

USER-TO-USER BASED RECOMMENDATION SYSTEM FOR FITNESS FREAKS

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ABSTRACT

It takes lots of effort to change your health motivation into an actionable workout schedule. A companion to join in your goals stimulates your motivation as well as acts as a challenging opportunity to grow in the journey. We propose a social networking platform where different users are suggested using User Profile-based recommendation systems using personality analysis. This system helps users to connect with the community or individuals as a companion. With the help of the companion aspect, the daily workout schedule for users and their connections in a network is more simplified, where the possibility of getting demotivated or lost is reduced. A friend recommendation engine is hence needed to provide a good way to diminish this problem as well as satisfy user needs. A recommendation engine facilitates the users by helping them in making an informed decision based on the information they need, like item recommendations based on users' previous behavior and the information on them collected by the system. Hence, proposing the use of a personality-based friend recommendation framework, which consists of a 3-Layered Artificial Neural Network for friend preference classification and a distance-based sorted subset selection procedure for friend recommendation.

Keywords -artificial neural networks, friend recommendation, personality analysis, social network.

INTRODUCTION:

Due to Rapid growth in technology, our life is highly facilitated with smartphones, which in return helps us to communicate with the outer world. Recommendation systems such as product-based and user-based are helping users/companies in making more intuitional choices. These types of recommendation systems can be integrated with social networking platforms, e-commerce platforms, and various interdependent domains. We are delegated to build various architectures by using the available services. Here we propose to build a user-friendly social networking platform for the fitness freaks, which help them in finding out a daily workout companion. This platform is integrated with a user-based recommender system, which will recommend the users by computing a similarity metric followed by shortlisting some users only, by taking care of important traits such as geo-location, age, gender, etc.

RELATED WORK

NafisNeehal and M. A. Mottalib [1] have proposed that pre-existing recommendation system can be improved by connecting people, who have similar personalities, with each other, an application of which is completely missing in the modern friend recommendation frameworks. Hence, they have

proposed a personality-based friend recommendation framework in this paper, which consists of a 3-Layered Artificial Neural Network for friend preference classification and a distance-based sorted subset selection procedure for friend recommendation and the model tends to achieve fairly high precision, recall, f1-measure, and accuracy of around 85%, 85%, 82%, and 83% respectively in the friend choice classification task

Yu et al. [7] presented GeoFriends, an FRS that recommends geographically related friends by social network structures analysis through combining GPS information. Vinciarelli and Mohammadi [19] have surveyed the field of personality computing and its impact on the social computing system. While Kaushal and Patwardhan [13] surveyed the literature on automatic personality recognition from SNS data.

Different works have used different methods for personality measurement using SNS data. The works in [14]–[16] have analyzed the language usage patterns and preferences to measure the user's personality, this was done by extracting linguistic features such as Linguistic Inquiry and Word Count, (Medical Research Council) Psycholinguistics Database, and parts-of-speech (POS). While the works in [17] and [18] discussed the relationship between social network photographs and the user's personality.

PROCESSING STRATEGY

It is a formal representation of a system organized in such a way that supports reasoning about the structure and behavior of a system. The following figure 1. represents the structural view of processing of the project. Deploying an Artificial Neural Network to predict the personality score of social network users. So eventually, the problem in hand gets transformed into a regression problem where the user is calculated in the cold start. Once a user's choice of clusters is predicted by the ANN, then users having those personality traits can be recommended as friends. The one big advantage of our system over the traditional friend recommendation methods used by giant social networks is users get to choose Fig. 2. Workflow Diagram the type of people they want to be a companion with, which is very much similar to what happens in our real life.

- i) Data Collection and Description: In general, the first stage of our proposed method should be to perform a rigorous survey which typically consists of 50 standard question items to calculate the user's personality along with users' personal information such as Name, locality, age, BMI, and some physical health-related aspects. From the answers to these 50 questions, we can calculate each user's personality score in each of the locality clusters. Besides the questions, the survey also contains a multiple-answer question about the choice of user's personality to be considered for companion/fitness-goals. In category though, we haven't done any survey. Instead, experimenting with the system by creating a dataset through python scripts. The dataset created can be randomized, but can help in effectively testing the model and its usability.
- ii) Data Processing: Standard data preprocessing like normalizing the features, find and fill out missing values, etc. were done on the pre-computed data set. Also, in the data set we received, the string values from surveys should be converted into numerical objects. Either way, the One-Hot Encoding technique can also help in creating dummy variables to calculate categorical boundaries. The numerical features

are transformed into normalized values. The transformer function scripts can be reused while a new user enters his/her information. The transformed information is fed to a recommendation engine created in further steps.

- iii) Building the model: The model building can be tried upon different machine learning model using methods such as – Traditional Recommendation System, Friend Recommendation System and Personality Analysis
- (a) Recommendation System: There are two methods for building a recommendation framework.
 - (i) Content-based recommendation system: Content-based filtering method depends on a user's history of behavior, such as the item ratings the user gave, the products the user browsed, and their history of purchasing goods. This model simultaneously establishes a model for user behavior and also a model for each item to describe its characteristics. After that, a crossmatch is performed between the user models and item models by gauging how much similar they are to each other, and then with enough similarity, an item is recommended to the user.
 - (ii) Collaborative filtering-based recommendation system: Collaborative filtering is different than a content-based recommendation. Collaborative filtering based recommendation recommends items for people based on users who are similar to them. In collaborative filtering, an item is recommended to a person if another user who is similar to him has recommended it. In collaborative filtering, we analyze relationships between dependencies among products and users, and from that, we try to identify new user-item.

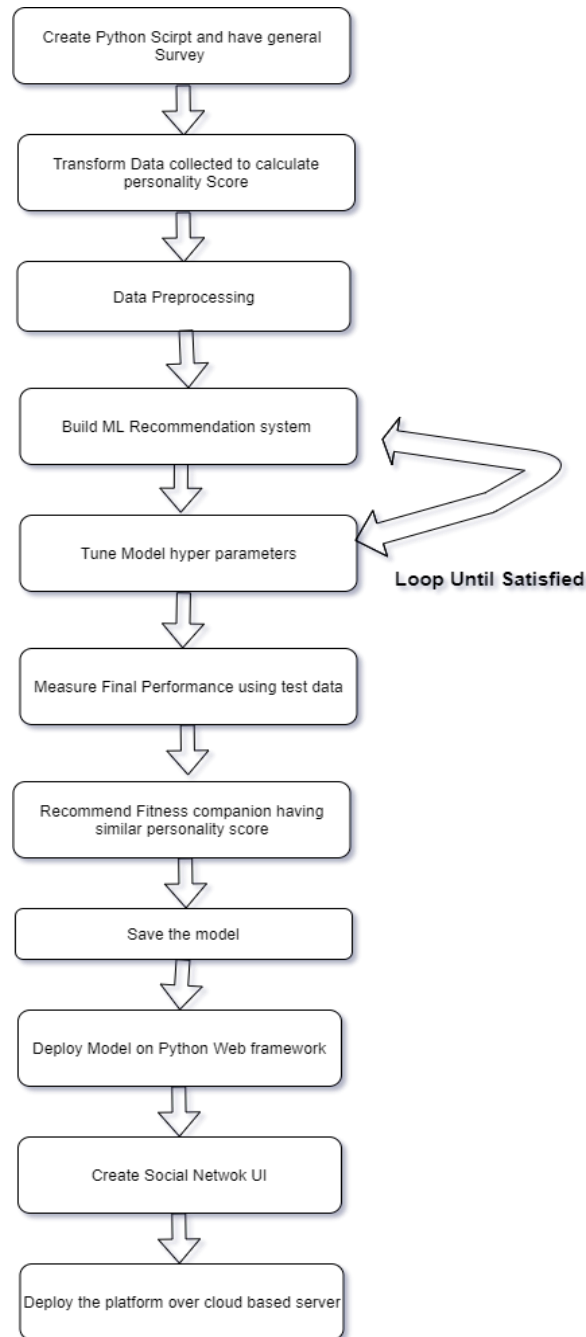


Figure 1: Workflow Diagram

(b) Friend Recommendation Systems: In real life, people typically relies on the opinions or interests or recommendations that they get from their friends in social media before purchasing a product. Hence, Social networking platforms can have the means to offer a shared platform for sharing interests, recommendations, etc., and also can serve as a platform that provides proper incentives in the marketing of products by modeling consumer behavior. Figure2 shows how the model undergoes the process of recommending user profiles. There are several mathematical models and methodologies available which show how people interact with one another. In the following subsections, the contributions of various link prediction approaches are described which encompasses two major categories: CF-based approaches and graph-based approaches[2].

- (c) ANN: Artificial Neural Networks, as we know it, is trivially a very powerful classifier. General structure of a neural network consists of several neurons stacked up in layers. There are 3 kinds of layers, namely - Input Layer, Hidden Layer and Output Layer. In general, the number of nodes or neurons in the input layer is equal to number of features used from the data and, number of nodes in the output layer is equal to the number of target variables. The in-between layers are called hidden layers. Number of hidden layers and number of nodes in each hidden layer is generally chosen in an arbitrary manner, typically which is based on trial and error methods

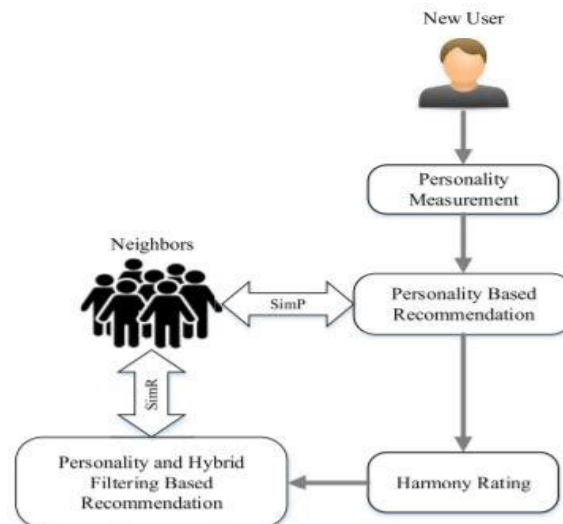


Figure 2: Model Design

- (d) Personality Analysis: The Big Five personality traits, also known as the five factor model (FFM), is a taxonomy for personality traits. The five factors are:
- I. Extraversion - Typically higher score in this trait means the user is outgoing/energetic in nature and solitary/reserved for vice versa.
 - II. Neuroticism - Typically higher score in this trait means the user is sensitive/nervous in nature and secure/confident for vice versa.
 - III. Agreeableness - Typically higher score in this trait means the user is friendly/compassionate in nature and challenging/detached for vice versa.
 - IV. Conscientiousness - Typically higher score in this trait means the user is efficient/organized in nature and easygoing/careless for vice versa.
 - V. Openness to experience - Typically higher score in this trait means the user is inventive/curious in nature and consistent/cautious for vice versa.

Scores in each of this 5 personality traits is calculated by the survey questionnaire presented. This questionnaire was collected from International Personality Item Pool (IPIP) which is considered as a standard for personality analysis. There are total 50 questions in this survey. As an answer to each of this 50 questions, surveyed has to give a number between 1 to 5, while 1 means surveyed completely disagrees and 5 means complete agrees and 2, 3 and 4 are in between. Although for our work we didn't perform the survey and used a pre-computed dataset instead, yet it is worth mentioning how it was done.

CONCLUSION

In this work, we propose to build an integration of Social Networks with Friend Recommendation System for connecting fitness freaks located in nearby locations. The system will recommend the user-profiles based on the similarity metric acquired by the ML engine. The model can be deployed over the mobile application or in the form of responsive Web-applications. The platform built will help individuals to find the companion/partner, which results in group fitness sessions together. The platform can create an effective social impact on young generations. We have demonstrated that by utilizing ML techniques such as Collaborative Filtering, Hybrid Filtering. The proposed framework can suggest trustworthy companions based on 5 personality traits matching. The end product can successfully be built with Software Engineering Techniques using SDK.

MOTIVATION

It's so easy to relegate exercise and activity to the bottom of your long to-do list. But being active is one of the most important things you can do, each day if you can, to instill good health. While we may not be able to reduce the time for other commitments, we might try to squeeze short bursts of activity into our busy life. Every bit helps. This can be achieved either by maintaining self-discipline or finding out someone with a similar path. Finding out someone is not an easy task, as it can affect your daily schedule. So, to eradicate these problems we need a smart solution with the use of advanced technology. With the use of advanced user-based recommendation pipelines integrated within our mobile phones in the form of a social networking platform, where we can easily find out the companion for our workout. The user recommended by the system is computed and presented based upon personality traits such as age, gender, location, etc. The user is then allowed to communicate with another user and this conversation leads to productive hours of the day. So this architecture helps in turning out into good health with a companion as a team within a few clicks.

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