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Optimizing User Indulgence for Mobile Crowd-Sensing

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Abstract: ***Mobile crowd sensing is a widely used paradigm where group of mobile users exploit their mobile phones to cooperatively perform a large scale sensing job. The main drawback that restricts user willingness to participate in crowd-sensing is the cost for data upload. In this paper, we propose a user recruitment model for crowd-sensing. We separate the user based on his willingness to use his data as Pay as you go (PAYG) and Pay monthly (PAYM). As PAYM user concerned, it reduces the cost problem for recruiting users for participating in crowd- sensing. PURE model is used to determine the probability distribution of users at a particular point of interest (PoIs) to calculate the inter-contact probability. Then, an efficient prediction strategy is used to recruit users with minimized data uploading cost.***
Keywords: Crowd-sensing, User recruitment, Data uploading cost, PAYM, PAYG.

I. INTRODUCTION

Nowadays, smartphones, smart watches and tablets acquire excellent capabilities such as sensing and communication. In recent years, mobile crowd-sensing applications has emerged enormously. This application, help the users to collect and share information about various tasks. For example, commercial mobile application, Gigwalk form a group of people called as “street team”, who research on various bands and aggregate data on how its point-of-sale material is displayed, customer service continuity and competitor product placement.

Because of the explosive proliferation of smartphones, a new sensing paradigm, called *mobile crowd-sensing*, is proposed. Roughly speaking, mobile crowd-sensing refers to a

group of mobile users being coordinated to perform this sensing job over urban environments through their smartphones on a large-scale. To enhance this process, many task allocation algorithms has been designed.

In this paper, we focus on proposing an efficient prediction based User Recruitment for mobile crowd-sensing(PURE), where multiple users with a higher contact probability to the destination can be recruited to cooperatively perform a common task, ensuring that the expected data-uploading coast is minimal.

In PURE, users are divided into two groups, Pay as You Go (PAYG) user pays a data cost according to the amount of data transferred. Pay Monthly (PAYM) user can transfer an unlimited amount of data during a month-long period.

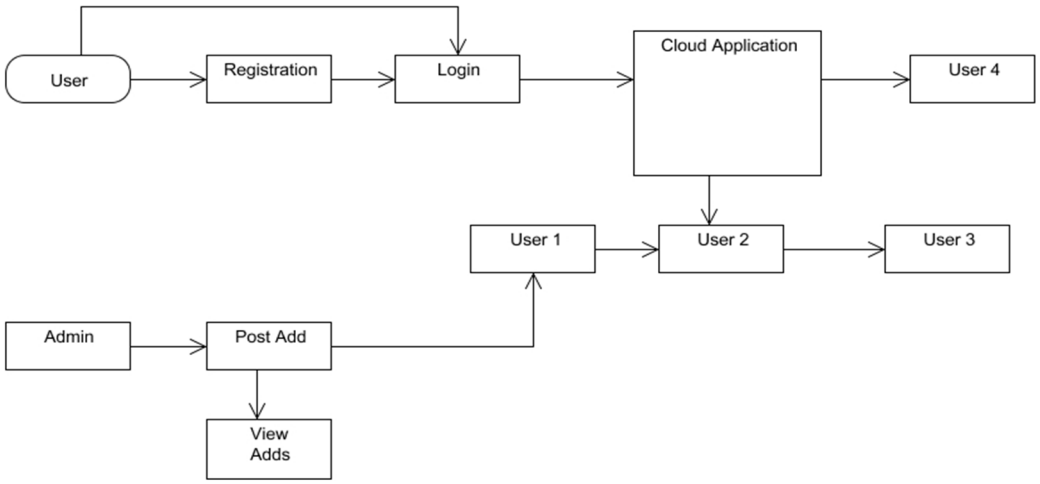

Fig1.System Architecture

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Assuming that a sensing task wants to collect real-time sensing data from many points of interest (PoIs) in an urban area (e.g., current traffic jam situations in some PoIs), and the sensing data are uploaded. Some user might pass by some PoIs, so that it can collect the related sensing data every day with some probabilities which simply make sure that how many users participate in the crowd-sensing process, as shown in Figure 1.

II. RELATED WORK

The mobile crowd-sensing works focus on the following two aspects:

A. How to simulate users to participate in the crowd-sensing task,
B. Which users should be recruited to finish the crowd-sensing task.

III. EXISTING SYSTEM

In the existing system, the mobile user should be connected to the internet to share the data via internet. The main phases in which mobile crowd-sensing occurs are: data collection, data storage and data upload. Data collection is performed on sensors available through the internet of things. There are three main strategies for collecting this data.
The user's device collects data manually. This can include taking pictures or using smartphone application. The collected data can be manually controlled, but some data can be collected automatically, such as when a user opens an application. Particular context that has been predefined to trigger data sensing (e.g., a device begins to collect data when the user is in a specific place at a specific time).

IV. PROPOSED SYSTEM

In this paper, we propose an efficient model to recruit user to participate in mobile crowd-sensing. In the Existing system, user without enough data balance, wouldn't be able to participate in the crowd-sensing process. Our aim is to make user participate in crowd-sensing by allowing them to transfer the collected information to the nearby device through wireless medium without having any data loss, but they can't be able to upload that information to the cloud unless they are an PAYG user. The collected information will be uploaded to the cloud only by the user who have enough data balance. This process is performed based on user's acceptance.

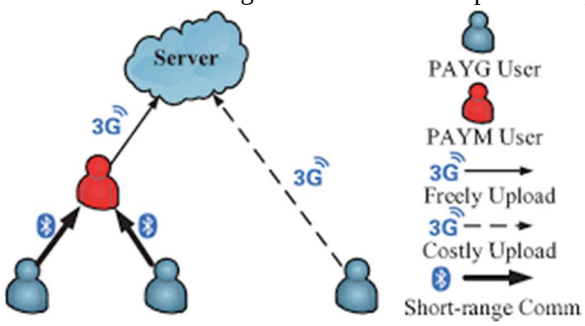

Fig2. Crowd-sensing Methodology

V. IMPLEMENTATION OF MODULES

A. Mobile device Registration & Login

Initially, User needs to register and login to the cloud by providing the necessary details, the type of user (user with data balance ie.3g or 4g user or a normal user), the user predilection to view. Based on the user predilection, user will receive the suggested content. The normal user participates in the Mobile crowd-sensing process, by only receiving the advertisements. He is then used as a wireless medium to transfer the corresponding information to the nearby devices.

B. Merchant Registration

In this module, we assume admin as the merchant. The main aim of admin or merchant is to advertise his product or advertise his shop for any discount. Firstly, the Merchant needs to register the details in the cloud also by the providing type of shop.
Merchant can be able to advertise his post and he will finally receive the number of count who views the particular advertisement. The Advertisement will be viewed only by the particular set of users those who have the same preference related to that particular advertisement.

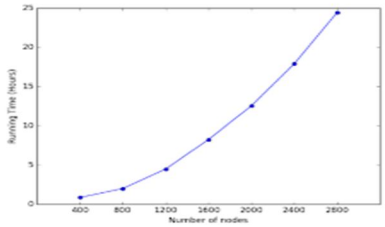

Fig3. Graph representing user recruitment in crowd sensing

C. Post an Advertisement

The advertisement is posted by various merchants in the cloud. From cloud all the particular advertisement will be delivered to all the users within the range, and travel to all their nearby users. While uploading an advertisement, the merchant uploads the corresponding image. Those image is also forwarded to all the mobile users who views the advertisement.

D. Upload Data to Cloud

Each time the user views the advertisement, the number of count will increase and this count is sent to the merchant from the PAYG user. PAYM and PAYG users are responsible for sharing the advertisement under the range defined through Wi-Fi, while PAYG user is also responsible for uploading the count data to the cloud. Once the information is received in the cloud, it is sent to the corresponding merchant, as shown in Fig2.

VI. CONCLUSION

We have looked into the problem of user recruitment in mobile crowd sensing campaigns drawing on opportunistic networking methods. First, we divide the users in the network into PAYG (uploading costly) users and PAYM users (uploading freely), and we formalize this problem as recruiting the user of the highest contact probability with PAYM users. Then, according to the semi-Markov model, we propose an efficient Prediction-based User Recruitment for mobile crowd-sensing, where the PAYG user's contact probability with destinations is achieved and where multiple users can be recruited to cooperatively perform a common task, ensuring that the expected data-uploading cost is minimal. Moreover, we propose PURE-DF by extending PURE to a case in which we address the agreement between the delivery ratio of sensing data and the recruiter number according to the thought of Delegation Forwarding.

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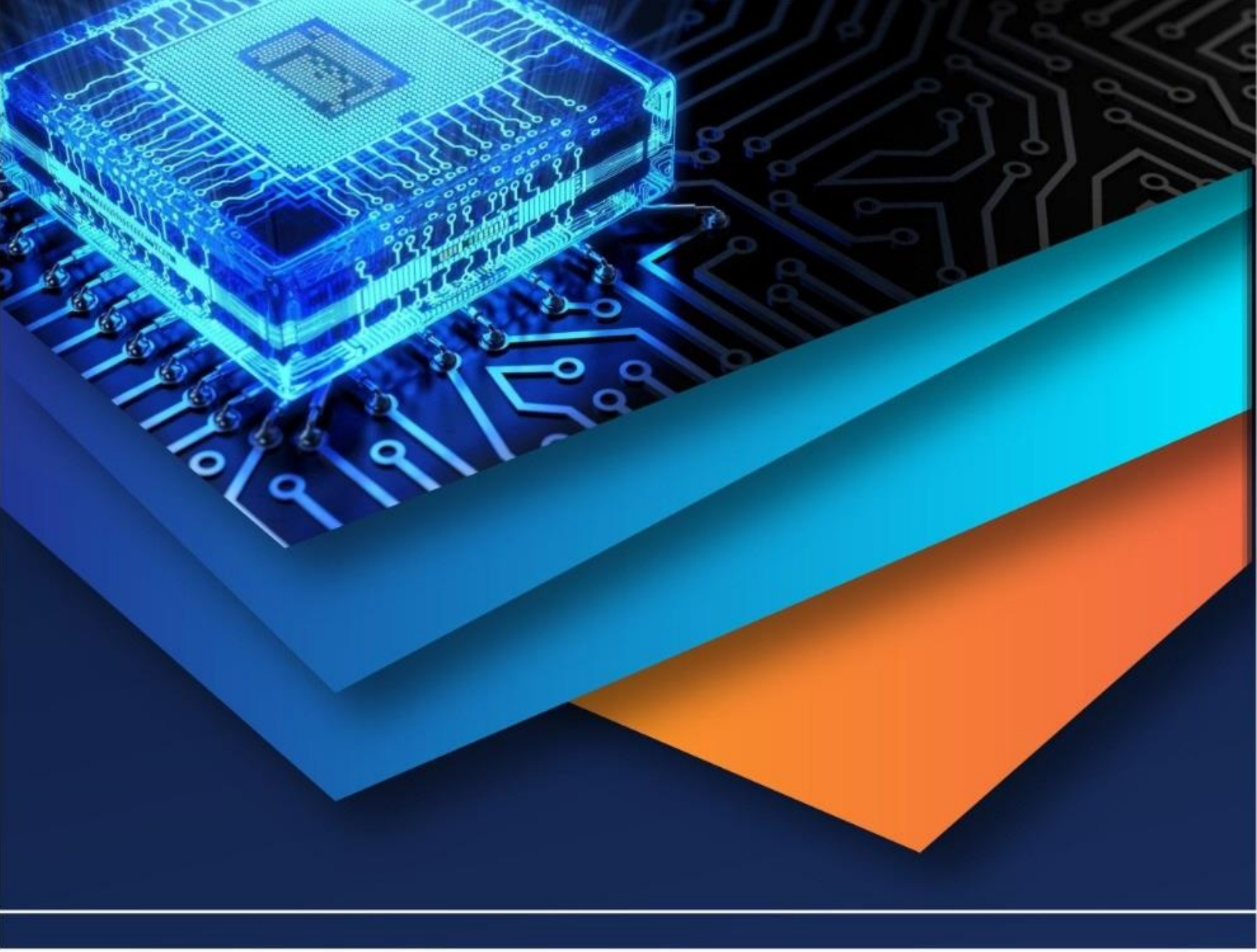

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