MOTIVATING LEARNING THROUGH MOBILE INTERACTION

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ABSTRACT

The acquisition of any goal happens only with the correct dose of motivation instilled in the individual pursuing it. Mobile technology is at the same time providing us with different sensors and technology which allow us to measure valuable attributes around a person who is engaged in a learning experience. In this paper we will be studying what motivates an individual while finding methods on the mobile device which will reach this motivation. The socio-cultural background of the individual undergoing learning will also be brought into context by acting as one of the driving forces of the presented recommendation technique.

KEYWORDS

Motivation, Mobile Technology, Recommendations, Location Based Services, Cultural Background

1. INTRODUCTION

Recommender techniques have been used in various scenarios and they do indeed act as a learning opportunity for the users of such techniques. However, recommendations provided to users are normally used as a tool for overcoming the information overload problem [Wei *et al*, 2005]. We believe that in the context of m-learning, the information overload problem is an opportunity if filtered carefully. Motivation of learners takes place when one finds the key factors which motivate the individual in question. Nevertheless, not everyone is motivated by the same content and therefore recommender systems must be strategically set to find the correct factors by which to filter the available information depending on the receiver or learner.

This paper therefore proposes a recommendation approach based on 3 main factors: *User Profiling*, *Mobile Metrics* and *User Cultural Background*. Traditionally, recommender systems have been based on user profiling and different techniques which would filter content. These techniques will be explored in section 2.2 in this paper. The philosophy of this proposed recommendation technique is to motivate individuals who are pursuing knowledge through their mobile devices. The theory behind human motivation will be explored in section 2.1 which will also outline the key factors of motivation and approaches towards motivation. The socio-cultural context of the individual will then be taken in consideration in order to ensure that the content respects the individual and appeals to the quest in question.

This technique is based on a mobile environment which implies that the user is on the move and therefore not bound to one learning environment. This aspect is very important in the effort of motivating learning and the design of this technique will therefore be based on providing content based on the User background in his/her '*geographical*' context. Feedback is important in the evaluation of the learning experience of individuals. Games are proposed in this technique in order to create a feedback interface between the learner and '*teacher'* in order to ensure that the learner is following the designated learning trends.

2. BACKGROUND

2.1 Human Motivation

Various motivation theories assume that people are motivated if they are given an opportunity to reach a goal together with the right stimuli [Heller, 1998]. In other words, motivation deals with actions that determine how and why people initiate actions towards a goal while feeling involved in the activity leading to the said goal [Maslow, 1943]. The more motivated a person is in reaching a goal, the more persistent this person gets in the endeavor. Learning motivation is organized in two categories, *Intrinsic* and *Extrinsic* [Vallerand, 1993]. The intrinsic category includes factors within the individual which include personal motivation and drive towards the achievement of a reward. On the other hand, the extrinsic category includes external factors which include social pressure or a degree of punishment if a goal is not achieved. The latter may not necessarily be related to the task.

2.2 Mobile Recommender Systems

This technique aims at providing relevant content from the web to the user depending on his current location. The unvarying problem arising from this approach is that the web contains a very large amount of information that is by far more than what the user really needs [Wei *et al*, 2005]. This is known as the *information overload* problem. Throughout the years various efforts have been made in this field and recommender systems are now widely used in various areas such as e-commerce [Li *et al*, 2009] and content websites which need to guide viewers through videos, audio and other media [Wei *et al*, 2003].

In order to achieve this goal, different techniques have been developed in an effort to filter vast amounts of content. The **Content-Based** approach recommends content depending on the description of items being recommended [Wei *et al*, 2005] and therefore acting upon a similarity measure between the items. This is an objective filter since it does not depend on opinions. On the other hand, the **Collaborative Filtering** approach depends on the opinion and feedback of people. This is very efficient when it comes to recommending content which is difficult to compare due to the nature of the files [Li *et al*, 2009]. Examples of such content are video and audio files. Half way between these two approaches; one finds the **Knowledge Based Filtering** which refers to the class of filtering techniques which rely on rules. This approach is about getting to know the user and respective items and translate this information into a collection of statements [Berka and Poslnig, 2004]. A combination of Fuzzy and Boolean Logic is used in this approach in order to reduce the size of the final data set. The **Hybrid** approach then brings together the other filtering techniques in order to allow for systems to balance out subjective and objective judgments. This is a very good compromise since no approach solves all problems [Wei *et al*, 2003]. In practice, the hybrid approach would compute a final vector and then merge it with other collaborative ratings. These filtering techniques were enhanced with the developments in the field of mobile technology. Mobile devices improved recommender systems since they now allow for collection of situational information depending on the location of the user and thus the environment surrounding the same user [Huang and Webster, 2004]. This collection of information from extrinsic sources would therefore add more value to the final recommended set of items since it would improve relevance to the end user.

2.3 Cultural Background

When striving to motivate an individual, one has to bear in mind that motivation is at the end of the day boosted by personal attitude and other factors such as needs and interests. These attributes are controlled by the cultural background of the same individual which overarches human behavior in different situations.
In this paper we are proposing an approach based on results of the World Values Survey (WVS) which is carried out in various countries around the world in an effort to measure a vast set of values while studying trends and variations in world values [Inglehart, 2009]. This survey investigates various aspects of values which vary from the measurement of the degree in trust in families or social groups to the degree of personal creativity. In the context of this survey, [Inglehart and Welzel, 2005] present the Inglehart-Welzel Cultural Map of the World which places countries on a set of axis categorized by a degree of Traditional/Secular

values against their Survival and Self Expression Values. The placing does not therefore reflect the geographical location of the countries in question and it is a measurement of cultural proximity.

3. METHODOLOGY

In this paper we attempt to show the importance of side-factors which are required in order to ensure the relevance of content to the end user. In this paper we are proposing a technique which would be able to generate content and quests in relation to the user profile and background together with information from the environment where the activity is carried out. In order to tackle this problem, we propose that internal functions are organized in 3 layers. The outer layer represents the functions which are closest to the user while on the other hand, the inner-most layer represents the metrics which the mobile device captures from the geographical environment of the user. Recommender systems which are not housed in a mobile device normally focus on the User Layer features by getting to know the user, build his profile and update it according to the feedback given back through the application. The proposed technique does not deal directly with the mobile layer since, in practice, most mobile operating systems handle these metrics very well. In the middle layer we propose features which are relevant to the end user but utilize at the same time the metrics from the Mobile Device Layer.

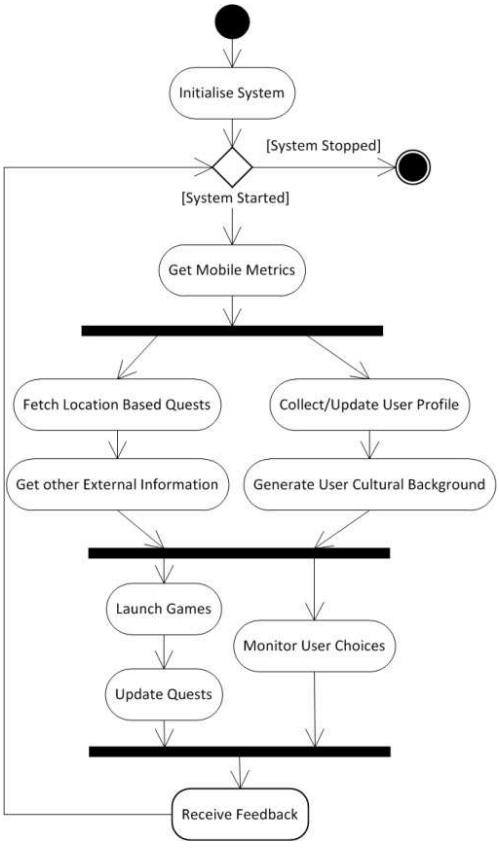

Figure 1. The key processes of the proposed technique [Source: Authors]

Figure 1 shows the outcome of the conceptual layer discussed above. The system starts by reading information from the device and then using is as parameter for the quests and information requests. While the games and content is loaded, the user profile together with his cultural background is computed. The Cultural background can be computed through a multinomial logistic regression of the WVS given the user's age gender and nationality. For a more precise reading, the user may be prompted with a set of questions which would return a better picture of the user's values. The system would at the same time update its

information about its location from the web by making use of the mobile metrics and adapt content accordingly. Once this is completed, the system would launch the games with quests together with location based information and monitor the user activity. The last step of the system would be the collection of any feedback from the user which would be used to tune the system in the next use. More material and detail will be presented in future publications

4. EVALUATION

The concept proposed in this paper was initially evaluated with a survey in which 92 individuals of different age, gender and nationality answered the questionnaire. This survey investigated the user views of mobile recommendations systems in light of travelling. An encouraging 87% said that they will follow suggested provided by mobile devices and 48% of the respondents owned a smart-phone or a tablet. This shows an encouraging trend towards smart-phones since a research conducted by the authors in 2010 showed that only 40% owned a smart-phone. This survey also showed that 63% of the respondents would update information whenever requested and another 16% said that they require more information before inputting any information in their device.

5. CONCLUSION

This paper intends to explore this concept in its early stages. Ground research was conducted about the way users expect applications to function and to measure the trust of users in such devices. On the other hand the concept presented above presents a way of engaging users in a learning activity while striving to keep the goals clear since they act as a stronghold in human motivation. Implementation of this work commenced but to date, there are no sufficient results to completely prove this concept. Work on a simulation together with another survey with an implementation of this technique on a mobile device is underway and will yield clearer results in the near future.

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