MAISTRO

Change the way you listen to music

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Problem Statement

- Music streaming, led by platforms like Spotify, has transformed how people consume music.
- Despite vast song libraries, discovering music tailored to evolving tastes remains a challenge.
- Current recommendation algorithms, based on user history and broad genres, often fall short in personalization and are context-unaware.
- **What if music could be recommended based on the user's mood?**

Proposal

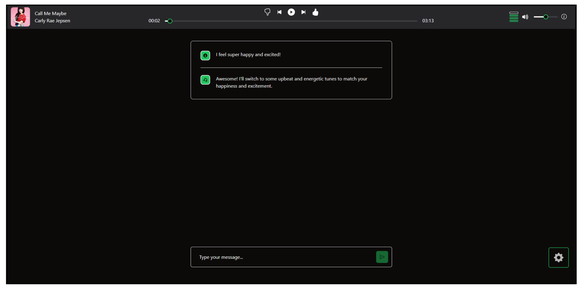
A full-stack application employing Natural Language Processing (NLP) techniques to:

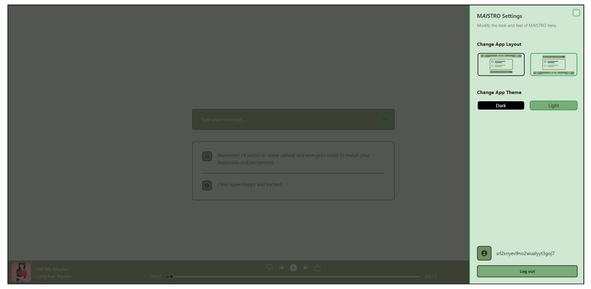
- Interpret user conversations, extracting emotional context with a custom model
- Deliver real-time, highly personalized song recommendations through an intuitive user interface with a familiar Spotify player integrated

Related Work

- Early music streaming services like **Pandora** and **Spotify** allowed users to influence song recommendations through "likes" and "dislikes".
- Spotify has recently introduced an **AI DJ feature**, using text-to-speech technology. that provides brief descriptions before song selections (Spotify Newsroom, 2022).

How It Works





Recommendation Function

- Each track has attributes
- The output attributes for each batch is calculated as the point of intersect between the two lines below:

$$y = 0.5 + (v - 0.5)x^2, v|v \in [0, 1]$$

Call Me Maybe
Carly Rae Jepsen

Danceability: 78/100
Speechiness: 4/100
Instrumentalness: 0/100
Energy: 58/100
Valence: 66/100
Popularity: 75/100

Frontend Stack

- React.js, Vercel, Next.js Tailwind CSS, and HTML

Backend Stack

- Python, FastAPI, MongoDB

APIs

- Spotify, OpenAI

Tools

- Docker, GitHub, LocalXpose

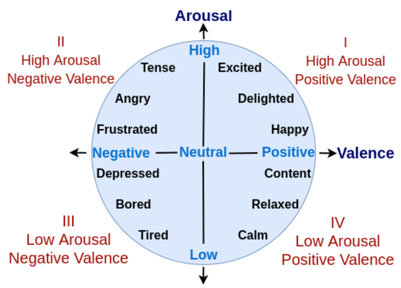


Figure 1: The Valence-Arousal Space (Rajasekhar et. al 2015)

Linear Classification Model

- Text is vectorized as a "bag of words" without respect to word order
- Vectors pass through **28** Dense layers, one for each emotion
- Predicted emotion is output

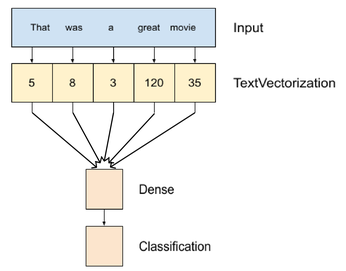


Figure 2: Model Architecture (Abadi et. al 2016)

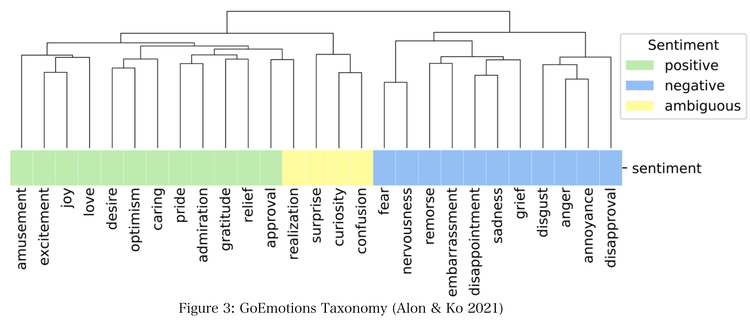


Figure 3: GoEmotions Taxonomy (Alon & Ko 2021)

Literature Review

Emotion Detection in NLP

- Emotion detection in text poses a significant challenge in NLP (Yam, 2015).
- While sentiment analysis gauges positivity, negativity, or neutrality, emotion detection identifies specific feelings like pride and disgust.
- Current approaches: Lexicon-based methods, sophisticated machine learning techniques, etc. (Nandwani, 2021).

Emotion Detection Datasets

- Available emotion detection datasets are generally small and cover a limited emotional range.
- Example datasets: AffectiveText, ISEAR, and GoEmotions.
- **GoEmotions** (released by Google Research in 2021) comprises over 58,000 Reddit comments categorized into 27 emotions, making it ideal for accurate user input interpretation (Demszky et al., 2020).

References

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