UNIVERSITI TEKNOLOGI MARA

GYM ACTIVITIES RECOMMENDER SYSTEM USING CONTENT BASED FILTERING ALGORITHM

MUHAMMAD SIDDIQ BIN SA'IDIN

BACHELOR OF COMPUTER SCIENCE (Hons.)

JANUARY 2025

ACKNOWLEDGEMENT

In the name of Allah, the Most Gracious and the Most Merciful. All praise is due to Allah, and I am grateful for His blessings that have enabled me to complete this research. I thank Him for providing me with opportunities, trials, and the strength to finalize this report.

First and foremost, I would like to express my sincere gratitude to my lecturer, Madam Ummu Fatihah binti Mohd Bahrin, for her guidance, understanding, patience, and most importantly, her positive encouragement and thorough explanations throughout the research process. It has been a great honor and pleasure to work under her direction.

My deepest thanks go to Madam Zeti Darleena Eri, my project supervisor, for his full cooperation and support. His willingness to take time from his busy schedule to review my research and share his extensive knowledge and expertise in the computer science industry has been invaluable in completing my research.

I extend my heartfelt thanks to all my family members. Writing this case study would not have been possible without their support. I am especially grateful to my father Saidin Hassan my mother Saripah, and all my beloved siblings for their understanding and encouragement during this time.

Lastly, I would like to sincerely thank all my dear friends who have supported me through thick and thin. Their advice and support during the research process have been incredibly helpful.

May God bless all the individuals mentioned above with success and honor in their lives.

ABSTRACT

This Gym Activities Recommender System serves to upgrade gym sessions by developing custom workout suggestions suited for each user's tastes as well as fitness objectives. The majority of gym members including newcomers battle to find appropriate exercises because they lack directional support and experience exercise complexity. The absence of proper guidance leads users to experience diminished motivation and choose wrong exercises that results in futile workouts. The proposed recommendation system bases its operation on Content-Based Filtering (CBF) to process metadata from different gym exercises which produces personalized workout recommendations. User-provided fitness objectives along with choice of workout exercises and experience background help the system develop customized workout profiles. The system matches users with appropriate exercises based on two similarity calculation methods which include cosine similarity alongside TF-IDF (Term Frequency-Inverse Document Frequency). The research adopts a formal methodology which combines gym activity dataset compilation and systematic design of the system with algorithm development and performance assessment. The recommendation system achieves performance evaluation through measurements of accuracy with 81.33% and precision with 81.66% as well as recall 100% and F1-score with 89%. The implementation of machine learning algorithms in content-based filtering methods delivers better gym activity recommendations which enhances user satisfaction as well as engagement. Users experience simplified workout selection through the system because it provides matched recommendations that boost their fitness development. The research demonstrates why artificial intelligence needs to enter fitness applications for data-oriented user-focused workout planning that enhances both workout adherence and health results.

TABLE OF CONTENT

CONTENT	PAGE
SUPERVISOR APPROVAL	i
STUDENT DECLARATION	i
ACKNOWLEDGEMENT	ii
ABSTRACT	iii
TABLE OF CONTENT	iv
TABLE OF FIGURES	viii
LIST OF TABLES	X
LIST OF ABBREVIATIONS	xi
CHAPTER 1	1
1.1 Background study	1
1.2 Problem statement	2
1.3 Objective	3
1.4 Project scope	4
1.5 Project significant	5
1.6 Research framework	6
1.7 Conclusion	7
CHAPTER 2	8
2.1 Introduction	8
2.2 Recommendation system	8
2.2.1 The use of recommendations system	9
2.2.3 Recommendation system technique	11
2.2.4 Advantages and disadvantages of recommendation design technique	es 15
2.3 Gym activities recommendation	20
2.3.1 Problem with gym activities recommendation	20
2.3.2 Benefit of gym activities existence	21

2.3.3 The recommendation in gym activities	21
2.4 Similarity computing	22
2.4.1 Cosine Similarity	22
2.4.2 Term Frequency-Inverse Document Frequency (TF-IDF)	23
2.5 Implementation of Content based filtering in various problem	24
2.6 The implications of gym activity recommender	32
2.7 Implication of Literature Review	43
2.8 Conclusion	44
CHAPTER 3	45
3.1 Overview of Research Methodology	45
3.1.1 Detailed of Research Framework	46
3.2 Preliminary Phase	48
3.2.1 Literature Study	48
3.2.2 Data pre-processing	48
3.2.3 Data description	51
3.3 Design Phase	52
3.3.1 System Architecture	53
3.3.2 Flowchart	54
3.3.3 User Interface Design	55
3.3.4 Pseudocode of Selected Algorithm	57
3.4 Model Training	58
3.5 Model Testing	59
3.6 Performance Evaluation	60
3.6.1 Recall & Precision	60
3.6.2 F-Measure	60
3.6.3 Accuracy	61
3.7 Prototype Implementation	61