Social Network for Volunteering Activities

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Abstract:
In recent years there is a rising need for volunteers to accomplish certain activities conducted by various Non-governmental Organizations, but more often than not they are overlooked by the general public. These activities require active participation from volunteers, in order to succeed. But due to a gap in communication between NGO'S and the public the overall turnout for these activities is quite low. Our application aims to bridge this gap by providing a social network for volunteers and NGO'S where activities can be posted along with a brief description, image and location wherein users are recognized for their contributions with points being awarded for completion of each activity. This in turn motivates the general public to learn about the various volunteering activities taking place near their vicinity and decide for themselves where to invest their time in from a range of different activities such as planting saplings, teaching the under-privileged, providing critical first-aid during road accidents etc.

1. INTRODUCTION

Volunteering activities in general suffer from one main issue, a lack of participation from the general public this is mainly due to the fact that most people including willing volunteers aren't aware of the array of activities that they can participate in. Our application aims to remedy this issue by providing a social network for volunteers and NGO's to post activities which require volunteers, along with a brief description and location of the activities, from which users can decide which activity to participate. This ensures that people are well informed about the activities taking place near them and allows them to respond accordingly. The social network in our application leverages intelligence from the data generated by our app users to enhance their user experience by fetching the information/posts what they are most interested this can be achieved by using recommender systems.

2. SYSTEM ARCHITECTURE

The application is implemented as a social network for smart phones running on Android using Android Studio which is the official integrated development environment for Google's Android operating system, built on JetBrains' IntelliJ IDEA software and designed specifically for Android development. The application utilizes Firebase which is a Backend-as-a-Service, that provides Authentication, Storage and Database solutions.
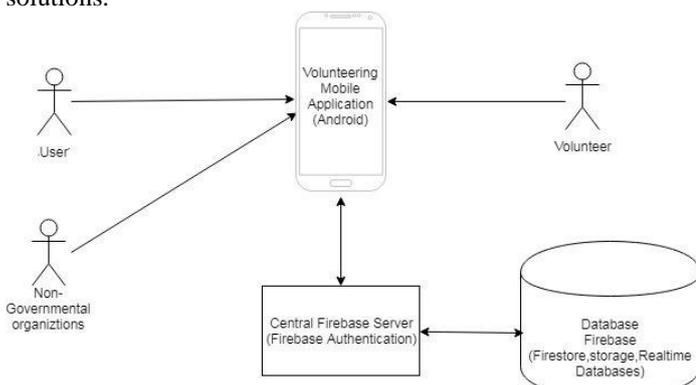

Figure.1. Application Architecture

3. RECOMMENDER SYSTEM

A recommender system is a technology that is deployed in the environment where items are to be recommended to usersor the opposite, these systems leverages the attributes provided by users in order to predict those of their friends. Most recommendation algorithms start by finding a set of users whose activities and interests overlap with the user's activities and interests. There are various approaches for implementing recommender systems but the following approach is implemented in our application,

3.1 Collaborative Filtering

Collaborative filtering, also referred to as social filtering, filters information by using the recommendations of other people. It is based on the idea that people who agreed in their evaluation of certain items in the past are likely to agree again in the future. Using collaborative filtering to generate recommendations is computationally expensive. It is $O(MN)$ in the worst case, where M is the number of users and N is the number of interests, since it examines M users and up to N interests for each user. However, because the average user vector is extremely sparse, the algorithm's performance tends to be closer to $O(M + N)$. Scanning every user is approximately $O(M)$, not $O(MN)$, the final performance of the algorithm is approximately $O(M + N)$.

3.1.1 Memory Based System:

The algorithm can select recommendations from the similar user's interests using various methods, a common technique is to rank each item according to how many similar users have a common interest. This Algorithm directly uses the system similar like the polling for the judgment of the rating of the active users. One way is to assume all the users but it usually accepts the neighborhoods algorithm. This algorithm is called as the "User-Based Nearest Neighbor Algorithm" and is commonly used. To find out the poll of the acquaintance match to the user, so as to give the weights and ratings to the acquaintance. The commonly used method to solve such problem is done by the Pearson correlation formula.

$$s(i,j) = \frac{\sum\limits_{u \in U}(R_{u,i} - \overline{R}_u)(R_{u,j} - \overline{R}_u)}{\sqrt{\sum\limits_{u \in U}(R_{u,i} - \overline{R}_u)^2}\sqrt{\sum\limits_{u \in U}(R_{u,j} - \overline{R}_u)^2}}$$

The above formula is used for the finding user similarity formula using Pearson correlation, Where Ru,n denotes the set of co-rated items between u and n

3.1.2 Item Based System:

In contrast to the above algorithm, this algorithm try to model the user based on their past ratings for predicting the unseen ratings of the products. It is type of probabilistic approach and analyzes the collaborative Filtering process as the computing the expected value of the user forecast, given his/her rating on the products. This algorithm has been performed on several different Machines learning Algorithm like Bayesian Network, Rule-based approach. A Probabilistic Model is defined by the Bayesian Network for the Collaborative Filtering problems. The Clustering Model treats this algorithm as a classification problem and performs by clustering user in same class and evaluating the probability that a particular user is in particular class, and from that it computes the probability rating. Similarly the association rule is applied to find the relationship between the purchased items and generate the association rating between items.
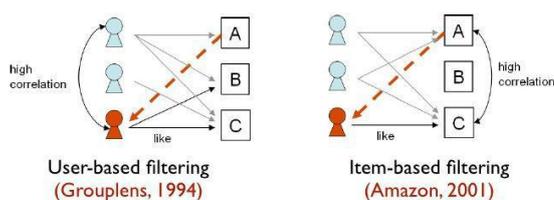
Figure.2. Difference between User and Item Based Filtering Techniques.

4. SYSTEM REQUIREMENTS
4.1 Hardware Requirements
- RAM: Minimum 1 GB
- Processor: Qualcomm Snapdragon 801

4.2 Software Requirements
- OS: Android (Minimum version required: Android 4.1, Jelly Bean)
- Firebase Services

5. TRAINING SET

In order to train our recommendation algorithm, we are going to use the data generated by our app users. We will record the user's interest and preferences and will be stored in the database in a structured way that acts as a training for the recommender algorithms. This algorithm will work as an online algorithm, where the recommender model will keep shaping itself for the better accuracy as the data comes in from the users. These training set can also help us with data analysis, which helps us to find what the users are most interested, thereby we can rewire the app to the user's expectations and needs.

6. CONCLUSION
The volunteer app connects people and NGOs, and also lets individual people to create awareness and get support for their volunteering activity, thereby letting people know when, where and what volunteering activities are going on and how they can get involved and contribute to the welfare of people. This mobile app will act as a platform for the public to get involved in volunteering activities such that we can together make a change and solve our problems by ourselves.

7. REFERENCES

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