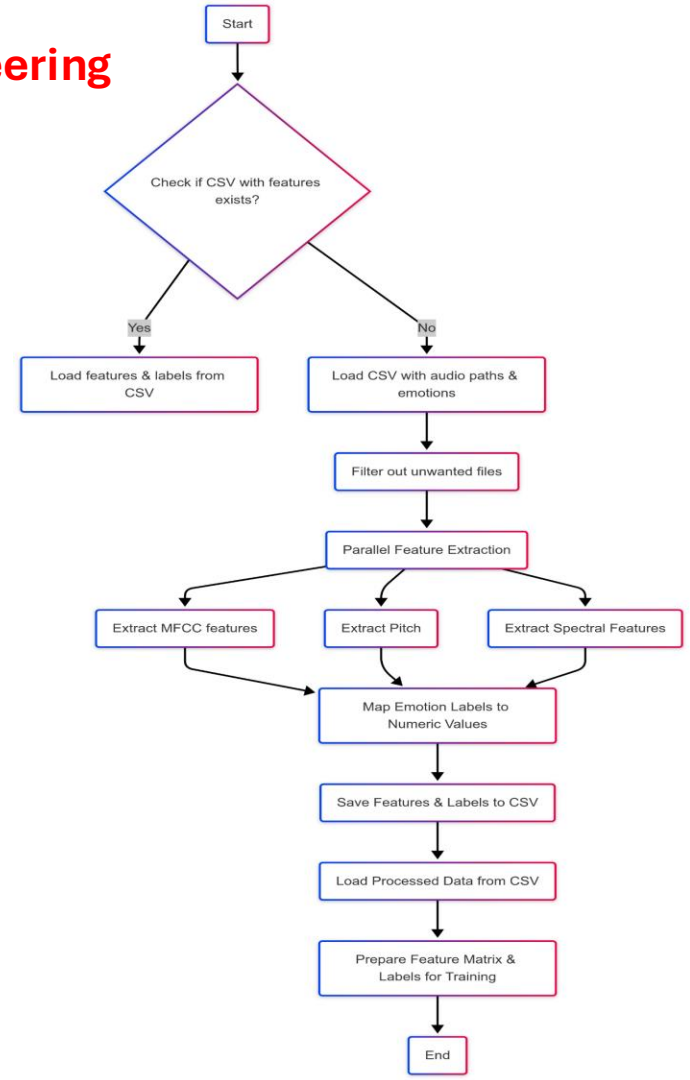
- ✓ **Milestone 1:** Kickstart the development process by planning the architecture and functionality of the models.

- ○ **Milestone 2**: Develop and implement an advanced audio-based model as a functional prototype, ensuring seamless integration with real-time data. Additionally, design and deploy a detailed questionnaire to collect feedback and insights for further improvements.

- ○ **Milestone 3**: Recalibrate and fine-tune the audio-based model, addressing any necessary adjustments to optimize performance and accuracy. Following this, launch a fully operational, end-to-end video streaming model, complete with a user-friendly and feature-rich app to deliver a smooth and efficient experience.

Highlights of our best model

Feature Engineering



DL Architecture

What does MentaLink proto-type do?

Interactive Questionnaire

- The MCQ-based structure makes it simple and quick for users to complete
- Structured set of multiple-choice questions assess various aspects of their mental well-being.

Voice Analysis

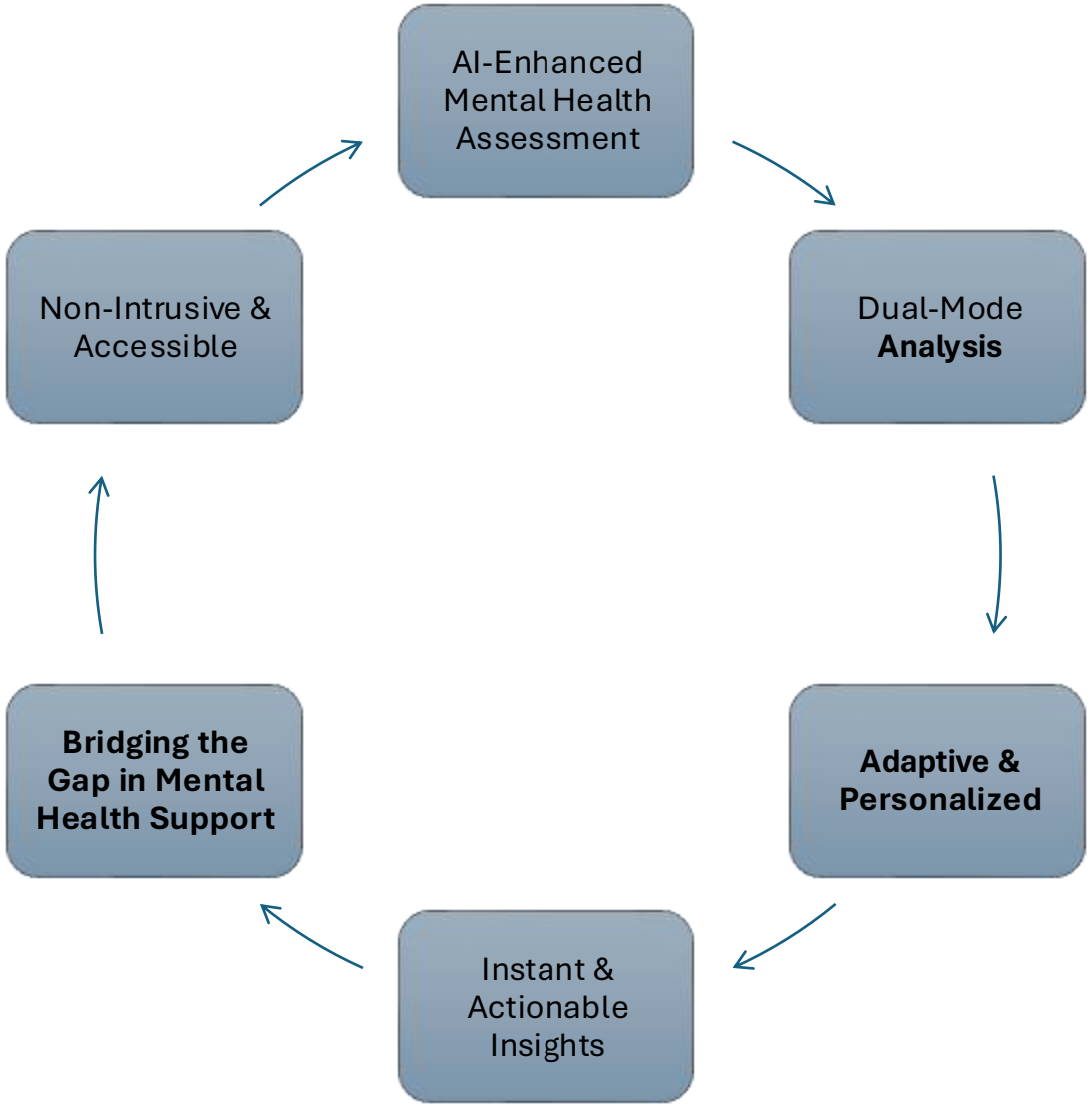
- Mentalink listens and analyzes user tone for deeper insights.
- Based on responses and voice analysis, the system offers classification result.

How is Mentalink's Approach innovative?

Mentalink goes beyond just words and responses by analyzing real-time voice and tone.

Mentalink can dynamically adjust based on user responses, creating a customised experience.

Mentalink offers an easy-to-use, technology-driven solution for early detection



What Next

In the next 12 hours (Milestone 3), we aim to:

- Construct the Audio-Video based model and optimize performance and accuracy.
- Launch a fully operational, end-to-end video streaming model.
- A user-friendly and feature-rich app delivering a smooth experience.
- Code the Performance Feedback feature and GenAI based soothing feedback for Ranting space.

High level Qualitative & Quantitative Metrics

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Final Accuracy: 0.7148490823600788

Best Model Classification Report:
              precision    recall  f1-score

           0       0.44      0.25      0.31
           1       0.66      0.68      0.67
           2       0.91      1.00      0.95
           3       0.70      0.90      0.79
           4       0.61      0.48      0.54
           5       0.82      0.99      0.90
           6       0.68      0.70      0.69

    accuracy                           0.71
   macro avg       0.69      0.71      0.69
weighted avg       0.69      0.71      0.69
```