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Techniques for Monitoring and Discovering the Children

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ABSTRACT

Bluetooth Low Energy (BLE) standard specifies a wide range of parameter values for neighbor discovery process (NDP). The parameter values used during neighbor discovery directly affect the persuance of the NDP. Therefore, an optimal parameter setting is essential to achieve the best trade-off between discovery latency and energy consumption. Analytical model can offer a beneficial guideline for such parameter selection. In this paper, we propose a general model for analyzing the performance of NDP in the BLE networks. In this model, the operations of the scanner and the advertiser, which are two main components of NDP are expressed on the distinct-time axis. Based on the Chinese Remainder Theorem, the discovery suspension and energy consumption of advertiser are derived. When considering that BLE is one of candidate communication technologies for Internet of Things (IoT), the proposed model is expected to be very useful in setting the default or initial values of NDP parameters for various IoT applications.

Keywords : IoT, NDP, BLE, NDP, BDAS, EQS, AIR

I. INTRODUCTION

Bluetooth Low Energy (BLE), which is a complementary technology of classic Bluetooth and is targeting at ultra-low power and low-cost communication, has attracted a lot of attention recently as one of the key enabling technologies for the Internet of Things (IoT). To design ultra-low-power BLE system, some major modifications were made to classic Bluetooth, one of which was for neighbour discovery process (NDP). All communications in BLE networks must involve NDP in the first place since it enables a BLE device to set up a connection or exchange information with its neighbours. Therefore, it is very desirable to have a fast and energy efficient NDP. To this end, unlike classic Bluetooth which may use all the available channels for discovery purpose, BLE dedicates only three special channels called advertising channels to neighbour discovery. Note that fewer advertising channels lead to fast discovery and this can give the devices more chances to put their transmitter/receiver electronics into sleep. In addition, BLE adopts more relaxed timing for NDP so that a device can flexibly control its duty cycle during NDP. The timing is determined by several discovery parameters of which values directly affect NDP .

II. METHODS AND MATERIAL

LITERATURE SURVEY

1. The Emerging Internet of Things Marketplace From an Industrial Perspective: A Survey

Charith Perera et.all

Says that,this paper presented a survey of the IoT solutions in the emerging marketplace. We classified the solutions in the market broadly into five categories: smart wearable, smart home, smart city, smart environment, and smart enterprise. Under each category,we also examined the contribution of each solution towards improving the efficiency and effectiveness of consumers' society as well as of lifestyle in general. It is important to highlight the proliferation of wearable solutions in the market. It is clear that more and more wearable solutions will make

their usage into the IoT marketplace over the coming years. Further, we can see a significant investment and focus on indoor smart home and office domains, in comparison to environmental monitoring solutions. These solutions are aimed at large scale industry players who are looking for novel methods to optimise their supply chain processes, especially through real-time data collecting, reasoning, and monitoring. Until household consumers adopt IoT solutions. Finally, we discussed the lessons learned and listed some of the major research challenges and opportunities.

2. Ambient Rendezvous: Energy-Efficient Neighbor Discovery via Acoustic Sensing
Keyu Wang et.all

Says that,in this study, we explore ambient acoustic information to decide the radio-on schedule for neighbor discovery on mobile devices. AIR leverages an ubiquitous microphone to detect audio events occurring nearby. Through extensive evaluation in different scenarios, the effectivity and feasibility of AIR are verified. On average, AIR significantly reduces the discovery latency by nearly 70% compared with the state-of-art neighbor discovery protocol, which basically satisfies users' demand in practical usage. In the future, we plan to conduct additional experiments in more complex scenarios, further enhance the robustness of AIR, and integrate AIR into real applications. In addition, we are planning to utilize more professional energy consumption tools to measure and compare the energy savings of AIR at a finer granularity.

3. Shoulder Surfing Defence for Recall-based Graphical Passwords
Nur Haryani Zakaria et.all

Says that,we have presented three new shoulder surfing defence techniques designed for recall-based graphical passwords.The *Line Snaking* defence technique has the best overall performance in terms of defence, since the strokes of the"password" are coiling away while they are being drawn leaving a very short time for the strokes to stay visible on the screen. The *Disappearing Stroke* technique is the second perfect defence. However, in many circumstances, both techniques worked equally well (see Tables 2-4). We expected the *Decoy Stroke* technique to provide some defence contrary to shoulder-surfing, but it turns out to achieve little protection. The reason is likely that all the password strokes stay visible on screen, and the decoys do not work well to divert the attackers. It is possible that the Decoy Stroke defence technique could be improved by introducing extra decoys, or the way the decoys are introduced, but this should be done with careful evaluation and consideration as it is important not to confuse the user. However, our results also reveal that for some users, there is a possibility that usability will not be concerned by the defence techniques applied especially when the users are highly familiar with their passwords.Our techniques and experimental results are directly relevant to other graphical password schemes such as Pass-Go [24] and Background Draw a Secret (BDAS) [6]. Finally, it is interesting to see how the defence techniques can be combined together to provide better defence and at the same time maintain good usability.

4. EQS: Neighbor Discovery and Rendezvous Maintenance with Extended Quorum System for Mobile Sensing Applications
Desheng Zhang et.all

Says that,In this paper, we introduce EQS, an augmenting layer to conserve energy for existing neighbor discovery and rendezvous maintenance schemes that use pairwise direct communication. Our work is mainly motivated by the insight that when devices share common neighbors, they can leverage the knowledge of each other to detect such neighbors indirectly. Thus fewer active slots are needed and energy is conserved,especially when a device needs to maintain rendezvous with previously discovered neighbors To capture such information sharing among devices theoretically, we propose a novel extended quorum system concept where information flow paths are equivalent to graph reachability. We then propose a graph reduction algorithm EQS that filters out redundant paths but still maintains graph reachability. We have integrated our EQS design with two discovery and rendezvous protocols, and evaluated its performance with both simulations and testbed experiments. The evaluation results show that EQS can effectively filter out redundant active slots to conserve as much as 55% energy with a maximal 5% increase on latency

5. Analysis of Latency Performance of Bluetooth Low Energy (BLE) Networks

Keuchul Cho et.all

Says that,there is a significant increase in the applications of BLE in different areas, which is capable of making BLE one of the leading technologies for short-range communication in the next generation of networks. The Bluetooth standard defined the BLE model in a clear and detailed way, but still there are many other parts which can be addressed. Therefore, we create an accurate analytical model for these parts such as the discovery probability, as well as the discovery latency in BLE networks. These are then validated via extensive simulation experiments. We also analyze the sensitivity of those performance metrics to significantly evaluate to what extent parameter setting would influence the performance metrics. With increasing number of BLE devices, delays of device discovery show an exponential growth against the usage of three advertising channels and tiny-sized frames. This implies that there exist severe contentions among different BLE devices. We find that the inappropriate parameter settings considerably impair the efficiency of BLE devices. As far as we know, this work is one of the first in-depth and accurate models for BLE discovery, including sensitivity analysis.

6. **Neighbor Discovery and Rendezvous Maintenance with Extended Quorum Systems for Mobile Applications**
   Desheng Zhang et.all

Says that, In this paper, we introduce EQS, an augmenting layer to conserve energy for existing neighbor discovery and rendezvous maintenance schemes that use pairwise direct communication. Our work is mainly motivated by the insight that when devices share common neighbors, they can leverage the knowledge of each other to detect such neighbors indirectly. We propose a novel extended quorum system concept where information flow paths are equivalent to graph reachability. We then propose a graph reduction algorithm EQS that filters out redundant paths but still maintains graph reachability. We have integrated our EQS design with two discovery and rendezvous protocols, and evaluated its performance with both simulations and testbed experiments. The evaluation results show that EQS can effectively filter out redundant active slots to conserve as much as 55% energy with a maximal 5% increase on latency. Finally, we propose an taxi-dispatching application called EQS-Dispatch based on EQS, and the evaluation results show that it can quickly navigate an empty taxi to a direction with few competing taxis to maximize potential profit.

III. RESULTS AND DISCUSSION

Proposed Architecture Diagram

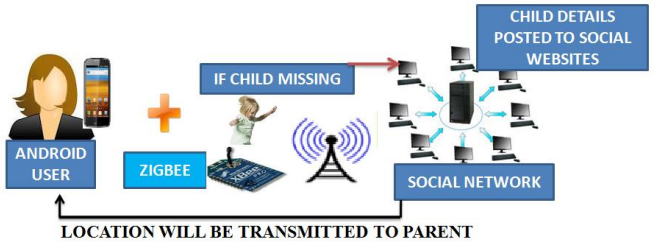

Figure 1. Architecture diagram

Fig 1. Zigbee device is connected with the android (Parent) and another is attached with the child. Parent can track the child continuously; if child is out the Parent's range then notification is made to the parents automatically. Patient's can share the device ID to the Social Networks. In & around people can also track the child if found in between. We implement Cloud Computing in this project. Once child is identified immediately location details are shared to the parents so that child is identified easily without mind boggling.

IV. CONCLUSION

In this paper, we have proposed a general model for analyzing the performance of NDP in BLE networks, where the operations of the scanner and the advertiser are modeled on a discrete-time axis. Based on the Chinese Remainder Theorem, the energy consumption and discovery latency have been derived as the performance measures of NDP. The results from the proposed model and the simulation results are very closely matched for any parameter values specified by the standard. In addition, the numerical results show that a reasonably good trade-off between discovery latency and energy consumption is achieved when the advertising interval is equal to the size of scan-window. However, this simple setting may not be always possible since the BLE devices can be in multiple modes and states simultaneously. Thus, our model which is applicable for any feasible parameter values can offer a practical guideline in effectively selecting

the desirable NDP parameter values according to various BLE applications.

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