Personal Multimedia Recommendation System on Smartphone Platform

Jun Lee, and Choong Seon Hong
Department of Computer Engineering, Kyung Hee University, Korea

***Abstract*--In this Paper, we propose a personal multimedia recommendation system for mobile devices. The proposed system automatically identifies the character of the user and recommends similar users to share multimedia contents.**

I. INTRODUCTION

The personal multimedia corresponds to an item such as a photo or a video created by a user. Nowadays, in order to share personal multimedia, many people upload their personal multimedia on websites. If a user wants to find a suitable multimedia content, he will have to use a considerable amount of time and effort. Due to multimedia explosion in the social network environment, it is not only time consuming but also difficult to find a satisfactory multimedia item, so a recommendation system is necessary [1] in such a scenario.

The rapid growth of mobile devices has brought innovation in which most people can use their own mobile device in their daily lives. Today most of the mobile devices are equipped, not only with camera but, also with multiple wireless interfaces such as Bluetooth, WiFi and 3G. As a result, mobile devices enable users to create their own multimedia contents such as music, picture, video, and store them in the mobile device. So through the mobile device, users can share multimedia contents with another user easily and directly [2], [3] Recently launched mobile devices such as smart phones have many functions. Many data logs are occurred in mobile environment. Because they can be used for many applications which include watching movies, taking pictures, listening to music, web browsing etc. So we can collect many data logs from mobile devices and these kinds of data logs can be used to analyze user's character in the mobile environment. In this paper, from this feature of mobile devices, we propose a novel system that applies analysis of collected data from mobile devices to infer user's interest and method to build a virtual network based on user's interest. Virtual network means that one or more users of similar interests connect with other users using mobile device such as smartphones. This paper is organized as follows: In section 2, we introduce the structure of our proposed system for recommending contents. In section 3, we present operation of our proposed system. We conclude our paper in the last section.

II. PROPOSED SYSTEM

In this section, we describe the proposed system. User profile is an important element in the network services, because user profile can represent the character of a user, which divides users in many groups to provide suitable services. In most of current services, user's profile, such as, hobbies and interests are predefined by the user before using services. However, user's interests can be changed as time goes by. So in the real life, predefined profile is not suitable for existing social network services. Our proposed system assumes that user can provide suitable multimedia contents to other users who have similar interests. The main goal of this system is to recommend a user for sharing suitable multimedia contents efficiently and effectively. The architecture of proposed system is shown in Figure 1

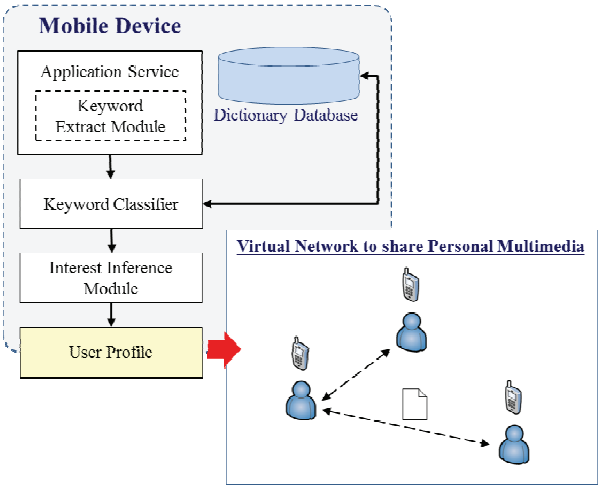

Figure 1. Architecture and Concept of Proposed System

Mobile device is a personal device with multiple functions. So it is very useful to collect user's data. To generate a user's profile reflecting user's interests, the proposed system extract meaningful words from services which are used by the mobile device. At present, most frequently used service in mobile device is web browsing. When a user connect to web services, web browser downloads web contents, such as, source code, documents, images, URLs, etc. From these contents, proposed system extracts meaningful words based on dictionary databases. From this process, many collected words can be formed as a representation of profiles. User profile is represented as $P = \{p_1, \ _2, p_3, \dots, p_n\}$ and each profile p_i has a weight as $W = \{w_1, w_2, w_3, \dots, w_n\}$. The weight is used for the degree of interest level, so if words are collected frequently, the weight of that particular interest is increased. Otherwise, if words are collected infrequently, weight of that interest is decreased. When the proposed system creates a user profile, it considers two types of profiles, regular interests and occasional interests. We define regular interest profile in which a user has an interest regularly. Otherwise, occasional interests are situations or events happening in the surroundings which may concern the user such as, information or news. In this case, the user has interest just for a specific time period. For example, a user has a particular interest in certain kind of sports, say Basketball. The regular interest in the person's profile for sport will be Basketball. But for some times during and after Soccer World Cup, the user will search news and

information concerning Soccer. In this case, Soccer will be an occasional interest whose weight will decrease over time after the event in the proposed system. Pattern of Collected words is depicted in Figure 2.

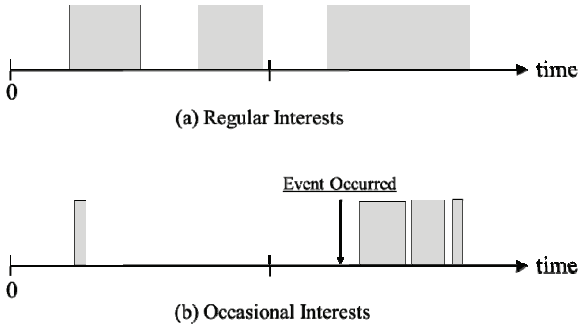

Figure 2. Collect history of words

In case of Regular Interests, words are collected more frequently and regularly than other words which can be used to infer Occasional Interests. In case of Occasional Interests, word are collected in a burst during and after a certain event occurred. In the proposed system, in order to interact with others, the most important thing is to discover the other users with similar interests [4]. The procedure of similar user discovery is as follows:

1) Mobile device A broadcasts a neighbor discovery message including user's interest to discover neighbor with similar interests.
2) When mobile device B receives a neighbor discovery message from A, it can get A's profile from received neighbor discovery message.
3) After that, the mobile device B calculate similarity between A and sends response message if the similarity is high and otherwise, discard the neighbor discovery message.
4) If mobile device A receives the response message, A and B form a virtual link to interact.

We adopt a vector space model and cosine similarity to measure the similarity between the users' profiles. Each user profile is represented as Vector and similarity is calculated as follows:

$$\text{Similarity}(P_A, P_B) = \frac{P_A \cdot P_B}{|P_A| \times |P_B|} = \frac{\sum_{i=1}^{n} u_i w_i}{\sqrt{\sum_{i=1}^{n} u_i^2} \sqrt{\sum_{i=1}^{n} w_i^2}}$$

If the result value of cosine similarity is higher than threshold value which is defined to measure relationship, the proposed system recommends user to share contents between each mobile devices.

III. Implementation

The proposed system is developed as a smart phone application which runs on android platforms to support recommendation system. Figure 4 depicts the main graphic user interface of proposed system.

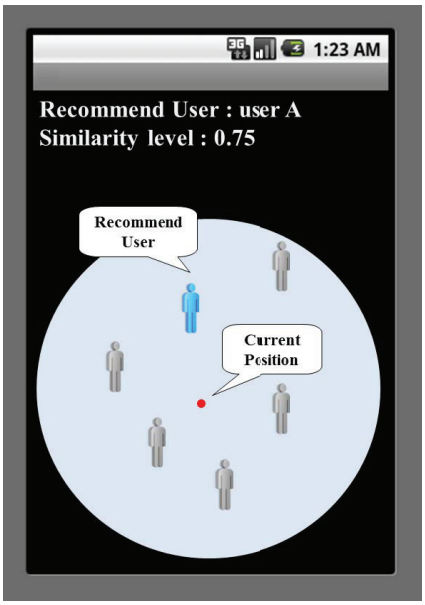

Figure 3. Application of Proposed System

When the user executes the proposed application on the mobile device, the mobile device can find another device belonging to the user who has similar interests. From these results, we can detect a user in commutation range who has a similar interest. In this way, similar user can be recommended to interact, such as for file sharing.

IV. Conclusion

In this paper, we present a new system for recommending users to share contents. This proposed system collects user's data from mobile devices and infer user's interest to recommend other users. Our recommend system provides new type of services such as file sharing directly . In our future work, we will try and implement it on mobile devices in real environment.

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Dr. CS Hong is the corresponding author.

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