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Recommending a Fitness Assistance System Using Artificial Intelligence

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Abstract
We suggest a recommender system (RS) to provide artificial intelligence support for the fitness assistance system (FAS). These recommendations are made for both new and experienced users using the RS. The objective of this project is to create an RS that can interact with humans via AI and learn, assess, predict, and provide these suggestions. The best workout for each novice has been predicted using Artificial Neural Networks and Logistic Regression. Additionally, it was created utilising the Soar architecture's reinforcement learning capabilities to aid users in choosing the right workout for them. The effectiveness of utility application is verified by the experimental results.

Keywords: Fitness Assistance System, Artificial Intelligence, recommender system, beginners and existing users, Artificial Neural Network, Logistic Regression, reinforcement learning, Soar architecture

SCOPE

Fitness assistance systems (FAS), also known as fitness aid equipment (FAE), are designed to assist persons. The time-tested method illustrates the general architecture of FAS. To accurately predict user recommendations and to send commands to the embedded controller operating the FAE, the recommended RS is integrated into FAS. The recommended RS used in FAS is an AI-enhanced system

that serves as a personal trainer by giving clients workout plans customized to their unique needs and preferences based on previous data and machine learning algorithms. With the use of machine learning methods, RS is better equipped to recognize and gather data from actual exercise logs.

1. Introduction

Information filtering systems, of which the RS is a subset, are invaluable tools for predicting how potential customers would rate a product or service ideas. Recent enhancements to RS have included the
individual users needs. Recent research in the fitness industry has focused on perfecting the RS for use with a wearable device that records data in real time. In a fitness assistant framework is created to intelligently monitor and detect user activity based on context.In addition, the RS runner request stated in has been submitted.The goal of this research is to develop an RS capable of providing individualized workout recommendations and anticipating a user's intention to exercise in the near future. To create the suggested RS, we use machine learning techniques to activity data. classifies the user's exercise activity using a prediction module in the BTL's basic training layer. We construct the training agent (TA) using the Soar framework, and we additionally In order to assist customers choose the workout that works best with their exercise schedule, a machine learning algorithm is being developed to represent the prediction of BTL.

2. Related Work

“An overview of current research and future directions for recommender systems.”

This article provides a survey of the recommender systems area and an explanation of the latest generation of recommendation techniques, which may be broadly categorized into three types: content-based, collaborative, and hybrid. In addition to outlining the many ways in which conventional recommendation techniques fall short, this study explores how they may be expanded upon to increase recommendation efficacy and broaden the scope of use for recommender systems. These enhancements allow for more nuanced and less invasive suggestion kinds, as well as better user and item understanding, contextual information inclusion, multi-criteria rating support, and more.

"A comprehensive survey of recommender systems that use machine algorithms."

To complement the F AS's AI capabilities, this study suggests implementing a recommender system (RS). The RS is used to generate these recommendations for both new and experienced users. The purpose of this work is to create an RS with the capacity for learning, analysis, prediction, and the provision of such ideas, as well as the ability to interact with humans via AI Each newbie's ideal exercise

routine has been predicted using a combination of Logistic Regression and Artificial Neural Networks. Members may get assistance choosing an appropriate fitness routine thanks to an agent designed using the reinforcement learning capabilities of the Soar architecture. The experimental outcome provides evidence that the utility application is successful.

"A generic architecture for smart recommendation systems"

In this research, we offer a comprehensive architecture for a smart recommender system, which builds upon the principles of a traditional knowledge-based recommender system. The smart recommender system does a wide variety of activities, including using knowledge, learning, discovering new information, inferring preferences and criticism. In this regard, a knowledge representation model, learning methodologies, and reasoning processes create the structure of a smart recommender system. In addition, there are five knowledge models covering the many factors that might be taken into account in a suggestion, including users, products, domain, context, and criticism. Combining these elements allows for knowledge to be used, updated, and inferred upon. In this project, we use Fuzzy Cognitive Maps to construct one smart recommendation systems system that is based on this architecture (FCMs). We then put the framework's adaptability and performance to the test by evaluating the smart recommender system against a set of unique criteria based on how the acquired information is put to use.

“PRO-Fit is a framework for a tailored exercise assistant.”

Technology improvements in wearables, such as accelerometers, gyroscopes, and other sensors, have made it simpler for people to adopt a healthier way of life. Most of the currently available apps, however, need constant user input and thus don't appeal to those who are either too busy to provide feedback or aren't as dedicated or self-motivated as others. In this paper, titled "Personalization of wellbeing recommendation using contextual interpertation," we propose a framework that uses machine learning and models is provided to intelligently track and identify user activity by collecting accelerometer, syncing with the user's calendar, and recommending personalized work outs based on the user's and similar users' past activities, their preferences.

3. Methodology

Fitness assistance systems (FAS) are meant to help people who are exercising by using dc wheels (called fitness aid equipment, FAE) to help with the heavy lifting. the tried and true technique. depicts the overall anatomy of FAS.

A microcontroller-based embedded controller, regulates the rotational velocity of the FAE's two motors. The suggested RS is integrated into FAS to make accurate predictions about user recommendations and to transmit instructions to the embedded controller running the FAE.The suggested RS employed in FAS is an AI-

enhanced system that acts as a personal trainer by providing customers with exercise regiments tailored to their individual needs and preferences based on historical data and machine learning algorithms.With machine learning techniques, RS is better able to learn, detect, and acquire information from real-world exercise data. In particular, it helps FAS simulate exercise according to the needs of individual users.

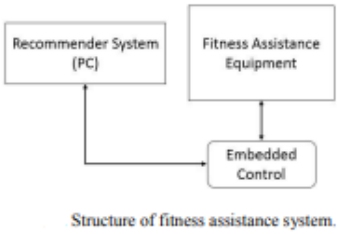

Figure 1 Structure of fitness assistance system

Fitness Machines That Use the RS Architecture depicts the RS architecture used in FAS. Several machine techniques have been utilized to forecast and provide the exercise advice in order to construct the RS with AI.the RS architecture is split into two parts: the basic training layers (BTL) and the trainer agent (TA). The BTL is constructed using an ANN and logistic regression to provide the foundation for the rest of the system's learning (LR). The module's focus is squarely on how to categorize data. In its present form, this module's primary responsibility is to provide beginner-friendly fitness routines based on input data.

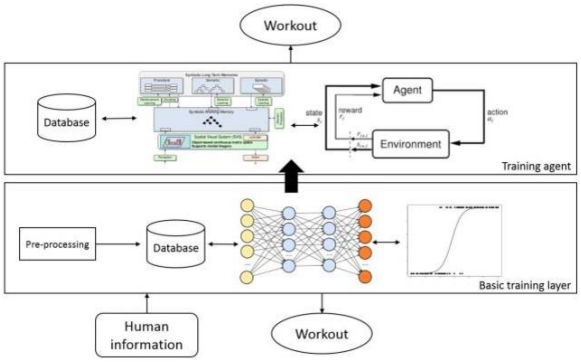

Figure 2 System Design Architecture

4. Results

This study describes the idea behind utilizing an ANN algorithm to suggest new users get on board with the Fitness Assistance System (FAS). For both new and seasoned users, the RS (Peer Support) is used to generate these recommendations. The purpose of this work is to use AI to help programmers build recommendation systems (RS) that can learn, analyze, forecast, and interact with humans. An artificially generated neural network and regression models were used to

determine the most effective routine for each newbie. The idea of this study is to create an RS that can anticipate a user's fitness schedule based on their past habits and preferences. A prediction module for classifying the user's behavior throughout their exercise is constructed using algorithms for machine learning on activity data in the proposed RS. In addition, we develop the training agent (TA) using the Soar architecture and a machine learning technique to mirror the BTL's prediction when recommending a variety of exercises from which users may choose the most appropriate one for their individual needs.

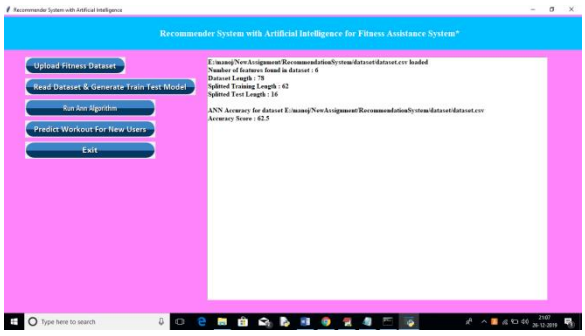

Figure 3 ANN algorithm

After developing the ANN model, the above display shows that it has an accuracy of 62%. To submit test data from new users and get a workout recommendation for those people, click the "Predict Workout for New Users" button

Figure 4 Predicting workouts

In the aforementioned window, we were given personalized suggestions for workout intensity, number of repetitions, and rest periods. We can observe that the first log suggests a starting weight of 60, with sets of 15–20 repetitions separated by 4-minute breaks. The same fitness program was suggested to us as was given to all new customers.

5. Conclusion

In this research, we offered a unique approach to fitness exercise advice using AI algorithms and RS for a fitness aid system. In order to provide a suitable fitness

routine, we built a system using a number of machine learning algorithms for prediction and data training. For the most precise workout-parameter forecasting, use an ANN trained using LR. Users may anticipate improved workout suggestions from the planned RS. Further work in this research will concentrate on enhancing the TA modules in the suggested RS with Skyrocket agent by creating the RL algorithms to suggest many exercises for the typical selection of current members. Further work will refine TA's existing capabilities, such as its ability to compute the epsilon value using the epsilon-greedy technique and evaluate the proposed program to better tailor the workout plan to each individual user. This means that in the future, the suggested RS will act as a professional trainer for the user.

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