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JUDUL : Sweet Heart Baby Location Tracker

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SWEET HEART BABY LOCATION TRACKER

OW LI LEE

This report is submitted in partial fulfilment of the requirements for the
Bachelor of Computer Science (Software Development)

FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY
UNIVERSITI TEKNIKAL MALAYSIA MELAKA
2013

DECLARATION

I hereby declare that this project report entitled
SWEET HEART BABY LOCATION TRACKER

is written by me and is my own effort and that no part has been plagiarized
without citations.

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DEDICATION

This dissertation is lovingly dedicated to my parents. Their constant encouragement and love for each step of the way have sustained me. I will always appreciate what they have done to me. I would definitely like to express a special word of thanks for my parents.

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This project would not have been accomplished without the guide and support of Dr Massila Kamalrudin. Many thanks to my supervisor, Dr Massila Kamalrudin, who guided me throughout the whole PSM project. A special thanks to my friends who are more than generous to share their knowledge with me.

ABSTRACT

Working mothers indeed contribute as a breadwinner in a family nowadays. They play an important role in either in a family or in the society, but taking care of their baby might become an obstacle for them. AS we flipped through the newspaper every day, we know from the highlighted headline that kids' safety is seriously threatened. Innocent kids are not well protected and eventually led them to dangerous situation. This project aims to develop a ubiquitous system to help those working mothers. A collection of multiple requirements are analyzed and characterized. The problems faced by working mothers are identified via a pilot study among them. From the analyzed gap, a ubiquitous system will be designed to overcome it. Lastly, this work will contribute to empower all the working mothers in order to focus in their work from afar.

ABSTRAK

Ibu yang bekerja memang menyumbang sebagai pencari nafkah dalam keluarga masa kini. Mereka memainkan peranan yang penting dalam sama ada dalam keluarga atau dalam masyarakat, tetapi menjaga bayi mereka akan menjadi penghalang untuk mereka. Keselamatan kanak-kanak diancam dalam era ini. Anak-anak yang tidak berdosa tidak dilindungi dengan baik dan akhirnya membawa mereka kepada keadaan yang berbahaya. Projek ini bertujuan untuk membangunkan satu sistem yang sentiasa ada untuk membantu ibu-ibu yang bekerja. Satu koleksi pelbagai keperluan dianalisis dan ciri-ciri. Masalah-masalah yang dihadapi oleh ibu-ibu bekerja yang dikenal pasti melalui satu kajian perintis di kalangan mereka. Dari jurang dianalisis, satu sistem akan direka untuk mengatasinya. Akhir sekali, kerja-kerja ini akan menyumbang kepada memperkasakan semua ibu yang bekerja untuk memberi tumpuan dalam kerja mereka dari jauh.

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LIST OF ABBREVIATIONS

PSM	-	Projek Sarjana Muda
NEXT	-	New Experiment Xtra Terrestrial
WP	-	Windows Phone
SDK	-	Software Development Kit

CHAPTER 1

INTRODUCTION

1.1 Project background

Every concerned parent worries about their baby especially new parent. Obviously, baby safety should be hold as a number one priority. This Sweet Heart Baby Location Tracker helps parent tracks their baby's location either indoor or outdoor. Hence, to avoid unwanted situation happen to the beloved baby, Sweet Heart Baby Location Tracker is introduced to all the parents to track baby's location precisely. Basically, baby tracker can track baby's location when he / she is sleeping or playing in different location. This device is excellent and reliable but has some limited range. With the public awareness, this will be one of the technologies that can help to improve baby safety or an alternative way offered to parents to keep tabs on baby. It helps parents to keep closer with the little one even they are not in the same room although it's probably not a good idea to leave them unattended. Parents will always stay on control with their baby with the device mentioned above. With all the new and extra features provided regardless of the limited range, this baby monitor is believe to give parents peace of mind by allowing them to track baby's location. It is indeed an extra eyes and ears to ensure the safety. Mothers can not only focus in their work from afar at the work place but monitoring their kids simultaneously.

1.2 Problem statement

As we flip through the newspaper every day, we know from the headlines that baby safety is seriously threatened recently. Innocent babies are not protected enough and will eventually lead them to risky situation. Parents can't keep their eyes all the time on their babies especially when they have several children. Every parent knows the feeling of having to randomly check on their baby all the time to make certain that he / she is in safe condition. With the economy is crawling along, most of the parent need to get back to work in order to support a household. They are force to leave their baby to a nanny or care giver. A number of cases on kidnapping of baby / infant / toddler will be highlighted then.

1.3 Objective

The main objective of this project:

1. To investigate the current problem that faced by working women on the issue of their kids.
2. To develop a ubiquitous solution for working mothers.
3. To evaluate the effectiveness of the ubiquitous solution proposed.

In short, this project is developed to empower working women with kids left with care givers.

1.4 Scope

Project scopes of this project will be divided in four categories which are target devices, operating system, internet connection and map coverage. The target devices for this project will be a smart phone and location tracker device to be worn. Only smart phone with windows operating system is applicable to this project. There must be an internet connection for the tracking system to run effectively. Internet Connection provided by the specific service provider will track the location of the kids and synchronize with the map provided in the smart phone.

1.5 Project Significance

This developed project will be useful for the all the mothers especially working mothers. Mothers will be the main beneficiary from the application in order to solve the kids' safety issue. With this application, mothers can focus in their work and monitor their kids from work. They need not to check their kids randomly on their location. Moreover, mothers can track the location of their kids whenever they feel like doing it.

Furthermore, this application will produce a ubiquitous solution for the issue of kids' safety. In this era, people complete their task just by a touch on their smart phone. With the combination of smart phone and device, mothers can track their kids' location easily.

1.6 Expected output

The expected output for this project will be:

1. To empower working mothers.
2. To have a ubiquitous solution for kids safety.
3. To achieve effectiveness of the device work together with application.

1.7 Conclusion

In this digital era, technology has made parents nowadays live easier with all the handy gadgets or device innovated. I hope the proposed deviced will be helpful for parents especially those mothers who need to work for survival. Sweet Heart Baby Location Tracker helps working mothers to focus in work. My work will contribute to empower working mothers to monitor their kids from afar at work.

Literature review and project methodology will be discussed in the next chapter.

CHAPTER 2

LITERATURE REVIEW AND PROJECT METHODOLOGY

Sweet Heart Baby Location Tracker: A ubiquitous solution to assist working mothers.

2.1 Abstract

Working mothers indeed contribute as a breadwinner in a family nowadays. They play an important role in either in a family or in the society, but taking care of their baby might become an obstacle for them. AS we flipped through the newspaper every day, we know from the highlighted headline that kids' safety is seriously threatened. Innocent kids are not well protected and eventually led them to dangerous situation. This project aims to develop a ubiquitous system to help those working mothers. A collection of multiple requirements are analyzed and characterized. The problems faced by working mothers are identified via a pilot study among them. From the analyzed gap, a ubiquitous system will be designed to overcome it. Lastly, this work will contribute to empower all the working mothers in order to focus in their work from afar.

2.2 What is ubiquitous computing?

Ubiquitous computing is named as the third wave in computing. First were mainframe which shared by lots of personal computing era, person and machine staring uneasily at each other across the desktop. Ubiquitous computing comes after the mainframe, age of calm technology, where technology is receded to the background of our lives. [Mark Weiser, 1996]

In other definition, ubiquitous computing, ubicomp, will enhance computer by making them available throughout the physical environment but invisible to the user. “Applications are of course the whole point of ubiquitous computing.” [Mark Weiser, 1993] Mark Weiser, “Some Computer Sciences Issues in Ubiquitous Computing,” Commun. ACM, July 1993.

As D. Salber points out, ubiquitous appeared as a paradigm for people and computer interaction, also known as HCI. One of the guiding principles of ubiquitous computing is to break away from desktop computing in order to provide computational services when and where needed.

In my work, ubiquitous defines the relationship between computer and wearable salient component like sensor, Bluetooth, Radio Frequency Identification (RFID), GSM module, context awareness software and artificial intelligent environments. A ubiquitous solution will be able to complete some supported tasks provided with a set of computer and a device with embedded infrastructure.

2.3 Type of Ubiquitous Solution

The advance wireless communication technologies is rapidly evolved in the domain of mobile ubiquitous computing. As we can see plenty of intelligent applications are seamlessly integrate with mobile in support to improve quality of people life.

Global System for Mobile Communication (GSM) module plays a major part in tracking system. A device will incorporate with a GSM module in order for tracking function to run. Most of the devices are assigned to service plan available where user needs to fork out their money monthly. Indirectly, it doesn't ease the burden of a family but increase their monthly spending by paying to service provider. GSM will be able to give their user the coordination of the missing item or kids. The coordination will be shown on the map with some nearby location track mark. Map coverage will be available if the roaming system is running at the background at other country. GSM is considered as the most on demand mobile network infrastructure on the globe. GSM base station will work with Global Positioning System (GPS) for location service. GPS technology makes up from a network of satellites orbit around the earth. Tons of receivers for GPS are located at every corner in the world. Data of GPS will be transmitted to the user via GPRS data protocol which provided by the GSM module.

Bluetooth did assist us in tracking. Two devices will be paired and connected for tracking. Bluetooth will be working well to some degree of traceable, within the indoor or less than 100 feet. If the device is out of the range, the device might be useless for the user. In this era, some of the high tech tracking devices requires Bluetooth 4.0 for operation where it is still very new to us. Bluetooth has no boundaries when you're away from the country, it does not include any extra charges. Item can be tracked as long as it is within the range. Bluetooth operated devices eliminate irritating wire and costly service plan.

Radio Frequency Identification, RFID, is a intelligent system that can communicate to the network for tracking. A device embedded with smart label will identify item and collect item's information before sending to the computer or mobile system. RFID will only have its best performance indoor. User will need to install a few RFID readers as a check point in the room. Localization system worked by RFID will record movements in its predefined reader network only. Furthermore, an exact of location coordination will not be provided by RFID tag or transponder.

In ubiquitous sensing, user activity will be supported by networked infrastructure while the remaining keeps transparent. Sensor will perceive physical or environment stimulus and convert them into signal. Sensor in ubiquitous solution must be self-calibrated; it must be able to adapt itself to the physical or environment stimulus as needed. Sensor can communicate with computer or mobile system to provide the information perceived. Sensor-based systems are readily established in every part of our life, ranging from personal healthcare to entertainment.

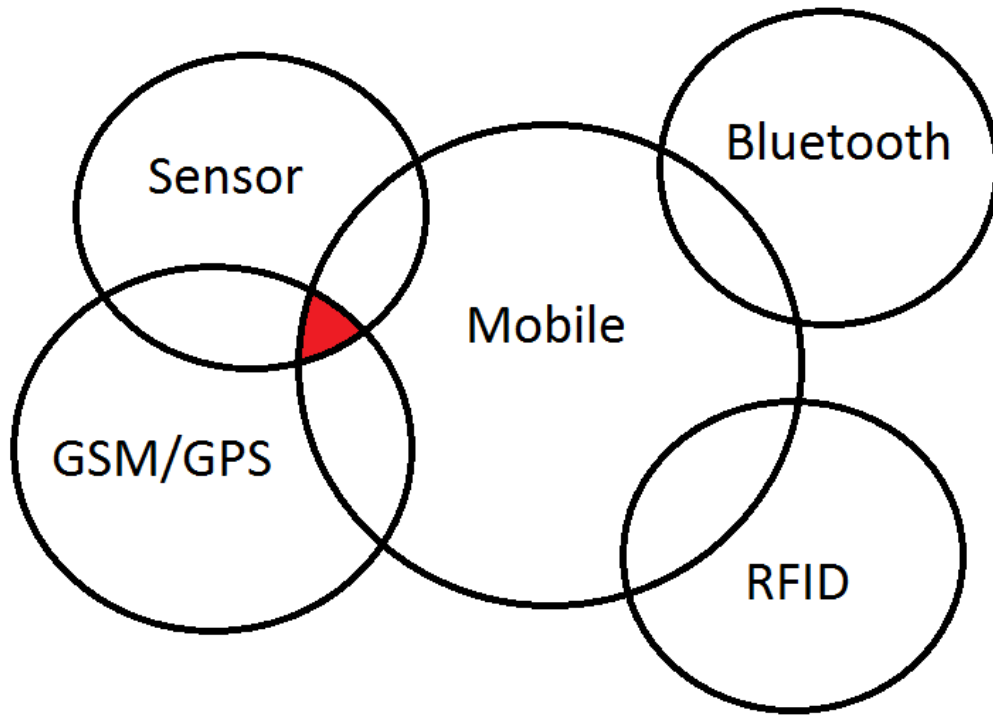


Figure 2.1: Interrelation Venn diagram

Based on the figure 2.1 above, mobile can integrate or match with any of the criteria above for ubiquitous computing purposes. While in my work, I will be focus in the overlapping area which consists of mobile, GSM/GPS and sensor. These three criteria will be integrating in order to track and sense before sending the result to mobile phone to achieved the purpose of ubiquitous computing. GSM/GPS will play be contributing for location tracking. Localization will be done by using the towers available by service provider respectively. The exact location found will be send to mobile phone to ease mother's responsibility on finding missing child.

In the other hand, mobile to mobile navigation allows user to navigate the kids using their smartphone with condition saying that the kids must own a smartphone as well. In simple words, navigation works between two handheld devices. Mobile phone integrates with the map provided in it for tracking. Yet, network will be needed for localization to function well between two mobiles.

2.4 Motivation

I had conducted a user needs analysis study to identify the gaps and the needs of working mothers to ensure their kids safety from a pilot study.

Among the 40 participants, 10% of them are belongs to the category of age 18-23 while 25% come from the category of age 24-28. The category of age 24-28 marks the highest participants with percentage of 35% and the remaining is 30% belongs to the category above age 35. The details of all the participants are demonstrated are below:

Age	Education Level		No. of Kids		Occupation		
	Undergraduate	Postgraduate	Under 3	Above 3	Government	Private	Not Working
18 - 23	3	0	3	0	0	3	0
24 - 28	7	3	10	0	1	8	1
29 - 35	10	5	11	4	1	13	1
Above 35	3	9	8	4	2	10	0

Table 2.1: Demographic table

Exactly 95% from the participants play their role as a working mother. The child care duties will automatically bear by their relatives, in law or caregiver. However, the working mothers still think it's a need for them to monitor their kids from far. The bar charts below show the need of 40 working mothers towards monitoring device.

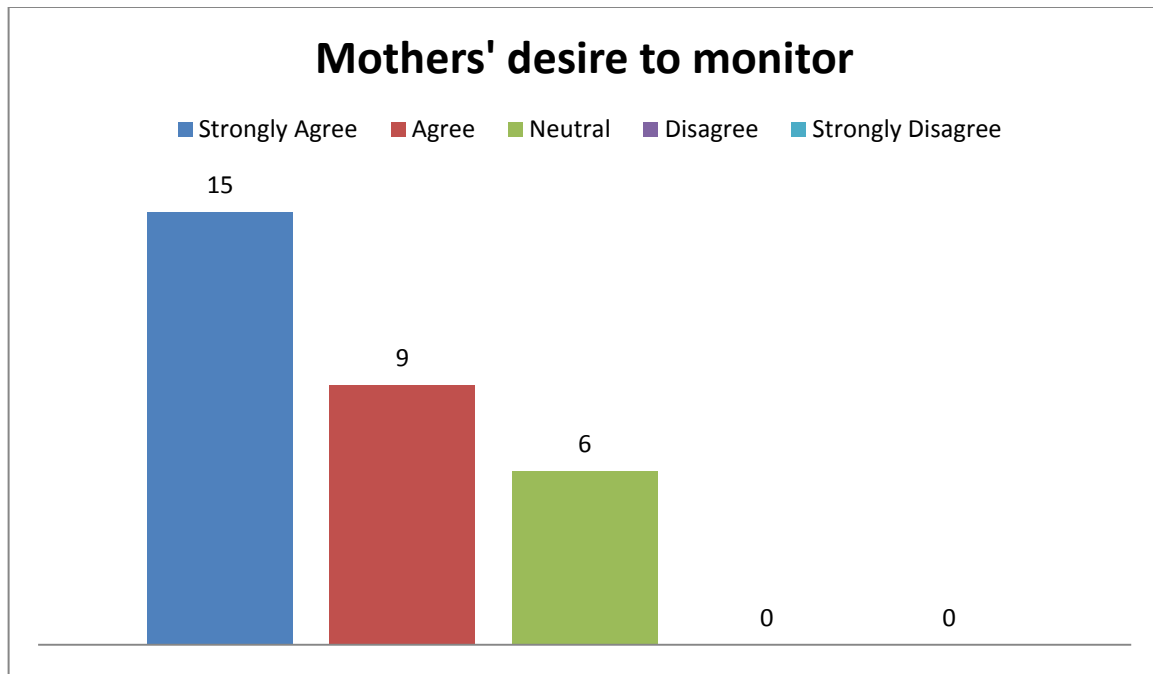


Figure 2.2

As shown in Figure 2.2, 37.5% of the participants strongly agree that they wish to monitor their child all the time from work place during working hours. It consists of 22.5% of them agree for the statement for monitoring. Obviously, it has exceeded more than 50% of the participants wish to have monitor their child all the time from work. None of them disagree or strongly disagree with this statement. These prove the strong desire of mothers to always monitor their children from far.

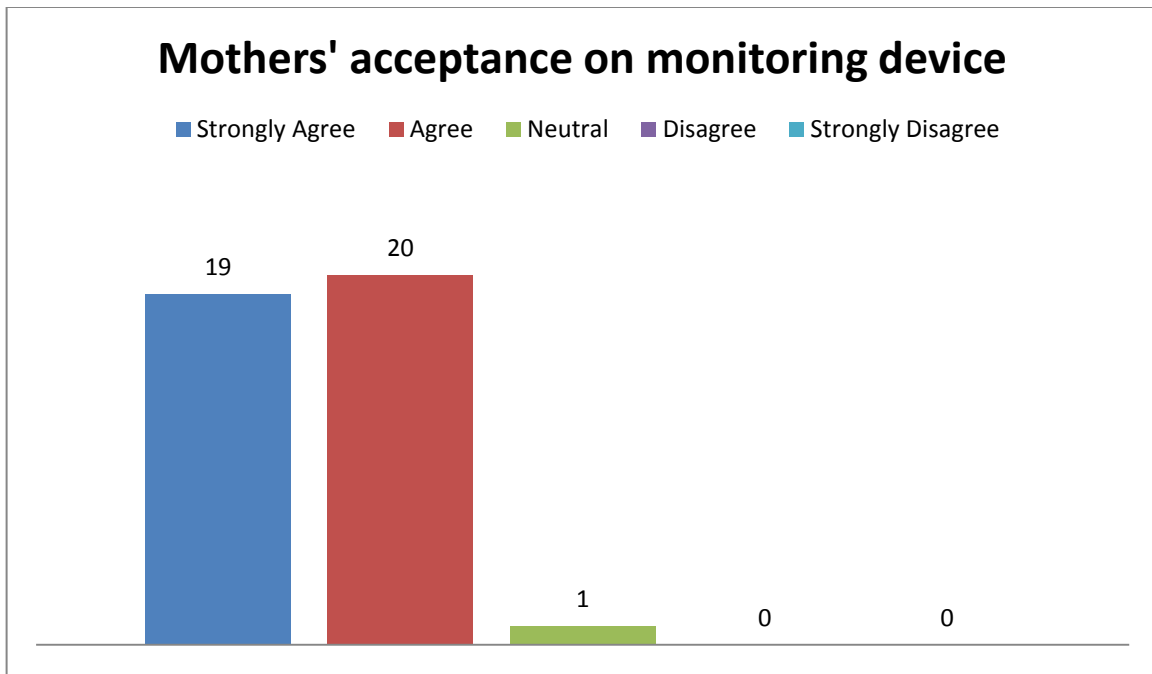


Figure 2.3

Figure 2.3 shows that most of the mothers prefer to have either a gadget or tool to assist them to monitor the child. It is also shown from the figure that very small numbers of the participant disagree to have a kind of device to help them to monitor the kids.