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Crowdsensing Application on Coalition Game Using GPS and IoT Parking in Smart Cities

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Abstract

This paper provides an overview of crowdsensing and some of its applications. Crowdsensing is a part of the collecting data situations also; it's built on a data system on multiple customer interactions. Moreover, writing the general information of the smart cities can be used to boost to received number frequency to send messages. This work mentioned the Crowdsensing layers that describe Mobile crowdsensing. The article focuses on crowdsensing layers, developed an application in Coalition Game using crowdsensing in terms of GPS. In addition, this paper discussed the Mobile crowdsensing system and how important the cloud is in serving the wireless network, the Internet of things (IoT), and data collection. Furthermore, this research also has developed a smart crowdsensing parking system that will help by reducing the time-wasting users.

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Keywords: Crowdsensing, Smart Cities, layers, IoT, GPS, Devices, Sensors.

1. Introduction

Mobile Crowdsensing (MCS) is part of crowdsensing, there are many applications that is collect data situations, and this data is a new originate in an area has raised in growth of data techniques. Also, the data techniques are built on several customer interactions. As the technology promote has developed devices that will make it simple to reach such

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as strategy and inexpensive to offer. In addition, the main side is to do the strategy possible that is approximately all consumers in the developing globe use smartphones. Multiple sensors are a device used by nature processed. Another significant issue is reality mobile networks will provide mobile internet access services customers can continuously link their mobile devices to the internet through the cellular network irrespective of their mobile devices. Different smart devices are used, aside from smartphones, either as handheld devices or as integrated parts of conventional appliances, its lightweight, low-power machines are primarily designed to gather data in order to provide their owners with intelligent services. These variables are continuously constructing an immense, universal sensing network that can be used to satisfy demands for data collection. The network size and the variety of its sensors allow it to support data requests that can be tailored in terms of different parameters, such as location, time, measurement method, etc. [1] Moreover, the mobile crowdsensing is used as a new paradigm to gather information for the physical world such as sound, feeling, sights, etc.

The sensory information provided by workers is not considered reliable and therefore crowdsensing is performed. In the case of crowdsensing applications, humans play the role of sensor carriers and sensory data collection is outsourced to the large crowd of participating users. In recent years' various developments have been made concerning a large variety of crowdsensing applications. The wide spectrum of applications served by crowdsensing leaves societal and economic impacts. With the help of crowdsensing a useful way is provided to gather information from the physical world. There is also a negative of using crowdsensing applications that malicious parties can easily perform malicious attacks. The most common type of attack made by these parties is known as data poisoning. It is therefore crucial that all pros and cons must be kept in view while using crowdsourcing applications. [2]

In addition, the smart cities is useful for the interconnection and it is essential to develop a telecommunications system that will include multiple systems for example cables, wireless networks, routers, and optical fiber, and these systems will provide a quick access and capacity to populations and city- based organizations. Enhancing physical space and transportation with embedded systems will also be critical, to be capable to achieve present time in mobile computers, data and real-time service offers, sensors and actuators. These smart cities will provide build applications that simplify collection data and processing. Additionally, smart cities could be applied to focus on transportation flows, by building systems to detect public transport traffic jam, resident's peaks, for instant underground, buses, etc. This smart cities system is used to find the model and boost the received number of frequencies; if the numbers of frequencies increase it will send a message at certain time. [3]

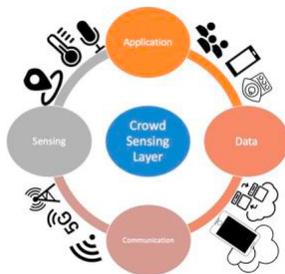


Fig. 1. This shows the Crowdsensing layers that describe the Mobile crowdsensing paradigm.

The crowdsensing layers are containing an application layer which will cover related sides to the customers, the next layer is data layer which will contains the knowledge collected data and managing operations, third one is about communication layer it will defines the skills for communication, the last layer will define sensing layer involve all sides will include characteristics detail to worker. The application layer provides computer software resources to guarantee that effective connectivity on a network with another computer program is reasonable. In addition, as an application the majority must not be considered as an application layer. As an alternative, inside an application that manages the way of communication to other applications, the appliance layer may be a part. It is a concept layer service that hides from the transmitting mechanism the remainder of the appliance. To finalize the process, the application layer depends on all the layers below it. At this point such as the material, is displayed in a graphic way that the user can understand. As it is showing above in figure 1, the application layer it includes user recruitment, task allocation and data visualization. To identify the user recruitment is training forcefully explorer and choosing the application for the unique job or certain spot. The idea of employing includes the whole processing collection that start from beginning to

the combination of the actual leasing employ into the companies. In addition, task allocation is the organization for operating development important assignments to one assignment and divided them into several individuals and organizational units. The data visualization its digital representation that have information is to simulated data, and it is propose application approachable meaning of understanding developments and seeing visual element by applying the maps, charts, graphs, and tables. Second layer called data layer its transfer the knowledge from nearby global network services, it will include all elements responsible for storage, manipulating contributing data received. The data can also locate in the cloud it called fog server in the users' end, for the operation it should illustration organizer. Third layer is communication layer it will includes all the technologies that will deliver the data collected from the cloud collector in the mobile devices. Moreover, the mobile devices have several radio interfaces; Bluetooth, Wi-Fi, and antenna are likely to make the communication system better. Last layer is sensor layer, is the center of mobile crowdsensing (MCS). Usually, the mobile devices sense and gather the data from the provided sensor in the devices. In the other hand, different types of sensors can be connected from certain sensors companies.[4] The specification usage is important to the sensors, so it can be established in device and it could be used in collected data, used in camera, temperature, microphone, and Global Positioning System (GPS). To explain the layers is to broadcast to the mobile crowdsensing (MCS) platform it willutilizes the communication abilities of mobile devices.

2. Related Work

In this section, this research is going to discuss different categories related to the crowdsensing system:

2.1 Cloud Server System Used in Crowdsensing

There is a category of cloud servers available in crowdsensing and a cloud server is used as a platform to hold sensing tasks effectively. Multiple objects are required to be observed in each sensing task. The participating devices in cloud servers are mobile devices that perform the task of sensing and observation is later on provided to the cloud server. Cloud server must investigate the true information after gathering data from all participating devices. The truth present in information can be determined with the help of the truth discover algorithm. The true discovery algorithm also reduces the chances of attack of any malicious third party on data or information generated. In case of an availability attack, the errors of truth discovery algorithms are maximized by attackers and the discovered truths turn out to be useless in these kinds of situations. [5]

2.2 Vehicular Mobile Crowdsensing System

The vehicular crowdsensing system is comprised of sensing data servers, wireless networks, and also vehicles. Different types of sensing devices can be used for installing vehicular sensing nodes and these nodes offer help in gathering multiple types of sensing data. Wireless communication interfaces are present in all vehicles. The selection of any vehicle as a sensing node helps to turn on the sensors installed in it and it helps to perform sampling of sensing data periodically. GPS coordination is being used for collecting all sensing data coupled with corresponding information. It then gives the option to users of the sensing system to make a query on sensing data of interest from the sensing data server. Also, in the case of a vehicular mobile crowdsensing system, the role of the sensing node is played by a vehicle installed with sensing devices and it also offers help in wireless communication interfaces. The collection of sensing data can be done with the help of all sensing nodes willing to perform this task. It is also important to know that vehicular sensing nodes are heterogeneous [6].



Fig. 2. Architecture of vehicular mobile crowdsensing systems

2.3 Mobile Crowdsensing for Data Collection

Recently mobile crowdsensing is used as a reliable approach to collecting data from participants present in the urban streets. The main issue related to data collection is to make sure that all streets are covered and each street segment is included which is performing the task of preserving the energy of mobile devices and also help to prolong the MCS network lifetime. To get rid of this issue a new scheme has been proposed for covering specific streets and achieving the coverage requirements. The selection of themes is made with the help of a modified localization method in which GPS usage is kept at a minimal level and Zig bee technology is being used. Communication with neighbor nodes and estimated distance between nodes can be determined with the help of the time of arrival method. The experimental results obtained with the help of real data indicate that the proposed localization and coverage scheme can be achieved with the help of localization accuracy and the usage of location sensors can also be reduced while following this practice [5].

2.4 Collaboration of Data Collection by Mobile Crowdsensing

Mobile crowdsensing plays an active role to help users follow collaboration concerning data collection. In real life, data is being collected from end users by taking help from their mobile phone devices. The gathered information is then shared with other users who are willing to get detail or any kind of information. Different parameters involved in data requests include location, time, and also the type of data that is going to be collected. The parameters are then published and corresponding data is sent to users who are willing to fulfill this criterion. In this activity, mainly smart phone is being used as a sensing device and it is an interesting alternative to common and traditional data collection methods being used. A privacy preserving platform must be provided for data generated with the help of mobile phones. For preserving user end privacy, the two most common methods which are being used include bitcoin payments and also data encryption. The results of different studies also indicate that it is possible to use platforms where privacy breaching issues are less commonly experienced by users. A complex environment is created due to data demand and privacy concerns in mobile based crowd sourcing. The validity of collected data is also another important issue faced related to mobile based crowdsensing. The integrity and truthfulness of collected data can however be ensured with the help of mobile based crowdsensing applications [7].

2.5 Crowdsensing Coalition Game Using GPS

The crowdsensing system offers sensing platforms that have back end servers and different smart phone users are in different forms devices. Overall, connectivity options available for people have been improved and social networking sites can adopt by people to enjoy their benefits and to socialize with each other. Multiples tasks are being announced by these platforms and joining of the task is done voluntarily by users and the execution of the task is performed after it is completed. The coalition game can be applied to multi-task scenario of crowdsensing (CS) modelling. Among various tasks, coalition games are being played by users, and users who take part in the same sensing task are required to perform the same coalition use diverse physical world can be observed with the help of crowdsensing applications. [8]

Overall, decision-making processes can also be improved with the help of crowdsensing approaches, there are six main research themes for crowdsensing include data acquisition methods for crowdsensing, data models for crowd sensing, data processing analysis and classification methods, event detection, fusion, and summarization methods and the last one is different evaluation approaches used for crowdsensing. All the themes of crowdsensing application must be fully understood to achieve the desired and positive results as expected and planned. Therefore, effective communication and data collection is made possible with the help of the crowdsensing approach being used [9]. The process of game followed among users is also followed as the process of selecting tasks. The total coalition structure of games can be maximized with the help of total utility. The total utility can be improved with the help of following this approach and it also plays an active role to get a stable task alliance structure. When minimum remuneration requirements are not met by users then it helps to re-select the users. The incentive mechanism is an important part of the CS system. In the case of CS systems, users are also provided with the option to collect data from the surrounding environment, and transmission of data can be made to the service platform [10]. There is an application crowdsensing

created by coalition game, its popular game in mobile devices called Pokémon Go. In 2016 Pokémon Go was established on the IOS and Android by Nintendo in smartphones, this game was designed as a reality game using the Global Positioning System (GPS) location, its working like virtual reality (VR) is a device produced replicated of a three-dimensional image or world that a person using special electronic devices, such as a helmet with an inside screen or gloves equipped with sensors, can communicate with in a seemingly actual or physical manner. Pokémon GO is appeared as if they are in the real-world location for the players, it uses a freemium business model and supports in-app transactions for extra in-game items.[11] Criticism and controversy, however, were not unmarred. In addition, as the game has a greater number of users playing it happens the crowdsensing and it has a lot of negativity reclaim been recognized as the cause of a spate of injuries that are often deadly? Though the authorities' criticism of a game will affirm its position in the canon, some of the derogatory press related to Pokémon GO is a lot more troublesome. We will rebuild an app have a same technique as Pokémon GO code but we will make it a unique application that will be safe for teenagers and adults either if it is a healthy person or determination person, and this app will include types of coalition game have a communicated with each other while chatting. Moreover, it will be designed special code that can sense the humans and objects such as (glass, furniture, cars, streetlight, etc.).

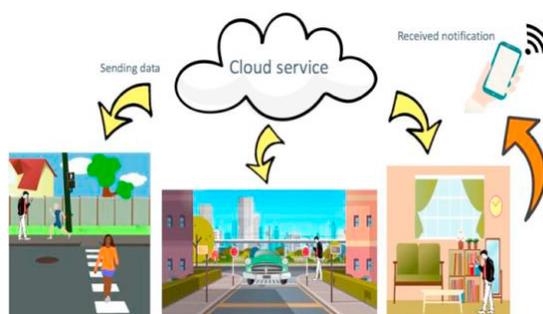


Fig. 3. This shows the Crowdsensing using the coalition game using GPS

There is a lot of cause and injury happens in the UAE and other countries which is considered a global problem, because of that application. In addition, this application will help the addicted people using mobile devices this will help the person to not be lost or get any harmed and hazard. First the design will work by sense the place while the person working automatically if this app sense any danger it will give a signal to the user while it is social without noticing and if they get missing this app have an option to save their home location it is safe because it will be private information no one can access it only the owner of the house, the notification of this app will work in three different techniques, it can be by sending the user notification message or notification voices, if this person didn't do any action to change his position this app will technically close. In other station, if this person gets too far from his/her house and he/she lost his way back to their house, they can access their location through the app. [12]

3 Methodology

This article provided a discussion about the Mobile crowdsensing system and how important the cloud is in serving the wireless network, IoT, and data collection, in addition to a brief description of the crowdsensing layers that describe the Mobile crowdsensing paradigm. Moreover, after describing and clarifying the benefits of some technologies that used to build the systems of crowdsensing, the systems were evaluated based on the following criteria: social visibility and impact, economic impact expected, upgrading of the structures of their system, sensing methods, inspiration scheme and degree of privacy. Furthermore, a proposed smart crowdsensing parking system has been provided to reduce wasting time and help people to find parking easily.

4 Crowdsensing in Smart Cities Using IoT (SMART PARKING)

The Wi-Fi can be determined by the sensors over stream data. A solar panel either with a battery can supply power to the unit, and it can be mounted on balconies. The smart cities (SCs) do not use gamification or other forms of incentive that may raise popular interest in this approach. It is possible to catch geographical location and username from the screen, which adversely affects the privacy of smart people. Crowdsensing technologies provide human populations a valuable weapon, such as enabling people to reach their governments about non-essential concerns they identify within their neighbor's hoods, such as problems identified on the streets. Typically, this software contains of a smartphone application that is used for website and sensing that shows the results sensed in almost actual time. Crowdsensing projects to communicate with residents in application may encourage intelligent citizens to cooperate on problems influencing local concerns in an urban area group. the most important sensors used in traffic system related crowdsensing applications are the GPS sensor and the accelerometer. Crowdsensing based application in the traffic systems domain. The major function point-to-point navigation, but it is operating function with a change that will allows drivers and other contestants (e.g., co-driver) to split roadside incidents for example accidents, police presence, traffic jams, road works. In this article, the applications and solutions mentioned were evaluated on the basis of the following criteria: social visibility and impact, economic impact expected, upgrading of the structures of their system, sensing method(s), inspiration scheme and degree of privacy. As sensors capture and transmit data from across a network, the IoT depends on data, and plenty of it. There are several ways this can be allowed. ZigBee, Bluetooth Low Energy, Wi-Fi and cellular technologies are all developed. But IoT used in the LPWA networking technologies like Sigfox, LoRa, LTE-M and NB-IoT. The LPWA network are low power and able to link millions of cloud-connected networks through kilo meters of devices. In car parking, transportation, emissions control, and other applications that involve wirelessconnectivity by always-on nodes in a network, they are widelyused outdoors. [13]

4.1 Discussion

Figure 4 explains the IoT smart cities the long-range forecast for wireless connectivity, it is containing six main elements it is the cars, antenna, cloud, cell phone, computer, and the city services. In addition, this application will begin work by having the LoRa embedded sensor the LoRa stand for (short for long-range) it has a spread spectrum modulation technique originating from the science of chirp spread spectrum, LoRa can be equipment and wireless radio frequency technology it has low power in the wireless devices and long range has become the main thing in the Internet of Things (IoT) network technology worldwide, next steps the cars will stop in the parking manager in order to increase parking operations, the incumbent offers administrative and technical assistance and establishes long range policies and strategies for parking inventories and traffic regulations [14].



Fig. 4. IoT smart cities: the long-range forecast for wireless connectivity

Initially, the cars will stop in the parking manager in order to increase parking operations, public parking areas and parking meters in an allocated area, then the Bluetooth of LoRa gateway will send the information about parking to the antenna after that will send it to the cloud then send it to the cell phone. Cell phone will receive the message from the cloud network services with parking manager, lastly the data will share real time parking data with other city services. Since the car parking is a main issue in urban areas is cooperation built and developing countries. The traffic in parking crowdsensing will reduce the issue on the time wasting. The solution of this problem is to help people to find the parking easier. Moreover, this application will work in cell phone devices that will be send the message through the

antenna, for example let's say you want to go anywhere outside today any time, you will simply open the app and reserve a parking spot for these hours that you want to go out this time.[15]

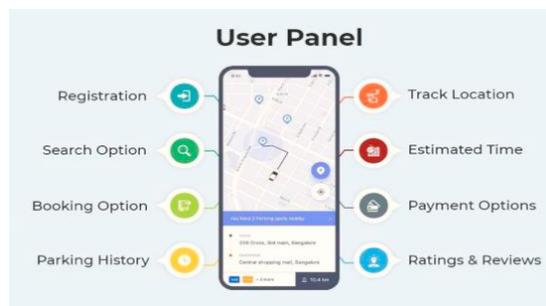


Fig. 5. User panel parking crowdsensing

5 Conclusion

In conclusion, the crowdsensing is used as a new paradigm to collect information for the physical world and describe the layers of in mobile crowdsensing. The crowdsensing system offers sensing platforms that have back end servers and different smart phone users are embedded in different forms of sensors. Multiples tasks are being announced by these platforms and joining of the task is done voluntarily by users and the execution of the task is performed after it is completed. It is also possible to use platforms where privacy breaching issues are less commonly experienced by users. A complex environment is created due to data demand and privacy concerns in mobile based crowd sourcing. The vehicular crowdsensing system is comprised of sensing data servers, wireless networks, and also vehicles. Different types of sensing devices can be used for installing vehicular sensing nodes and these nodes offer help in gathering multiple types of sensing data. Wireless communication interfaces are present in all vehicles. Moreover, we create device for coalition game using GPS that help the people to be more consciousness and less danger. Besides, we describe the IoT application in the smart cities using the LoRa sensor for parking issues by using satellite through the cell phone the user can select the parking spot.

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