A Synopsis on

Developing Smart ML Based Recommendation System

Submitted in partial fulfillment of the requirements
of the degree of

Bachelor of Engineering

in

Information Technology

by

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CERTIFICATE

This is to certify that the project Synopsis entitled ***"Developing Smart ML Based Recommendation System"*** Submitted by ***"Sakshi Naik (17104059)" "Sayali Phowakande (17104060)" "Arjun Rajput(17104068)"*** for the partial fulfillment of the requirement for award of a degree ***Bachelor of Engineering*** in ***Information Technology.***to the University of Mumbai,is a bonafide work carried out during academic year 2021-2022

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Abstract

Sometimes, music plays an important role in our life. Whether you are sad or happy, music plays an important factor as it expresses your mind, also the importance of music in your life will depend on your personal experience. This Recommendation System is developed for those users who express their feeling and prefer listening as well as viewing music videos depending on their choice. The recommendation system will filter out the contents depending upon user choice with similar data. For this Recommendation System, two techniques are used which are Collaborative Filtering and Content-based filtering. Considering the issues for some users while searching they can play music with help of a voice assistant.

Introduction

For some people, music has an important role in life. Music is one of the solutions for many problems as it enhances mood, can make excited, can also feel relaxing and calm. Basically, it helps you from reducing stress, depression, pain. Considering the rapid development of mobile devices and the internet has made it possible to get more closer to the music by music player system. The reason behind most portable music systems is that music can be played whenever and where ever. The increase in the number of music available exceeds the listening capacity of a single individual. Therefore it is sometimes difficult to choose from millions of music. The solution for this issue is that there should be a good recommender system that can provide user music recommendations. This system will basically recommend music to users according to analyzing the most popular, highly rated and users preference this will help users to get personalized results. By considering all factors we are developing a smart recommendation system that will be convenient for music listeners as well as there would be an increase of audience in the music field. This Smart recommendation system is an advancement

to the basic music player as it can recommend music to users by personalizing according to their choice and demands. Besides recommending music audio, this system also provides a recommendation of videos for 'now playing' music i.e While listening to the music, the music player screen while also provides a recommendation of music in video format. To make it more convenient voice assistants would be integrated with this smart recommendation system to have a hand-free experience. This System even helps out those users who are unable to type manually by using Voice Assistant. Voice assistant is basically implemented to have a hands-free experience for users. Voice-assistant would also result to recommend music on basis of the user's request.This would be beneficial for those are busy in other activities and wish to have music played simultaneously. In this Recommendation System, the resulting Recommendation is be provided based on audience preference or request. Besides this, the system will also recommend music based on categories like Latest Music, Top Hit Music that will introduce users to new music. For processing, this recommendation machine learning algorithms need to implement. This algorithm helps to instruct the data set and provide desirable output depending upon the specific algorithm used. The most common approach towards recommendation systems has been the Content-based Technique and Collaborative Technique. Most of the recommendation systems use collaborative filtering techniques as recommended music based on a community of users, their preferences, and their browsing behavior. Whereas in Content-Based filtering is a technique in which music is recommended on the basis of users' similar preferences and by knowledge accumulated of the user by studying users' recent played, favorite music, search music, etc. Besides recommending music this system will also provide video recommendations i.e while playing music the system will also provide Video option recommendations which will be useful for those users who want to play videos instead of audio, this can be implemented by navigating users to another page which will view video content. Another feature of the smart recommendation system is integrating the system with voice assistants. Voice-Assistant will also act as an interface for some users. This feature would be useful for those users who are willing to work simultaneously while playing music, which means that requesting voice assistant through command would give results. Basically, voice assistance is integrated to have a hand-free experience.

Objectives

a. Compatibility

To develop a Cross platform application, i.e Developing single application that can be run on different operating system.

b. Feasibility

To build a hand-free mobile application by integrating it with Voice assistant,which can make application more convenient.

c. Regularity

To keep a track of frequently played music by user.

d. Usability

To provide recommendations based on recorded information of users' preferences and suggesting video link of played music so that even videos can be watched.

e. Serviceability

To deliver a set of playlist from analyzing the current and future popularity of music ,artist and genres.

Literature Review

[1] In year 2019 author Shainee Jain,Tejaswi Pawar, Heth Shah,Omkar Morye and Bhushan Patil, has published paper Video Recommendation System Based on Human Interest. This system is develop for teenager user who are likely to watch videos on mobile. This paper proposes a video recommendation system that collects the reaction of the users for various videos which helps to know its relevance. Based on the viewers' watching history or browsing, the system is capable of recommending videos to the users. In this system Hybrid System is used which combination of Content Base filtering and Collaborative filtering.

[2] In the year 2019 Anand Neil Arnold and Vaira Muthu S have published a paper Music Recommendation using Collaborative Filtering and Deep Learning. This application is developed considering that increase in the collection of commercial music libraries has exceeded the capacity of a single user. In this system author's approach is to enhance the recommendation system by using Deep Learning. This Music Recommendation system is basically a hybrid system that recommends music as well as videos depending on user preference by CF and Deep learning techniques. Here Collaborative filtering is used in which the existing history of the user and recommend music from other users' history which is similar. One of the drawbacks is the results of this system are not accurate yet.

[3]In the year 2020 S Subhash, Prajwal N Srivatsa, S Siddesh, A Ullas Santhosh B publish paper Artificial Intelligence-based Voice Assistant.This system is basically an intelligent personalized assistant which can perform mental tasks like turning on/off smartphone applications with the help of the Voice User interface (VUI) which is used to listen and process audio commands. For this, the PyCharm library was installed from python packages. As a result, this system gives output on voice commands like playing songs on video, searching any location, and google search output.

[4]In this literature the authors Yui Matsumoto; Ryosuke Harakawa; Takahiro Ogawa; Miki Haseyama publish the paper in the year 2019 which was Music Video Recommendation Based on Link Prediction Considering Local and Global Structures of a Network in this system they have implemented a novel method based on LP-LG SN for recommending music and videos. In this, they have the construction of a network by collaborative use of the multi-model feature. As a result, it can work well in real-world applications. In the future, this application will introduce a framework to fuse prediction which can control the effect of local and global structure-based.

[5] In this Literature the authors Xiangpo Li publish a paper in the year 2021 which was Research on the Application of Collaborative Filtering Algorithm in Mobile E-Commerce Recommendation System. This system was implemented to improve the personalized e-commerce experience of the different products by using the Collaborative Filtering Algorithm. Collaborative Filtering is the most successful technology in the system of personalized recommendation system. It has made an important role in the sales of e-commerce websites. Here they have implemented Collaborative filtering to get recommendations of products based on user's experience, behaviour.

[6] The author M.Sunitha, Dr T.Adilakshmi published the paper Mobile Based Music Recommendation System in this system they have developed a music application that provides a suggestion based on similar users to target the users. It was a limited approach to solving problems by the computation resources available. In system model-based user collaborative

filtering and collaborative with metrics filtration and model based item collaborative filtering are some of the approaches which were considered while implementing.

[7]In this literature authors Shun-Hao Chang; Ashu Abdul; Jenhui Chen; Hua-Yuan Liao publish the paper in the year 2018 which was A personalized music recommendation system using convolutions neural networks approach. This system is based on the CNN approach and collaborative filtering.CNN approach was considered to classify music based on the corresponding audio. Here Collaborative Filtering is used to classify music data and provide recommendations.

[8]In this Literature author, Dr. Jagendra Singh published a paper titled Collaborative Filtering-based Hybrid Music Recommendation System. This system is developed considering a hybrid recommender which can give results depending on the combined recommendation procedure. This hybrid recommendation is used in many applications. Finally concluding this system consist of has hybridized factorization machine and SVD model to have better accuracy while recommended. Due to the increasing the nearby neighbor accuracy increase in the model which was implemented by using the KNN algorithm. As every user has their own model, therefore, the cost is much higher for the content-based recommenders.

[9]In the year 2018 the author's JOUR, Bae Joonho, Park Jinkyoo, Choi Jeonghye had published a paper titled "Mobile recommender systems: Identifying the major concepts".This application is developed considering the mobile application based on recommendation systems like E-commerce, Video platforms, Social networks. This consists of a hybrid technique wherein two algorithms are used, Collaborative Filtering and content-based filtering. Finally, this system concludes that there is yet an existing gap between mobile computation and recommender systems. Mobile computation should integrate tightly which can result in the research field of recommendation system. Considering Ecommerece recommendation system algorithm selection must be done based on privacy-preserving technology.

[10] In the year 2020, the authors Jisha R C, Amrita J M, Aswini R Vijay, Indhu G S had published a paper titled Mobile App Recommendation System Using Machine learning Classification. This application is basically developed Web Crawling and by using a clustering algorithm. Here Web Crawling is used to record information about websites and the Clustering algorithm is used to collect clusters on basis of Popularity and security aspects. The basic aim behind this application is to provide a simple recommendation system. Basically, this application shows how the rating, permission, and size of the application are being considered. Web crawling is implemented to extract users' rating permission and application size. This application was built on an android application that would give more efficient and accurate results.

[11]The author R. Obeidat, R. Duwairi, and A. Al-Aiad had published a paper titled A Collaborative Recommendation System for Online Courses Recommendations in the year 2019. This application consists of a collaborative recommender system that recommends online courses for a student considering the similarity of student history. Even theData mining techniques are implemented which are the apriori algorithm and SPADE algorithm. The apriori algorithm was used that generate the association rule and the SPADE algorithm was used to assess the effect of causes dependency. Finally considering the outcome of this system The system was proposed to have recommendations for online courses based on similar functions of students. The clustering techniques have a higher impact than generates rules to cover the

dataset.

[12] In the year 2021 authors Kiruthiga Devi M; Divakar M S; Vimal Kumar V; Martina Jaincy D E; Kalpana R A; Sanjai Kumar R M published a paper titled FARMER'S ASSISTANT using AI Voice Bot. The main purpose of this application is to develop a mobile application that can assist farmers depending on two techniques voice bot and suggestion bot. The multi-language response was generated depending on the farmer's queries. These queries were responded to by a multi-linguistic bot which was implemented using Google translator,pysttsx3, and Google search engines. This mobile application can improve increase in agriculture production and suggest farmer for progress in better farming practice.

Problem Definition

- Music Industry has experienced a boom in recent years due to the rapid increase in Music listeners.

- The number of music available exceeds the listening capacity of a single individual.

- It is sometimes difficult to choose from millions of music. However to manage this user needs a recommendation system which can help their user to introduce new music by giving quality of recommendation.

- Our system is developed as a music recommendation system that can give recommendations based on similarity and rating features.

- Along with the music recommendation, a video link will also be provided for those users who are willing to even watch music in video format.

- To make more innovative Voice assistants is integrated which offers a productive and personalized experience for users.

Proposed System Architecture/Working

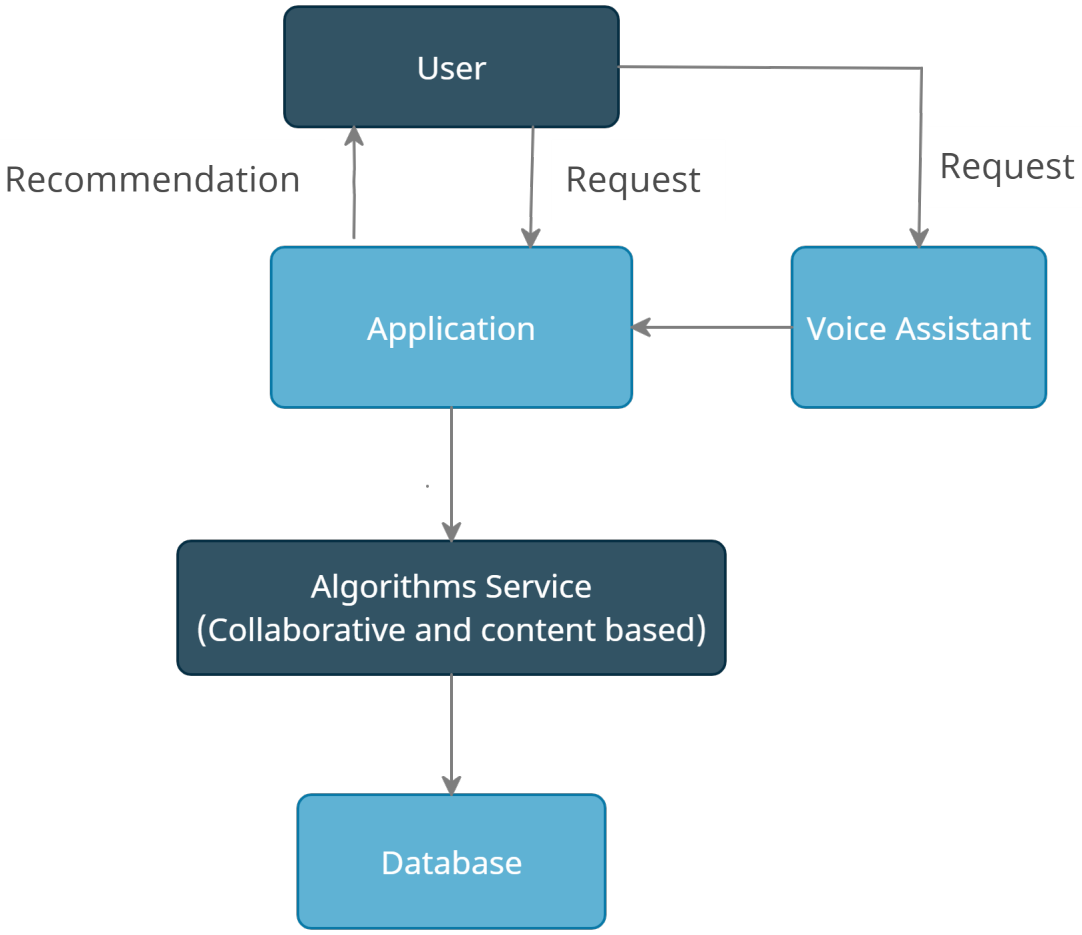

Figure 1: Proposed System Architecture/Working

The main goal of our application is to recommend users with the latest, preferred, and previously played music along with the video link. This is can be implemented by applying machine learning filtering algorithms which are collaborative and content-based filtering. This algorithm provides music based on user history and by collecting other user preferences. Following are the modules which are been considered while implementing this application.

- **User**

  The user module is the targeted module that will request recommendations by interacting with the application or with a voice assistant to get music recommendations.

- **Application**

  This module is the main interaction with the user module which consists of a main application wherein music is recommended and played according to the user. This is a module where the user interacts the most to get recommendations.

- **Algorithms Service**

  This module consist of a Machine learning mechanism is which will recommend music by using algorithms like content-based and collaboration filtering.

- **Database**

  This module consists of a collection of user details and a music playlist which would be pushed towards user's dashboard depending upon the algorithm.

- **Voice assistant**

  This module is implemented to perform hand-free use of application wherein user can command to assistant and assistant future send the request to the application.

Design and Implementation

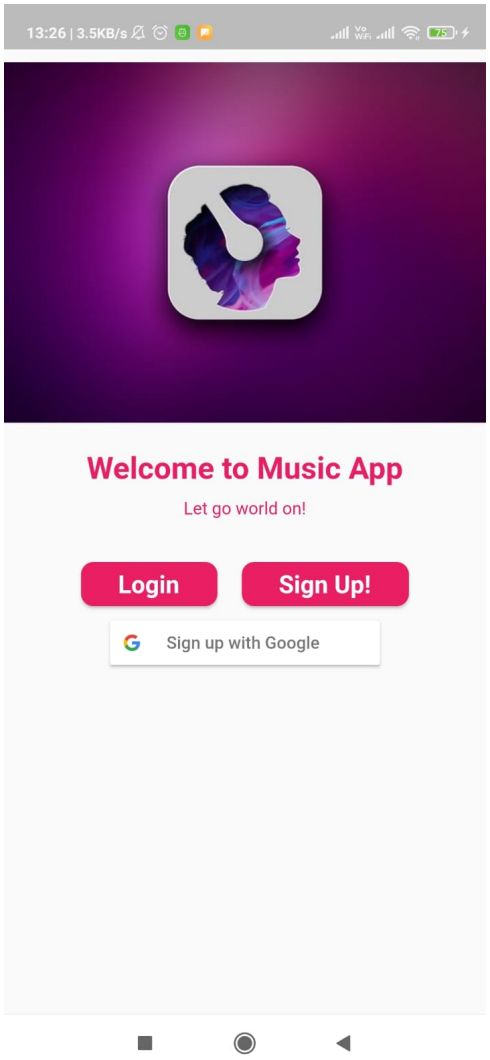

Figure 2: Welcome Page

Welcome

This page is the first page of the application ,where in Users can Sign Up for creating an account or if already exist then Login through the Login section and enter to the application.

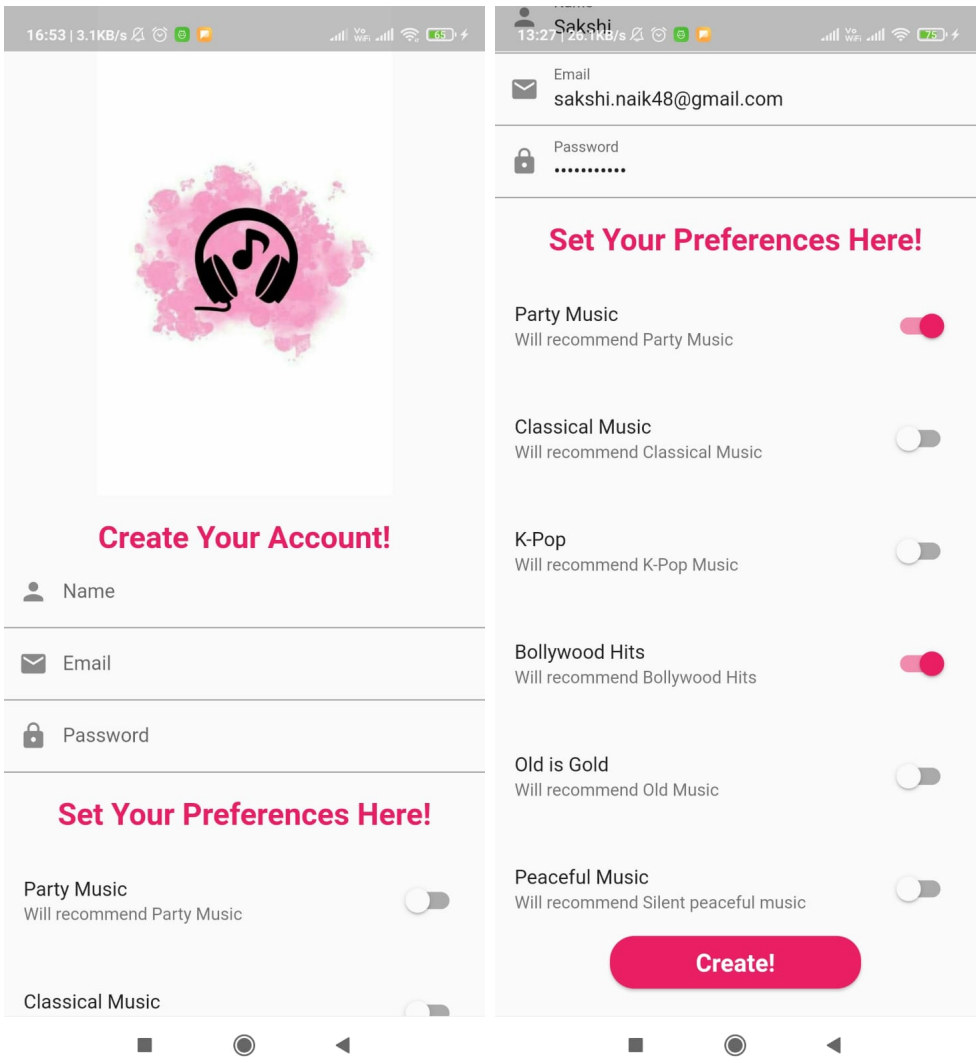

Figure 3: Sign Up page with selection of preference

Sign Up

After selecting Sign up option from welcome page this page is visible , wherein user can register themselves,while registering user get options to set preference which can future be use to play music accordingly.

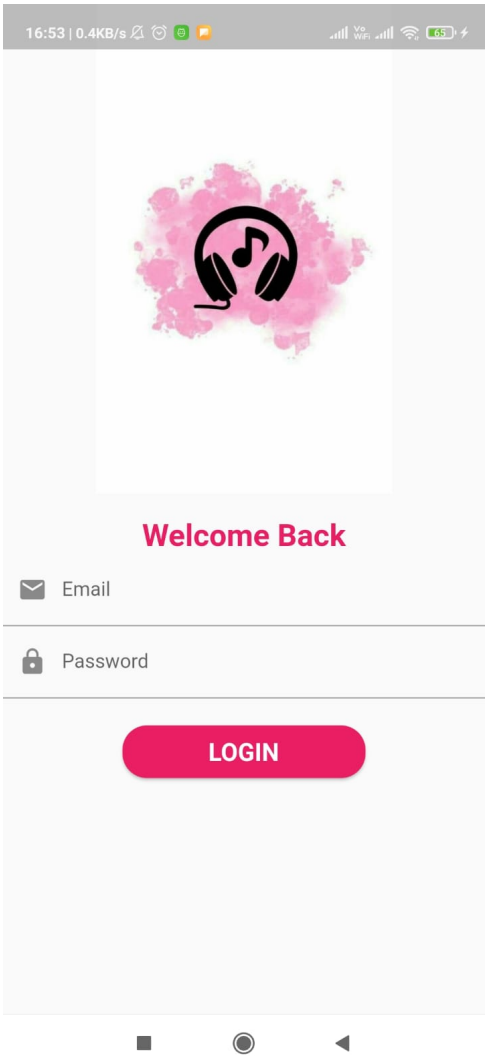

Figure 4: Login page

Login Page

The section can be used for those users which are already registered.

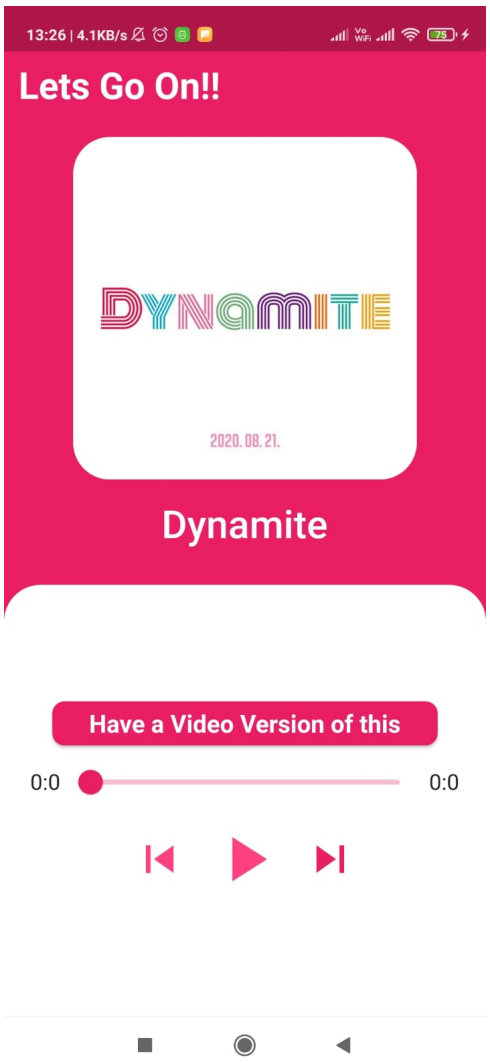

Figure 5: Login page

Music Player

After successfully Login user will able to access music player ,wherein music is been played with this the music player recommends user to have a watch on video version of same playing music.

Summary

By applying the knowledge and skill set, we are determined towards building a completely user interactive system that would be useful for every music listeners. This project will be implemented as a cross-platform application that will be compatible with multiple operating systems. So we have proposed a recommendation system with hybrid technique using ML. This system will recommend music to users depending upon preferences, recently played, and ratings of other users. Along with the music recommendation, a video link will also be suggested for those users who are interested to watch music in video format. To make it more innovative Voice assistants are integrated which a hand-free and personalized experience to users.

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1 Publication

Paper entitled **"Developing Smart ML Based Recommendation System"** is presented at **"3rd International Conference On Emerging Technologies In Data Mining And Information Security"** by **"Sakshi Naik","Sayali Phowakande", "Arjun Rajput", "Prof.Apeksha Mohite", "Prof.Geetanjali Kalme".**