BABY CARE ALARM SYSTEM

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To my beloved supervisor, family and friends.

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ABSTRACT

Alarm system is a system designed for securities and protection for property of user. Baby care alarm system is implemented become needs of parents who will accidently left their children inside the car. Besides that, the price for baby care alarm system is become more expensive because the desire of customer. Therefore, the low cost baby care alarm system is designed for people will accidently left their child in car. From this paper, it shows all the details and function of the baby care alarm system which able to send data through Wi-Fi to the cloud and get the notification. The whole system involves two part which is baby seat system and the keychain carry by the parents. This system have notification using IOT and alert the parents when the IOT not function. When the weight of baby and temperature is more than 32°C is detected, then system will alarm and alert the parents using twitter notification. If the parents are out of range, the key chain device is disconnected the router, the keychain device will alert the parents using buzzer.

ABSTRAK

Sistem penggera adalah sistem yang direka untuk sekuriti dan perlindungan kepada harta pengguna. Baby sistem penggera penjagaan dilaksanakan menjadi keperluan ibu bapa yang sengaja akan meninggalkan anak-anak mereka di dalam kereta. Selain itu, harga untuk sistem penggera penjagaan bayi menjadi lebih mahal kerana keinginan pelanggan. Oleh itu, sistem penggera penjagaan bayi kos rendah direka untuk orang sengaja akan meninggalkan anak mereka di dalam kereta. Daripada karya ini, ia menunjukkan semua butiran dan fungsi sistem penggera penjagaan bayi yang dapat menghantar data melalui Wi-Fi ke awan dan mendapatkan pemberitahuan. Keseluruhan sistem melibatkan dua bahagian yang merupakan sistem kerusi bayi dan membawa rantai kunci dengan ibu bapa. Sistem ini mempunyai pemberitahuan menggunakan IOT dan memberi amaran kepada ibu bapa apabila IOT tidak berfungsi. Apabila berat bayi dan tempearature adalah lebih daripada 32°C dikesan, maka sistem akan penggera dan memberi amaran kepada ibu bapa menggunakan pemberitahuan twitter. Jika ibu bapa adalah di luar kawasan, peranti rantai kunci adalah memutuskan sambungan router, peranti rantai kunci akan memberi isyarat kepada ibu bapa menggunakan loceng.

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CHAPTER 1

INTRODUCTION

Chapter 1 is the introduction of the project. This chapter included project background, objective, problem statement, and project scope.

1. 1 Project background

Nowadays, there is many baby die in a car because of the careless of parents. One child is die in hot car being left by parents every 10 days [7]. Based on statistics, 38 children dead in a hot vehicle each year from heat stroke after being trapped inside a hot vehicle. Even the best caregivers can left a sleeping baby in a car because of careless. This may result the baby injured or even death. There are too many children have been accidently forgotten in hot vehicles. A heat stroke is defined as a disease with a body temperature is greater 40.6 ◦C. A heat stroke happen because of a person expose to an environment heat in a long time.

Bases on the statistics on greenhouse effect in vehicles, the temperature inside a vehicle can increase very fast even window cracked. The temperature inside a car can reached 50◦C in a minutes. A cracked window will not affect the temperature inside a vehicles and will not slow down the increasing rate of the temperature. For the first 10 minutes, the temperature increasing very fast until 50◦C. So, it may cause the children died from heat stroke in a vehicle which have a temperature more than 50◦C.

Besides that, there are many kidnapping cases occur because of the parents careless to left their children inside the car. Many kidnapping cases result the children murdering. The number of kidnapping cases increasing year by year. Because of advances of technology, most of the sensor are low cost and low power consumption. To avoid these kind of tragedy happens, the vehicles should install a devices or s system to alert them their children is inside a car. The system should is install in a safety pad and install it under a baby seat in a car. The safety pad will detect the presence of the baby and the surrounding temperature.

Once the system is activated, the sensor will keep sensing the baby is sit on a baby seat or not. If the safety pad detected the load of the baby, it will notify the parents baby is in the car. Besides that, if the temperature inside the car is overheat, it also will notify the parents baby is in high risk temperature inside a car. Because of the Internet is very important and reliable for people nowadays, so a thingspeak cloud is using to store the data and notify using twitter. Furthermore, there is another backup devices implement into keychain which is use to alert the parents when the parents are far from the child.

1. 2 Objective

The objective of this project is:

a. To design a baby care alarm system using Arduino and give notification to alert the user.

1. 3 Problem Statement

Nowadays, case of kid abduction is keep increasing. To prevent this problem, one system need to be create for preventing abduction occur. This system will show their child at anywhere once their children left them. To prevent this tragedy happen, the proposed system can solve the problem by parents can check their children current location and

send the alarm to parent's smartphone if they the children leave safety pad which will detect the presence of the child.

There are many children dead in a hot car because of parents left their children in a car. Nowadays, many parents are rushing for the working under pressure. This may cause them careless on take care of children and will left their children in the car. To prevent the children left in a hot car for long time, so a baby care alarm system will be solving this problem and prevent the baby die in a car.

1. 4 Project Scope

This purpose of this project is to design a baby care alarm system to prevent the parents left their children in a car that may cause the tragedy happen. This project consists of hardware part and software part.

1.4.1 Hardware part

The circuit will construct and testing on the breadboard. After this, the circuit will fabricate on a PCB board and test on it. The hardware part of the project consists load sensor, temperature sensor, load cell amplifier, Arduino Uno microcontroller, logic converter, buzzer, WIFI module. The load sensor is used to detect the presence of baby is on the baby seat. The load sensor can measure up to 10kg, it can detect the baby from one years old to 3 years old because it can measure up to 10kg. The function of load cell amplifier is to amplify the signal get from load sensor and send it to microcontroller Arduino Uno. The temperature sensor is used to sense the surrounding temperature of the car, if the temperature in the car is in danger level, it will send the signal to Arduino Uno. Arduino Uno is a microcontroller executes the coding and command for the next step. Wi-

Fi module function is communication between Arduino Uno microcontroller and router. When a load sensor detected the weight of baby and the temperature sensor sense the temperature in car is danger, it will send then the signal to Arduino Uno microcontroller to command and notify the parents using smartphone through twitter. The Arduino Uno is connected to the router through WIFI. For another devices keychain, it also connected the same router, if the parents are far from the baby until the WIFI connection is loss, then the buzzer is on to alert the parents.

1.4.2 Software part

An open source Arduino IDE software is used for writing the codes to command. The coding is for Arduino Uno, WIFI module, load sensor and temperature sensor. All the coding will be done for smoothen the system.

CHAPTER 2

LITERATURE REVIEW

Chapter 2 is the literature review of the project. This chapter included previous project that needed to implement onto the project and the research on hardware part. This chapter discuss the previous research, project, journal that can implement to this project. This chapter cover all the theories, hardware components, and some good idea to implement to this project.

2. 1 Previous research on baby care alarm system

2.1.1 A multi agent system to avoid heatstroke in young children left in baby car seats inside vehicles [1]

According to this journal, this invention is to alarm the parents who left their children in a hot vehicle. This system is using multi agent system to solve the problem. They used intelligent agents to build an architecture that use to detect the presence of child left in a car seats inside a hot vehicle. If the system sense there is a child inside a hot vehicle, it will send the notification to the parent's smartphone to alert the parents their children is inside a hot vehicle. Besides that, this journal also shows that how to use a INGENIAS methodology to build the multi-agent system. This system use Arduino microcontroller and Raspberry pi mini-computer.

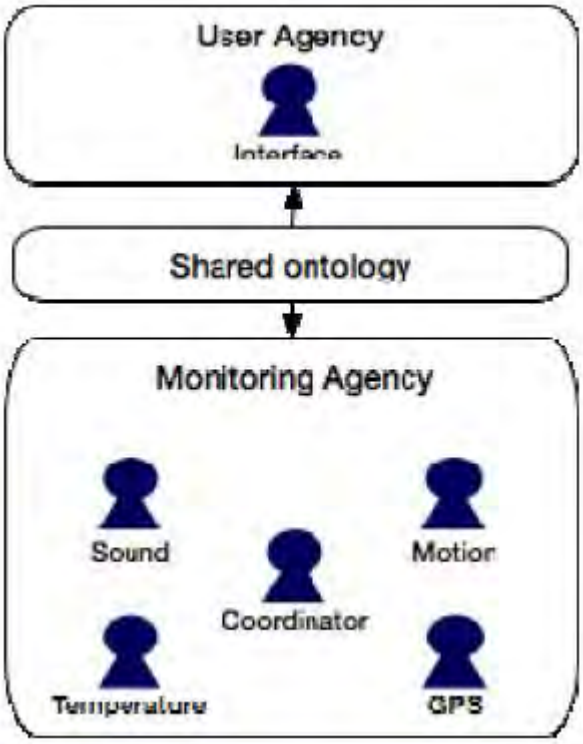

Figure 2.1: Multi-agent architecture [1].

The system divided to two part of agencies which is monitoring agency and user agency. Monitoring agency is used to check the status facing children left in a baby seat inside a vehicle. It consists of coordinator sensor, temperature sensor, GPS sensor, motion sensor and sound sensor. Coordinator sensor is to determine the status in which there is danger of heatstroke for the children. The GPS sensor is to induce change of routine of the driver. The sound sensor is to detect the surrounding sound inside the vehicle to make sure that child is inside the vehicle. The motion sensor is to determine the motion in the baby seat in car. The user agent is the communication between sensors and the users. It used to alert the parents by send the notification to the parent's smartphone.

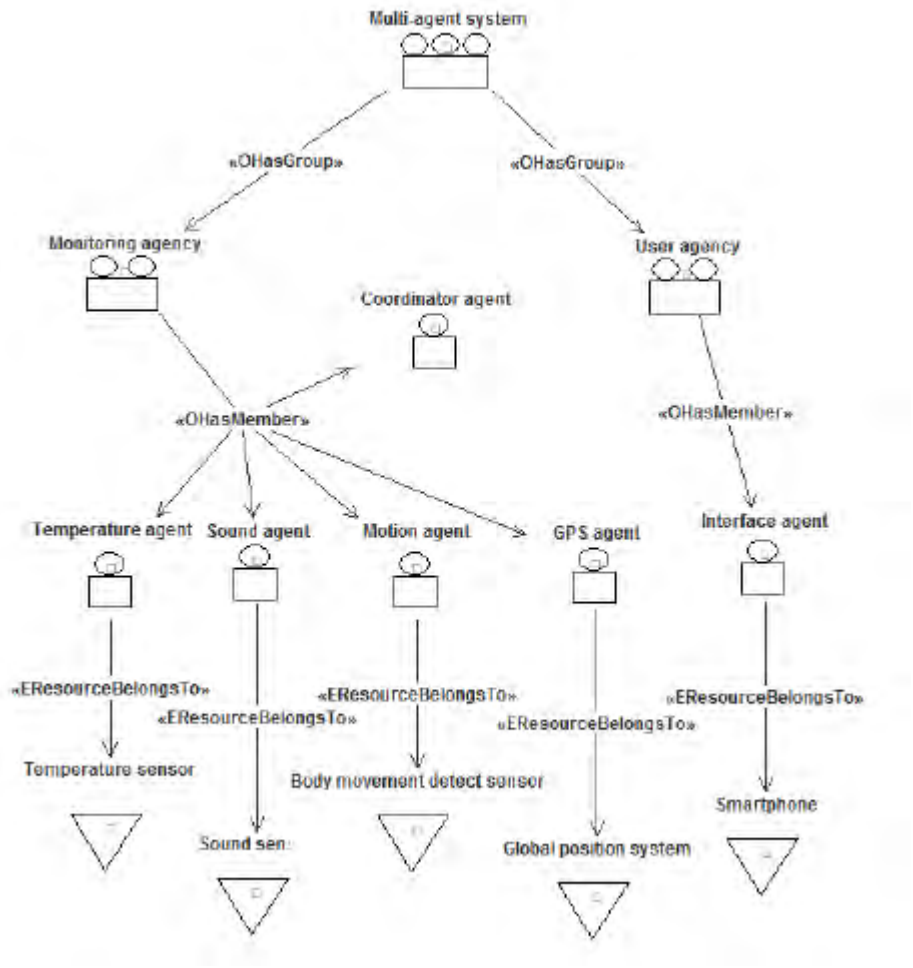

Figure 2.2: Organization model diagram [1].

2.1.2 ThingSpeak – an API and Web Service for the Internet of Things [5]

This paper presents the application of ThingSpeak, which is application programming interface (API) and web service for internet of things(IoT) [2]. The ThingSpeak API is an open source interface for collecting data and transform it into graphical form and communicate using coding in Arduino. In ThingSpeak, personal channel can be created and uploading the data needed to display in own channel. Besides that, ThingSpeak can give notification in twitter if the data needed to be trigger. This paper also provides some example to use with ThingSpeak which microcontroller need an

internet connection to upload the data to cloud and only can communicate any devices that can connect internet. The IoT give many advantage to modern society. For ThingSpeak, it gives a free platform for data exchange. This is very good for students to do their projects and the channel inside the ThingSpeak have no limit and no cost.

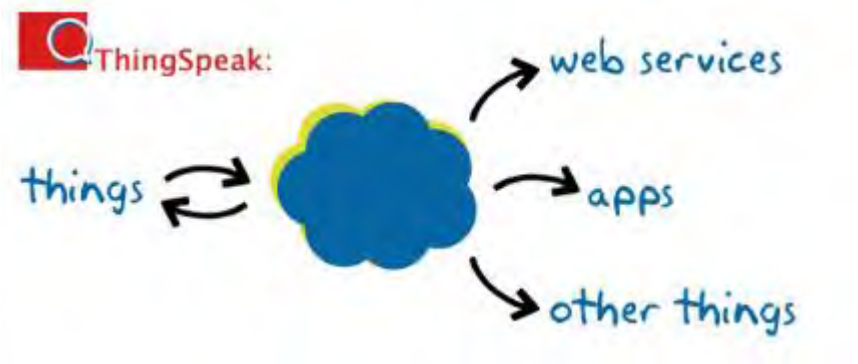

Figure 2.3: ThinkSpeak representing itself as 'cloud' interface [5]

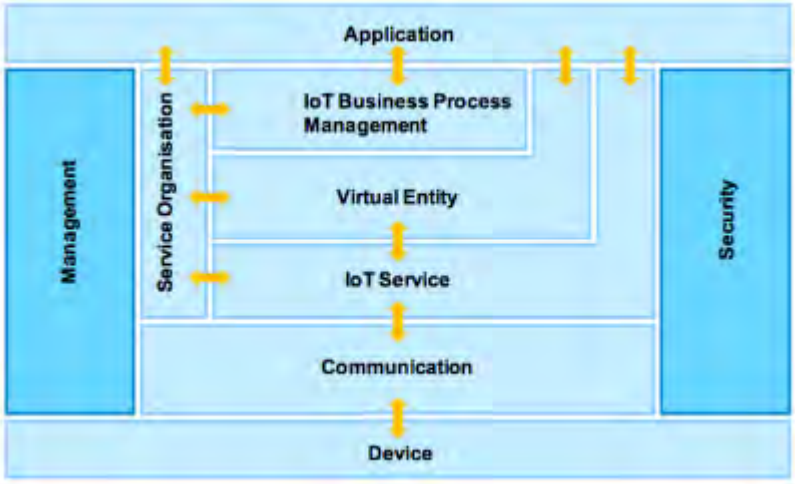

Figure 2.4: Model of the IoT [5]

2.1.3 Warning system for child left unattended vehicle [2]

According to this journal, a warning system to alarm a person when a child is left in a baby seat in the car. The system will detect the presence of child on baby seat by using pressure pad and a seat lap belt. The system is activated when the driver released the seat belt and the baby is sit on the baby seat. When the seat belt is release, the system will start to alarm the driver sit on driver seat. The alarm included a tranquil audio, a story or a song.

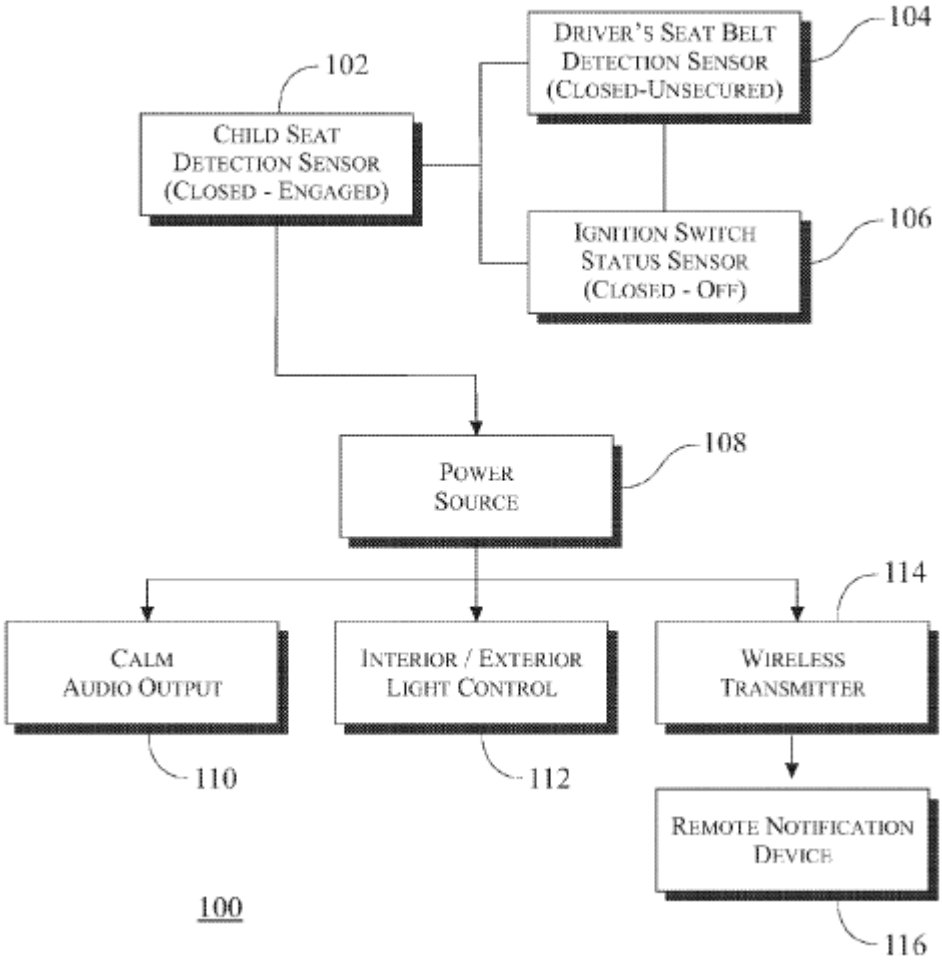

Figure 2.5: block diagram of warning system for children left in car [2]

Based on the Figure 2.5, there are a child seat detection sensor and it has relation to driver seat belt detection sensor ignition switch status sensor. The child seat detection sensor is connected to power source and it has output of calm audio output. The power source is a portable like a rechargeable battery. Exterior/interior light control is used to reduce the stress of the child when child is inside the car. Wireless transmitter is used for transmitter the notification to the mobile device such as message, voice mail, and e-mail.

2.1.4 System and method for a child safety seat having sensing and notification abilities [3]

According to this journal, a child safety seat in car, a proximity sensor, a presence sensor, and a transmitter is used in a child safety seat system. This system used the presence sensor to detect the presence of baby and proximity sensor is to sense the wireless receiver is within the range for transmit and receive near the baby seat in car. The transmitter is used to transmit the information get from the sensor and to make a notification which is generate a alarm to alert the parents. Beside the presence sensor and proximity sensor, the system also used the temperature sensor to sense the temperature surround the baby. If the baby is in high risk temperature, parents will also get the notification.

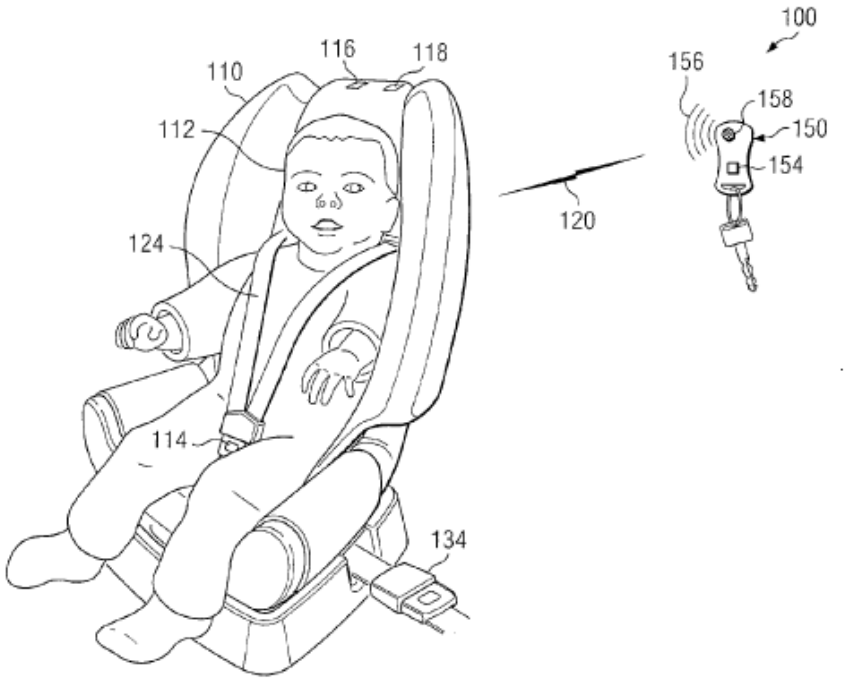

Figure 2.6: the system for child safety seat and having detection and notification abilities [3]

110- Baby safety seat

112- A baby

114- Presence sensor

116- Proximity sensor

118- Transmitter

124- Restraint

134- Seat belt

100- A system for notification

150- Wireless receiver