

Music Genre Classification

“Music is the universal language of mankind.”
— Henry Wadsworth Longfellow

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ABSTRACT

Audio data is becoming an important source of information in machine learning, we are using voice more and more to interact with smart agents like Siri and Alexa. One easily available source of audio data is music records. In recent years machine learning and artificial Intelligence has had good success in various tasks like music genre classification, music recommendation, music generation etc. The music industry has gone major changes from its conventional existence and also in the form of music created in last few years, the ever-growing customer base has also increased the market for different music styles, music not only brings individuals together, but also provides insights for various culture, therefore it is essential to classify the music according to genres to satisfy the needs of the people categorically.

Introduction

What is music?

“Music is a way to express yourself, keep you company while you're alone, and always give you something to do.” “Music is everything, without music there is no purpose to a lot of stuff.” “Music is a way to express yourself and your feelings. A music genre is a style or a type of music. There are numerous music genres, such as hip-hop, rock, country, pop, etc. Music is classified into genres based on various factors such as valence, liveness, acoustic-ness, and so on.



Different categories of music

Problem Statement:

Music plays a very important role in people's lives; Music brings like-minded people together and is the glue that holds communities together. Communities can be recognized by the type of songs that they compose, or even listen to. Different communities and groups listen to different kinds of music. One main feature that separates one kind of music from another is the genre of music, The phrase "music genre" is frequently used to group several musical styles together as following a shared custom or set of guidelines. According to their unique preferences, people now make playlists based on particular musical genres. Due to the determination and extraction of appropriate audio elements, music genre identification is regarded as a challenging task.

Market/Customer/Business Need Assessment:

In market there is a huge scope of availability in Music industry as all Companies provide the best music in their field domain. And there are many types of music available in the market such as Disco, hip-hop, etc. Time factor plays an important role where customer finds it difficult to choose the music. If customer is likely to get the music accordingly, then there will be huge profit in terms of business.

1. Recorded Music – This type of music business sells music that has been recorded in a studio.
2. Music Licensing – This type of music business licenses music for films, TV shows, video games, advertisements, online videos, etc.
3. Live Music – This type of music business sells tickets to live concerts and tours. They might also operate a school that teaches people how to become successful musicians, or they might sell memorabilia such as T-shirts and posters.
4. Music Publishing – This type of music business is in the rights business; they represent songwriters. If someone wants to use a song by a songwriter that is represented by the music publishing company, they need to get permission and then pay a royalty.

5. Music Production – This type of music business provides a service for musicians and recording artists. They might produce and record an album and then provide marketing services such as radio promotion and public relations.
6. Music Business Consulting – This type of business is in the business of providing advice to musicians on how to become successful. For example, they may offer consulting on how to promote your music and how to book gigs.
7. Music Artist – This type of business operates as an individual musician or music group. For example, they might be solo artists, bands looking for a record deal, or groups of musicians hoping to become successful together.
8. Music Education – This type of music business offers music lessons, either in-person or online.
9. Retail Music Store – This type of music business sells instruments, sheet music, and other music-related items.

Target Specifications and Characterization (your customer characteristic)

Some of the music genres prevalent worldwide are:

- 1) Electronic: It is a type of music which makes use of electronic musical instruments and circuitry-based music technology. The rhythm of this genre is said to develop anticipation and produce dopamine.
- 2) Jazz: This music is uniquely identified by its complex harmony and rhythms apart from the heavy emphasis on improvisation. It is well known for reducing negative emotions and giving positive feelings.
- 3) Country: It is a genre filled with elements of folk and rural dance music, and is quite popular for thought provoking lyrics.
- 4) Rock: It perceives to denote loud and pessimistic vibrations. Rock music comprises of heavy beats and rhythmic electric guitar chords.
- 5) Classical: It is known for its Mozart effect. This genre comprises of symphony and opera which eliminate any kind of nervousness and alleviate the mood.

Customer Characteristic:

- Every Individual Person Who is fond of Music has different taste of music depending on rhythm, harmony, Melody, Sound or pitch.
- Some other types of music are Blues, Classical, Country, Disco, Hip-hop, Jazz, Metal, Pop, Reggae, Rock.
- For selection of Music, it differs from person to person, one who loves to spend free time with music.
- There are many applications available in the play store and download music for free.

Bench marking alternate products (comparison with existing products/services):

Artificial Intelligence has great impact on market related to music industry.



There have been several advances in artificial intelligence devices and software applied to music. One example is Lyric jam, a real-time system that uses artificial intelligence to generate text lines for live instrumental music and was created by members of the natural language processing lab at the university of waterloo, Canada.

To date, the work has led to the creation of a system that learns artist's musical expressions and generates lyrics in their style.

Amper, an open-source programme that allows anyone, even non-professionals, to create music by indicating parameters such as genre, mood and tempo.

Daddy's car, a track openly based on Beatles songs. This system is capable of analysing the composer's primary idea and assisting them by generating ideas during the virtual composition.

Another great invention is juke deck, now owned by Tik-Tok. This AI platform works every easily in order for it to create a new piece, the user just selects the desired composition genre (folk, rock, electronic, ambient) the mood (upbeat or melancholic), the temp (beats per minute) and sets the desired duration.

Search & Recommendation: With 500 million songs online and 300,000 new songs uploaded to the internet every day, this can easily be called an inhuman task.

Applicable Patents (Patent of Tech/Software/Framework etc you are going to use in your Product/Service idea):

Some works published in last few years show that investigations related to musical genre in music information retrieval scenario are not exhausted, and they still remain as an active research topic, as one can note in the following:

1. **In Hareesh Bahuleyan, (2018).** Music Genre Classification using Machine Learning techniques, the work conducted gives an approach to classify music automatically by providing tags to the songs present in the user's library.
2. **In Tzanetakis G. (2002).** Musical genre classification of audio signals, they have mainly explored about how the automatic classification of audio signals into a hierarchy of musical genres is to be done. They are categorised by some of the common characteristics.
3. **In Lu L. (2002).** Content analysis for audio classification and segmentation, they have presented their study of segmentation and classification of audio content analysis. Here an audio stream is segmented according to audio type or speaker identity.
4. **In Tom LH Li. (2010).** Automatic musical pattern feature extraction using convolutional neural network, they made an effort to understand the main features which actually contribute to build the optimal model for Music Genre Classification.

Applicable Regulations (government and environmental regulations imposed by countries):

- Customer Data Protection and Privacy law.
- Regulation under False advertising.
- Piracy Protection law.
- Fraudulent Reporting.
- Employment laws.

Applicable Constraints (need for space, budget, expertise):

- Space for storing past browsing data acquires more storage
- More Number of Expertise required for maintaining the server.
- Cost on R&D increases in coarse time.
- Having multiple Connections in industry.

Business Model (Monetization Idea):

These are the factors of AI in music Industry

1. Generation of music:

With AI mastering the music industry, users get a plethora of music creation and music remix tools to generate their own style of beats. AI music generator is gaining vast popularity among popular artists/musicians who are really inspired by AI-generated albums.

For example, a known online musician and ai music composer – *Taryn Southern* said that 'her source of inspiration comes from her AI-driven lyrics and vocal melodies and uses that in her actual music'.

2. The various tools of AI in music industry are –

- **Phonic Mind** – Phonic Mind is one of the best vocal remover tools on the internet which uses the state-of-the-art AI techniques to remove vocals, drums, bass, etc from any song to achieve a high-quality performance. One can use it to quickly produce AI generated music specifically karaoke tracks out of any preferred songs.
- **Magenta** – Magenta is an open-source library that is powered by TensorFlow based project to generate a new model by training an existing model in the creative process. Magenta Studio is an application to make music and acts as a plugin to Ableton Live which is a well-known DAW used by musicians to manipulate source data like images, music, etc. Magenta was started by engineers of Google for generating AI in music industry, songs, and other materials for music enthusiasts.
- **LANDR – Developed** by Mix Genius, Landr is an online software for AI generated music to let users master the track with the best sound every time. It makes the music process easy, fast, and affordable that fits the creative vision of the artist. Landr, now has expanded its services to the Distribution of music, Samples Library, Virtual Studio Technology and Plugins.

3. Streaming Music

There is no doubt that AI plays an incredible role in music streaming. On streaming platforms, AI in music industry is used to study the listening patterns and song preferences of users across the globe. It works the best in figuring the common patterns within the songs produced.

The world popular music streaming platform, Spotify comprises AI-driven features like ‘Spotify’s Discover Weekly’ that offers a customized list of songs for every enthusiast on a weekly basis. It actually depends on the streaming or listening habit, musician taste or preference, etc. Do you know, AI is the secret of Spotify’s success and popularity?

Presently, Spotify has more than 280M users and occupies 40% of the global music market. Spotify’s AI technologies recommend songs to its users in a highly personalized manner depending on the number of songs repeated and other actions taken by the users.

Then what’s more interesting is that a million users are analysed later to discover others who have similar interests. AI wipes out the need to buy tapes, records, or CDs to listen to the favourites ensuring that one can streamline music anytime and anywhere.

4. Marketing Music and Identifying the Upcoming Stars

Do you ever wonder how listeners explore the new artists or decide who to listen to? Significantly, AI-created music helps them to discover this.

In the year 2018, the audio-on-demand streamed around \$534.6 Billion in the US alone as per BuzzAngle Music’s Year-end Report. It is hard and quite expensive to help new artists gain popularity amongst the music community and get discovered. With the help of AI technology, the fans can determine which music to listen to as per their taste.

Believe it or not, AI is also helping the industry with A&R discovery (Artist and repertoire) which helps to find promising musicians who are not signed to a label. In fact, Apple has also acquired a start-up with a specialization in music analytics to assist the A&R process. AI is behind the scenes leveraging the music we listen to in various ways.

Concept Generation (process of coming up with Idea):

Concept is simple that we want to enhance our music industry with the help of Artificial Intelligence.

Concept Development (Brief summary of Product/Service will be developed):

Artificial intelligence is growing in music industry as AI refers to simulation of human intelligence in machines that are programmed to think like humans and mimic their actions. The term may also be applied to any machine that exhibits traits associated with a human mind such as learning and problem-solving.

Final Product Proto type of Music Genre in AI:

Artificial Intelligence has been widely used in Music in today's world.
Here are few examples

AI Bot Name: Sony CSL Research Lab Unlike the rest of this list, 'Daddy's Car' was created entirely by AI, including the soundtrack. Researchers built FlowMachines, which can learn to imitate a band's style from its entire collection of songs. They gave it The Beatles' whole works.

OpenAI, has their own online AI music- generating tool called Muse Net. According to the company, the tool can generate songs with up to ten different instruments and music in up to 15 different styles.

Spotify's AI powers music and podcast recommendations designed to create long-term user satisfaction. To do that, Spotify leverages user data, from playlist creation to listening history to how you interact with the platform, to predict what you might want to listen to next.

The future of music will most likely follow the same trends we are seeing in modern technology. It will be incredibly social similar to social media; it will become increasingly computer-based and AI.

Conclusion:

The extent of AI complexities in the music industry has reached a point where computers are now being used in mainstream music. We already know that AI has the ability to assist humans in the creation of audio content. However, artificial intelligence (AI) is on its way to completely replace artists. The advancement of AI technology has had a significant impact on the way business is conducted in a variety of industries, including music. The techniques that AI uses in its processes can be used by music business players. For beginners, human mastery capabilities, for instance, maybe prohibitively expensive.

However, with the correct tools, they can improve their efficiency and sound optimization capabilities. Artificial intelligence is used in music mastering, soundtrack production, and recommendations, among other things. I believe this report has given you some insight into how artificial intelligence has drastically transformed the musical world. In the coming years, AI is expected to open several more possibilities for new musical potential.

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