NIET Journal of Engineering and Technology (NIETJET)

Volume 6, Issue 2, 2015 ISSN: 2229-5828 (Print)

Study on an Emotion Based Music Player

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Abstract: ***Recent research shows that humans respond to music and that music has a significant impact on brain activity. Every day, the average person listens to up to four hours of music. People usually listen to music that matches their mood and interests. This project focuses on developing an application that uses facial expressions to propose songs based on the user's mood. Nonverbal communication takes the form of a facial expression. The Emotion-based music player project is a revolutionary concept that allows users to automatically play songs based on their feelings. It recognises the user's facial expressions and plays music that matches their mood. Computer vision is an interdisciplinary tool that allows computers to analyse digital images or movies at a high level. The computer vision components of this system employ facial expressions to assess the user's emotion. When an emotion is recognised, the system offers a playlist for that emotion, saving the user time from having to manually select and play songs.***

Keywords – emotion, mood, music, expressions, playlist

1. INTRODUCTION

Music is a major source of entertainment. As technology has advanced, the optimization of manual labour has gained a lot of attention. Many traditional music players require manual song selection and organisation. Users must take time to create and update playlists for each mood. More advanced features, such as lyrics and song recommendations based on the singer or genre, are available on some music players. Music player automation should be improved, despite the fact that some of these capabilities are entertaining for users. Tracks that are automatically selected and organised based on the user's mood will provide a better experience. The system accomplishes this by reacting to the user's emotions, saving time that would otherwise be spent manually entering data.

Gestures, words, and facial expressions are all examples of how emotions can be represented. A user's mood is determined by their facial expression. Using the camera on the mobile device, we may capture the user's facial expression. Many emotion recognition systems use images as input to determine what kind of emotion someone is having. In this application, CML Tracker is being utilised to recognise emotion. The system includes a new algorithm [EMO-algorithm], which organises songs based on the emotions and preferences of the users. This algorithm suggests songs to listen to based on people's moods. We've always maintained that music players should be able to do more than merely play songs and make playlists.

A music player should be clever and respond to the choices of the user. A music player should assist users in automatically arranging and playing songs without requiring them to spend time picking and reorganising tracks. The Emotion-Based Music Player gives all music fans a better platform by automating song selection and updating playlists on a regular basis. This allows users to organise and play music according to their moods. Users should be able to change songs while on the move, according to the player. There are currently no dedicated apps that recommend songs based on the emotion of music listeners.
There are also very few non-customizable applications that focus on user preferences and recommendations, such as All Music. Other apps recommend pre-made (non-user-specific) music playlists. Manual song selection, partially Shue, and playlist are all aspects of an app similar mood fusion. Some popular music apps, such as Saavn and

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Spotify, allow users to create and update playlists manually. Rather of providing a spec city to every user, these apps focus on generic categorisation.

To improve the user experience, a dedicated app that focuses on user choices, priorities, and dynamic playlist generation is necessary. It should have a user-specific playlist generator that is based on usage, as well as efficient categorization. Many widely used facial expression classification approaches, such as Viola and Jones, can be used to collect and determine the user's emotion in the early phase, however these techniques have high processing needs.

Use a cloud-based web service to process computations in the cloud as an alternative. The present technology recognises emotions using a CML tracker that has assessed emotions from over a million faces. This tracker aids the programme in detecting and capturing emotion from a photograph. This feeling can then be used to categorise the playlist of the user. The following are some of the capabilities accessible in existing music players for computer systems:

i. Manual selection of Songs
ii. Party Shuffle
iii. Playlists
iv. Music squares

For only four basic emotions, the user must manually categorise the music. Passionate, Calm, Joyful, and Excitement are the four emotions. A user had to search through his playlist and select songs to calm his mood. Various music players have been developed in today's world, with ever-increasing advancements in the field of multimedia and technology.
The Emotion Based Music player allows the user to browse through a playlist and choose songs based on his current mood and behaviour. In order to use the player, the user must first create a profile. The app's functions meet the user's fundamental needs, but require active participation from the user. The technology will determine the user's emotions and produce playlists for them depending on those sentiments. Users can also quickly personalise their playlists using the app.

2. SYSTEM ARCHITECTURE AND DESIGN

The Emotion-Based Music player's system architecture. The application is designed utilising the Model-View-Controller architectural paradigm. The top layer is where the end-user interacts with the programme via pressing buttons, using the camera, selecting a radio button, and uploading tunes, among other things.

2.1 Controller*:* This layer comprises the application's primary functionality as well as the business logic. This layer processes the answer as soon as the user interacts with the application. This layer contains all run-in background functions, such as log-in and playlist display. This mostly comprises of all of the functions and the EMO-algorithm (described in later parts) that aid in the separation of songs and the transmission of output to the view layer.

2.2 Model: This layer is in charge of keeping track of the user's information. MySQL is used to store user data in the Emotion-Based Music Player. MySQL is useful for keeping track of user profiles and preferences. The feasibility study is conducted to see whether the project will meet the organization's goals in terms of work, effort, and time when completed. A feasibility study allows the developer to envision the project's future and utility. A feasibility study of a system proposal is based on its workability, which is defined as the impact on the organisation and ability to meet user needs. The document outlines the project's viability and details the different aspects that were considered. It includes technical, economic, and operational feasibilities.

2.3 Feasibility: An inquiry must recommend the type of equipment, process for building the system, and method for operating the system. Is the current technology adequate for the proposed solution? What are some of the technical questions that were highlighted during an investigation by the BBC's Technical Analysis Unit (TAU)?

Is it feasible for the system to improve and grow?

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The technology may become obsolete over time, yet the system can still be used because no newer versions of the same programme are compatible with previous versions. The project is technically feasible because the system was built utilising web technology.

2.4 Economic Feasibility:

The cost and utility of the emerging system must be justified. Criteria to ensuring that effort is focused on the project that will yield the best results as soon as possible. The cost of developing a new system is one of the elements that influences its development. During the preliminary investigation, the following were some of the most critical financial questions asked:

- The costs include the cost of doing a full system analysis, as well as the cost of hardware and software.
- The benefits come in the form of lower costs or less costly errors.
- There are no manual costs associated with the suggested system because it was developed as part of a project.

Furthermore, all of the resources are already in place, indicating that the system can be developed economically.

3. TESTING AND EVALUATIONS

3.1 Test Techniques and Test Strategies

The controlled execution of software to answer the question, "Does the software work as expected?" is known as software testing. When it comes to software testing, the terms verification and validation are frequently used. Validation is the process of checking or testing products, such as software, to ensure that they comply with a set of requirements. Software testing employs verification processes such as reviews, analyses, inspections, and walkthroughs. Validation is the process of ascertaining that the user's request has been met.

Validation: Are we doing the right job?

Verification: Are we doing the job right?

Software testing should not be mistaken with debugging. Debugging is the process of assessing and discovering flaws in software when it fails to perform as planned. While playing with the software may disclose some flaws, a systematic approach to software testing is a much more thorough technique of finding vulnerabilities. As a result, debugging is a complementary but not a replacement for testing. Two further procedures that are typically associated with software testing are static and dynamic analysis.

Nothing is complete without testing. Testing is a set of tasks that can be organised and carried out in a logical and orderly manner. Static analysis examines the source code of software without running it, looking for faults and calculating metrics. Dynamic analysis looks at how software behaves while it's operating in order to provide information like execution traces and test coverage.

3.2 UNIT TESTING

Unit testing is done on the software component or module, which is the smallest unit of software design. The important control routes are validated using the component-level design description as a reference to find flaws within the module's border. Unit testing is defined by the relative complexity of tests and the scope that is left unexamined. Unit testing is white-box in nature, which implies that it may test numerous components at once. Unit testing is done on the software component or module, which is the smallest unit of software design. The important control routes are validated using the component-level design description as a reference to find flaws within the module's border. Unit testing is defined by the relative complexity of tests and the scope that is left unexamined. Unit testing is white-box in nature, which implies that it may test numerous components at once.

3.3 INTEGRATION TESTING

Integration testing is a technique for constructing a program's structure while also checking for interface concerns. The goal is to create a design-driven programme structure based on unit-tested components. The programme as a whole is put to the test. Correction is difficult due to the program's vast scope, which makes it tough to isolate causes. As soon as these flaws are repaired, other ones surface, and the cycle appears to continue eternally. After unit testing in the Sell-Soft System to check for any interface conflicts, all of the modules were merged. Furthermore, differences in programme designs were eliminated, resulting in a single programme structure.

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3.4 VALIDATION TESTING OR SYSTEM TESTING

This is the last phase in the testing process. All forms, code, modules, and class modules were used to test the entire system. This type of testing is commonly referred to as Black Box or System testing. The Black Box testing method focuses on the software's functional requirements. Black Box testing allows a software engineer to create sets of input conditions that completely exercise all of a program's functional requirements. Black Box testing looks for defects in the following areas: erroneous or missing functions, interface errors, data structure or external data access errors, performance errors, initialization and termination errors, and performance errors.

4. VALIDATION CHECKING

To produce a high-quality product, diagrams and typography must be computer-drafted or hand-drawn using India ink. Figure captions are in lower case letters and appear below the figure, flush left. A figure in the body of the text is referred to by the abbreviation "Fig." When numbering the figures, keep in mind the sequence in which they appear in the text. Table captions are centred above the table in upper- and lower-case letters. No abbreviation is used in the text when referring to a table, and "Table" is capitalised.

5. CONCLUSION

The Emotion-Based Music Player automates and improves the end-music user's player experience. The app satisfies music listeners' basic needs without troubling them in the way that other apps do: it makes use of technology to increase the system's relationship with the user in a variety of ways. By using a camera to capture the image, analysing their mood, and providing a customised playlist through a more complex and interactive system, it makes the end-job user's easier. The user will be notified of songs that are not being played in order to save storage space.

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