

HarmonyNote



A Serene Space for Peace and
Love

Jian Wu, Matthew Frank, Saranya Mylswami



MEET THE HARMONY TEAM



PM & Data Engineer
Jian M Wu



Product Manager & Front-End dev
Saranya Mylswami



Machine Learning Engineer
Matthew Frank



Subject Matter Expert
Meredith Frank



PROBLEM & THE CHALLENGES

1 in 8 people **worldwide** (**970 million**) are affected by mental disorder

In the U.S., It is estimated that more than **1 in 5 U.S. adults** live with a **mental illness** (**59.3 million** in 2022; **23.1%** of the U.S. adult population).

Depression and anxiety cost the global economy US **\$1 trillion** each year predominantly from reduced productivity.



Human Resources Shortage

Social Stigma

Financial Barriers

Lack of mental health education and awareness

Racial Barriers



HARMONYNOTE'S FEATURES & IMPACT

We Offers



A Secure and Private Journaling Experience with Real-Time Mental Wellness Support (**User Journal Data is Fully Encrypted**)

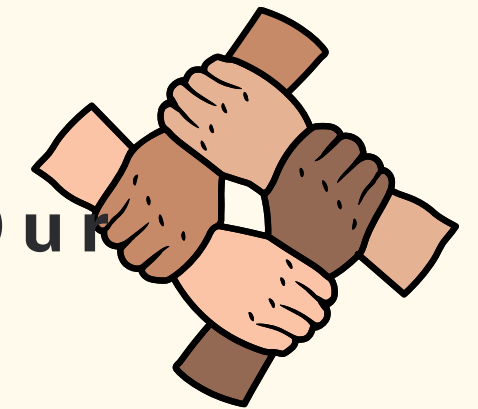


Immediate Personalized Emotional Support with an AI Wellness Coach (**No Tracking of User Conversations**)



Periodic Mental Wellness Reports to Empower Users with Insights and Self-Awareness (**Users Retain Full Ownership of Their Data**)

Positive Impact to Our Community



Emotional & Cognitive

Organizational & Economic

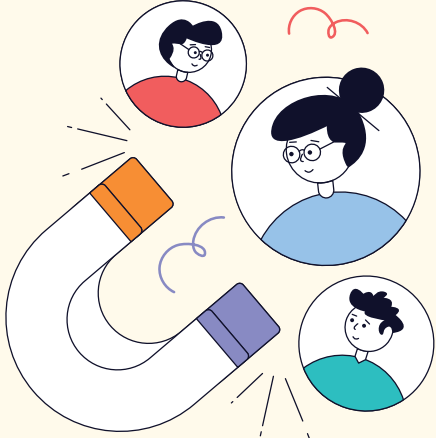
Reduce Societal Burden

Harmonious Society



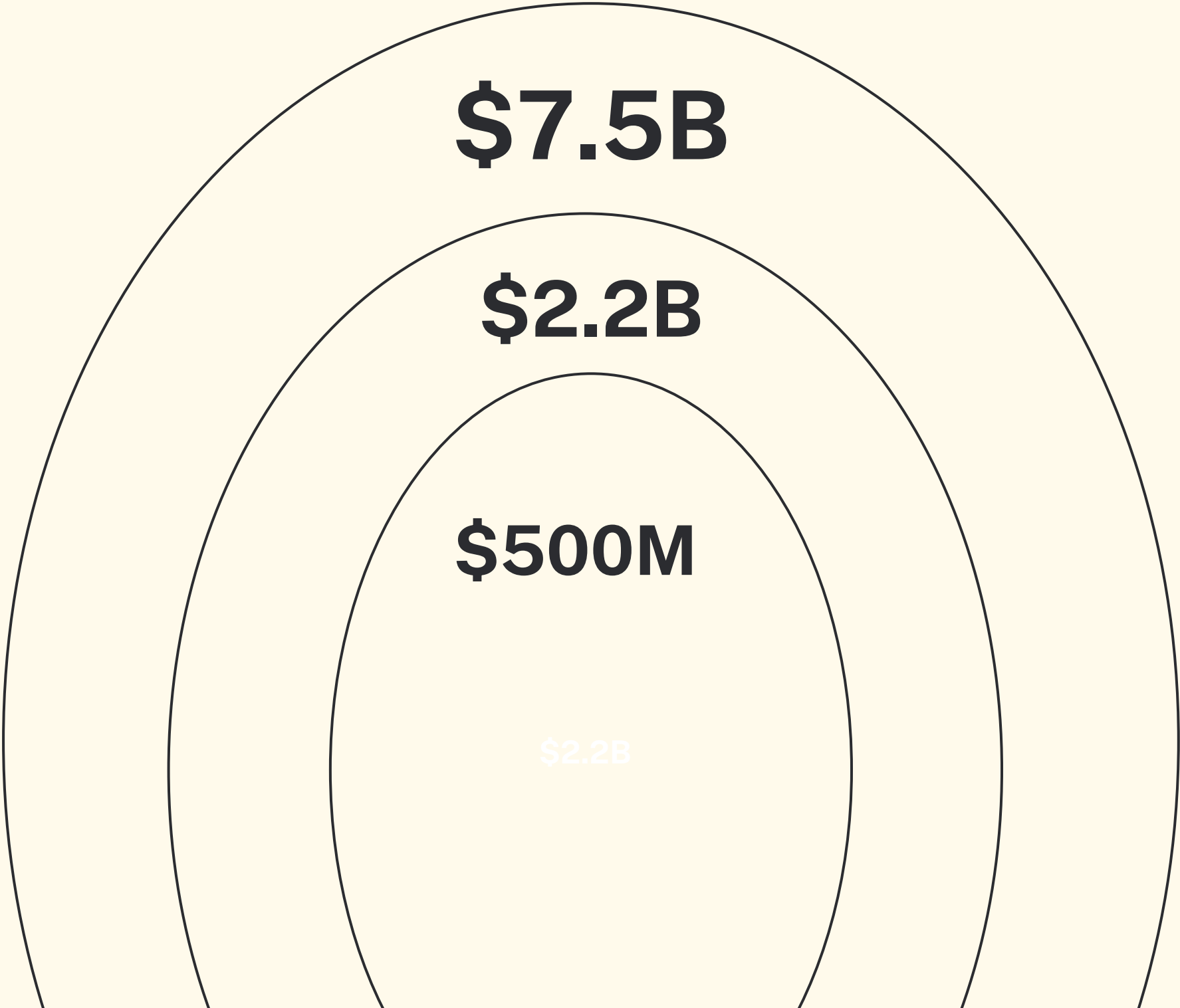
TARGET USER & MARKET SIZE

Targeted Users



- **Age Range:** 13-55 years old.
- **Geography:** English-speaking users, primarily in the United States.
- **Demographic:**
 - Individuals with a habit of journaling
 - Interested in self-improvement, creativity, and wellness practices
 - Professionals in fastpace industries

Targeted Market Share



Instant Recommendations and Emotion Support

There may be some **happy** undertones in this entry. Do you want song suggestions to improve your mood/cheer up? Click below for recommendations.

🎵 Song Suggestions

- the center's falling out - Poppy
- What You Know Bout Love - Pop Smoke
- Popcorn Salé - SANTA
- Mood Swings - Pop Smoke
- V.A.N - Bad Omens
- Popular (From "Wicked" Original Broadway Cast Recording/2003) - Kristin Chenoweth
- Poppin - Yeat
- Popular Monster - Falling in Reverse
- Pop Out - Polo G
- have you had enough? - Poppy

This chat session is completely private and secure. We do not store, track, or record any conversations between you and our AI Wellness Coach.

AI Coach: Wow, Jian! It sounds like you and your team have poured your hearts and souls into this capstone project. The joy and pride you're feeling are absolutely deserved after all those intense weeks of hard work. Late-night debugging sessions and countless revisions can be tough, but it's clear that your collaboration has made a significant impact.

It's wonderful to hear how much you've all grown together and supported each other through the challenges. That kind of teamwork is truly special! As you're looking forward to showcasing your hard work, it's a great opportunity to celebrate your achievements. How are you planning to unwind after your presentation?

You: I will be traveling to Japan for two weeks

AI Coach: That sounds exciting, Jian! Japan is such a beautiful country with so much to explore, from the vibrant cities to the serene landscapes. Do you have any specific places or activities you're particularly looking forward to—maybe some hiking spots or local foods you want to try? Traveling can be a wonderful way to recharge and create amazing memories, especially after the hard work you've put into your project. Enjoy every moment!

You:



View, Share, Download the Journals (100% User Ownership)

View Journal Entries by Date

Select a date to view entries:

2024/12/01




Journal Entries for 2024-12-01


- our team's hearts are bursting with joy and pride as we put the finishing touches on our capstone presentation! These past 14 weeks have been intense - from late-night debugging sessions to countless revisions of our methodology. But seeing how we've grown together, supported each other through technical hurdles, and transformed our initial concept into something remarkable makes every challenge worthwhile. We can barely contain our excitement to showcase our hard work! (on 2024-12-01 11:06:47.232574)
- Hello (on 2024-12-01 19:57:09.694029)

Delet
e

Delet
e

 Share the journals

Download & Delete All Entries


 This will download and permanently delete all your journal entries. This action is irreversible.




MVP FEATURE II - 24/7 AI Wellness Coach

Chat with marshmallow, Your AI Wellness Coach for Inner Peace


This chat session is completely private and secure. We do not store, track, or record any conversations between you and our AI Wellness Coach.


 hey, I am anxious for being stuck in the traffic for 3 hours today on my way to work

 I hear you, Jian. Being stuck in traffic for that long can be really frustrating and anxiety-inducing. It's completely understandable to feel overwhelmed in that situation.

If you can, maybe take a few deep breaths or listen to a favorite podcast or some calming music to help ease your mind a bit while you're waiting.

You're doing your best to navigate through this stressful moment. Once you're out of the traffic, perhaps you could also treat yourself to something nice to unwind after work, like enjoying a bit of your favorite wine or a good meal. Is there anything in particular that helps you feel better during long drives?

 not only that, I was bullied by the security guard

 I'm really sorry to hear that, Jian. Experiencing bullying, especially from someone in a position of authority, can be really unsettling and hurtful. Your feelings are completely valid, and it's understandable to feel anxious and upset after such an encounter.

It's important to remember that you deserve to be treated with respect and kindness. If you feel comfortable, you might consider talking to someone about what happened, whether it's a friend or a family member, to help process the situation.



MVP FEATURE III - Periodic Wellness Report

[True Notes](#) [Serene Space](#) [Harmony Recap](#) [Harmony Community](#)

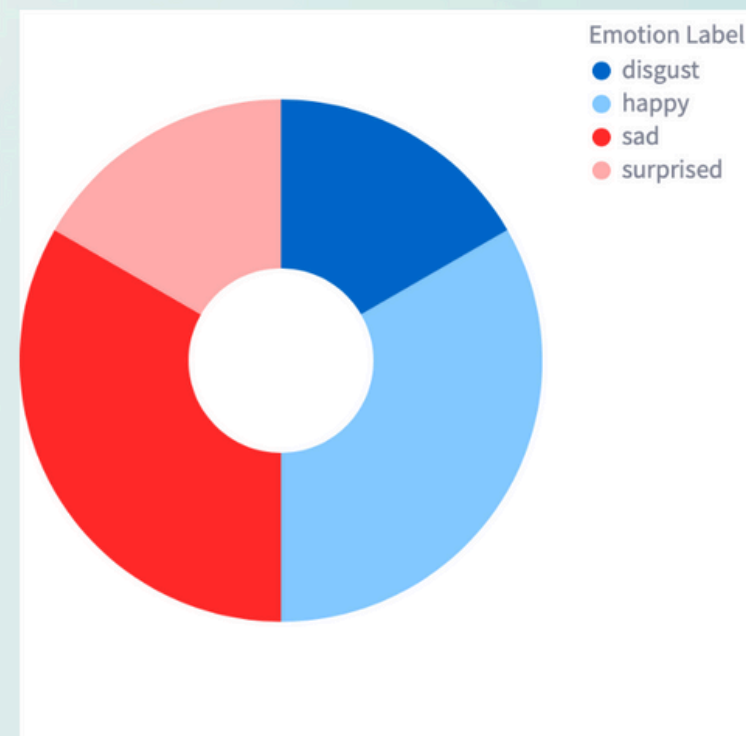
Select a week (choose a date within the week):

2024/11/20

Mental Wellness Report Summary

Over the past week, your mental health reflects a mix of highs and lows. You experienced significant joy and happiness during your graduation and a surprise birthday party, both of which brought feelings of love and celebration. However, you also faced moments of sadness and disgust, particularly related to packing up your home and encountering a distressing scene behind a restaurant. Overall, your emotions oscillated between happiness and sadness, indicating a complex week with both joyful milestones and challenging moments.

Emotion Overview Of The Week 2024-11-18 to 2024-11-24

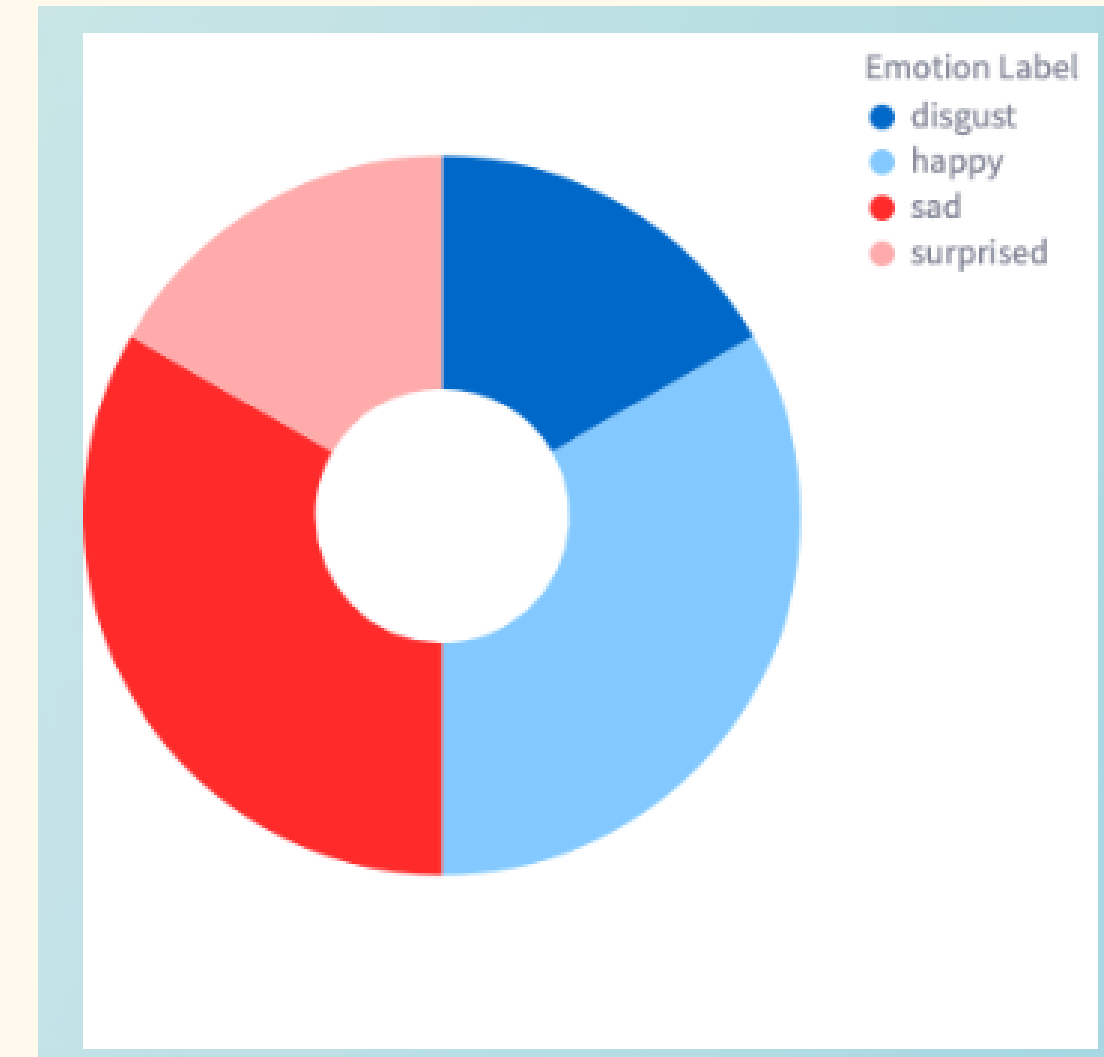


MVP FEATURE III - Periodic Wellness Report

Mental Wellness Report Summary

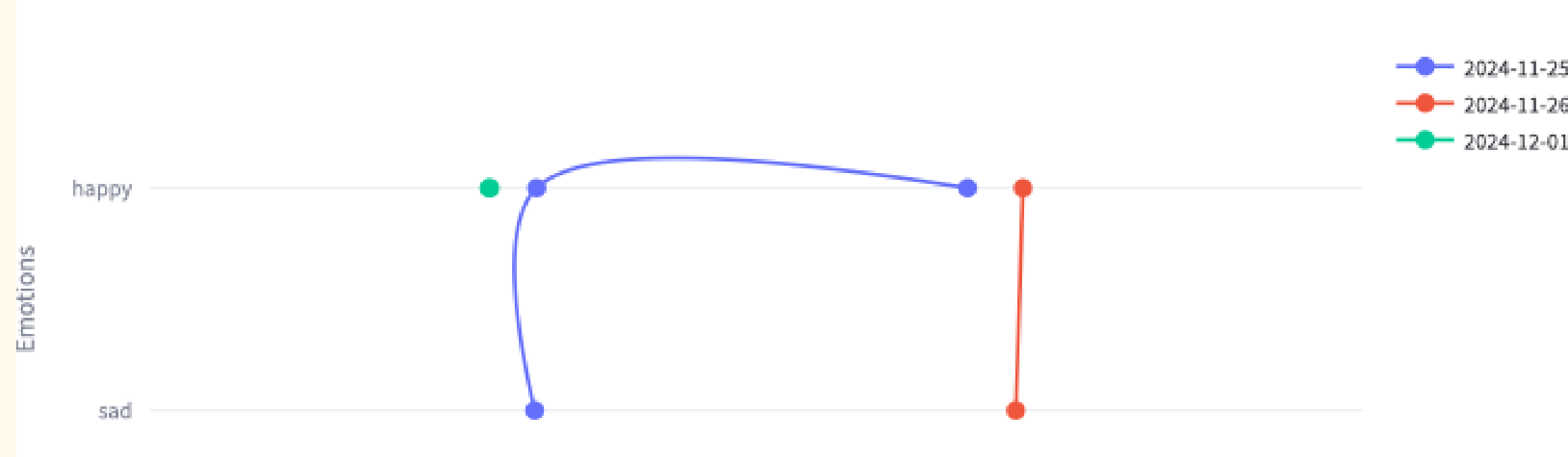
Over the past week, your mental health has experienced a mix of highs and lows. You celebrated significant milestones, such as graduation and a surprise birthday party, which brought you feelings of happiness and joy. However, there were also moments of sadness and disgust, particularly related to moving and the overwhelming process of packing up memories. Overall, your week showcased a beautiful blend of positive experiences and challenging emotions, reflecting both celebration and a sense of loss.

Emotion Overview Of The Week 2024-11-25 to 2024-12-01



Interactive Emotion Tracker

This feature provides an interactive day by day overview of your emotions throughout the week. Track emotion trends and discover patterns, helping you gain insights into how your feelings evolve over time.



MVP FEATURE IV - HarmonyNote Community

True Notes Serene Space Harmony Recap Harmony Community

Therapists Ready to Help

Choose a therapist to start chatting immediately, or schedule a chat for a later time.

Schedule later

Therapist 1

Therapist 2

Therapist 3

Therapist 4



Chat with Therapist
1

Chat with Therapist
2

Chat with Therapist
3

Chat with Therapist
4

External Resources

Access to professional help, support services, and educational resources for your mental health journey

Support Services

Crisis Hotlines

Professional Services

Support Groups

National Suicide Prevention Lifeline
24/7 free and confidential support
[Visit Website](#)
Contact: 988

Psychology Today Therapist Finder
Find licensed therapists in your area
[Visit Website](#)

NAMI Support Groups
Free, peer-led support groups for individuals and families
[Visit Website](#)

Crisis Text Line
Text HOME to connect with a Crisis Counselor
[Visit Website](#)
Contact: Text HOME to 741741

BetterHelp Online Therapy
Professional counseling with licensed therapists
[Visit Website](#)

7 Cups
Online emotional support and counseling
[Visit Website](#)

Educational Resources

Understanding Mental Health

Self-Help Guides

Prevention & Wellness

NIMH Mental Health Information
Comprehensive guides on various mental health conditions
Key Topics: Depression, Anxiety, Bipolar Disorder, PTSD
[Visit Website](#)

Mayo Clinic Mental Health
Expert-reviewed articles and self-help tips
Key Topics: Stress management, Building resilience, Healthy habits
[Visit Website](#)

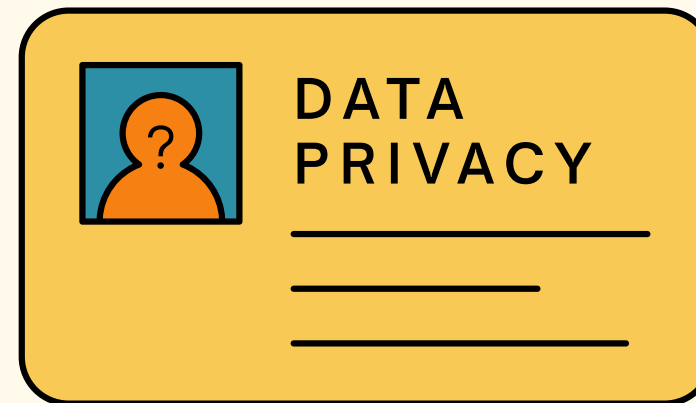
Mind.org Mental Health Tips
Practical advice for maintaining mental wellness
Key Topics: Self-care, Workplace mental health, Student mental health
[Visit Website](#)



SME & DATA PRIVACY TAKEAWAY, USER TESTIMONY



Ethical Boundaries Clarification and Handling of Sensitive Information



Confidentiality and Privacy Assurance



- Works as expected
- Provided helpful and thoughtful suggestions on journal entries
- Engaged conversations with the AI wellness coach.



DATA COLLECTION & EDA

STAGE I
123,341 Rows



Go Emotions by Google Research

ISEAR (International Survey on Emotion Antecedents and Reactions)

Setfit Emotions

Dair-AI Emotions



STAGE II
279,531 Rows



8 Additional Datasets

Collect Emotions Angry, Surprise, Disgust Labeled Text

Diversified Happy & Neutral Labels



1. Happy - 53,750
2. Sad - 33,107
3. Angry - 16,830
4. Fear - 13,817
5. Surprised - 4,592
6. Neutral - 828
7. Disgust - 417

Key EDA Takeaways

- Imbalanced Emotion Labels
- Multiple Emotion Labels to Text
- Different Emotion Naming Conventions
- Many Labeled Text is Less than 3 Words
- Low Accuracies on Small Labeled Text



1. Happy - 56,198
2. Sad - 33,107
3. Angry - 24,066
4. Fear - 13,817
5. Surprised - 10,280
6. Neutral - 136,216
7. Disgust - 5,847



DATA CLEANING & PRE-PROCESSINGS

NLP Oriented Tasks

Data Validation and Quality Checks

Text Normalization

Noise Removal

Text Enrichment

Handling Numbers

Text Correction

Lemmatization/Stemming

Stop Word Removal



Human Language

Can't BELIEVE I just finished my 1st marathon! 🏃🎉 Feeling absolutely AMAZING rn!!! 26.2 miles in 4:35:12 #RunningCommunity #Achievement @NYCMarathon Check out my blog: <https://myblog.com/marathon2024> 😊👍



LLM Recognized Language

finished first marathon feeling amazing distance miles time



CONSOLIDATED DATASET



Cleaned Text: 171,341

Emotion Labels: 171,341

Distribution of Emotion Labels

Neutral - 49,318

Happy - 39,919

Sad - 29,961

Angry - 23,976

Fear - 12,125

Surprised - 10,248

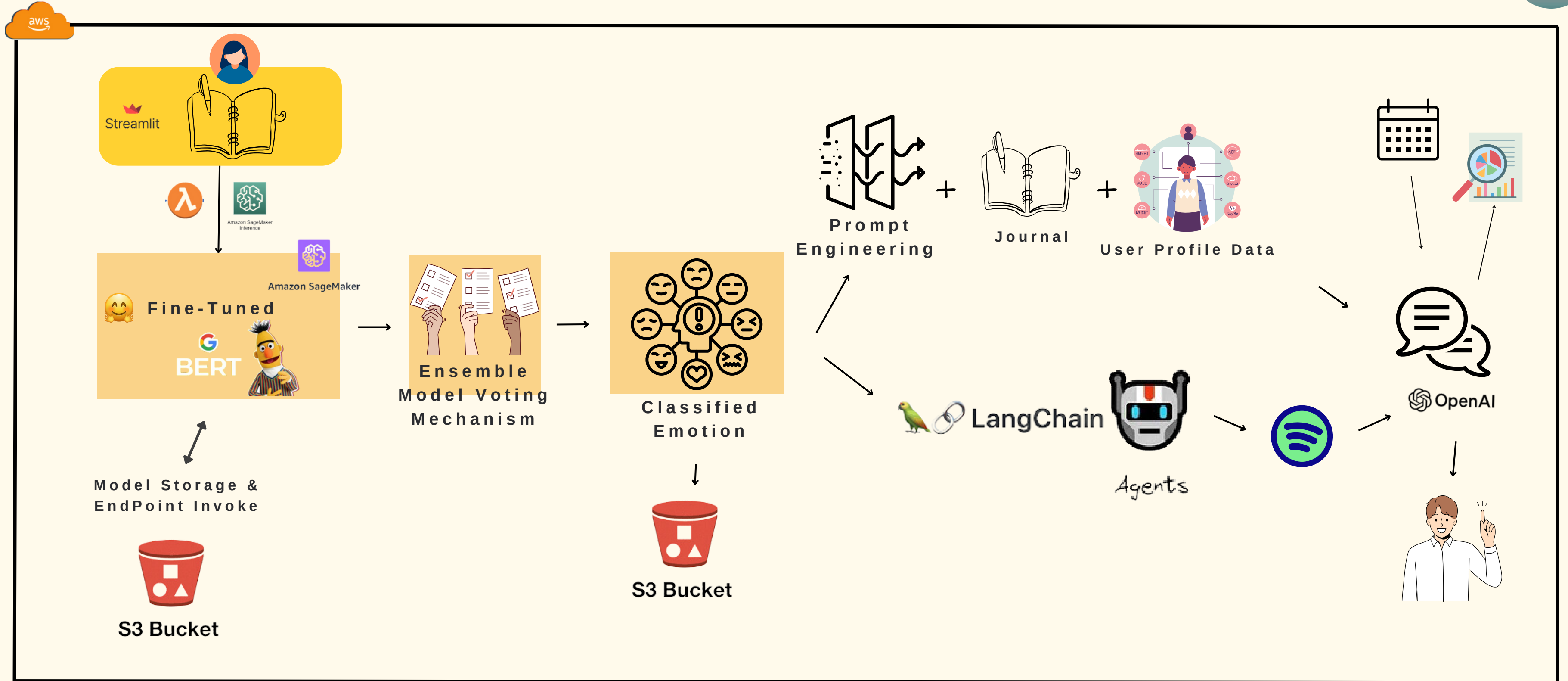
Disgusted - 5,794

Naive Bayes (Baseline Eval) - Tri-Grams

	precision	recall	f1-score	support
angry	0.73	0.58	0.64	4826
disgusted	0.85	0.33	0.48	1124
fear	0.88	0.52	0.65	2402
happy	0.65	0.91	0.76	7929
neutral	0.83	0.81	0.82	9948
sad	0.72	0.80	0.76	5986
surprised	0.79	0.43	0.56	2054
accuracy			0.74	34269
macro avg	0.78	0.63	0.67	34269
weighted avg	0.76	0.74	0.73	34269



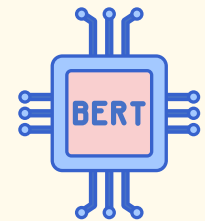
UNDER THE HOOD (ML PIPELINE)



MODEL CHOICES AND TECHNICAL DISCUSSIONS

Emotion Classification Model Pool

BERT Based Uncased
BERT Large Uncased
RoBERTa Base Uncased
RoBERTa Large Uncased
DistillBERT Base
ALBERT XLarge
DeBERTa Large
DeBERTa X3 Large



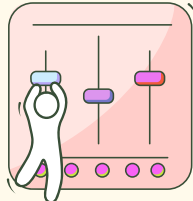
Experiment Setup

- Subset with 1k for each emotion
- Accuracy
- Precision
- Recall
- F1 Score



CLASSIFICATION MODEL EVALUATIONS

Grid Search of Hyper-Parameters



- 1. Batch Size -16
- 2. Learning Rates - 2.00E-05
- 3. Loss Functions -
- 4. Token Maximum Length-
- 5. Layers Backpropagations -

Fine-Tuned RoBERTa Results



Classification Report:

	precision	recall	f1-score	support
neutral	0.82	0.84	0.83	2398
happy	0.79	0.76	0.77	579
angry	0.90	0.84	0.87	1213
sad	0.95	0.96	0.95	3992
fear	0.90	0.92	0.91	4932
surprised	0.92	0.89	0.90	2996
disgusted	0.77	0.81	0.79	1025
accuracy			0.89	17135
macro avg	0.87	0.86	0.86	17135
weighted avg	0.89	0.89	0.89	17135

Top 1 Accuracy: 89%, Top 2 Accuracy: 96%, Top3 Accuracy: 98%



Ensemble Approach


RoBERTa-Large, Bert-Large-Uncased, DistilRoBERTa-Large

Overall Accuracy Increased to 92%!



AI WELLNESS COACH MODEL CHOICES

AI Wellness Coach Model Pool

LLaMA 2 7B Chabot
Dialog GPT
Mistral 7B Instruct
LLaMA 3 8B Instruct
Mental LLaMA 
ChatGPT 40-Mini

Experiment Setup

BLEU SCORES
ROUGE -1
ROUGE -2
ROUGE -L

The Power of Prompt Engineering

1. Emotional Validation

Before: "Don't worry about it."

After: "It's completely natural to feel this way. Your feelings are valid."

2. Progress Recognition

Before: "Good work."

After: "I notice how far you've come from where we started.

Remember when [specific reference]?

You've made such meaningful progress."

3. Crisis Response

Before: "That sounds serious."

After: "I hear the pain you're in right now. While I'm here to listen, I want to make sure you get the support you need. Would you be open to exploring some professional resources together?

There are caring people available 24/7 at [crisis hotline]."

4. Building Resilience

Before: "Stay positive."

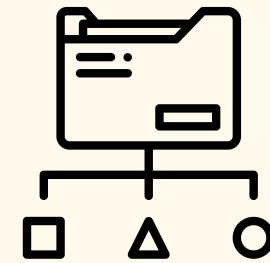
After: "While this is challenging, I notice your strength in [specific example].

What strategies have helped you navigate similar situations in the past?"



DATA SCIENCE TAKEAWAYS

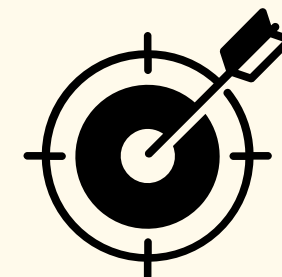
Classification Problem: Multi-Variables Classification



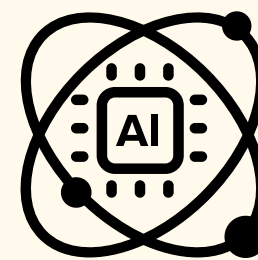
High Quality Data Matters



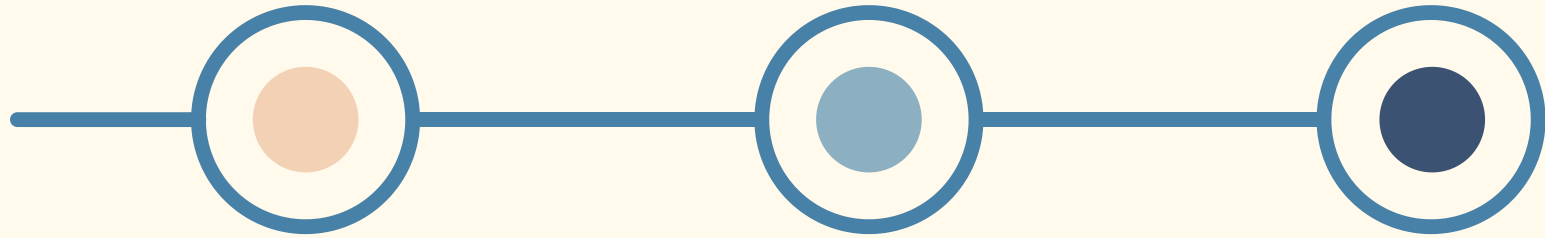
LLM Model Accuracy: Ensemble Model's Voting Mechanism



Generative AI Problem: Agent Reasonings & Prompt Engineerings



HARMONYNOTE'S ROADMAP



- Proprietary AI Chabot Model
- Self-Augmented A High-Quality Dataset
- Dynamic Recommendation System from the Agent Reasonings
- Mental Wellness Training Programs with RAG



HARMONYNOTE'S MISSION

To elevate, cherish, and enrich lives in a harmonious way

