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Android Location Based Reminder Including Step Counting Distance and Calorie Measuring.

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ABSTRACT

Indoor positioning and tracking services are gaining more attention. Recently, many state of art localization techniques are recommended that utilize radio maps and sensors without delay obtainable on Mobile gadgets. In any case, owning to the shortage of fixed infrastructure and constant system association in DTN's (digital network transmission), identifying the location of mobile users and tracking their movement trajectories are challenging. In this paper, we create an android application to track the user's step counts using MEMS (Micro-Electro Mechanical Systems) accelerometer associated in the android device along with distance and calorie measuring with respect to location based reminder. This sensor tracks the x, y direction of the clients and dynamically counts the total steps covered by user. In the process of modification apart from steps counting, this app also measure the total distance covered, amount of calories smoldered with respect to the location based reminder by user along with the map for trajectory movement.

Keywords: MEMS (Micro-Electro Mechanical Systems), Accelerometer sensor, Location reminder, ZigBee.

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INTRODUCTION

Smart phones have become the foremost popular devices in our daily lives. In a exceedingly good smart phone there are many in-built communication module (e.g., WIFI, Bluetooth, and GPS) and sensor or detector modules (e.g., accelerometer, gyroscope, and magnetic sensor). By these communication and sensing modules, smart phones can be accustomed to develop various kinds of services and applications.

Recently, some researchers or firms use the step count information to develop numerous smart phone services. For instance, in the indoor localization service, some researches propose to utilize users' trajectories to assist indoor positioning functions. To conclude a user's walking trajectory, these schemes have to be compelled to understand the user's walking direction and distance, where the distance information is usually estimated by the user's step counts. Some APPs record number of steps that a user strolled in a day. After grouping the user's habits, these APPs can give some health tips for the user. Some APPs further more utilize the step count information to style games, which may inspire user to try and do exercises. Many existing step counting solutions have shown that when a user is walking, the perceived readings of the accelerometer (on the user's body) can modify frequently. These changes may be wont estimate the number of steps that the user walked. But the user should hold the smart phone in the hand and by swinging his hand naturally, and watches the screen while walking. This was challenging for the users and So Location based services were initialized without using GPS and also getting the information like step counting, Distance and amount of calories smoldered. This can be done by involving some part of embedded hardware which consists of Zigbee and MEMS accelerometer sensor attached to a micro controller board along with AC to DC convertor. And this embedded hardware was connected to the mobile gadget using OTG cable. No matter however the user carries the phone, the linear acceleration values exhibit periodical and regular changes over time based on the movements of the user.

However, in reality, the sensory values obtained from the measuring system are a series of continuous information. So, we need an algorithm which will distinguish or divide continuous information exhibiting similar tendencies in real time. Secondly, we can see that completely different carrying ways (i.e., hold the phone by different manners or place the phone in various locations) will result in different changes on linear acceleration values. However, existing solutions limit the users to hold their smart phones (or sensors) in a particular fashion or to void shaking the carried sensing devices, and these restrictions are inconvenient for users. Thus, the designed algorithm ought to have the potential to handle sensory readings, which can fluctuate dynamically. In this paper, we tend to propose a step reckoning algorithm, which can determine the steps in real time and permit users to hold their smart phones randomly while walking. The projected algorithm utilizes the linear acceleration values of Y and X axis to count steps.

When the two ZigBee's , one connected to our android gadget and another in our destination location , Then both will got paired around the radius of 15 meters then we will get a reminder notifies and then the total information about number of steps walked from starting point to destination , Distance travelled and amount of calories smoldered will be displayed in our application.

In this process GPS was not used, instead of that MEMS accelerometer sensor and ZigBee component was used for Step counting, Distance and amount of Calorie smoldered with respect to the location based reminder notifies.

LITRATURE REVIEW

Initial position and Reference Point Detector (IPR)algorithm, tracking algorithm, Step counting estimator algorithm are used to find the number of steps walked by the user. But it was not useful in the case of Location based reminder services[1]. Dead reckoning algorithm was used for the Location services which will not be useful for step counting, Distance and Calorie measuring[2]. DR algorithm, Kaman tracking algorithm are used but it will not be useful for the Location reminder, Distance and Calorie measuring[3].Infrastructure-based techniques like training algorithms and non-training algorithms was used. The training algorithms work supported the belief that the received signals are totally different in numerous locations. on-training techniques perpetually rely on distance estimation. During a dense reading scenario, a multi-literation technique can be applied[4].

Training algorithms are square measures to the risk of atmosphere changes, and therefore the training is labor intensive. the training algorithms perceptually return additional more accurate valves compared to the non-training algorithms[5].In existing mobile applications like *Fit bit, Shealth* Global Positioning system (GPS) was used for finding distance, step counting And by using GPS we cannot execute the Location reminder services[6] . In MAC applications, the applications like the *walk*: Fitness *tracker* GPS and also step counting estimator algorithms was used but instead of using GPS we are using embedded hardware[7].In the user location and tracking system also the tracking algorithms are used which was directly linked with the GPS (Global Positioning System). Instead of that ZigBee was used for the location based reminde[8] .

DR algorithm was used in the case of indoor dead reckoning system which will be helpless in the case of step counting, distance and calorie measuring[9].Accelerometer sensor was used for walk detection and step counting but it will not involve locating reminder services[10].Walk detection can be executed using the tracking algorithm of the user's steps but this algorithm was not used in the case of distance and calorie measuring[11].GPS (Global Positioning System) was used in the context provider of location based reminder but we are using ZigBee for the location based services[12]. Extending the concept of robust step detection method by using the MEMS accelerometer sensor and also adding distance and calorie measuring techniques[13]. Geo magnetism concept was used in the Indoor location sensing using Geo magnetism but instead of that ZigBee was used for the location reminder services[14].Wi Fi tracking system was also used to find the location of the user but it was helpless in the case of step counting and distance measuring[15-16].

PROPOSED WORK

In the proposed system, we create an android application to track the client's step counts and distance, calorie smoldering using MEMS accelerometer with respect to location based reminder connected in the android gadget. These sensor tracks the x, y coordinates of the user and dynamically counts the user steps, distance covered and also measures the amount of calorie smoldered. Along with this the main concept here is location based reminder service by using ZigBee technology. This ZigBee is attached to the android device through OTG cable.

The embedded hardware contains a micro controller board attached with the AC to DC In this process GPS (Global Positioning System) was not used for the location based services instead of that we are using the MEMS sensor and ZigBee's which are present in the embedded hardware and was attached to the mobile device through the otg cable. Initialization of location services involves of Location survey using ZigBee and Location based notification reminder, we will design in such a way that when the two ZigBee components will get paired then automatically we will get a notification. And then we will get the information about number of steps walked, Distance covered and Calorie smoldered. Step counting , Distance and Calorie measuring can be found out through the MEMS accelerometer sensor which was fixed in the embedded hardware component. convertor, MEMS accelerometer and ZigBee which was used to the location based reminder. When the two ZigBee's are paired with each other with the radius of 15 meters then we will get a reminder to the android device that our destination was reached and we will get the details about number of steps covered through our journey and also total distance, amount of calorie smoldered.

SYSTEM ARCHITECTURE

Fig. 1 shows the system architecture location based reminder including users stride counting, distance and calorie measuring consists of five steps of process.

Firstly, the user registration process which involves recording of the user details and login in the local database using SQLite. The information and data will be saved in this database. The embedded hardware in the architecture consists of Microcontroller board, ZigBee, MEMS accelerometer sensor attached to it. The accelerometer sensor was used count the number of steps strolled by the user by calculating the x and y coordinates of the users trajectory position and according to that it will also calculate the total distance covered and amount of the calories burnt by the user. And this information was sent from the embedded kit to the mobile gadget through the OTG cable .when the user comes to neutral position, within 10 seconds the information about steps, distance and calorie burnt will be sent to the mobile application.

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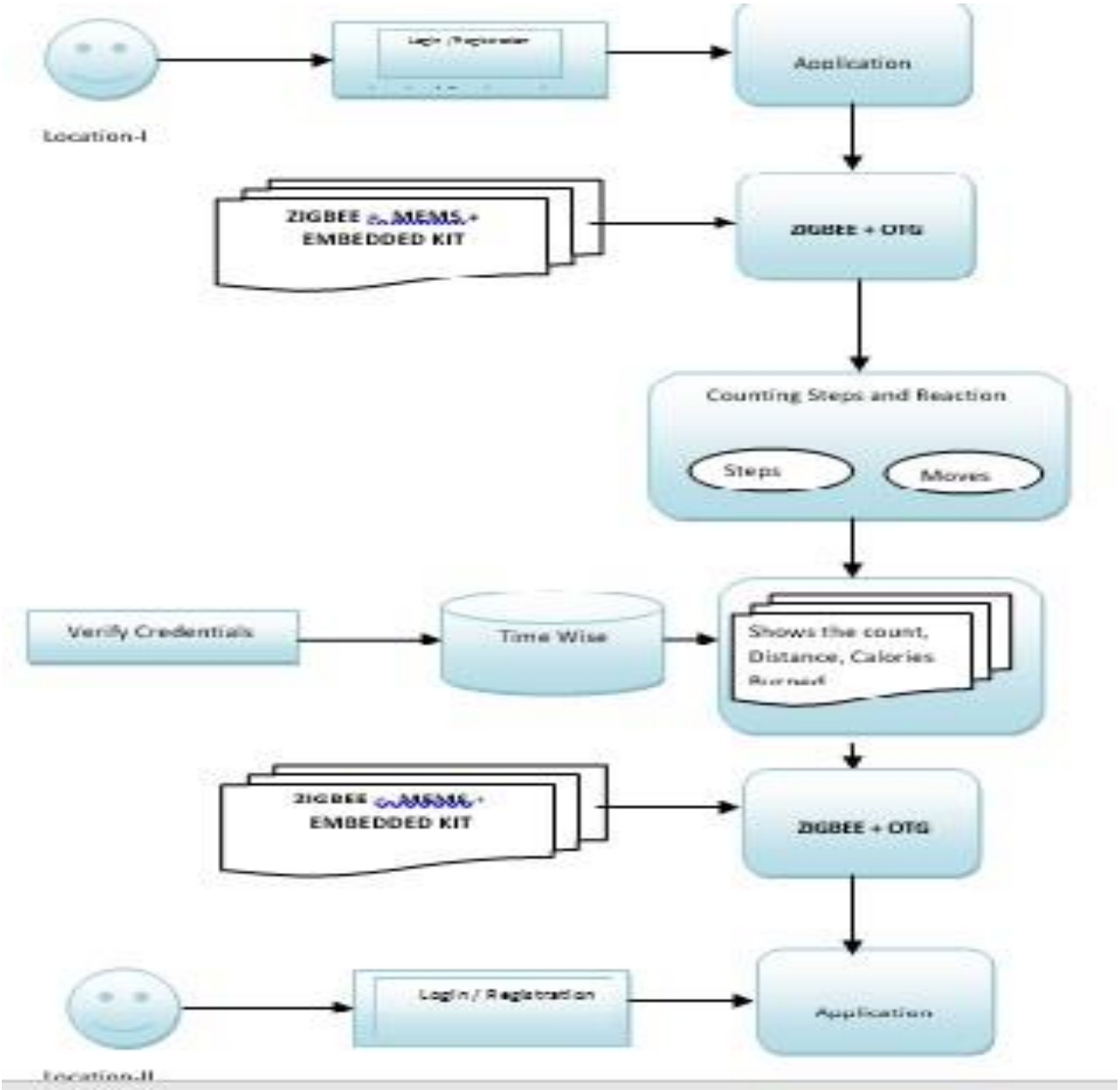

Fig. 1: System Architecture of the Application.

Location based reminder using the ZigBee. In this step we are using ZigBee which was present in the embedded hardware kit and connected to the mobile phone using OTG cable .and another ZigBee as placed in two locations i.e., location 1 and location 2. if the user walks from a starting point to location 1 then he will be notified that location 1 has reached and then will get the information about number of steps walked during the journey and also distance covered and amount of calories smoldered. In this we are using the ZigBee technology instead of GPS.

The two ZigBee's will gets paired each around 15 meters if both the location was at same places it will notify the location which was very near to it by comparing the other one.

The mobile application and the embedded hardware can operate in basic USB-OTG mode handset. Behavior of the transceiver is fully configurable through the serial bus. The transceiver supports session request protocol and host negotiation protocol. To observe the measurement distantly, a wireless transmission technique ZigBee can be used as it offers low power consumption, high reliability and it is more

secure technology. This technology is simpler and cost effective than other wireless personal area networks such as ZigBee. Performance of ZigBee transceiver has been analyzed using different modulation techniques.

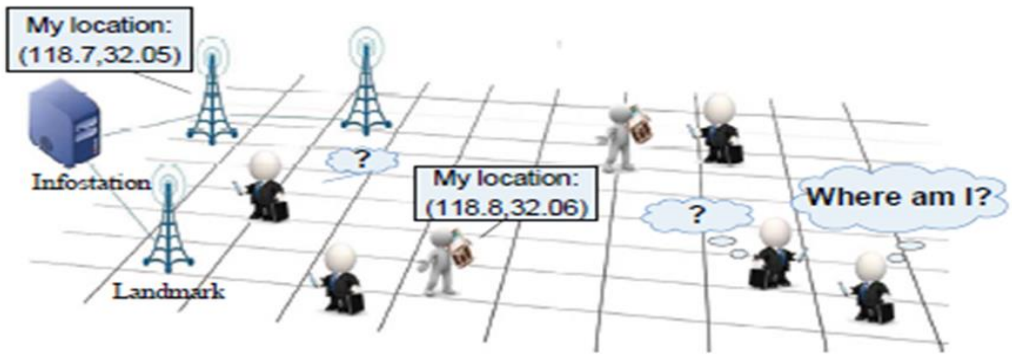

Fig. 2: Architecture of the mobile application

Fig. 2 shows the basic architecture of the application. the user will be at my location point with ZigBee attached to the mobile device and when he travels from that point to the location 1 then both the ZigBee's will be paired and then the information about the step Counting, distance and amount of calorie smoldered along the journey will be displayed in our mobile application through the OTG cable and the analog valves that are recorded in the embedded hardware will be converted to Digital valves and then sent to the mobile application .

MEMS Sensor

Fig 3: MEMS accelerometer sensor

Fig. 3 represents the pictures of the MEMS (Micro Electro Mechanical Systems) accelerometer sensors. which was used for the step counting, distance measuring. This sensor will calculate the x,y coordinates of the users trajectory and will count number of steps walked with respect to that it will also measure the distance covered and calories burnt .

ZIGBEE

Fig. 4: ZIGBEE

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ZIGBEE is the emerging standardized protocol for ultra low power Wireless Personal Area Networks(WPANs).ZIGBEE is an established set of specifications for Wireless Personal Area Networking (WPAN) i.e., digital radio connections between computers and related devices.
ZIGBEE is targeted at radio-frequency(RF) application which require a low data rate, long battery life, and secure networking.

In Fig. 4, it represents the ZigBee which was used to the location based survey .when the two ZigBee's one in the mobile phone and another at the location got paired around 15 meters then we will get the notification.

Flow Diagram

Fig. 5. represents the flow diagram of the android application and also the connection between the mobile application and the embedded hardware component. the android gadget was connected to the external embedded hardware through the OTG cable and in the embedded hardware ZigBee , MEMS accelerometer sensor, attached to the micro controller board are present the valves recorded in the embedded hardware was sent to the mobile application through the OTG cable .

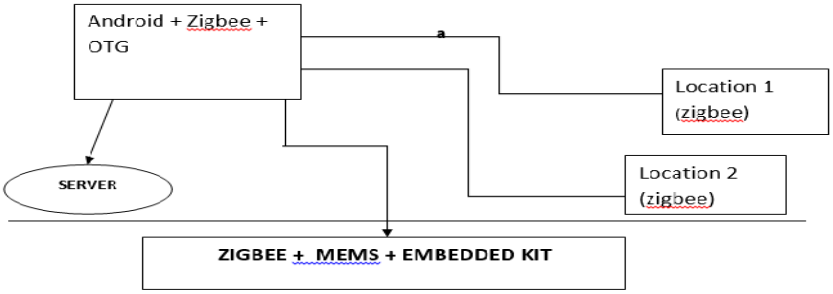

Fig. 5: Flow diagram of the connection between mobile application and embedded hardware

The application will have its own local database and all the information will be saved in the database commonly known as servers. Step counting, distance and calorie measuring can be calculated by using the MEMS accelerometer sensor. It will measure the x and y coordinates of the user's trajectory and calculates the step counts, with respect to that it will also measures the user's distance travelled and amount of calories burnt information. Location based reminder services can be initialized by using the

ZigBee technology, one ZigBee was attached to the mobile phone and another ZigBee will be at the destination location. when the two ZigBee's will get closer around 15 meters the both will be paired to each other and we will get a reminder notifies and then the information about step counting, distance and amount of calorie smoldered throughout the journey will be displayed in our mobile application.

RESULT AND DISCUSSIONS

User Android Registration

In this module we tend to create an User application by which the User is allowed to access the information from the Server of the local database. Firstly the User shouldcreate an account and then they are allowed to access the Network. Once the User create an account, they have to login into their account. All the User details will be stored in the server of the local database. In this Project, we are going to style the the

User Interface Frame to Communicate with the local server through Network Coding using the programming Languages like Java/ .Net.

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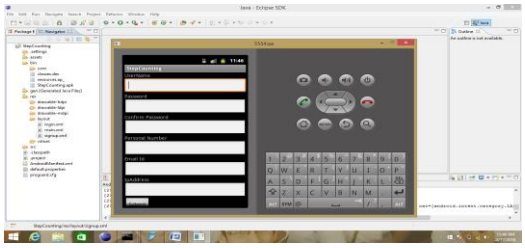

Fig. 6: User registration using Eclipse

Hardware Fabrication

Micro-electro mechanical systems (MEMS) are a technology that combines computers with little mechanical devices such as sensors. In this module, we can design and implementation of vibrator using MEMS sensor. MEMS sensor fixed with the hands of the person. This sensor watches the person movements. Finally find the loss of how much calories. MEMS sensor will monitor the user movements. The Hardware part also includes ZigBee and analog to digital convertor

Location Survey Using Zigbee

It can operate in basic USB-OTG mode handset. Behavior of the transceiver is fully configurable through the serial bus. The transceiver supports session request protocol and host negotiation protocol. To observe the measurement distantly, a wireless transmission technique ZigBee can be used as it offers low power consumption, high reliability and it is more secure technology. This technology is more simpler and cost effective than other wireless personal area networks such as ZigBee. Performance of ZigBee transceiver has been analyzed using different modulation techniques.

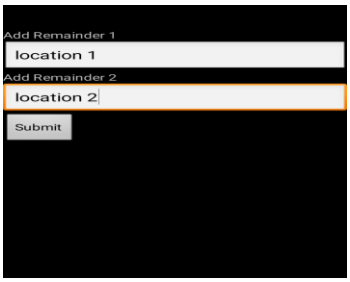

Fig. 7: Adding the locations in the Application.

Step Counting Distance

In this module we can design and implementation of users stride counts and distance calculation by using the embedded hardware which was Connected to the Android gadget using the OTG cable . Calculating the number of calories smoldered using the MEMS Accelerometer which is present in the embedded hardware.

Fig. 8: Measuring step counting, distance and calorie measuring.

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Reminder Notification

Android based location reminder notifies concept by using the 'ZigBee' connection. Automatic location remainder by using the ZigBee.

Fig. 9: Searching the devices in the application.

CONCLUSION

The proposed system, can be used to calculate the step counting, distance and amount of calorie smoldered along with the location based reminder services. The projected algorithm contains a MEMS accelerometer sensor which was used to calculate number of steps strolled and also distance travelled by the user. The sensory device will calculate the X and Y axis of the users trajectory as correlative segments. Those correlative segments can be taken as user's steps. In Addition to this we are also including the distance and calorie measuring based on the location reminder. This work was enforced on the Android platform.It indicate that the designed scheme can outperform other schemes when the user carries the phone in a very static manner. Besides, for the case the phone is randomly operated while walking, the projected scheme can also count steps effectively alongside the distance and calorie activity.

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