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Region based rewarding system

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Abstract
The large number of mobile devices has motivated the mobile marketing to surge in the past few years. New type of mobile marketing, mobile location-based services (MLBSs) have involved intense attention recently. In this paper, we proposed region based rewarding system, where system tracks the current location of the mobile user and using that location, system offers different number of notifications related to commercial entity given by vendor and also provides the offers information which is going on different products and services. This Region based rewarding system also provides the recommendation system, recommendation system is nothing but it offers personalized suggestions by analyzing user preference. It also provides common rewarding systems and different location based services like reminder services etc.

Keywords: Mobile location-based services, recommender system, Naïve Bayes

1. Introduction

With the rapid development of internet and mobile phones, the mobile marketing has become an important way of marketing also it can be even more effective targeting the individual in the crowd. Mobile marketing includes all those activities which connect advertisers to customers through mobile devices and networks. Mobile devices contain phones, PDAs, media devices, portable gaming consoles, tablet computers. The advertising is the most important activity in mobile marketing. The advertising creates the connection between companies, products, and customers. Advertising can motivate buying, increase sales, and help to startup the economy. In traditional way, marketing could be done by newspaper, flex, mouth publicity, radio, television etc. but nowadays marketing trends are increase day by day so marketing ways are also changing hence mobile marketing came into picture. So, the first mobile marketing start with text message (SMS) after this Multimedia Messaging Services (MMS) is used for sending the audio and video then Mobile Internet and Social Media is used for marketing and Mobile application etc.

Currently, there are various kinds of Mobile Location Based Services (MLBSs).One of them is location-based App is foursquare, Foursquare is use for a local search and finding service mobile app which gives search results for its users. It also provides recommendations of the places to go around a user's current location. Another App is Niffler which is app discovers the best offers and discount running at stores near you. It will easily search the offers across 80000 stores. This application provides Reward Management system. However, these location-based check-in systems are limited in several aspects. First of all, in Foursquare app there is no any rewarding system. Second, in Niffler customers can only receive and redeem rewards at the similar brand stores or even the same store. So, in view of all these points we proposing Region Base Rewarding System its characteristics are it gives reward points to user as per based on products. And it also has common reward management facility that means user can redeem their reward points from any commercial entity. Our system shows the nearby commercial entity by tracking the current location of user and gives advertisement based on user preferences.

In this paper, we propose a mobile location-based rewarding system, the proposed system consists of a Verification Center (VC), mobile users (MUs), Token Provider (TDs), Token Redeemer (TCs), and a central Information System (CIS). The TTP issues each MU with a real uniqueness and a corresponding certificate.

2. System Modules

2.1 System Architecture

We introduce the Location based rewarding system in which we are proposing this system, in this system we are trying to track the current location of the customer through the GPS according to that, the customer will get the information about discount which is going on different objects.

This system is time efficient. So the customer which is new in the city he/she will also get to know that all the discount which is going on to nearby shops. For every growing business, customers are very important hence, for attracting customer towards our system we proposed reward points. In the previous system, there were not any centralized system so that every customer needs to go particularly commercial entity to collect their reward points but in this system we are removing this limitation and trying to make the central reward system that means customer does not need to go particular commercial entity to collect rewards, he/she can collect reward points from any location in minimum amount of time, this leads to attract the more and more customers. In this system include common reward entities like Verification center (VC), Mobile Users (MUs), Token provider (TPs), Token redeemer (TRs), and a Central Information System (CIS).

Verification center (VC): A trusted third party in which each MU has an identity and a certificate. The VC is only responsible for issuing identities and not involved in any other activities in the system.

Mobile Users (MUs): The mobile devices which collect location-based tokens and redeem them for beneficial rewards. Each time that an MU visits a token distributor, it sends a request and receives a token through its Wi-Fi interface. Whenever an MU meets a token collector, it can redeem its gathered tokens. After the token collector verifies that the tokens are redeemable, the MU will receive the corresponding rewards. The communications between MUs and token receivers can also be carried out via their Wi-Fi interfaces.

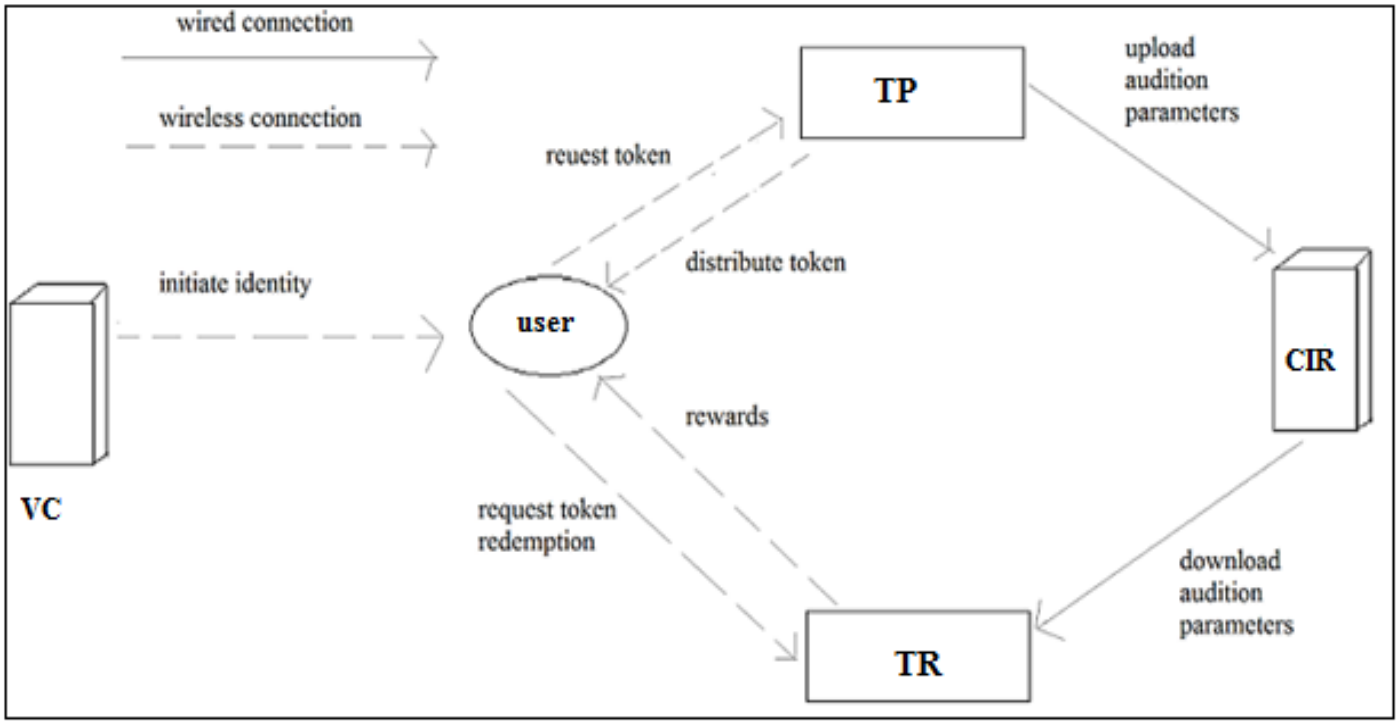

Fig 1: System Architecture

Token provider (TPs): The commercial entities who issue redeemable tokens containing reward points to attract customers, such as stores, restaurants, and car rental companies. Each TP is equipped with a Wi-Fi access point (AP) which can distribute location-based tokens. Besides, each TP also generates corresponding audition information and stores it in the CIS for future token verification. TPs are connected to the CIS through a backbone wired network, say the Internet.
Issued by other TPs or MUs' previous location histories. Besides, although TRs are responsible for verifying MUs' tokens to be redeemed, they cannot know MUs' real identities, or any of the detailed token information except the values of the tokens to be redeemed, or MUs' previous location histories. Any MU cannot know any other MUs' private information either.

Token Redeemer (TRs): The commercial entities who verify the MUs' token redemptions and reward the MUs with benefits, for example, monetary rewards, coupons, gift cards. TRs communicate with MUs via Wi-Fi interfaces and are connected to the CIS via the backbone network. Note that some TPs can serve as TRs at the same time.

Central Information System (CIS): As commonly used in many mobile application systems we consider an online Central Information System run by an independent third party. It is responsible for storing audition information of a token and forwarding it to TRs when asked to.

2.2 System Flow

This system is divided into three parts such as admin, vendor and customer.
Customer:
In proposed system first of all customer have to register with this system if user is not register with this system then customer will not get any services from the system. After registration, now user able to get different type of ads based on location based services and recommendation system. User can also search by the name of product or city. Customer also set the location based remainder for reminding future visiting places. After purchase, customer will get the reward points and this reward points redeem at any commercial entity. After redeeming the rewards points' customer will get the award based on the reward points.

Fig 2: System Flow

1. **Admin:** In proposed system the role of admin is to manage customers and vendors data. Data from vendor sides such as, different types of objects as well as vendor's information and from customer sides' data is personal information and reward points' database.
2. **Vendor:** In proposed system first of all vendor have to register with this system then every time he will have to inform the admin about current status of stock.
3. **Recommendation of commercial entity:** In this section we describe about the recommendation system, for the recommendation system we are using the naïve Bayes algorithm. The Naive Bayes algorithm uses the classification. The system contains the information related with the product and the preferences which is given by the user for a product. Using this preference it recommends the product.

3. Design Goals

The location based information system is to assist with the exact information, at right place in real time with personalized setup and location sensitiveness. A reward system can help an organization to attract and retain their customer. So, the motivation for every location based rewarding system is provide the information regarding a place he or she wants to visit to particular commercial entity. But these applications are limited to desktops only. We need to import them on mobile devices.

4. Implementation

In this section, we evaluate the computation, communication, energy, and storage costs of the proposed system, which consists of a laptop and an Android smart phone. In particular, the laptop has a 2.5 GHz CPU and 4 GB RAM, while the smart phone is a Samsung Nexus S with 1 GHz ARM Cortex A8 processor and 512 MB RAM. We implement a TP, a TR, and the CIR on the laptop platform, and a MU on the smart phone platform, respectively. The two platforms communicate with each other via the Wi-Fi access point in our engineering building using IEEE 802.11b, and their conversations are carried out via TCP connections. Thus, the communication cost in practice can be even lower than the results presented later on, considering that TDs/TCs may be connected to their access points via cables.

In this system, the technology which is going to be used at client side is Android Application, at server side is Net Beans and the database is MySQL.

4.1 Algorithm

The Naive Bayes Classifier technique is particularly used when the size of the inputs is high. Regardless of its simplicity, Naive Bayes can often overtake more sophisticated classification methods. Naïve Bayes model identifies the characteristics of customer with user preferences. It shows the probability of each input attribute for the predictable state. There are so many advantages of the Naïve Bayes; it is easy and fast to predict class of test data set. A Naive Bayes classifier performs better compare to other models like logistic regression and it need less training data.

Also there are some disadvantages of Naive Bayes, it is also known as a bad estimator, so the probability outputs from predict probability are not to be taken too seriously. Naive Bayes is the assumption of independent predictors. In real life,

it is almost impossible that we get a set of predictors which are completely independent.

For example, a fruit may be considered to be a Mango if it is yellow, oval, and about 4 inches in diameter. Even if these features depend on each other, all of these properties independently contribute to the probability that this fruit is a mango and that is why it is known as 'Naive'.

$$P(H|E) = P(H|E).P(H) / P(E)$$

H: Stands for any *suggestion* whose probability may be affected by data .Often there are competing hypotheses, from which one chooses the most probable.

E**:** The *evidence* H corresponds to new data that were not used in computing the prior probability.

P (H): The *prior probability* is nothing but the probability of H *before* E is observed. This indicates one's previous guess of the probability that a hypothesis is true, before gaining the current evidence.

P (H|E): the *posterior probability*, is the probability of H *given* E, that means, *after* E is observed. This tells us what we want to know: the probability of a hypothesis *known* the observed evidence.

P (E|H): is the probability of observing *given*. The likelihood function should not be confused with P (H|E) as a function of H rather than of E. It shows the compatibility of the evidence with the given hypothesis.

P (E): This factor is the same for all possible hypotheses being considered. This means that this thing does not enter into influential the relative probabilities of different hypotheses.

5. Conclusion

In this paper, we have proposed region-based rewarding system, In this app, we are providing marketing and location based services through mobile so, if the user is new in the particular area then he will able to get the information about commercial entities which is nearby to him in minimum time. Also the user will get route to particular entities. The system gives favorable discount to the user so, the user can easily attract to this system. Hence, proposed system is not only beneficial for the vendor but also for the user. In future mobile user's privacy can be well protected as well.

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