RSSI ESTIMATION USING BLUETOOTH IN SMART PHONES

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Abstract—***The "On-Time"communication has become an tremendous implication in the real world scenarios. Moreover the problem of proximity estimation is found to be difficult in a variety of environment. Existing approaches such as Global Positioning System and Wi-Fi triangulations are insufficient to meet the requirements of accuracy and also requires high cost. In this paper, the Bluetooth which is commonly available in all Smartphone's are used to find the proximity over a shorter distance and also this paper provides an estimation model to determine the distance based on the Received Signal Strength Indicator values of the Bluetooth. In order to provide a high accuracy in finding the proximity the Values of atmospheric pressure and light sensor data are also collected and used in the RSSI estimation. For every 30sec these values are updated in the cloud server technology and thus the "On Time" proximity estimation between the devices can be determined based on the RSSI values of Bluetooth in different environments with high accuracy and low cost.***

Keywords—Radio Signal Strength,Indicator,lightSensor,On Time proximity estimation

I. INTRODUCTION

A mobile computer is effectively any computing device not constrained in its location to a desktop or data centre. In recent years the variety of mobile computing devices available has rapidly increased. In doing so, it has also turned from theory to reality a trend for ubiquitous computing, whereby computers are all around us in the world, enabling access to digital content anytime, anyplace and anywhere. Bluetooth is the main device of wireless communication the main idea of Bluetooth is to develop a way for users to connect a wide range of mobile devices quickly and easily, without cables Cable replacement Bluetooth contains several cable-replacement specifications that eliminate the need for numerous cable attachments [1]. Data and voice access points-Bluetooth supports real-time voice and data transmissions by providing wireless connections to stationary and portable devices. Ad hoc networking a device with Bluetooth radio can automatically establish connection with another Bluetooth-enabled device when in range [2,3]

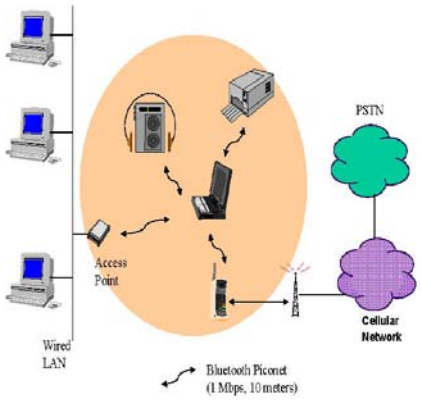

Figure 1. Architecture of Bluetooth

Figure1 [5] represents the architecture of Bluetooth ,various wired lan are connected to the access point via Bluetooth piconet and then to the base station and then transmitted to cellular networks. The remainder of the paper is organized as follows. Section 2, presents the survey of technologies on mobile networks. Section 3 deals with proposed methodology of Bluetooth Local Positioning Application (BLPA). Section 5 presents the results .Section 6 presents the conclusion and future works.

II. RELATED WORKS

This paper [4] proposes an architecture that leverages this functionality in mobile phones originally designed for communication at a distance, to connect people across the room. Serendipity is an application of the architecture. It combines the existing communications infrastructure with online introduction systems' functionality to facilitate interactions between physically proximate people through a centralized server[7]. A new mobile-phone-based system uses Bluetooth hardware addresses and a database of user profiles to cue informal, face-to-face interactions between nearby users who don't know each other, but probably should. By using Multiple Data Sets,[6] social relationship is proved and demonstrate the difference with empirical evidence. immense diversity among users are identified [8]. Along all aspects that

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study, users differ by one or more orders of magnitude. For instance, the average number of interactions per day varies from 10 to 200, and the average amount of data received per day varies from 1 to 1000 MB. This level of diversity suggests that mechanisms to improve user experience or energy consumption will be more effective if they learn and adapt to user behavior. For locating mobile device, the technique presented in this paper [5] uses existing wireless LAN infrastructure with minor changes to provide an accurate estimation of the location of mobile devices in indoor environments. This technique is based on round-trip time (RTT) measurements, which are used to estimate distances between the device to be located and WLAN access points. Each RTT measurement estimates the time elapsed between the RTS (Request-to-Send) and the CTS (Clear-to-Send) frame of the 802.11 standard are used. Several real world scenarios [9] Bluetooth proximity estimation with respect to accuracy and power consumption on Android are implemented.

III. PROPOSED METHOD

Figure 2 represents the proposed architecture of RSSI Communication. In existing system GPS is used to find the location, it won't work in indoors and in most commercial building areas. So in the proposed system the problem is overcome by using Bluetooth to Bluetooth proximity estimation. By using the signal strength of the Bluetooth device, pressure sensor value, light sensor value, RSSI value of the device is estimated RSSI value is used t find out exact distance between the devices. This technique helps in tracking the location of nearby user.

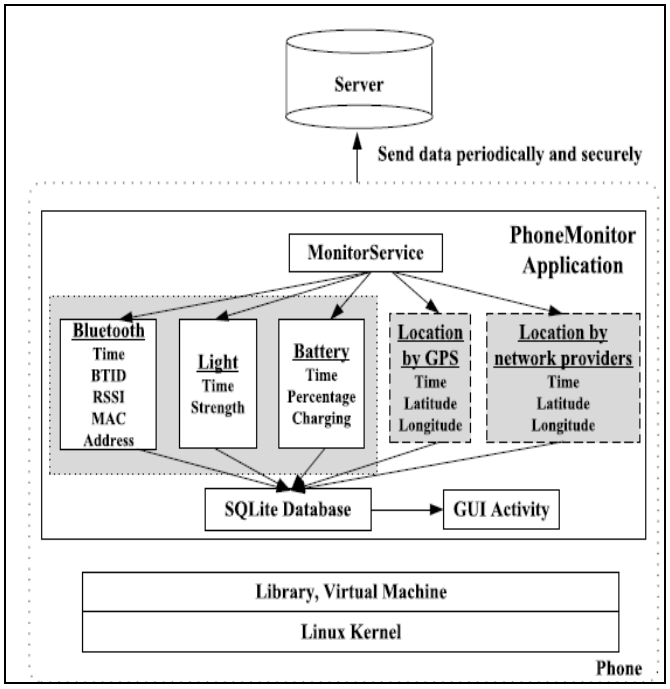

Figure2. Proposed Architecture

Presented the design and implementation of a Bluetooth Local Positioning Application (BLPA) in which the Bluetooth received signal power level is converted to distance estimate according to a simple propagation model 3-D optical wireless based location approach is proposed which based on both GPS and triangulation technologies.

A. Advantages Of Proposed System

- Compared to the Wi-Fi triangulation and GPS methods, the Bluetooth-based method was more suitable for the face-to-face proximity estimation.
- Helps in obtaining the accurate distance between two mobile devices.
- Battery consumption and power consumption of the device is saved.

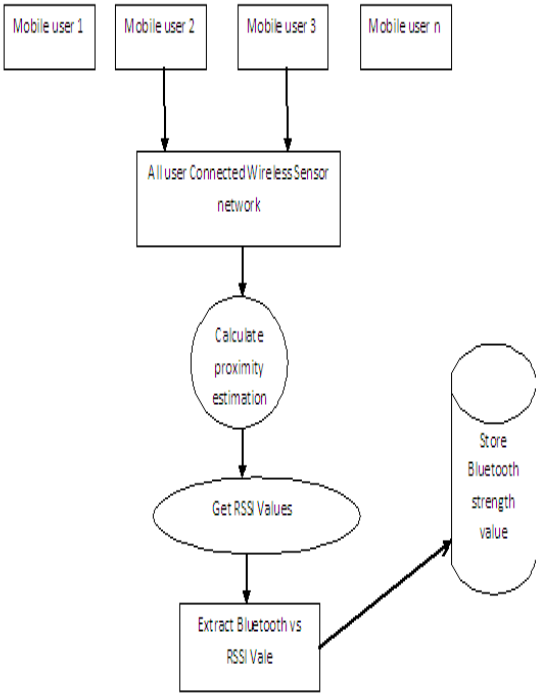

Figure3. Data flow model of proposed architecture

IV. RESULTS

Result shows the development of monitoring system using Java language. The frame work used is Android SDK 4.0. The values are stored in the backend database using MySql.

Figure4.Login Details of the user.

Figure 4 shows the registration details of the user inorder to connect with another device. In order to make Bluetooth device visible the user register the details in the monitoring system.

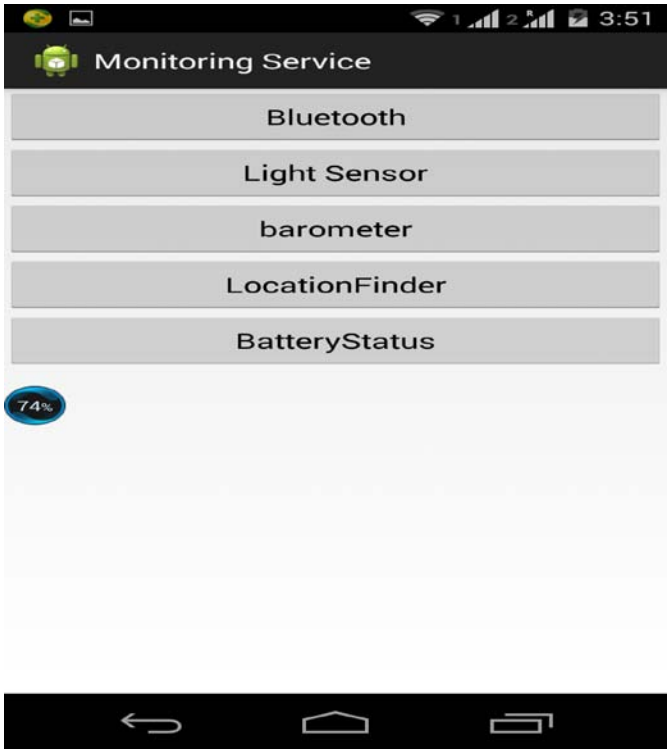

Figure5. Attributes in Monitoring Services

Figure 5 represents the attributes included in the monitoring system. The main attributes are Bluetooth device name, light sensor values, pressure sensor values, battery status.

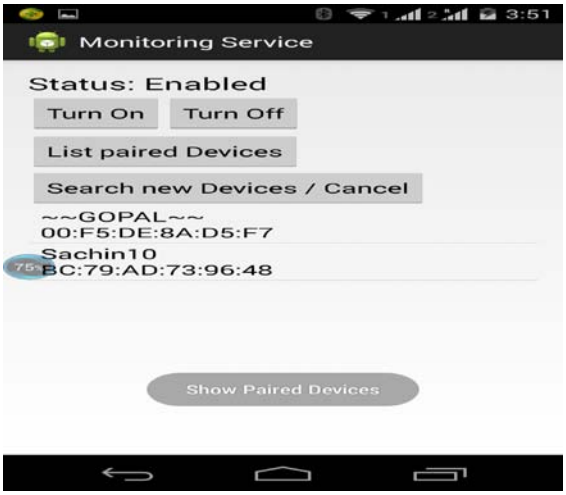

Figure6.Connected devices

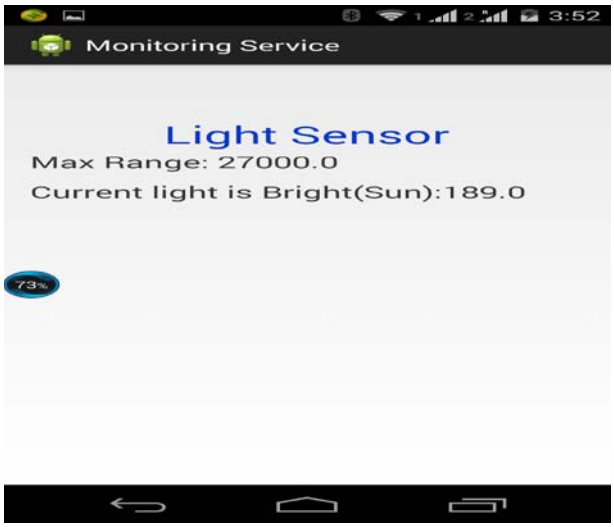

Figure 7.LightSensor values.

Figure 7denotes the values of the light sensors values are collected and stored kin the database and finally received signal strength value is calculated.

V. CONCLUSION

This paper proposed the proximity estimation model by combining Bluetooth RSSI value, light sensor data as well as data smoothing together. The proximity estimation model on the realistic data is analyzed. Compared with the existing method of collecting all devices around, the accuracy of utilizing proximity estimation model is used to estimate betweentwo devices in a direct communication are improved dramatically. The results demonstrate that Bluetooth offers an effective mechanism that is accurate and power-efficient for measuring face-to-face proximity to increase Bluetooth

signal length. In our future work we have planned to develop and deploy the application in Android smart phone.

REFERENCES

[1]. A.O.M. Raento and N. Eagle, "Smartphones: An Emerging Toolfor Social Scientists," Sociological Methods Research, vol. 37, no. 3,pp. 426-454, 2009.

[2]. C. Baouche, A. Freitas, and M. Misson, "Radio Proximity Detection in a WSN to Localize Mobile Entities within a Confined Area," J. Comm., vol. 4, no. 4, pp. 232-240, 2009.

[3]. E. Mynatt, M. Back, R. Want, and R. Frederick, "Audio Aura:Light-Weight Audio Augmented Reality," Proc. 10th Ann. ACM Symp. User Interface Software and Technology, pp. 211-212, 1997.

[4]. F. Izquierdo, M. Ciurana, F. Barcelo, J. Paradells, and E. Zola, "Performance evaluation of a TOA-based trilateration method to locate terminals in WLAN," in *Wireless Pervasive Computing, 2006 1st International Symposium on*, jan. 2006, pp. 1–6.

[5]. G. Treu and A. K€upper, "Efficient Proximity Detection for Location Based Services," Proc. Workshop Positioning, Navigation and Comm. (WPNC '05), 2005.

[6]. M.N. Juuso Karikoski, "Measuring Social Relations with MultipleDatasets," Int'l J. Social Computing and Cyber-Physical Systems,vol. 1, no. 1, pp. 98-113, Nov. 2011.

[7]. N. Eagle and A. Pentland, "Social serendipity: Mobilizing social software," IEEE Pervasive Computing, vol. 4, no. 2, pp. 28–34, 2005.

[8]. P. Nathan Eagle and D. Lazer, "Inferring social network structure using mobile phone data," Proc. of the National Academy of Sciences (PNAS), vol. 106, no. 36, pp. 15 274–15 278, September 2009.

[9]. S. Liu and A. Striegel, "Accurate extraction of face-to-face proximity using smart phones and Bluetooth," in *ICCCN'11*. IEEE, 2011, pp. 1–5.