Jurnal Ilmiah Teknik Elektro Komputer dan Informatika (JITEKI)
Vol. 8, No. 2, June 2022, pp. xx-xx
ISSN: 2338-3070, DOI: 10.26555/jiteki.v8i2.xxxx

KNN-Based Music Recommender System with Feedforward Neural Network

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ARTICLE INFO

Article history:

Received July 28, 2021
Revised August 28, 2021
Published September 28, 2021

Keywords:

Feedforward Neural Network;
K-Nearest Neighbors;
Recommender System;

ABSTRACT

Music, as a form of entertainment, is now an essential element in the lives of many individuals. Access to music-related information has become widespread through various websites and applications, leading to a significant increase in music data. Technological advancements have driven the development of music recommendation system research, which utilizes multiple methods, algorithms, and classification techniques to present recommendations that match user preferences. This research contributes to integrating the K-Nearest Neighbors (KNN) method for initial classification and the more advanced Feedforward Neural Network (FNN) model. In addition, this research also recommends songs with similar audio features. The main focus of this research is to design and evaluate a song recommendation system by combining such methods while comparing various hyperparameter results to find the most suitable model. The best model found will be incorporated into Content-Based Filtering (CBF) to provide song recommendations based on genre. This research uses the GTZAN dataset of 1,000 audio data from ten music genres. The K-NN model test assesses how well the model maintains consistency and achieves optimal performance. This study conducted three tests to find the best-performing model by integrating the model and hyperparameters. The results showed that the third FNN model showed the best performance after being optimized using the SGD optimizer. Furthermore, this model was combined with the CBF method using cosine similarity calculation. The system effectively recommended songs based on the blues genre, with five relevant nearest neighbors and an average score reaching 98%.

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1. INTRODUCTION

Many consider music an essential form of entertainment [1]. The development of information technology and the popularity of music streaming platforms have changed how people enjoy and listen to music. People also increasingly classify music into specific categories called music genres. As a result, we now recognize a wide variety of music genres [2],[3]. Based on APJII data, around 35.5% of internet users in Indonesia, around 46.9 million people, listen to music online [4]. Music platforms such as Spotify, Apple Music, and Deezer allow people to access an unlimited variety of music and artists worldwide. However, with so many options, users often struggle to find songs that suit their tastes. For this reason, recommender systems have become very useful in helping them find suitable music [2]. Recommender systems have become very popular in the entertainment industry, especially music. In recommender systems, several methods can be used, such as Collaborative Filtering (CF), Content-Based Filtering (CBF), as well as a combination of both, known as a Hybrid [5],[6].