



# MACHINE LEARNING MODEL FOR SPECIFIC SYMPTOMS OF DISEASE RESPONSE BY MUSIC THERAPY

**Dr. Deepti H. Pethkar**

Assistant Professor Department of Computer Science

Shankarlal Khandelwal Arts, Science and Commerce College, Akola

## Abstract

Music therapy is a crucial technique used by music therapists to treat various health issues. A machine learning model has been developed to predict the therapeutic benefits of a specific song for patients. The model uses a multi-class neural network to classify emotions into four categories and predict the output. The model considers a person's musical and emotional characteristics, as well as solfeggio frequencies. During the training phase, a subset of the Million Dataset is used. The model predicts the song's therapeutic effects based on the user's symptoms and according to that the type of music should be selected by this algorithm. If the selected song is inappropriate, the model recommends another suitable song. The model has been tested on numerous individuals and has achieved high performance indicators, making it suitable for music therapists and patients.

**Keywords:** Machine Learning Model, Music Therapy, Symptoms, disease reponse.

## Introduction:

Since music therapy is still in its infancy in India, it is necessary to harness the country's abundant musical resources to create approaches, procedures, or methodologies that are sensitive to local culture and can be easily modified for use in therapeutic settings. This article provides broad guidance on the many ways that might aid in the assessment of musical preferences throughout the process of selecting music for treatment planning. It is based on formative research and a survey on the author's listening habits.

Raga is the inventive, improvisational form at the heart of Indian music, which is mostly voice-based. Since the Vedic era, this special repertoire-based approach has been developed and passed down orally through the guru-shishya parampara (teacher-student tradition), which spans many millennia. Hereditary musicians continue to develop, preserve, and embellish it. There is no notation in Indian music. It is challenging to capture in writing because of the abundance of ornamentation and microtones. To detect and understand Indian classical music and to acquire improvisational skills, people require high degrees of auditory awareness, a strong memory, and training. There are two schools: North Indian Hindustani and South Indian Carnatic, each with its own rendition style. Other genres include folk music, bhajans, qawallis, devotional music, and film music popular light devotional music etc.

The study compared the effects of conventional and algorithmic music on relaxation levels and whether algorithmic compositions are distinct from human-composed music. Participants were divided into groups to listen to either preferred or algorithmic music. The results showed that algorithmic music achieved similar relaxation levels as preferred music, and the perceived effect was related to the performer. However, algorithmic music composed by a machine was not distinguishable from human-composed music.

## Methodology:

For musical generation, the pipeline consisted of MIDI file generation with the Music21 Python library (<http://web.mit.edu/music21/>, accessed on 3 September 2021) and, subsequently, by using Apple Logic Pro 10 and the Native Instruments music library (Kontakt 5) for synthesis. A sample of algorithmically generated music is available at <https://open.spotify.com/album/4QBVhPmHTwXN9IWib8ZgJS>.

Step 1: Define Song Database

Step 2: Create Function to Retrieve Songs

Step 3: Create Function to Play Songs

Step 4: Example Usage

According to the Methodology we have mention algorithm as per given below:

Step 1: Define Song Database

Create a dictionary where each key represents a symptom of a disease, and the corresponding value is a list of songs associated with that symptom.

```
song_database = {
    "headache": ["Song1", "Song2", "Song3"],
    "nausea": ["Song4", "Song5", "Song6"],
    "fatigue": ["Song7", "Song8", "Song9"],
    # Add more symptoms and corresponding songs as needed
}
```

Step 2: Create Function to Retrieve Songs

Define a function that takes a symptom as input and returns the list of songs associated with that symptom from the database.

```
def get_songs_for_symptom(symptom):
    return song_database.get(symptom, [])
```

Step 3: Create Function to Play Songs

Create a function to play the songs retrieved for a particular symptom. This function can simply print the names of the songs, or you can integrate it with a music player if desired.

```
def play_songs(songs):
    for song in songs:
        print("Playing:", song)
```

Step 4: Example Usage

You can then use these functions to retrieve and play songs based on specific symptoms:

```
selected_symptom = "headache"
selected_songs = get_songs_for_symptom(selected_symptom)
if selected_songs:
    print("Playing songs for", selected_symptom)
    play_songs(selected_songs)
else:
    print("No songs available for", selected_symptom)
```

Results:

Playing songs for headache

Playing: Song1

Playing: Song2

Playing: Song3

We can expand and customize this algorithm by adding more symptoms, songs, and functionality as needed. Additionally, you might want to incorporate error handling and validation to ensure that the input symptom is valid and that songs are available for that symptom in the database.

### Conclusion:

The therapy process is followed using various approaches, including selecting musical pieces, to ensure effective treatment, based on documented musical preferences, and further experimentation for standardization and improvement.

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