



## Team Name:- Tune Mend



### ☐ Dhruvrajsinh Vansia

- **Role:** Project Manager & Machine Learning Model Developer
- **Skills:** Python, ML frameworks, data analysis



### ☐ Jiya Modi

- **Role:** Developer
- **Skills:** Frontend & backend web development, HTML, CSS, JavaScript, Django/Flask for backend, and MySQL(Database).



### ☐ Vishwa Patel

- **Role:** Developer and Designer
- **Skills:** Frontend development, logo design, graphic design software

# Problem Statement

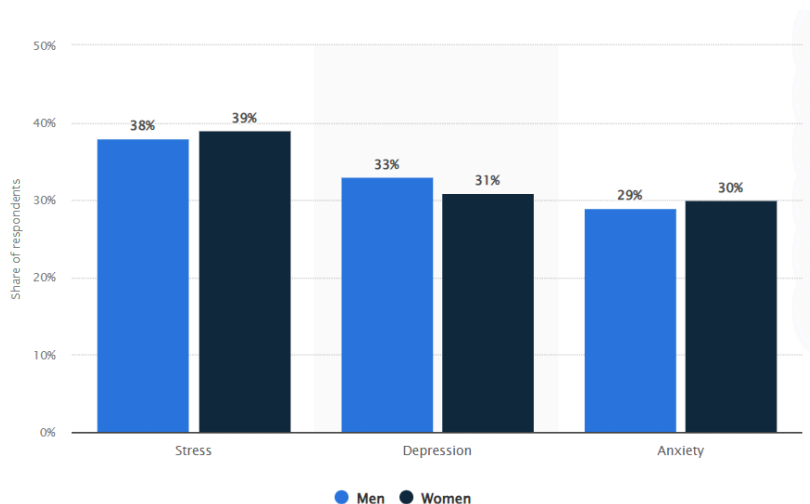
Identify mental health conditions such as Anxiety, Depression, OCD, and Insomnia and recommend personalized music therapy based on the identified condition and its severity.

- One in seven adolescents aged 10-19 experiences a mental disorder, which accounts for 15% of the global disease burden in this age group.
- In 2019, 970 million people worldwide lived with a mental disorder.
- In India, an estimated 15% of the population has a mental health issue.

## What is Music Therapy?

Music therapy draws on the power of music in a therapeutic relationship to manage a range of conditions and improve quality of life. It involves using music and/or elements of music (like sound, rhythm, and harmony) to accomplish goals, such as reducing stress or improving quality of life. Music therapy helps people of all ages and may benefit many different aspects of well-being, including:

- **Mental**
- **Emotional**
- **Physical**
- **Social**
- **Cognitive**



## Solution Overview

**Tune Mend** is an innovative solution designed to use machine learning for music therapy, aimed at enhancing mental wellness. By integrating ML algorithms with a user-friendly web interface, Tune Mend provides personalized therapeutic recommendations to individuals experiencing mental health conditions like Anxiety, Depression, Insomnia, and OCD. The system's comprehensive approach addresses the growing need for accessible mental health support, offering an effective tool for individuals to manage their mental health through the healing power of music.

# Framework

The framework of Tune Mend is centered around machine learning and web development technologies, focusing on:

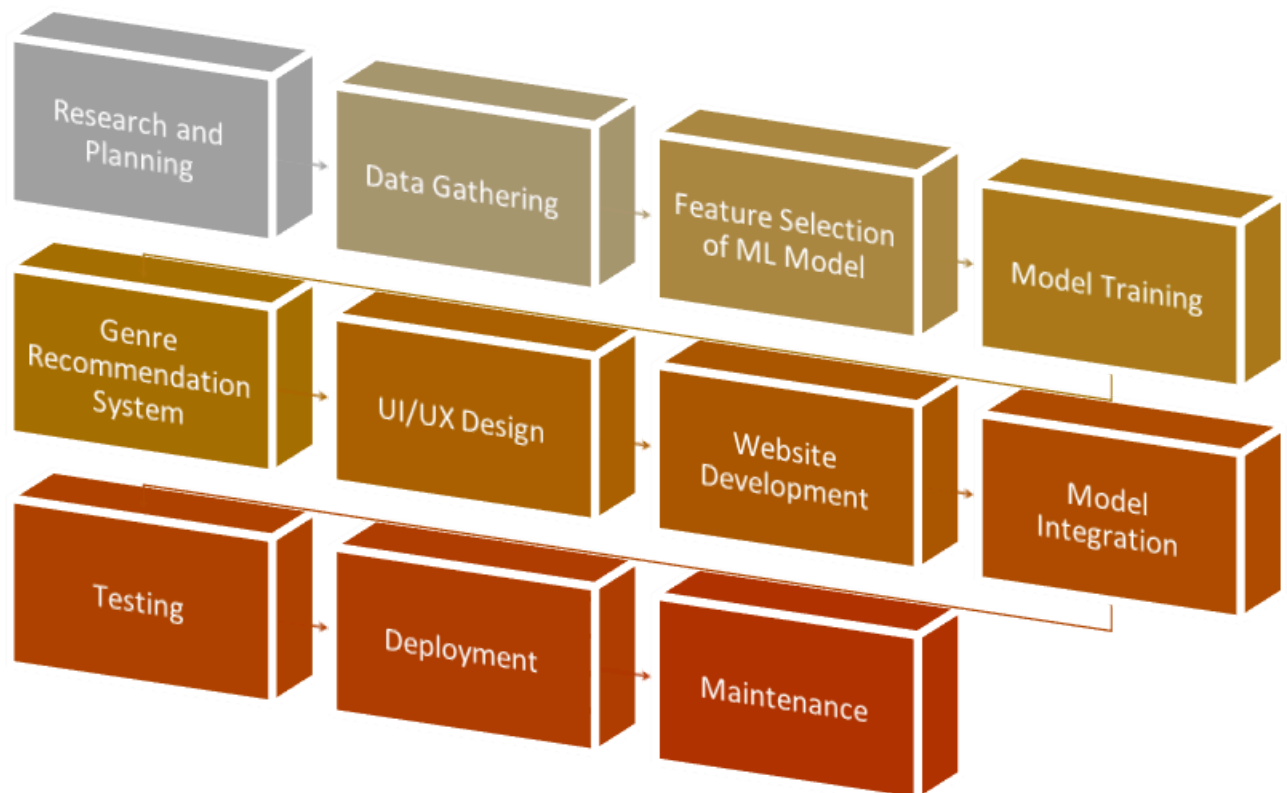
- **Machine Learning:** Random Forest classifier, Python, sci-kit-learn, pandas, NumPy
- **Web Development:** HTML, CSS, JavaScript, Flask, MySQL

## Feasibility and Implementation

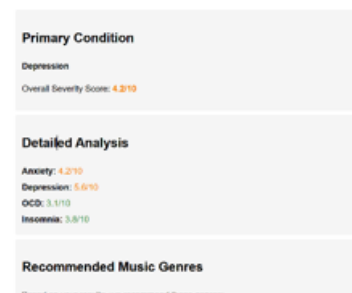
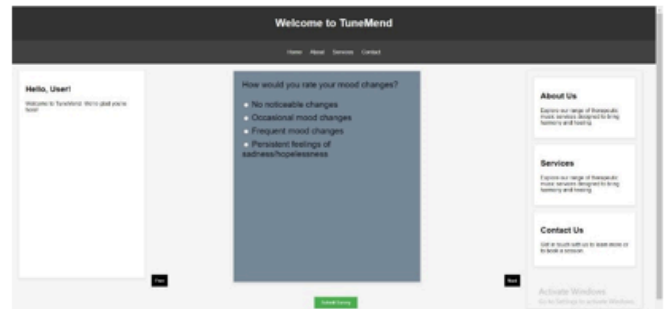
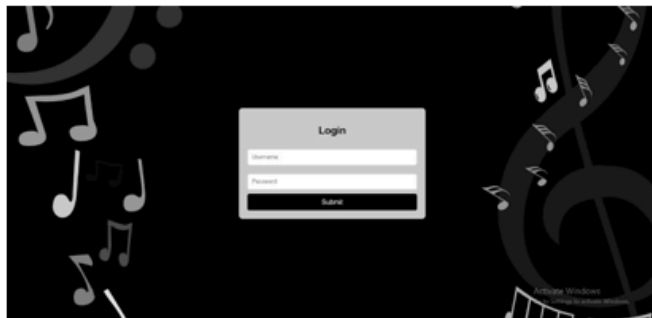
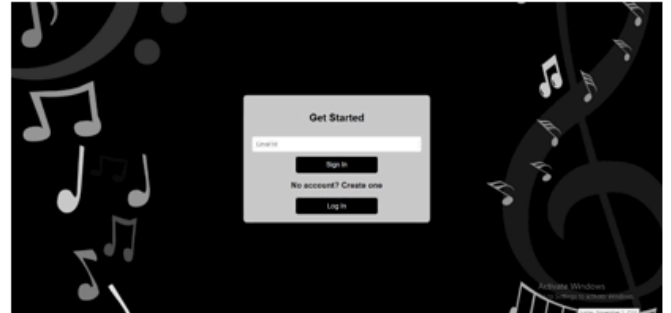
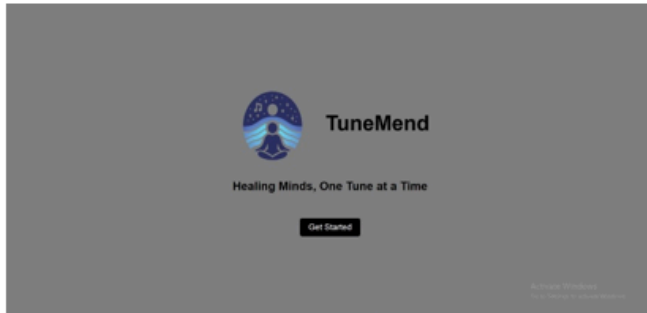
### Feasibility

- **ML Model Development:** A Random Forest classifier ensures robust handling of complex data patterns. Python and its powerful libraries, such as scikit-learn, pandas, and NumPy, facilitate efficient model training and data manipulation.
- **Web Integration:** Implementing the model within a website enhances accessibility. Utilizing frameworks like Flask can seamlessly integrate your ML model with the web interface.
- **Scalability:** Designing the system to handle multiple users simultaneously ensures scalability. Utilizing cloud services for hosting and database management can support growing user numbers without compromising performance.

### Implementation



# UI/UX Mockups



## Personalized Spotify Playlist



# Use Case

**Tune Mend** is designed to address the pressing issue of mental health, using the therapeutic power of music to manage conditions such as Anxiety, Depression, Insomnia, and OCD. The project harnesses machine learning to analyze user inputs and recommend personalized music therapy tailored to each individual's specific mental health needs. The use case explores how Tune Mend integrates into daily life, bringing tangible benefits to its users.

Imagine Sarah, a 19-year-old college student who has been experiencing severe anxiety due to academic pressures and social challenges. She finds it difficult to concentrate on her studies and often feels overwhelmed. On discovering Tune Mend, Sarah is prompted to answer a series of questions that assess her mental health. These questions are designed to capture key indicators of her emotional and psychological state, including her current mood, stress levels, sleep patterns, and more. Based on her responses, the Random Forest classifier within Tune Mend identifies that Sarah is dealing with Anxiety.

Once the system identifies her condition, Tune Mend goes a step further by recommending a specific genre of music that has been shown to reduce anxiety symptoms. For Sarah, this might include genres such as classical or ambient music, known for their calming effects. Additionally, the platform provides a curated playlist of songs within the recommended genre, which Sarah can listen to directly through the integrated website.

## System Design and Architecture

The architecture of Tune Mend can be broadly divided into three main layers: the user interface layer, the application layer, and the data layer. Each layer interacts with the others to deliver a cohesive user experience from input collection to music recommendation.

### User Interface Layer

- **Website Interface:** Developed using HTML, CSS, and JavaScript, the website serves as the primary platform for users to input their data and receive recommendations. The design focuses on user-friendliness, ensuring that users can easily navigate through the survey questions and access their personalized music therapy plans.
- **User Input Forms:** These forms collect data from the users based on key questions related to their mental health and music preferences. The input is validated and then sent to the application layer for processing.

### Application Layer

- **Machine Learning Model:** The Random Forest classifier, developed using Python and scikit-learn, is the heart of the system. It processes user inputs to classify the mental health condition as Anxiety, Depression, Insomnia, or OCD.
- **API Endpoints:** Built using the framework Flask, this endpoint serves as the bridge between the website and the machine learning model.

- **Recommendation Engine:** Based on the classification results, this engine suggests suitable music genres and specific playlists. Using Spotify API, it provides the playlist suitable for lowering the mental wellness of the user.

## Data Layer

- **Data Storage:** A scalable database system (such as MySQL) stores user inputs, model outputs, and music recommendations.

## Coding Approach

The coding approach involves:

- Developing a robust ML model using Python libraries.
- Building a responsive web interface with HTML, CSS, and JavaScript.
- Creating API endpoints in Flask for seamless integration.
- Implementing a recommendation engine linked to the Spotify API.

## References

<https://www.sciencedirect.com/topics/medicine-and-dentistry/music-therapy>

<https://www.cochranelibrary.com/cdsr/doi/10.1002/14651858.CD004517.pub3/full>

<https://www.cochranelibrary.com/cdsr/doi/10.1002/14651858.CD004517.pub2/abstract>

<https://www.cambridge.org/core/journals/the-british-journal-of-psychiatry/article/individual-music-therapy-for-depression-randomized-controlled-trial/A1CD72904929CECCB956F4F3B09605AF>

<https://www.sciencedirect.com/science/article/abs/pii/S0197455610000857>

<https://www.sciencedirect.com/science/article/abs/pii/S0165178121004339>

<https://www.sciencedirect.com/science/article/abs/pii/S0147956301973479>

<https://pmc.ncbi.nlm.nih.gov/articles/PMC5072238/>

<https://www.tandfonline.com/doi/abs/10.1080/10911359.2013.766147>

<https://nyaspubs.onlinelibrary.wiley.com/doi/abs/10.1196/annals.1360.020>

<https://www1.cgmh.org.tw/intr/intr2/c3390/en/music-therapy.htm>