PERSONALIZED MOOD-BASED SONG RECOMMENDATION SYSTEM USING A HYBRID APPROACH

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DECLARATION

I declare that this is my own work, and this thesis/dissertation does not incorporate without acknowledgment any material previously submitted for a degree or diploma in any other University or Institute of higher learning, and to the best of my knowledge and belief, it does not contain any material previously published or written by another person except where the acknowledgment is made in the text. I retain the right to use this content in whole or part in future works (such as articles or books).

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The above candidate has carried out research for the ~~Ph.D./MPhil~~/Masters thesis/dissertation under my supervision. I confirm that the declaration made above by the student is true and correct.

Name of Supervisor: Dr. Thushari Silva

Signature of the Supervisor: Date: 25/06/2023

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ABSTRACT

Music recommendation systems are becoming a crucial concern for the music industry because of the rise of digitization and the subsequent increase in music consumption. To ensure that users have an exceptional listening experience and remain loyal to their platform, music applications are continuously striving to enhance their recommendation systems. In the early days, the recommendation system used collaborative filtering and content base approaches to achieve this goal, but these approaches have an issue with a cold start, and context awareness of these approaches is less. Researchers identified in the context of the personalization of songs, Emotion, and mood can play a huge role. Research has shown that a user's current emotional state significantly influences their musical preferences in the short term. Therefore, the recommendation system moves toward mood-based recommendation approaches. The vast variety and context-dependent character of the data that must be considered present the main difficulty for mood-based recommendation systems. This information can vary greatly and is depending on a number of variables, including the user's environment and personal circumstances. Hybrid approaches have shown very good results in this domain. Therefore, in this master thesis, we are proposing a hybrid approach for a mood-based personalized song recommendation system. This approach combines content-based and context-based approaches together. The proposed solution produces the output as a personalized song recommendation for the music listener. This output is determined by several parameters including user mood, the profile of the user, and history of previously listened to songs.

Keywords—Collaborative approach, Content-based approach, Hybrid approach, Thayer's 2D Emotion Model, CNN

CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF ABBREVIATIONS

Abbreviation	Description
EEG	Electroencephalography
ECG	Electrocardiography
GSR	Galvanic skin response
BPR	Bayesian personalized ranking
HRV	Heart rate variability
DNNs	Deep neural networks
RNNs	Recurrent Neural Networks
RR	Respiration rate analysis
MCSG	Music concept sequence generator
SKT	Skin temperature measurements
MRS	Mood based recommendation system
EMG	Electromyograms
LTM	Location-aware topic model
EOG	Electrooculography
ALS	Alternating Least Squares
FE	Facial expressions
BP	Body posture
HLDBN	Hierarchical linear model with deep belief network
ARIMA	Autoregressive integrated moving average
GA	Gesture analysis
SVD	Singular Value Decomposition
MAE	Mean Absolute Error
RMSE	Root Mean Square Error
ROC	Receiver operating characteristics
PRC	Precision-recall curve
PMB-SR	Personalized mood-based song recommendation system
NDCG	Normalized Discounted Cumulative Gain

LIST OF APPENDICES