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الجامعة المصرية للتعليم الالكتروني الاهلية

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Anti Kidnapping System

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Abstract

This paper presents the design and implementation of a comprehensive anti-kidnapping system device aimed at protecting individuals from abduction threats. The device integrates advanced technologies and robust security measures to provide continuous real-time tracking, immediate emergency alerts, and effective communication capabilities. Key features include GPS tracking for real-time location monitoring, an emergency panic button for instant distress signals, and secure communication channels for contacting emergency services and trusted contacts. Additionally, the system employs geofencing to define safe zones, alerting users and their contacts if these boundaries are breached.

The anti-kidnapping device is designed to be discreet, user-friendly, and durable, ensuring reliability under various environmental conditions. Data security is a critical component, with encryption protocols in place to protect sensitive information and ensure user privacy. The system is also equipped with robust battery management features, including low battery alerts and long-lasting power.

This system serves to notify the victim's relatives in real time and to find him for assurance or aid. And that's through the use of many of the services that are available through the Internet of Things technology.

Through a combination of preventive measures, rapid response capabilities, and post-incident support, the anti-kidnapping system device aims to significantly reduce the risk of kidnapping and enhance the overall safety and security of individuals in high-risk environments.

Chapter 1 (Introduction)

history

The history of anti-kidnapping systems is shaped by evolving threats and advancements in technology, leading to the development of various measures and systems aimed at preventing and responding to kidnappings. Here's a brief overview:

Early Efforts

Ancient and Medieval Times:

- **Ransom Payments: Kidnapping for ransom has been a tactic used since ancient times.Families and communities would negotiate or pay ransoms to secure the release of captives.**
- **Community Vigilance: Small communities often relied on mutual aid and vigilance toprotect against kidnappings.**

18th and 19th Centuries:

- **Formal Policing: The establishment of organized police forces in the 19th century, suchas the Metropolitan Police in London (1829), provided a more structured response to kidnappings.**

Legal Frameworks:

Laws began to emerge specifically addressing kidnapping, enhancing penalties and defining the crime more clearly.

20th Century

Early to Mid-20th Century:

- **High-Profile Cases: Kidnappings like the Lindbergh baby case in 1932 brought significant public attention to the crime, leading to the Federal Kidnapping Act in theUnited States, which made kidnapping a federal offense.**
- **Technological Integration: The use of telephones and telegraphs allowed for quicker communication in kidnapping cases.**

Late 20th Century:

- **AMBER Alerts: The AMBER Alert system was established in 1996 in the United States, named after Amber Hagerman, a young kidnapping victim. This system uses media and communication channels to broadcast information about child abductions.**
- **Hostage Negotiation Teams: Law enforcement agencies worldwide began developing specialized hostage negotiation teams to handle kidnapping and hostage situations moreeffectively.**
- **Tracking Technologies: The advent of GPS and mobile phone technology enabled newmethods for tracking and finding kidnapped individuals.**

21st Century

Early 21st Century

- **Advanced Communication Systems: With the proliferation of mobile phones and internet access, new communication systems were developed for quicker alert dissemination and coordination during kidnapping incidents.**
- **Surveillance Technology: The increased use of CCTV and other surveillance technologies provided more tools for monitoring and responding to potentialkidnappings.**

Modern Anti-Kidnapping Systems:

Global Positioning Systems (GPS): Modern anti-kidnapping systems heavily rely on GPS technology for real-time location tracking of potential victims.

Mobile Applications: Various mobile applications have been developed to enable rapid alert and response in kidnapping situations, including panic buttons, and tracking features.

Motivation

The motivation for developing and implementing anti-kidnapping systems stems from various factors, driven by the need to protect individuals, ensure public safety, and uphold societal stability. Here are some key motivations:

Protection of Human Life and Safety

- **Individual Safety: The primary motivation is to safeguard individuals from the physicaland psychological harm caused by kidnappings. Ensuring the safety of citizens is a fundamental responsibility of governments and societies.**
- **Vulnerable Populations: Special attention is often given to protecting vulnerable groups,such as children, women, and the elderly, who may be more susceptible to abductions.**

Societal and Economic Stability

- **Public Trust: Effective anti-kidnapping measures are crucial for keeping public trust inlaw enforcement and governmental institutions. A society where people feel secure is more stable and cohesive.**
- **Economic Impact: Kidnappings can have severe economic consequences, including thecosts of ransom payments, law enforcement operations, and the broader economic impact on businesses and tourism in affected areas.**

Legal and Ethical Responsibilities

- **Human Rights: Preventing kidnapping is aligned with protecting human rights, as kidnapping is a gross violation of personal freedom and dignity.**
- **Legal Obligations: Many countries have legal frameworks mandating the protection ofindividuals from kidnapping, requiring law enforcement agencies to develop effective response strategies.**

Deterrence of Criminal Activity

- **Crime Prevention: Anti-kidnapping systems are designed to deter potential kidnappersby increasing the risks associated with committing such crimes. Effective deterrence reduces the incidence of kidnapping.**

- **Crime Prevention: Anti-kidnapping systems are designed to deter potential kidnappersby increasing the risks associated with committing such crimes. Effective deterrence reduces the incidence of kidnapping.**

- **Disruption of Organized Crime: Kidnapping is often linked to organized crime groups. Implementing robust anti- kidnapping measures disrupts these groups' operations anddiminishes their power.**

Technological Advancements and Capabilities

- **Leveraging Technology: Advances in technology, such as GPS, AI, and IoT, have enabled the development of sophisticated anti-kidnapping systems. There is a motivation to use these technologies to enhance public safety.**

- **Innovation in Law Enforcement: Continuous innovation in law enforcement techniquesand tools motivates the development of more effective and efficient anti-kidnapping strategies.**

International and National Security

- **Terrorism and Political Stability: Kidnappings, particularly those with political motivesor executed by terrorist groups, can threaten national and international security. Anti- kidnapping systems are essential for counterterrorism efforts and keeping political stability.**

- **Cross-Border Collaboration: The international nature of some kidnappings motivatescountries to collaborate on global anti-kidnapping initiatives, sharing resources and intelligence to combat this crime more effectively.**

Problem Statement

Kidnapping stays a critical issue globally, posing a severe threat to the safety and well-being of individuals.

Despite advancements in security measures, the incidence of kidnappings continues to rise, driven by various motives such as ransom demands, human trafficking, and political agendas. The current security solutions often fall short in preventing and responding to such incidents due to their reactive nature, delayed response times, and lack of comprehensive monitoring.

Chapter 2 (IOT)

Introduction

In this chapter, we will explain internet of things (IoT) in general way, also its history, and more details about this field of technology. Then we present its application. As conclusion we will define the problem and suggest a solution.

Internet Of Things "A Brief History"

Internet of things (IoT) has become an important thing for the person, because of its development. What is the original of (IoT), and why it has such an importance in a daily life!!

The principle of linked devices dates to 1832, when the first electromagnetic telegraph was developed [1].

The telegraph allowed for direct communication between two machines through the transmission of electrical signals [1]. However, the real IoT past began in the late 1960s with the advent of the internet a critical part which then grew exponentially over the next decades [1].

In the 1980s, at Carnegie Mellon University, some local programmers created the first connected device, which was a Coca-Cola vending machine. The connect device via the internet, allows to know, if they kept drink is cold enough, and if there is a bottle or no [1].

The '90s, John Romkey used a TCP/IP protocol to link a toaster to the internet for the first time. One year later, scientists at the University of Cambridge devised a plan to use the first web camera prototype to check the amount of coffee in their nearby machine lab's coffee pot. They programmed the webcam to photograph the coffee pot three times a minute and then send the photographs to local computers, allowing anyone to see if coffee was available [1].

In 1999 Kevin Ashton talk about "Internet of Things" in one of his presentations, where he used the word "Internet" in the title of his presentation in order to attract the attention of the audience because the Internet was a great deal of insomnia at that time, and where he described the Internet of things as a technology that connects many devices with the help of RFID Tags for Supply Chain Management [1].

Figure 1.1 Kevin Ashton.

At the beginning of the twenty-first century, the term Internet of Things spread very quickly, as it attracted the interest of many researchers and developers, which led to the first international conference on the Internet of Things, which was held in 2008 in Switzerland. In which RFID technologies and wired short-range communications and the networks of the sensor. Where were debated by the participants from 23 countries from the world [1].

The mentioned above studies, led to the achievement of new innovations in the field of (IoT) such as:

In 2000, LG Electronics introduced an Internet-connected refrigerator, allowing its users to shop online and make video calls [1].

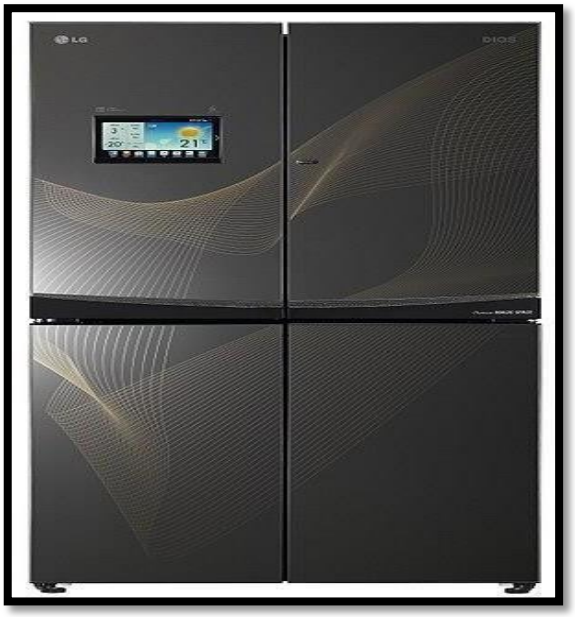


Figure 1.2 internet refrigerator.

In 2005, a small robot called Nabaztag in the shape of a rabbit was created, which was able to provide the latest forecasts of weather and stock market changes as well as the latest news [1].

Figure 1.3 Nabaztag.

Connected devices in 2020.

Cisco IBSG, April 2011

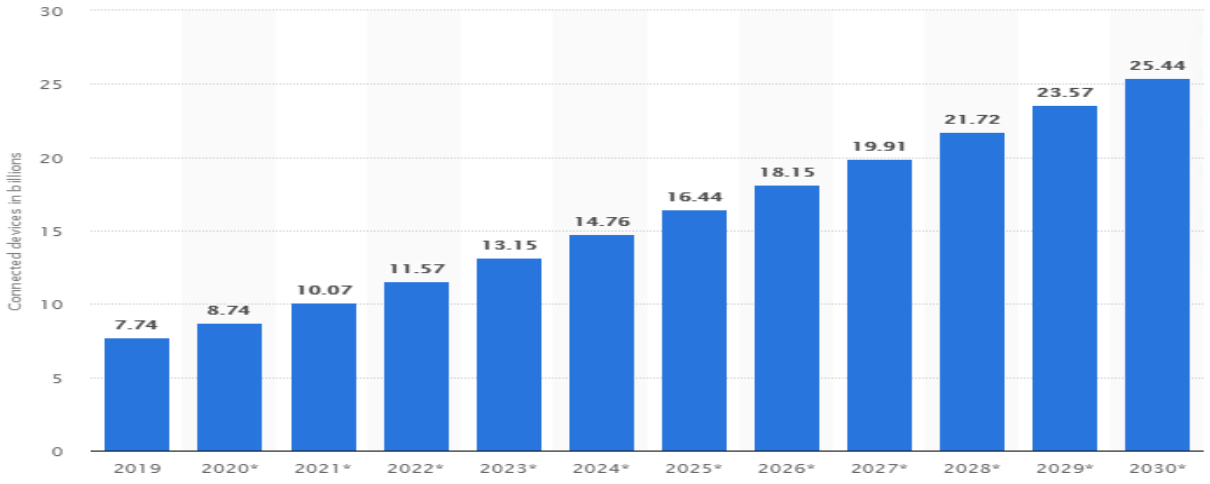
World populatio n	*6.3 billion*	*6.8 billion*	*7.2 billion*	*7.6 billion*
Connecteddevices500 million		*12.5 billion*	*25 billion*	*50 billion*
Devices per person	*0.08*	*1.84*	*3.47*	*6.58*
2003		*2010*	*2015*	*2020*

Table 1.1 Data source <CISCO-The internet of things. How the next evolution of the internet is changing everything> [1].

In the year 2011, cisco IBSG predicted there will be 25 billion Internet-connected devices in 2015 and in 2020 there will be 50 billion [2].

Internet of Things Statistics

Arne Holst predicts that IoT applications will account for 60 percent of all internet-connected devices in 2020 for the consumer sector in all forms of corporate and commercial industries. In the next ten years, this share will continue at this pace [3].



connected devices worldwide from 2019 to 2030 [3].

Figure 1.4 statistics "Expectations" of the Number of Internet of Things (IoT)

We will explain as following, more details about (IoT) and the most points in this technology.

Internet Of Things Definition: It is the connection of all devices or things existing in the world, via the internet [4].

Internet of Things system:

IoT system has four main components, they can create a truly integrated and implementable system:

- ### Sensors/Devices

We say about a thing or device that it is a sensor if that can sensing their environment and collect the information. there exist several sensors in one device [4], for example, the phone has: the camera, GPS, touch sensor, humidity sensor, temperature sensor...etc.

- ### Connectivity

Connectivity is Which defines the concept of communicating all types of devices in the field of the internet of things. to save data in the cloud in its own [4]. And one element can be selected from a set of options to deliver IoT data to the cloud as: Bluetooth, WIFI, Cellular, radio, connecting with a gateway/router, low-power wide-area networks (LPWAN) or connecting directly to the internet via ethernet [4].

- ### Processing of Data

The system of (IoT) process data before to store it in the cloud, where the aim of data processing is to transform raw data into something usable. Anything to which the end user will react [5].

- **The User Interface "APP"**

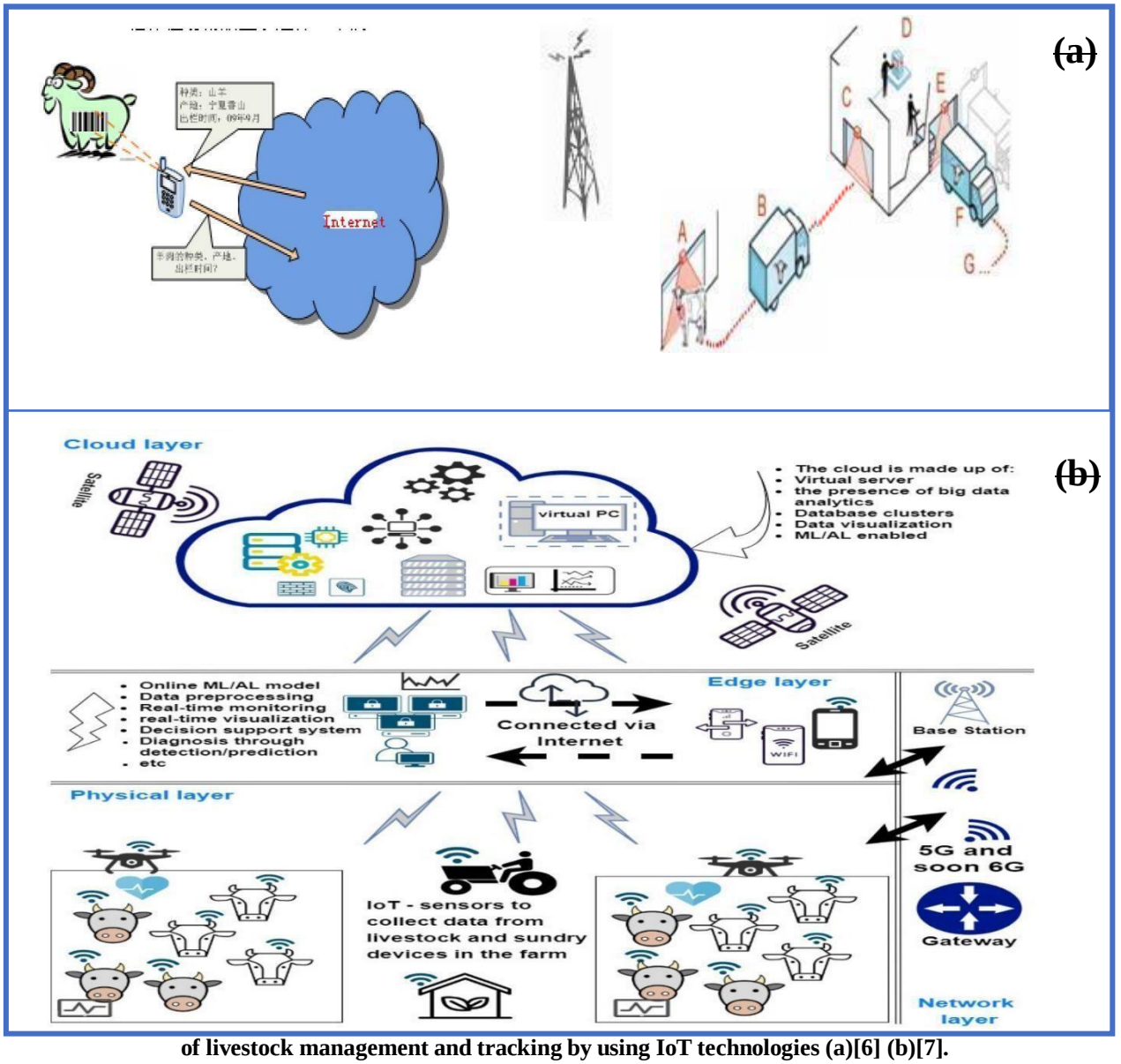
After the information becomes useful to the user, he needs an interface to perform some procedures and settings that allow the user to proactively verify his system, for example the user may set the temperature through predefined rules in the way that if it increased above the specified amount, he would receive an alarm or like checking out video feeds proactively [5]. These checks are made via the mobile app or web browser.

IoT Applications

(IoT) has become an important field in technology, it performs several advantages; we found for example small items that need smart sensors or must relate to other smart devices to perform a purpose [6]. Speed in performing tasks has become the most important point agreed upon by researchers and sought to implement and develop it in various current research. Through the advantage of fast performance in a short time, regardless of the distances between objects. We will mention as follow some of the most important applications of (IoT):

Livestock management and tracking

Preserving livestock [6,7] for future generations and providing them well is one of the most important points that trouble a productive society from a farmer to a producer to a supplier and finally to a consumer. Here, IoT applications had the ability to study and predict the situation that animal wealth will be in the coming years [7] and how to preserve and track it, as well as facilitating the consumer to know some information by reading a two-dimensional code affixed to animal foods available in supermarkets only by phone [6]. The figure below shows the applications of (IoT) to preserve livestock.



of livestock management and tracking by using IoT technologies (a)[6] (b)[7].

Smart City is a notion that categorizes technology as handling improving urban infrastructure to make cities more efficient [8].

The concept of smart city on general is all things in city can control and manger small part of city, like the transportation and traffic management, smart parking, water quality, health care services, gas and leak detection, smart energy, smart streetlights, and other.

Smart grid

Smart grid is the integration of IoT technologies in traditional electric grid to make it smarter and faster in making decisions [9].

An intelligent network is possible for the manufacturing of energy, it provides a real-time surveillance of energy supply for safety of electrical equipment and demand information; and hence increases in consumer comfort level [8].

It would be impossible to distinguish between a "smart grid" and a traditional grid. As a result, it is far more practical to think of "smart grid" as a term that refers to opportunities for enhancing power system operation [9]

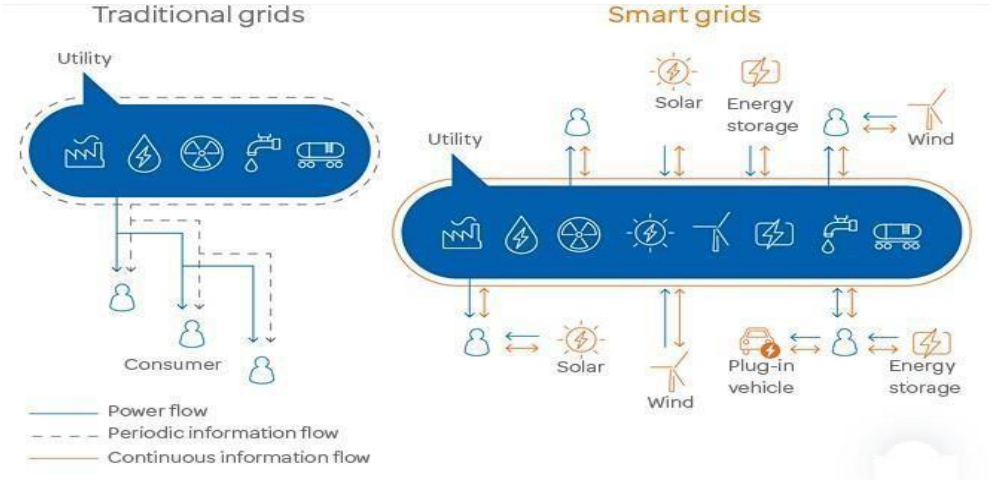


Figure 1.7 Illustration of smart grids.

Agriculture « IoT in farming »

It is also known as a term of Exactness horticulture (PA), in which utilizes IoT technologies for manage contemporary data apparatus: that utilize implanted electronic sensors throughout the agriculture and programming it to permits for those gadgets to send and get receive information from one to another [10].

as following some examples of farming IoT devices in smart agriculture: Smart Elements, ALLETE, and Pynco.

These devices can of detect weather temperate and other environmental data. The smart farming idea has the potential to transform the farming business [8].

Figure 1.8 Illustration of smart agriculture.

Healthcare

In recent years, IoT has become an important role in health care, especially after the widespread spread of the Covid-19 epidemic all over the world. Demand for specific IoT health applications such as telehealth consultations, digital diagnostics, remote monitoring, and robot aid is increasing.

It is also possible to attach sensors to clothing and check certain signals. This sensor takes data via skin contact and sends it to cellphones and remote diagnostic equipment [8].

Figure 1.9 Illustration of IoT in healthcare.

Other

IoT becomes an efficient solution for the major problems in the world; it provides efficiency in the collection of data and processing to give the result "alert, monitoring, prophesy or other" via the internet. As example:

- **Smart home. Connected car. Smart Retail. Wearables. Smart building.**
- **Industrial Automation. Security & Automation.**
- **Asset, person, pert monitoring & controlling. Everyday things.**
- **M2M wireless sensor.**

Kidnapping Definitions Legal definition

“The taking of a person against his or her will from one location to another under conditions in which the individual thus taken lacks freedom of movement, will, or decision due to violence, force, threat, or intimidation” [11].

General definition

Kidnapping is a social phenomenon that has come to grieve the world with the ambiguity of information. This phenomenon is a crime; it causes multiple anxiety feelings, such as fear.

Kidnapping is one of the most serious crimes after murder. Due to the complexity of the crime, and the physical and psychological impacts on victims as well as their families [12].

kidnapping purposes

Violence and abduction often have psychological or material motives that lead the offender to commit acts that violate the human right to live in dignity and security. Here we will mention some of the most important reasons for these violations, which are as follows:

- **To earn money by selling human organs or enslaving people and using them for illegal business. Kidnapping the victim for ransom for a safe release [12, 13].**
- **Babies and children are at danger of abduction because of military recruiting, molestation, hate crimes, and custody fights [12]. Abduction for the purpose of forced custody of the child, usually between divorced parents.**

Statistic of kidnapping in the world

The Counter-Trafficking Data Cooperative (CTDC) provides a global portal on human trafficking, having all data from organizations around the world [14]. To study them and provide adequate information to all parts of society who are researchers and interested in the issues of victims whose rights have been violated in the world.

Information about dataset:

Field	Value
Modified Date	*2018-10-22*
Release Date	*2018-09-03*
License	*IOM Terms of Use*
Public Access Level	*Public*

Table 1.2 Data details

According to the information currently available to us for 2018, we will provide some statistics on the phenomenon of kidnapping in the world, and we will mention the age group most vulnerable to this phenomenon and some other details below:

Age

Adolescents account for one-third of all abduction victims, with a ratio of roughly 23% for this age group [14].

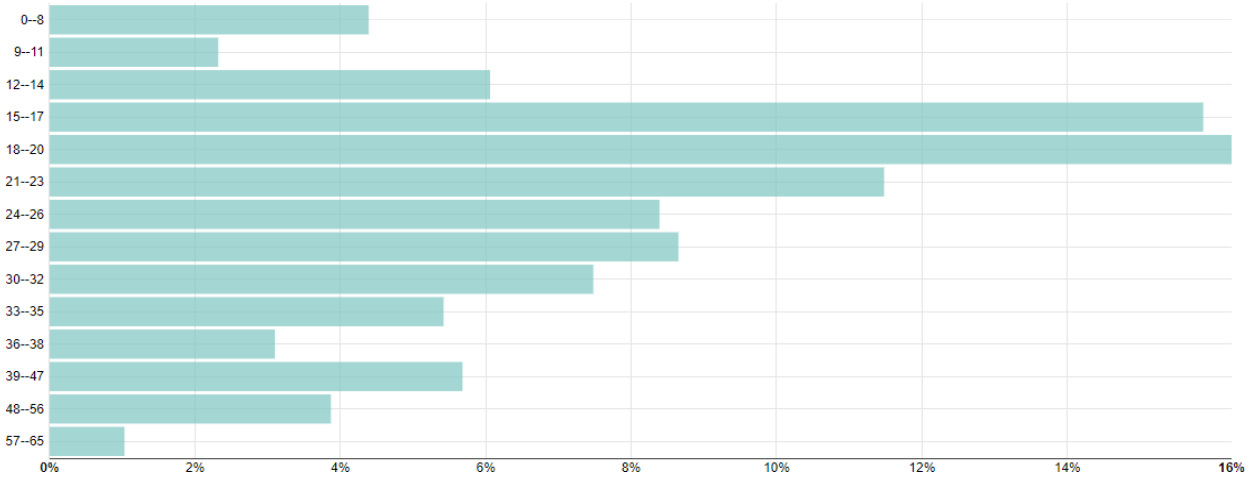


Figure 1.10 statistic of age abducted victims [14].

General

Women account for 78% of victims kidnapped (see. Figure 1.11), this is slightly higher than the proportion of women in the global dataset, which is 71% (see The Global Data Set at a Glance dashboard) [14].

Males account for about 22% (see. Figure 1.11). This group is generally found to be less vulnerable to abduction.

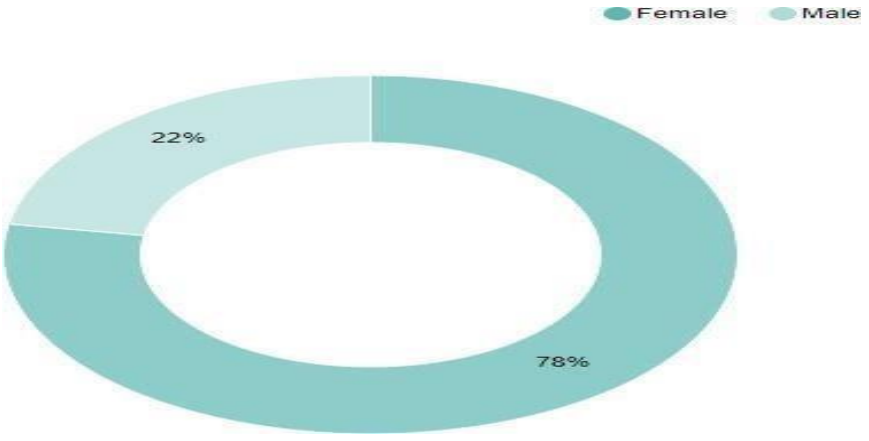


Figure 1.11 statistic of gender abducted victims [14]

General and Age

Women and girls outnumber men and boys across all age groups (see. Figure 1.12). This is consistent with the remainder of the dataset, with the exception of the 9- to 11-year-old age group, when males outnumber females (51 percent). It is also worth noting that among kidnapped victims, females make for 76 percent of the 0- to 8-year-old age group, but in the Global Dataset, they account for just 52 percent of this age group [14].

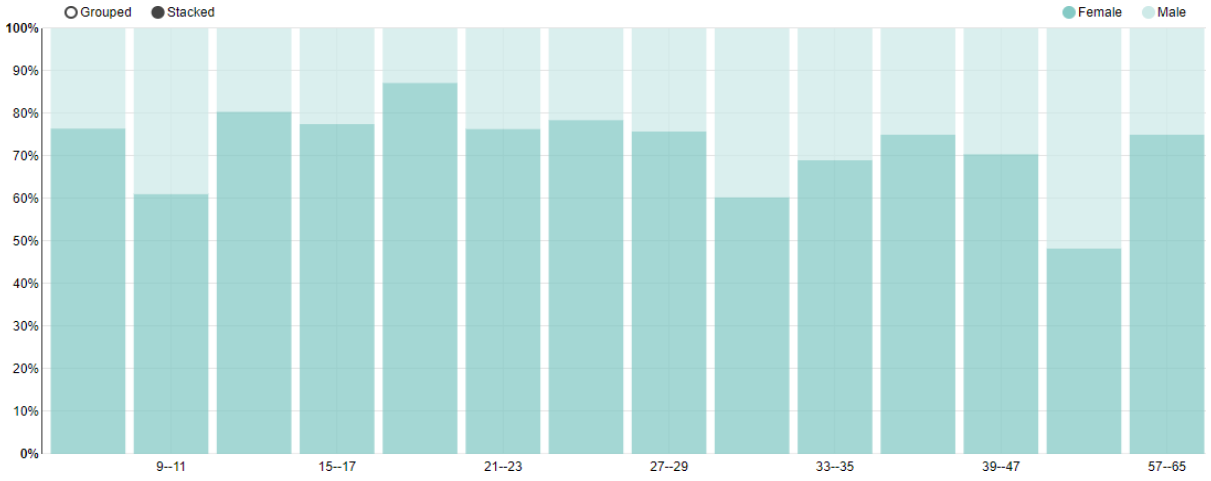


Figure 1.12 Statistic of gender and age abducted victims [14].

Marital Status

The graphic columns below (see. Figure 1.13) show that 75% of kidnapping victims belong to the single category, compared to 46% in the global data set (see [14]). This might imply that unmarried women and men are more prone to be kidnapped.

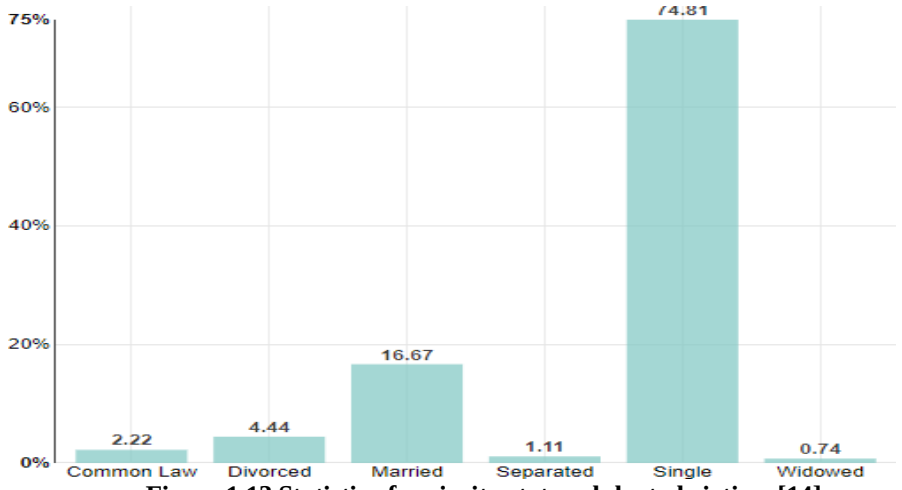


Figure 1.13 Statistic of majority status abducted victims [14].

Statistic of kidnapping in Algeria

According to the few information available on the information network on kidnapping statistics in Algeria. We will demonstrate the latest statistics available for 2015 (see. Figure 1.14).

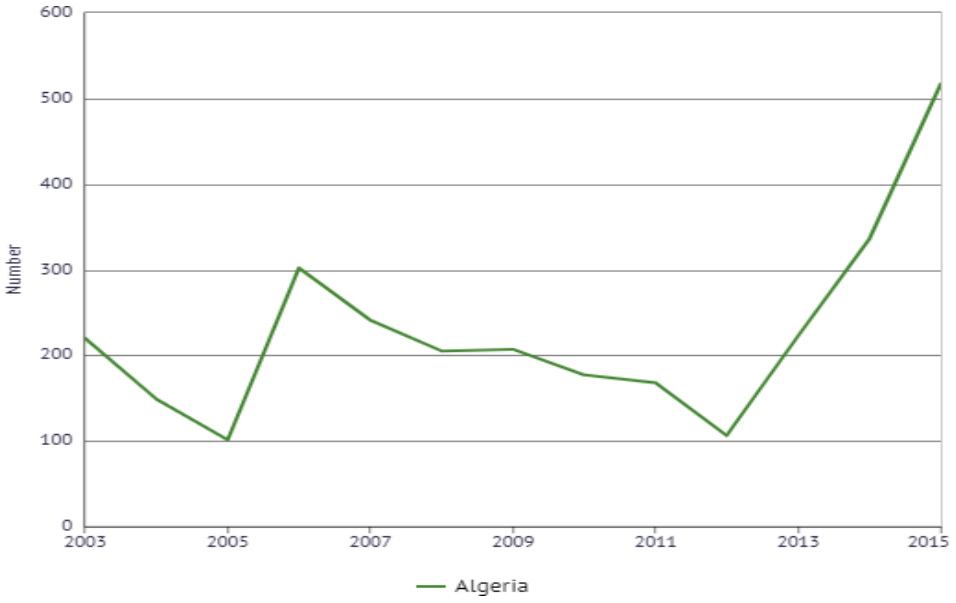


Figure 1.14 Statistic of kidnapping in Algeria (2003 to 2015) [15]

Algeria had 517 kidnappings in 2015. Algerian kidnapping grew from 302 in 2006 to517 in 2015, expanding at a 13.81 percent yearly rate [15].

This phenomenon continues to cause fear and concern among parents in Algeria to this day. The annual recurrence of rape and kidnapping constitutes a major boost in civil society, requiring researchers to provide solutions and studies that help to reduce the phenomenon of kidnapping in our society.

Proposition

After the increasing phenomenon of kidnapping in recent years in Algeria, deliberate murder in brutal ways violates the human right to live and enjoy a life of dignity. as well as the psychological and physical consequences on the victims and their famili in this study, we proposed an approach that able to monitor a person "children" state and tracking it by using internet of things. To minimize the level of abduction and torture in society.

General Vision

We align the problem of kidnapping with the facilities provided by the Internet of Things in transmitting data and analyzing them in real time. Combining these two points was a safety probe that allowed us to form an initial system that is still being improved for the better in order to reach out to the victim as soon as possible or at least know the situation the victim is in and where he is.

This system allows us to learn some information about the person carrying the tracking device, and this information is sporadic, when compiled, we can see or predict the state in which the person, like, feeling a fever, has performed physical activity like running and thus increasing the heartbeat, to other information that we will detail in Chapter III

Related Work

There are many works similar to our study; we mention some of them in the table below:

Title	Author "s	Aim	Year	Referenc e
IMPLEMENTATION OF CHILDREN TRACKING SYSTEMON ANDROID MOBILE TERMINALS	***Yuvraj Rathod, et.al***	***The main objective of this paper is to establish a child tracking system if they go to school and return. so that parents can be assured through the phone and the child can also send a warning to their parents in fear.***	***2018***	***[16]***
"Real-time Alarm, Dynamic GPS Tracking, and Monitoring System for Man Overboard"	***Bor-Horng Sheu, et.al***	***In this paper, they talk about cases of drowned by the boat user in the middle of the sea. Where this research presented a solution to track downers***	***2020***	***[17]***

		and determine their location with some advanced equipment and methods in determining their location at sea "more detail in this paper [17]"		
"Implementation of Car Tracking System using GSM/GPS"	***Nwukor FrancesNkem***	***the main aim of this study is to provide to secure and monitor vehicles remotely, by using GPS and GSM modules to anti-theft in cars and hijack. The user can send a command from his cellphone to the GSM module, it'll immediately send the exact location of the vehicle pointed out on google maps.***	***2020***	***[18]***
Integrated healthcare monitoring device for obese adults using internet of things (IoT)	***Dev Gupta***	***The primary goal of this study is to apply the internet of things in healthcare for real- time monitoring of obese people as well as the storage of medical information for several patients at the same time.***	***2020***	***[19]***

Table 1.3 Related work.

Conclusion

Speed world. This term limited many definitions to the Internet of things and recent developments in this area.

In this chapter we stated of the brief history of IoT and some details on it, also its most applications. Each application of IoT exist now had some limitation in beginning but after the study and development it become efficient and perfect to use. In this study of anti- kidnapping system for children we use internet of things as a medium to collect data and do some investigate or control of the data coming to system. To do there we use some components that able to make the main aim of this study.

In the second chapter we will discuss more details about the components use in this project.

Chapter 3 (IOT Hardware)

Introduction

In this chapter we will present all the component used for modeling our proposition system for safe children from kidnapping or any violence Could be exposed to it, by using some sensor devices in Which can give us some basic information in order to achieve the main objective of this proposal which is as safe a system as possible in order to protect people in general and children's in particular from kidnapping.

why internet of things sensor

The sensor is the thing or physical device that has the ability to sense the external environment by measuring information, processing it, and presenting it in the way it was made. And integration the configuration of the internet in this later its facility more things in the world and can be named by the smart things just by mean the ability of exchange the data in several uses.

The sensor can get data from satellite or external environment, this feature can use in different application for solving any problem by this information getting, so this why we use IoT sensor in our project for making data and do some analysis or test to know what do with the child for protecting it as possible.

In the next section, we will define all devices used in this project.

General information on the Internet of Things devices used arduino:

General presentation “introduction”

Arduino is a free and open-source electronics platform with simple to use hardware and software. For all segments of society. From students and researchers to children [20].

Arduino boards can read inputs and turn it into an output, like activating a motor read message. You use the Arduino programming language (based on Wiring) and the Arduino Software (IDE) (based on Processing) to do this [20].

It is a feature of Arduino

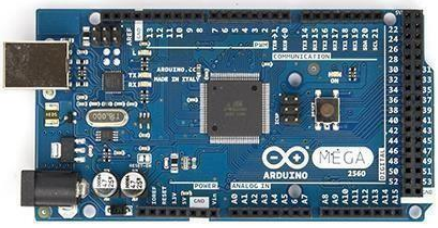
1. **Inexpensive Arduino boards are relatively inexpensive compared to another microcontroller platform**
2. **An Arduino IDE works on many operating systems as LUNIX, windows …etc.**
3. **The Arduino IDE is easy to use and program in it. It is an open source, scalable and extensible program.**
4. **Also, libraries can be added easily in your code to limit and simplify the desired work.**
5. **Finally, upload the code to the Arduino board via a USB cable.**

Arduino board types

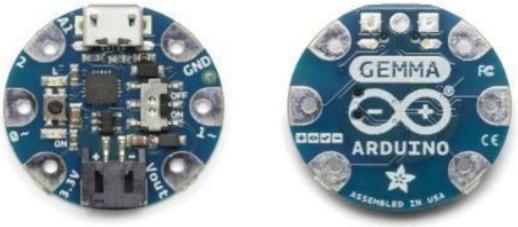
There are many types of Arduinos UNO, and each type has special features that differfrom the other types, and the appropriate type can be chosen according to the application to be implemented.

Arduino UNO

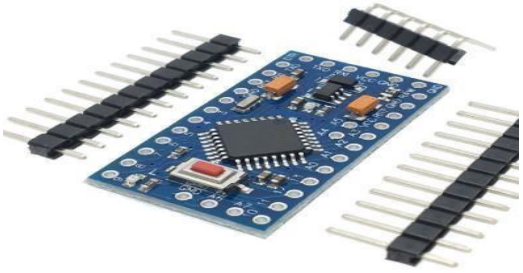
Arduino Yun



Arduino Mega (2560)



Arduino Gemma



Arduino Pro Mini 328p

Arduino Zero

We will talk about the Arduino UNO because it is the main component of the other types:

Arduino Uno

Arduino uno is the best board to get started with coding and electronics, it is the original among other Arduino boards. “UNO”, which simply means "one" in Italian, is the entry-level Arduino board. The Uno, now in revision 3 [21].

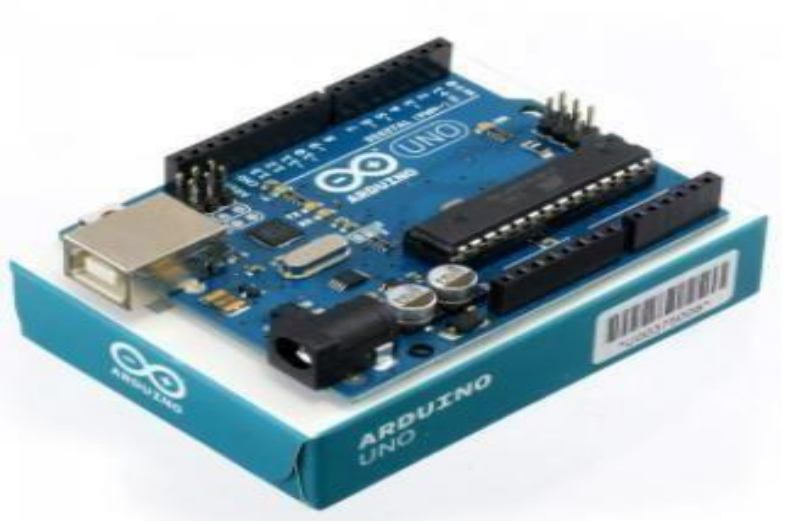


Figure 2.2 Arduino Uno.

- **At the heart of the Uno, An ATmega328 8-bit microcontroller. The Uno offers [21]:**
- ***16 MHz Clock***
- ***32 KB Flash Memory 2 KB SRAM***
- ***14 Digital I/O Pins with internal pull-up resistors (disabled by default but can be enabled with input pullup command)***
- ***6 Analog input Pins, a 10-bit resolution on each pin.***
- ***All the IO pins are connectable via the 0.1" pin headers.***
- ***20mA maximum current draw per pin, 200mA maximum for ATMega328 package.***

- ***Powered via USB (5V @ 500mA) or using the Centre positive 5.5mm/2.1mm Barrel Jack connection. With the DC Barrel plug, you'll want to use a 9-12V @ 2A DC supply such as this one.***

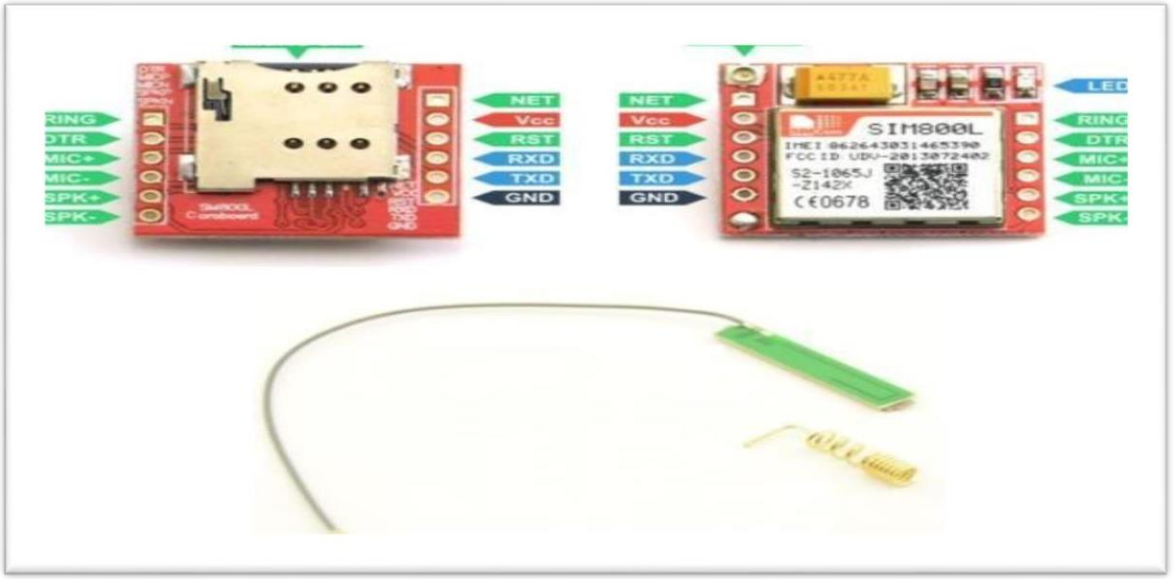
Most SHIELDs are also designed to work with the Uno, resulting in direct plug-and-play compatibility between the controller and the shield. Optional updates of the Uno include Wi-Fi and a surface mounted ATmega328 [21].

GSM SIM800L

SIM800L GSM module is one of the smallest GSM modules in the world, where the size is estimated at 2.2 cm x 1.8 cm [22]. It is a powerful module that starts automatically and automatically searches for the network [22]; It also allows GPRS transmission, sending and receiving short messages, and making and receiving voice calls [23].

The use of a quad frequency makes this device an excellent choice for any project involving long-distance communication.

The GSM device comes with two separate formed antennas. The first is made of wire (sold directly to the NET pin on the PCB) and is very convenient in small spaces. The second is the PCB antenna, which is attached to an IPX connector using double- sided tape and a pigtail cord. The latter has best performance and helps you to position your device inside a metal case as long as the antenna is outside. and lets your unit be placed inside a



metal case – if the antenna is outside [23].

Figure 2.3 Module GSM SIM800L with antenna PCB.

Pinout of the module

THE PINOUT (LEFT SIDE):	*THE PINOUT (RIGHT SIDE):*
RING (FIRST FROM THE TIP, SQUARE) - LOW CONDITION WHEN FIELDING CALLS. *DTR IS THE SLEEP MODE. THE DEFAULT SETTING IS HIGH (MODULE IN SLEEP MODE, SERIAL COMMUNICATION DISABLED). THE MODULE WILL WAKE UP AFTER BEING SET TO LOW.* *DTR IS THE SLEEP MODE. THE DEFAULT SETTING IS HIGH (MODULE IN SLEEP MODE, SERIAL COMMUNICATION DISABLED). THE MODULE WILL WAKE UP AFTER BEING SET TO LOW.* *MICP AND MICN ARE MICROPHONES (P* *+ / N -).* *SPKP AND SPKN - SPEAKER (P + / N -).*	*NET - ANTENNA* *VCC - SUPPLY VOLTAGE* *RESET - RETURN TO THE PREVIOUS STATE. RXD - SERIAL COMMUNICATION* *TXD - SERIAL COMMUNICATION GND - GROUND*

Tab 2.1 The GSM sim800L module's pinout [23].

Finer details:

- **Voltage range: 3.8V - 4.2V.**
- **4V is the recommended supply voltage. Electricity consumption:**
- **sleep mode < 2.0mA. idle mode < 7.0mA.**
- **(Average) GSM transmission current: 350 mA. GSM transmission (peek):2000mA.**
- **Module size: 25 x 23 mm.**
- **Interface: UART (max. 2.8V) and AT commands. SIM card socket: micro-SIM (bottom side).**
- **Supported frequencies: Quad Band (850 / 950 / 1800 /1900 MHz). Antenna connector: IPX.**
- **Status signaling: LED.**
- ***Working temperature range: -40 do + 85 ° C.***

HC-SR04 "Ultrasonic Sensor"

An ultrasonic sensor HC-SR04 is used for measuring the distance between sensor and thing Corresponding to him.

And that is through by sending ultrasound waves, where the sensor-receives those sent waves again when they are reflected on the object opposite them [24].

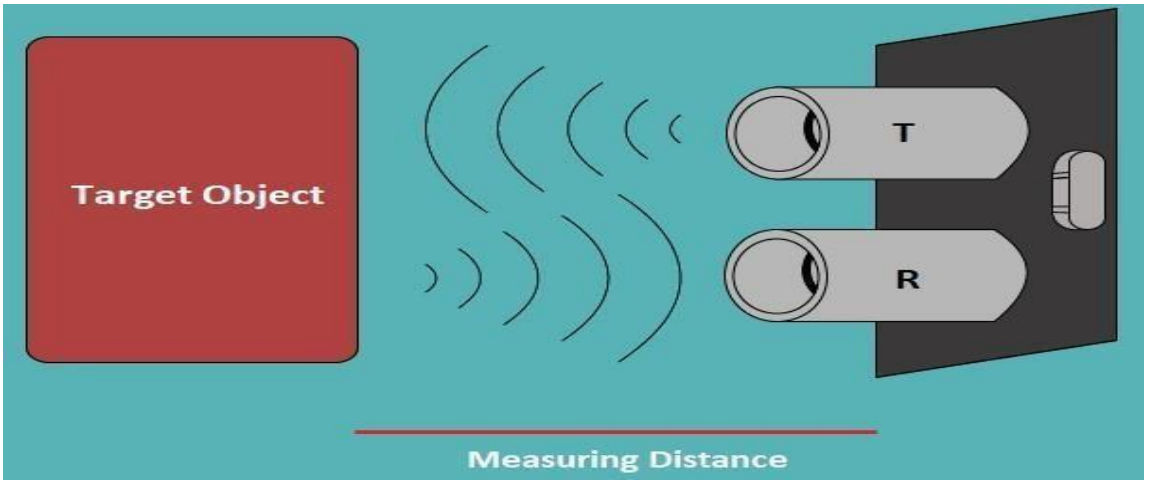


Figure 2.4 Ultrasonic Sensor HC-SR04.

- **The detection distance is around 2 to 500cm and the detection angle is 15° [24].**
- **This sensor uses high-frequency ultrasound waves, which reach 20,000 Hz, knowing that these sound waves cannot be heard by humans because they are high frequency, so they are called ultrasound [25].**
- **Distance is measured by the following statement [26]:**
- **D= (V x T) / 2**

in which:

- **D: is the required distance is the speed of sound.**
- **T: The time taken for the sound waves to return to the sensor after hitting the body**

Pinout of the module

HC-SR04 model contain 4 pins, it is shown in the figure below:

Figure 2.5 Ultrasonic Sensor HC-SR04 Pinout.

The HC-SR04 Pinout & Explanation shows in the following table:

Pin Name	***Pin Description***
VCC	***The power supply pin of the sensor that mainly operates at 5V DC.***
Trig Pin	***It plays a vital role to initialize measurement for sending ultrasonic waves. It should be kept high for 10us for triggering the measurement.***
Echo Pin	***This pin remains high for short period based on the time taken by the ultrasonic waves to bounce back to the receiving end.***
Ground	***This pin is connected to ground.***

Tab 2.2 the ultrasonic sensor pinout with description [26].

- **the main features of the ultrasonic sensor [26]: Main Parts: Transmitter and Receiver.**
- **Technology used: Non-Contact Technology. Operating Voltage: 5V.**
- **Operating Frequency: 4MHZ. Detection Range: 2cm – 400cm. Measuring Angle: 30°.**
- **Resolution: 3mm. Operating Current<15mA.**
- **Sensor Dimensions: 45mm x20mm x15mm.**

A general view

The AI Thinker's IoT ESP32-CAM; has a compact camera module based on ESP32 with minimal power consumption.

So that the ESP32 unit provides a Wi-Fi interface for the miniature camera. This set is ideal for creating miniature connected projects that require capturing a video or photo.

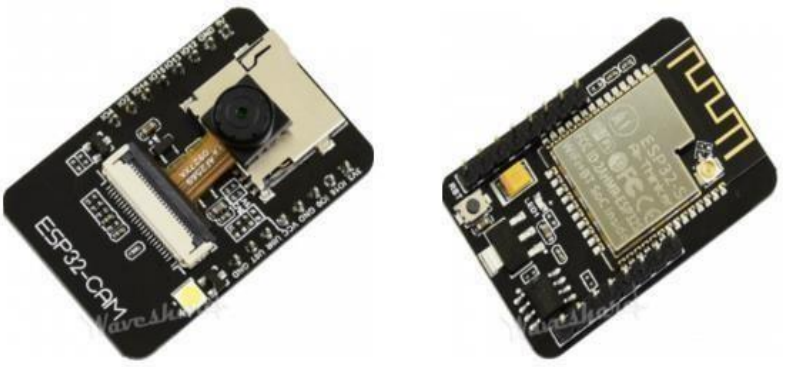


Figure 2.6 ESP32-CAM, Camera Module.

Pinout

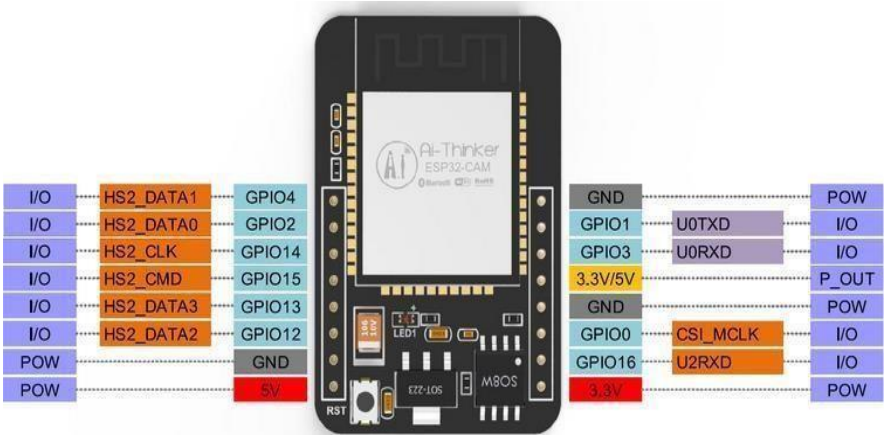


Figure 2.7 pinout of esp32-cam module.

Characteristics

	Support
	Wi-Fi + Bluetooth + OV2640 camera +flash
	Wi-Fi video surveillance + WIFI picture upload
	Supports multi sleep modes, deep sleep current as low as 6mA

Tab 2.3Characteristivs of esp32-cam [27]

Model GY-NEO6MV2 “GPS”

The NEO-6M GPS module is a high-performance GPS receiver with a built-in 25 x 25 x 4mm ceramic antenna that delivers a powerful satellite search capacity. where consisting of at least 24 satellites. GPS works in any weather, anywhere in the globe, 24 hours a day, with no membership or setup expenses [16].

Figure 2.8 Model GY-NEO6MV2

In a precise orbit, GPS satellites circle the Earth twice a day. Each satellite broadcasts a unique signal and orbital characteristics, which GPS systems can decode and calculate the satellite's precise location [16].

GPS works in any weather, anywhere in the globe, 24 hours a day, with no membership setup expenses.

A GPS receiver must be latched on to the signal of at least three satellites to determine your 2-D location (latitude and longitude) and track movement. When four or more satellites are visible, the receiver may calculate your 3-D location (latitude, longitude, and altitude). A GPS receiver will often track 8 or more satellites, although this depends on the time of day and where you are on the planet [16].

specifications

Receiver Type	***50 channels, GPS L1(1575.42Mhz)***
Horizontal Position Accuracy	***2.5m***
Navigation Update Rate	***1HZ (5Hz maximum)***
Capture Time	***Cool start: 27sHot start: 1s***
Navigation Sensitivity	***-161dBm***
Communication Protocol	***NMEA, UBX Binary, RTCM***
Serial Baud Rate	***4800-230400 (default 9600)***
Operating Temperature	***-40°C ~ 85°C***
Operating Voltage	***2.7V ~ 3.6V***
Operating Current	***45mA***
TXD/RXD Impedance	***510Ω***

Tab 2.4 GPS model specifications.

NEO-6M GPS Module Pinout

The NEO-6M GPS module has a total of four pins that allow it to communicate with the outside world. The following are the links:

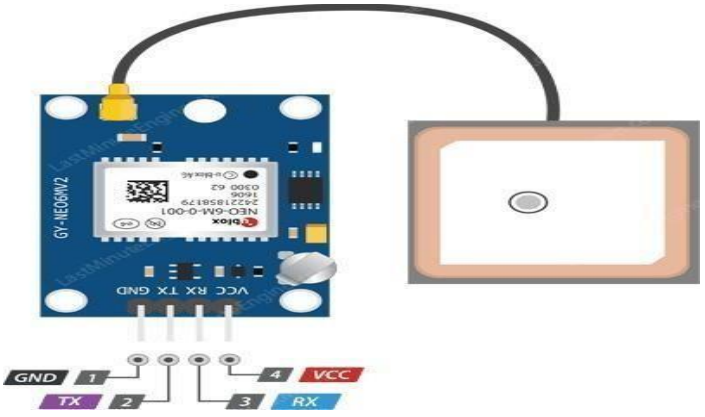


Figure 2.9 NEO-6M GPS Module Pinout

The necessary data pins of NEO-6M GPS chip are broken out to 0.1 pitch headers. This includes pins required for communication with a microcontroller over UART. The module supports baud rate from 4800bps to 230400bps with default baud of 9600 [28].

In the table below we will give a description of each pinout of NEO-6M GPS model:

PIN NAME	*PIN DESCRIPTION*
GND	*IS THE GROUND PIN AND NEEDS TO BE CONNECTED TO GND PIN ON THE ARDUINO.*
TXD (TRANSMITTER)	*IS USED FOR SERIAL COMMUNICATION.*
RXD (RECEIVER)	*IS USED FOR SERIAL COMMUNICATION.*
VCC	*SUPPLIES POWER FOR THE MODULE. YOU CAN DIRECTLY CONNECT IT TO THE 5V PIN ON THE ARDUINO.*

Tab 2.5 Description of GPS Module Pinout

DHT11 sensor

The DHT11 is a low-cost integrated sensor that measures temperature (in a range from0 to 50 degrees Celsius with an accuracy of +-2 C) and humidity (in a range from 20% to 80% with an accuracy of +-5%) [29]. It has a thermistor, which is a resistive and wet NTC temperature measuring device, incorporated in it for temperature measurement.

This sensor is high-quality, has a quick reaction time, and is anti-interference.

FEATURES	*DHT11*
OPERATING VOLTAGE	*3 TO 5V*
MAX OPERATING CURRENT	*2.5MA MAX*
HUMIDITY RANGE	*20-80% / 5%*
TEMPERATURE RANGE	*0-50°C / ± 2°C*
SAMPLING RATE	*1 HZ (READING EVERY SECOND)*
BODY SIZE	*15.5MM X 12MM X 5.5MM*
ADVANTAGE	*ULTRA-LOW COST*

Tab 2.6 Specification of DHT11 Senso

Pinout

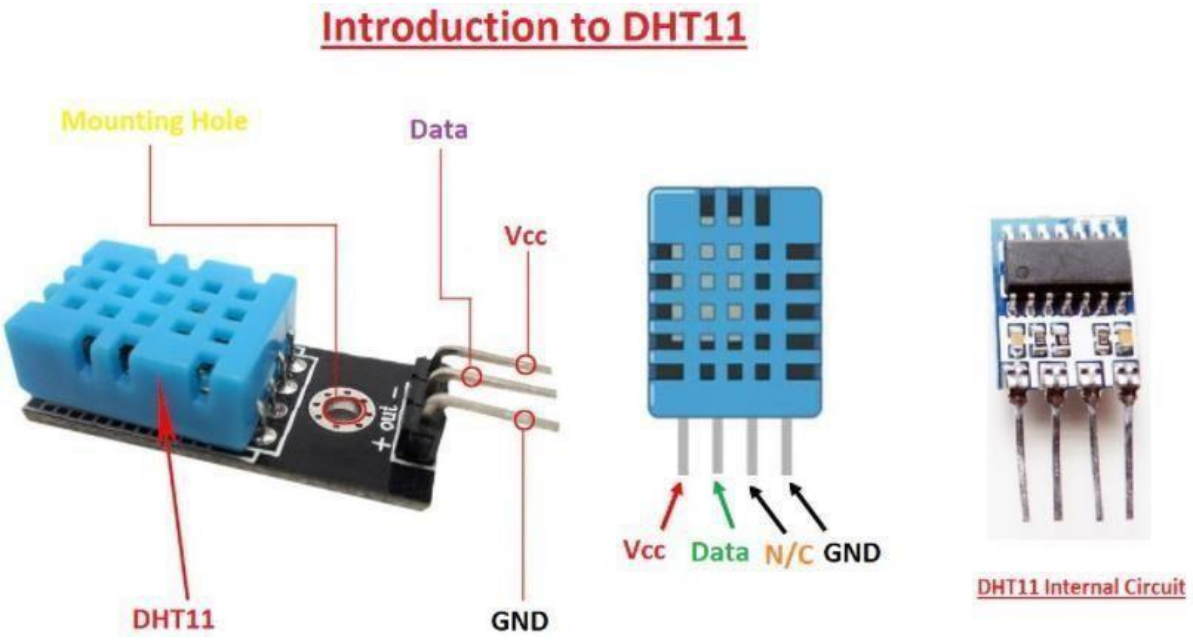


Figure 2.10 Pinout of DHT11.

DHT11 Pinout consists of 4 Pins in total, which are shown in table below:

PIN#	*TYPE*	*PARAMETERS*
PIN# 1	*Vcc*	*THIS PIN IS USED FOR INPUT PURPOSE AT THIS PIN WE APPLY 3.3 V TO 5V INPUT SUPPLY.*
PIN# 2	*Data*	*BY THIS PIN WE GET OUTPUT OF TEMPERATURE AND HUMIDITY VALUES, BY SERIAL TRANSMISSION PROTOCOL.*
PIN# 3	*N/C*	*NOT CONNECTED.*
PIN# 4	*GROUND*	*THIS PIN IS USED FOR GROUND (CONNECTED TO 0V OR GND).*

Tab 2.7 DHT11 Pinout with descriptions.

DHT11 applications

- **These are some applications of DHT11:**
- **It can be used for Humidity and Temperature measurement.**
- **It is also used at weather station for temperature measurement. It is an automatic climate control sensor.**
- **It is also use as environment monitoring device.**

Model Node MCU ESP8266

Nedelcu is an open-source Lua-based firmware and development board designed specifically for Internet of Things (IoT) applications.

figure 2.11 Node MCU ESP8266

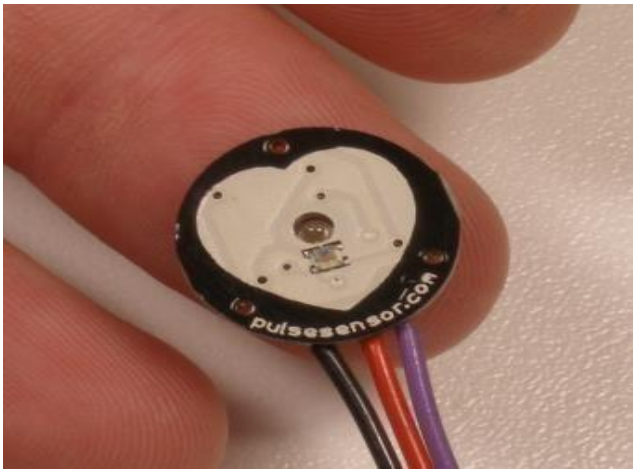
Nedelcu ESP8266 Specifications & Features

In below, we define the set of NodeMCU ESP8266 specification [32]:

- ***Microcontroller: Ten silica 32-bit RISC CPU Xtensa LX106 Operating Voltage: 3.3V***
- ***Input Voltage: 7-12V Digital I/O Pins (DIO): 16 Analog Input Pins (ADC): 1 UARTs: 1***
- ***SPIs: 1***
- ***I2Cs: 1***
- ***Flash Memory: 4 MB SRAM: 64 KB***
- ***Clock Speed: 80 MHz***
- ***USB-TTL based on CP2102 is included onboard, Enabling Plug n Play PCB Antenna***
- ***Small Sized module to fit smartly inside your IoT projects.***

Pulse Sensor

Pulse Sensor is a well-designed plug-and-play heart-rate sensor for Arduino.



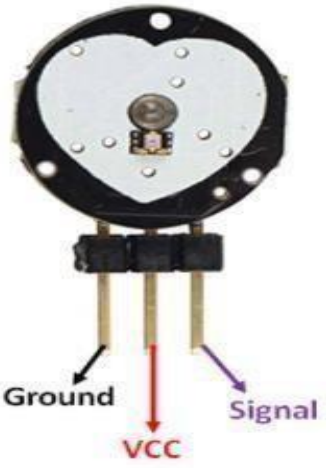


Figure 2.12 Pluse sensor [33].

Features

- **Biometric Pulse Rate or Heart Rate detecting sensor Plug and Play type sensor.**
- **Operating Voltage: +5V or +3.3V**
- **Current Consumption: 4mA**
- **Inbuilt Amplification and Noise cancellation circuit. Diameter: 0.625”**
- **Thickness: 0.125” Thick.**

PIN NUMBER	*PIN NAME*	*DESCRIPTION*
1	*Ground*	*CONNECTED TO THE GROUND OF THE SYSTEM*
2	*Vcc*	*CONNECT TO +5V OR +3.3V SUPPLY VOLTAGE*
3	*SIGNAL*	*PULSATING OUTPUT SIGNAL.*

ab 2.8 Pulse sensor pinout with description [33].

IOT web server

Thing Speak Definition

Thing Speak is a platform that offers a variety of services that are specifically designed for the development of IoT applications. It supports real-time data collecting, chart visualization of gathered data, and the creation of plugins and apps for interacting with online services, social networks, and other APIs [34].

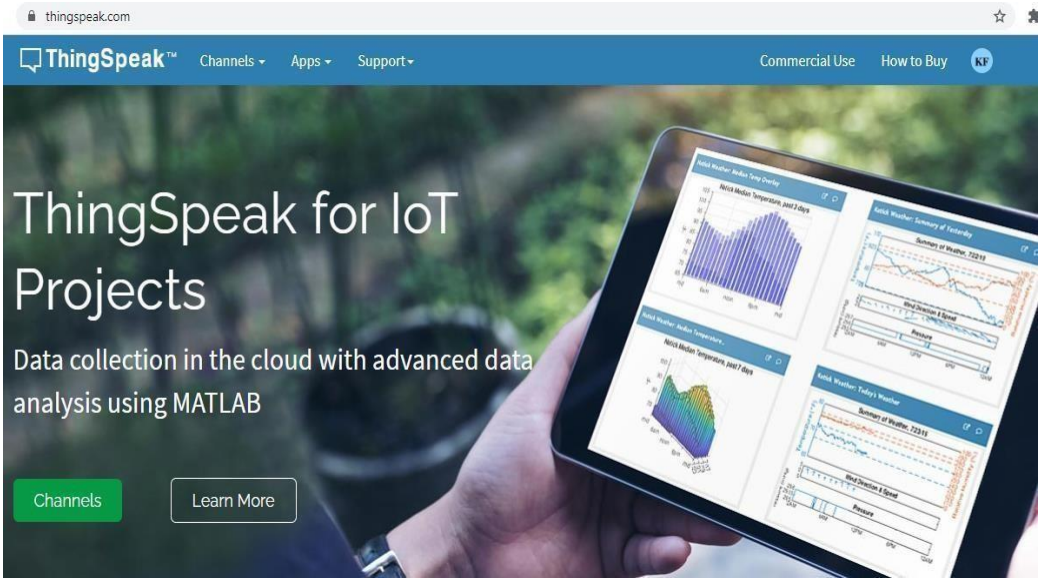


figure 2.13 Thing speak web service.

The core element of Thing Speak is a „Thing Speak Channel". A channel stores the data that we send to Thing Speak (to more details visit Ref [34]).

An Overview of IFTTT

"If This Then That" (IFTTT) is a web service that allows you to connect other webservices, apps and devices to each other to automate simple tasks [30].

Let's look at what IFTTT is, according to their website [31]:

- **Channels: IFTTT's basic building components are channels. Triggers and Actionsare unique to each channel.**
- **Trigger: A Trigger is the „this' part of a Recipe. Triggers might include.**
- **Actions: An Action is the „that' element of a Recipe. Examples of Actions include"send me an SMS message."**
- **Ingredients: Ingredients are bits of data from a Trigger. An Email Trigger'sIngredients might include.**

- **Recipes: Personal Recipes are a combination of a Trigger and an Action from your active Channels (On / Off).**

Conclusion

In this chapter, we presented some of the equipment used in this work. It started by Arduino to some other IoT devices. We also defined some web services provided by IoT technology (Thing speak, IFTTT).

In the next chapter. We will present the proposed system conception with the obtained results.

Chapter 4 (implementation)

Introduction

Our proposition is about safe children from kidnapping, this system can make information or notification alarm to the parent of the child in real time.

In this section we will give more explanations about the proposed system and show the result make it with more explanation. And in the final we will give our vision about the system also our future work with improvements proposed to demonstrate the effectiveness of the system in most use cases.

Programming environment used.

As programming environment, we used Arduino software (IDE) version 1.8.14 to implement and install our system.

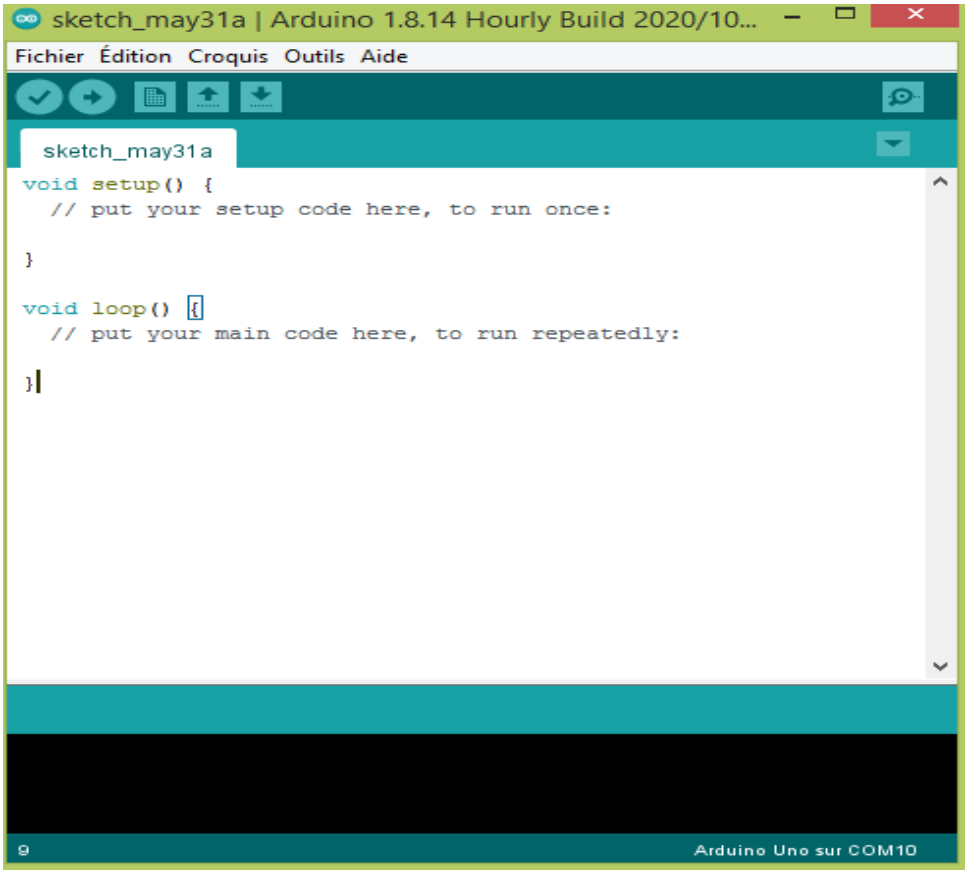


Figure 3.1 Arduino ide software.

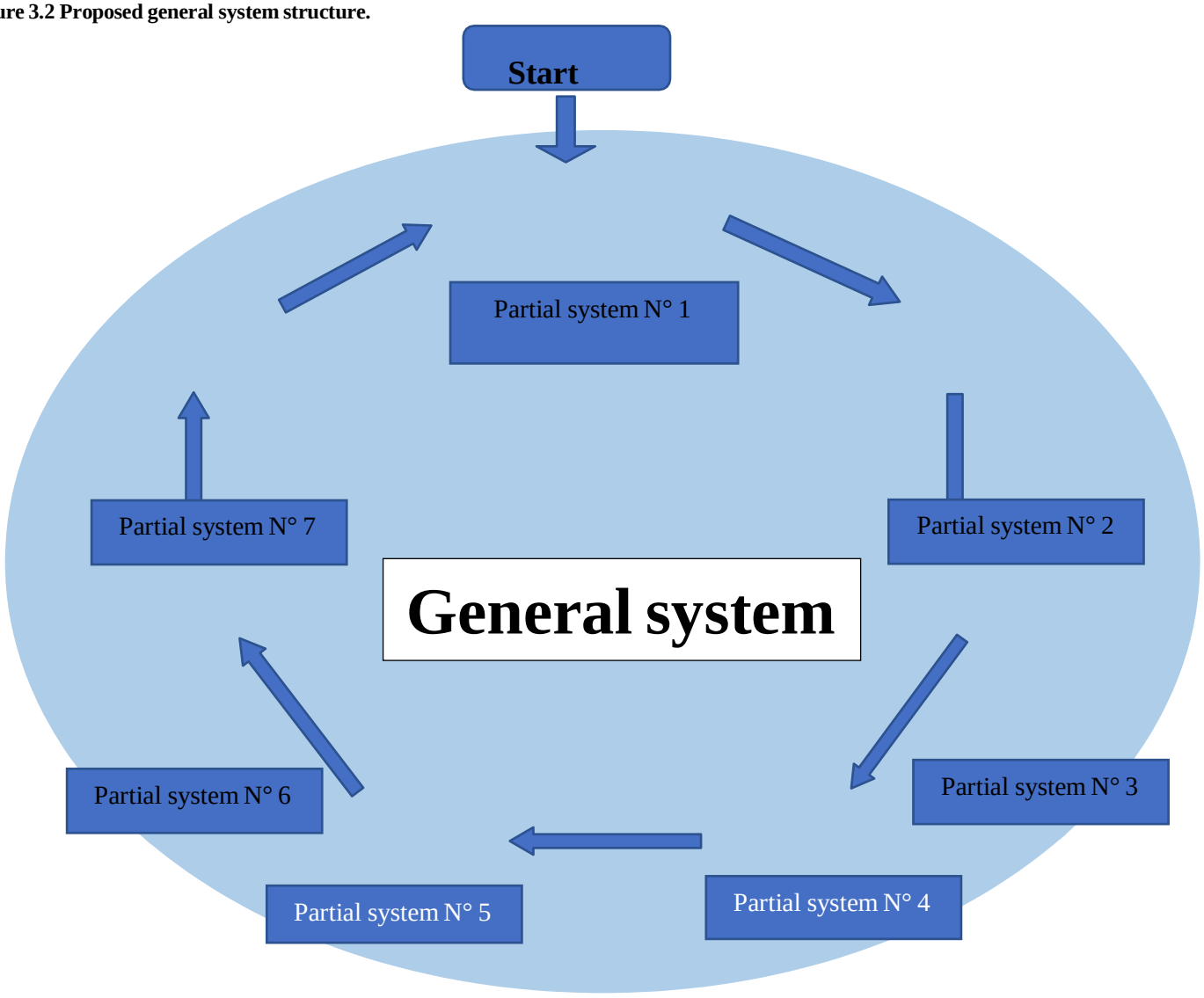
Arduino software IDE (Integrated Development Environment) is a graphical interface easy-to-use that brings together all the tools that allow programming for the Arduino.

This software allows the communication of many devices with Arduino unit via the specific serial ports, such as: camera device, GSM device, GPS, and others.

Architecture of the proposed system

Our proposed system, in order to protect children from the risk of kidnapping, contains many small systems that allow monitoring part of the proposed parts of this system, for more protection and more general monitoring.

Figure 3.2 Proposed general system structure.



In the table below, we will subtract a heading for each system of the general system:

PARTIAL SYSTEMN°	*TITLE NAME*
1	*SYSTEM TO KNOW YOUR LOCATION BY SENDING A TEXT MESSAGE "LOCATION"*
2	*SYSTEM IN THE CASE THAT SOMEONE HOLDS THE CHILD IN ORDER TO KIDNAPPING HIM*
3	*MONITORING SYSTEM IN CASE SOMEONE REMOVES THE TRACKER*
4	*A SYSTEM TO VERIFY IF THE CHILD IN SAFE ZONE*
5	*HEART CONTROL SYSTEM*
6	*SYSTEM OF THE SURVEILLANCE CAMERA FOR A CHILD REMOTELY*
7	*SYSTEM TO MONITORING BODY TEMPERATURE*

Tab 3.1 Title name of each partial system.

❖ Hardware Requirement

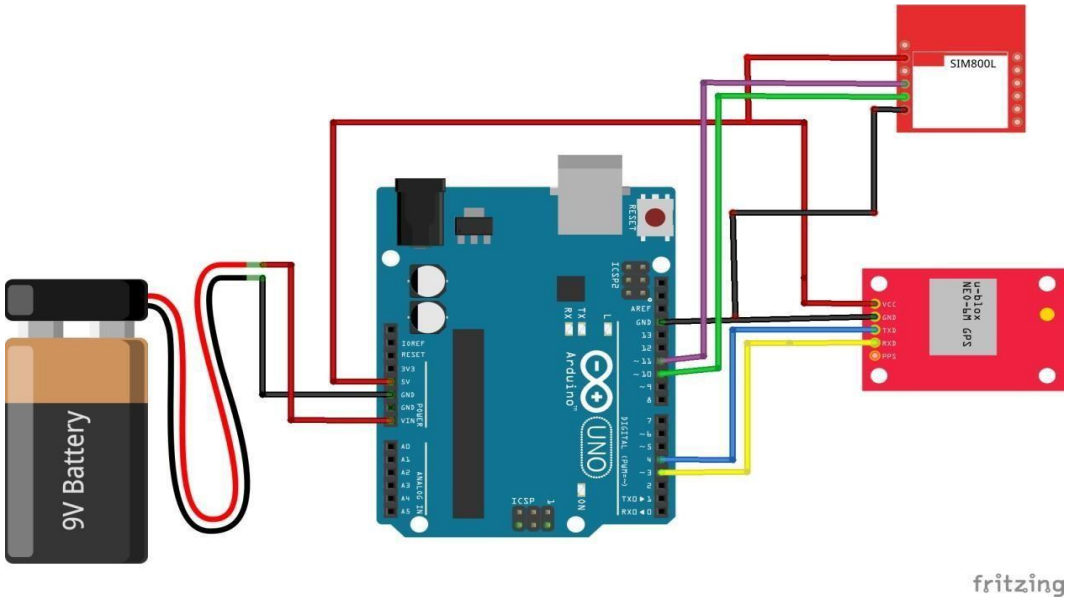


Figure 3.4 Hardware conception of partial system N° 1 (see. Tab3.1)

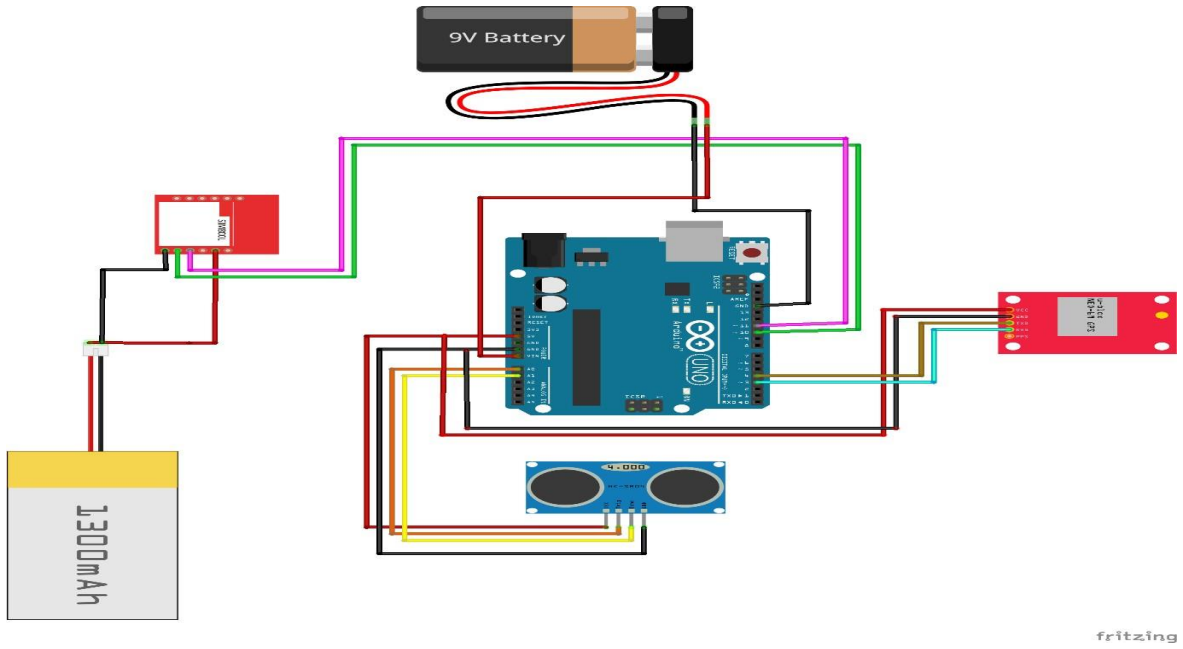


Figure 3.7 Hardware conception of partial system N° 2 (see. Tab3.1).

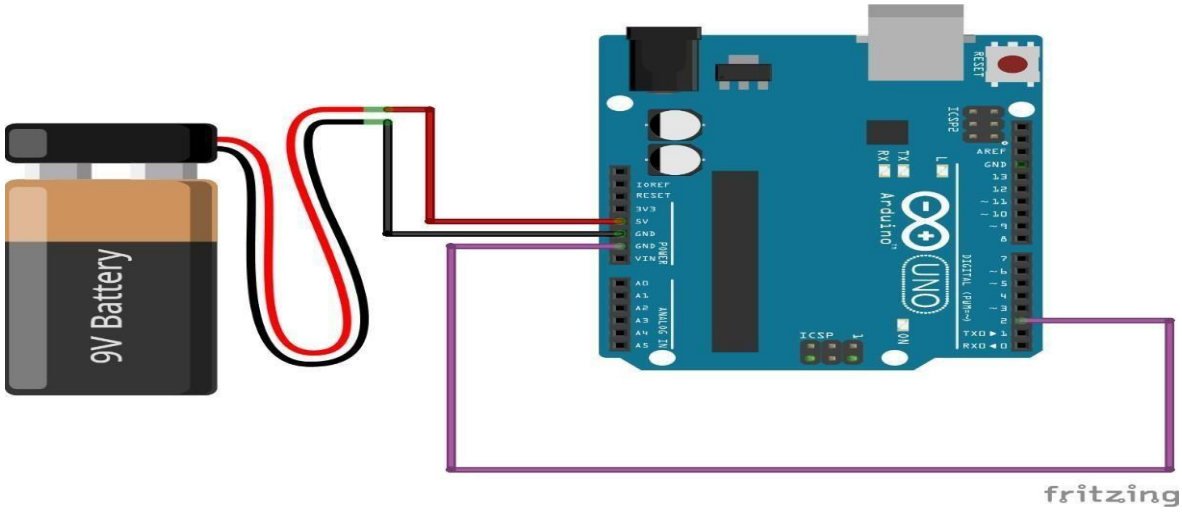
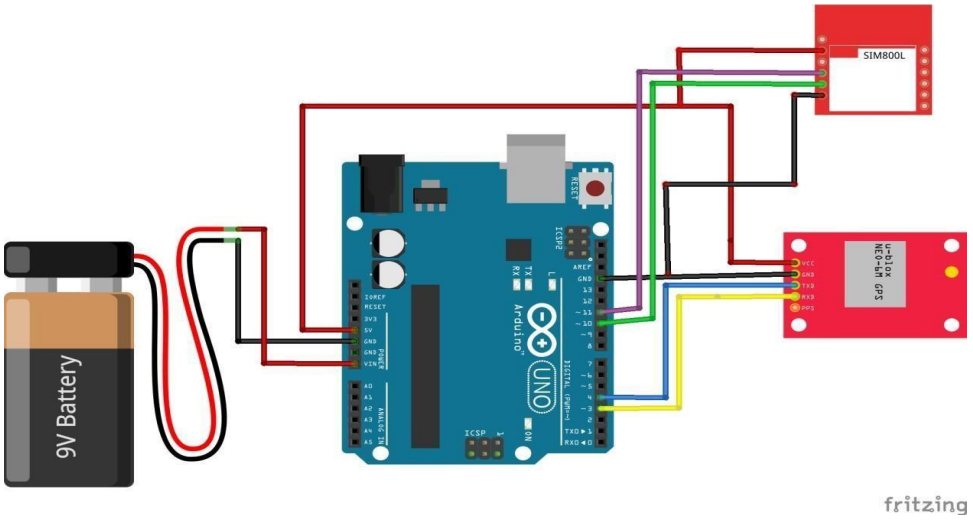
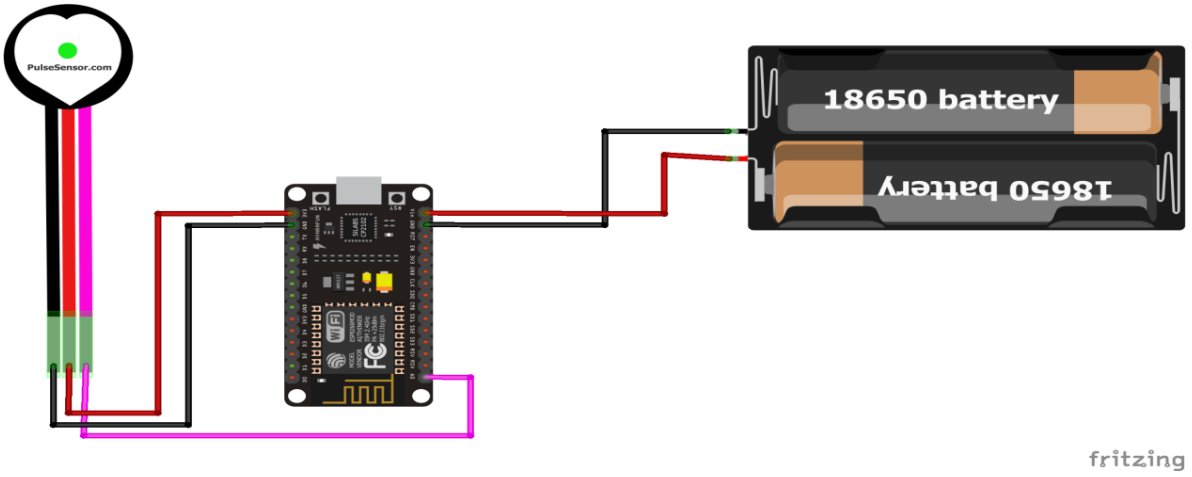


Figure 3.10 Hardware conception of partial system N° 3 (see. Tab3.1).


SIM800L
9V Battery
Arduino
UNO
u-blox
NEO-M8N GPS
fritzing


PulseSensor.com
18650 battery
18650 battery
fritzing

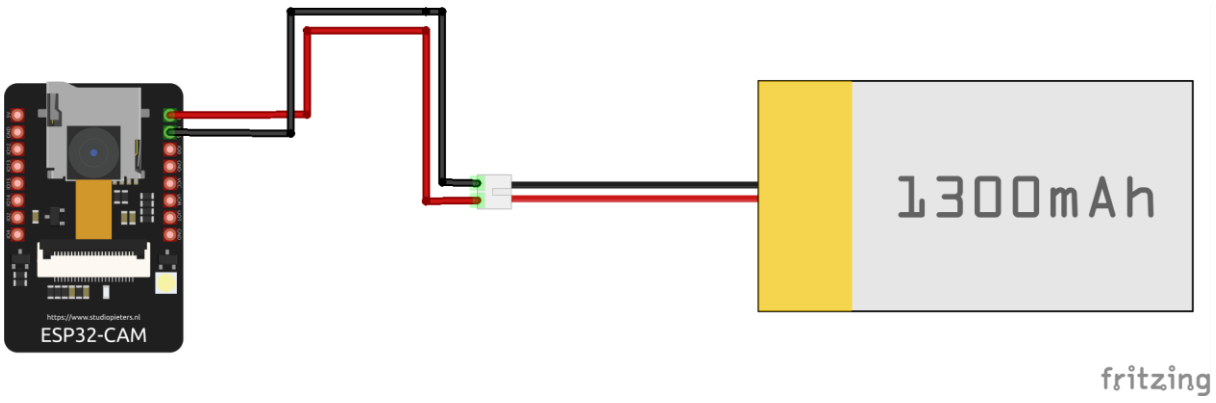


Figure 3.19 Hardware conception of partial system N° 6 (see. Tab3.1).

❖ Software Implementation

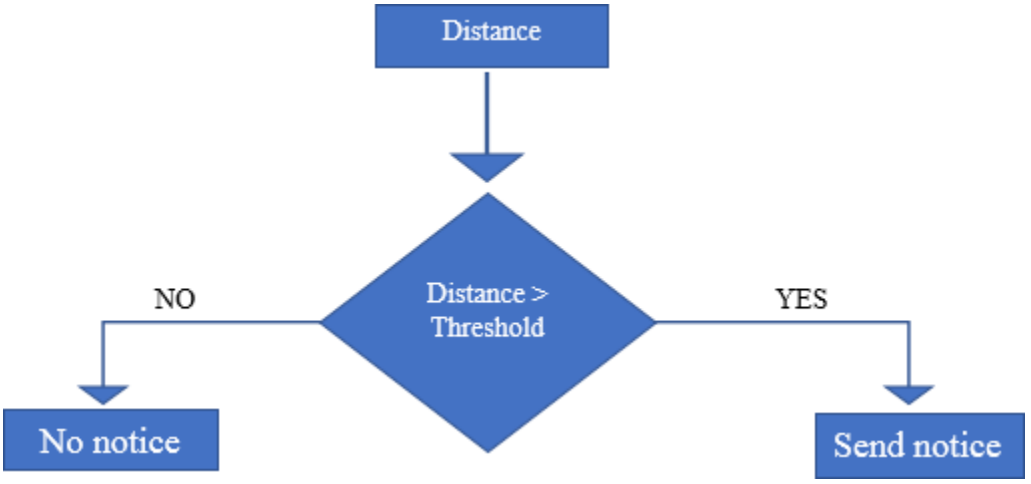


Figure 3.6 diagram of partial system N° 2 (see. Tab3.1).

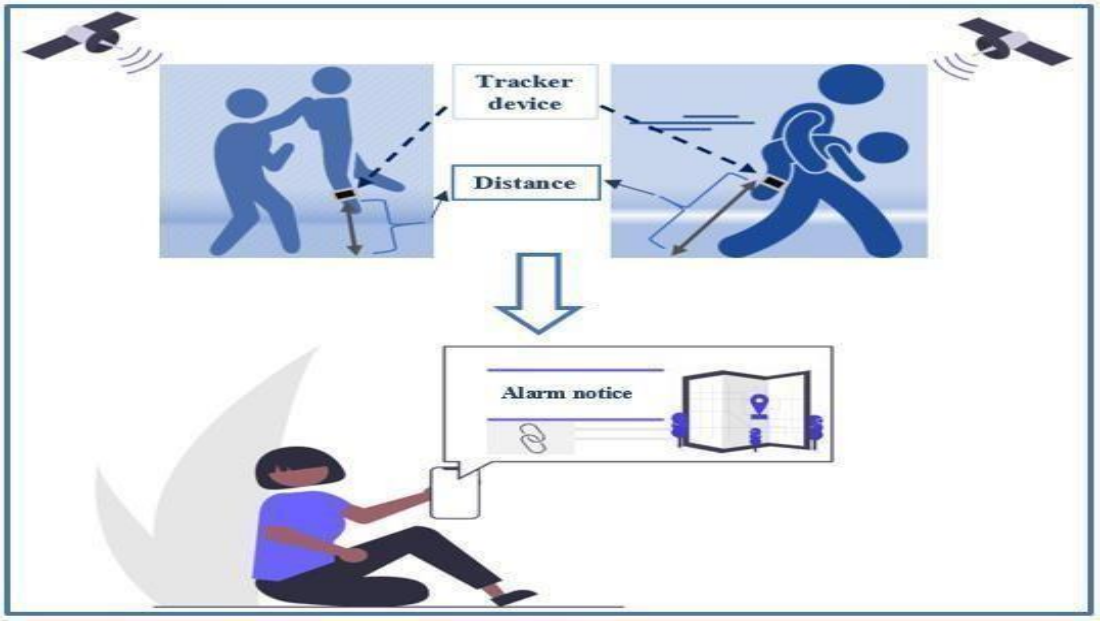


Figure.3.8 Illustration of second partial system.

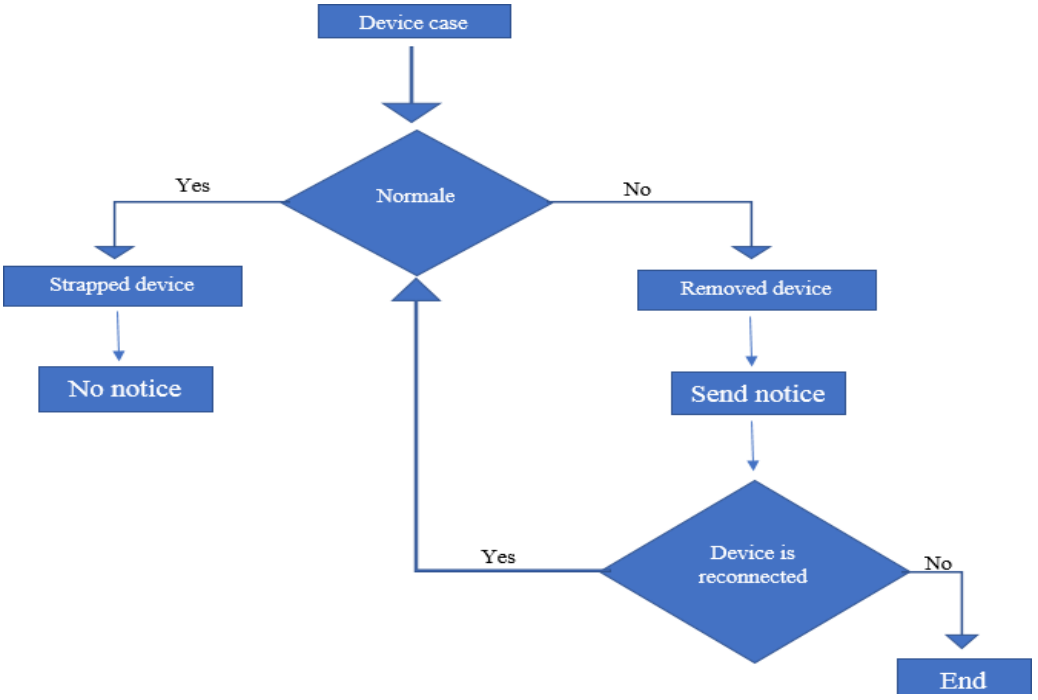
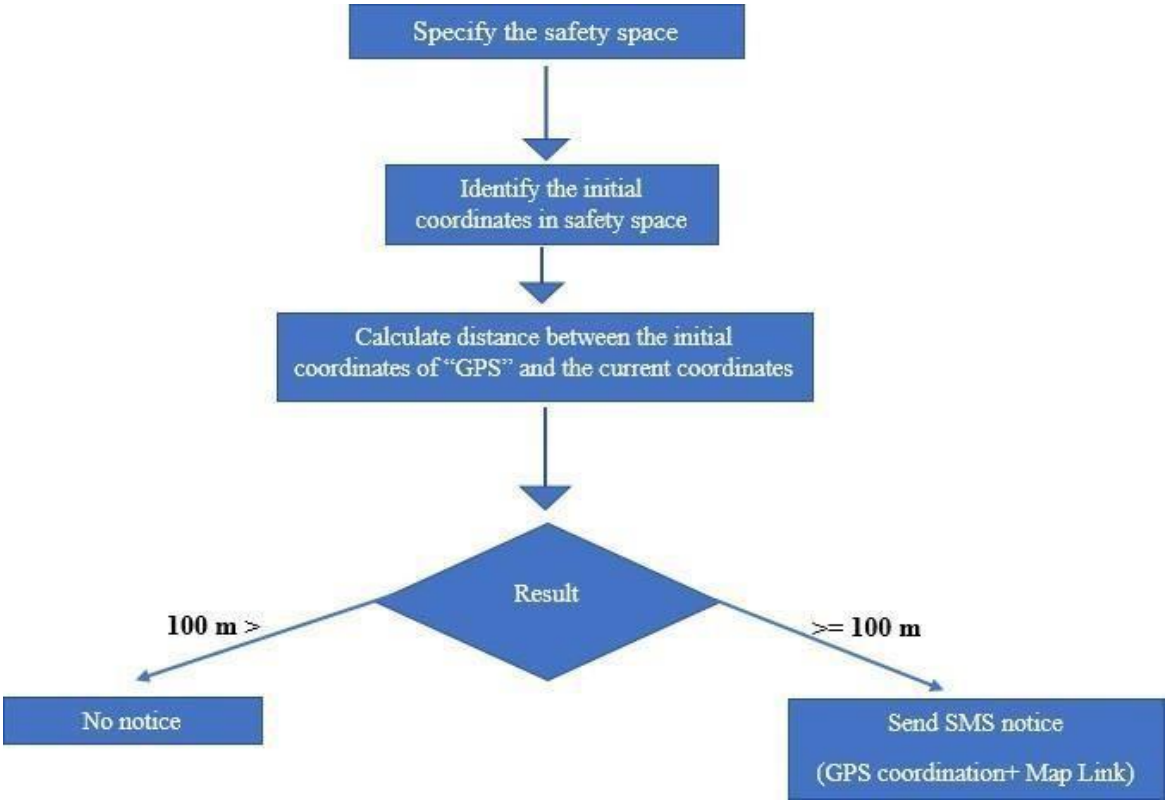


Figure 3.9 diagram of partial system N° 3 (see. Tab3.1).

Figure 3.12 diagram of partial system N° 4 (see. Tab3.1).



Software Requirments

➢ Flutter and dart

✓ Core Flutter SDK and Essential Packages:

- **flutter: The core Flutter SDK.**
- **Cupertino icons: Icons following the Cupertino design for iOS apps.**

✓ State Management:

- **bloc: Business Logic Component library for state management.**
- **flutter bloc: Integrates bloc with Flutter.**
- **animated_conditional_builder: Provides widgets for conditional rendering with animations.**

✓ Local Storage:

- **shared preferences: For storing simple data locally on the device.**

✓ Networking:

- **http: For making HTTP requests.**
- **Dio: A powerful HTTP client for Dart, which supports interceptors, global configuration, and Form Data.**

✓ Geolocation and Maps:

- **geolocator: For accessing device location.**
- **geocoding: For converting coordinates into addresses.**
- **flutter_polyline_points: For drawing polylines on maps.**
- **permission handler: For handling permissions.**
- **location: For getting location data.**
- **google_maps_flutter: For integrating Google Maps in Flutter apps.**
- **flutter map: An alternative map widget for Flutter, using OpenStreetMap.**
- **latlong2: For working with geographic coordinates.**

✓ Firebase:

- **firebase core: Core Firebase functionalities.**
- **firebase AUTH: Firebase Authentication.**
- **cloud_firestore: Cloud Fire store for storing and syncing data.**

- **firebase storage: Firebase Cloud Storage.**
- **firebase database: Firebase Realtime Database.**

✓ **UI Components:**

- **flutter toast: For displaying toast notifications.**
- **modal_progress_hud_nsn: For showing a modal progress indicator.**
- **percent indicator: For displaying circular and linear percent indicators.**
- **awesome_bottom_bar: For creating customizable bottom navigation bars.**

✓ **Form and Validation:**

- **email validator: For validating email addresses.**

✓ **Image Handling:**

- **image picker: For picking images from the gallery or camera.**

✓ **Localization:**

- **intl: For internationalization and localization.**

✓ **Development Tools:**

- **flutter test: For writing unit tests for Flutter apps.**

❖ IDE -> Android studio

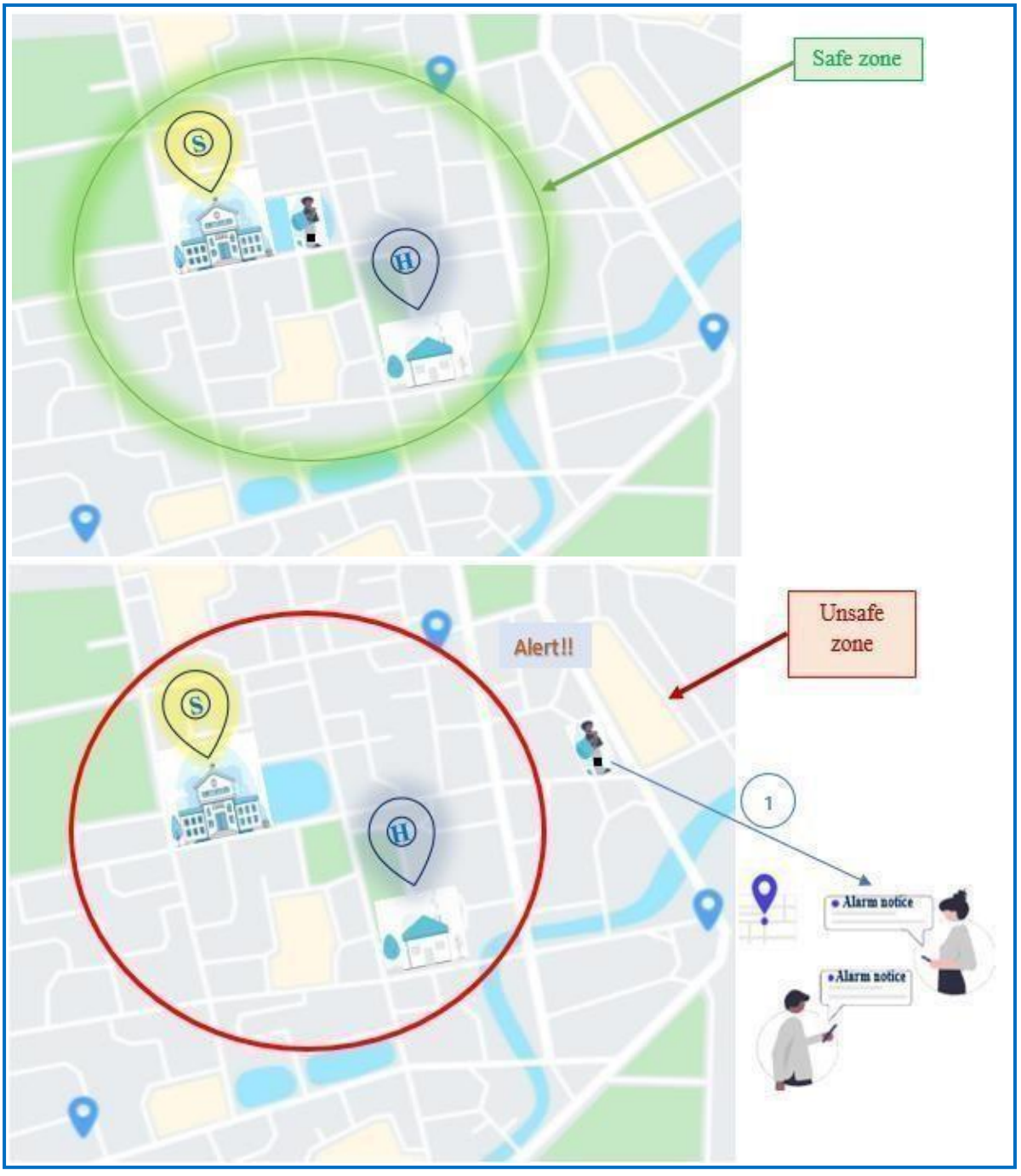


Figure 3.14 Illustration of the fourth partial system.

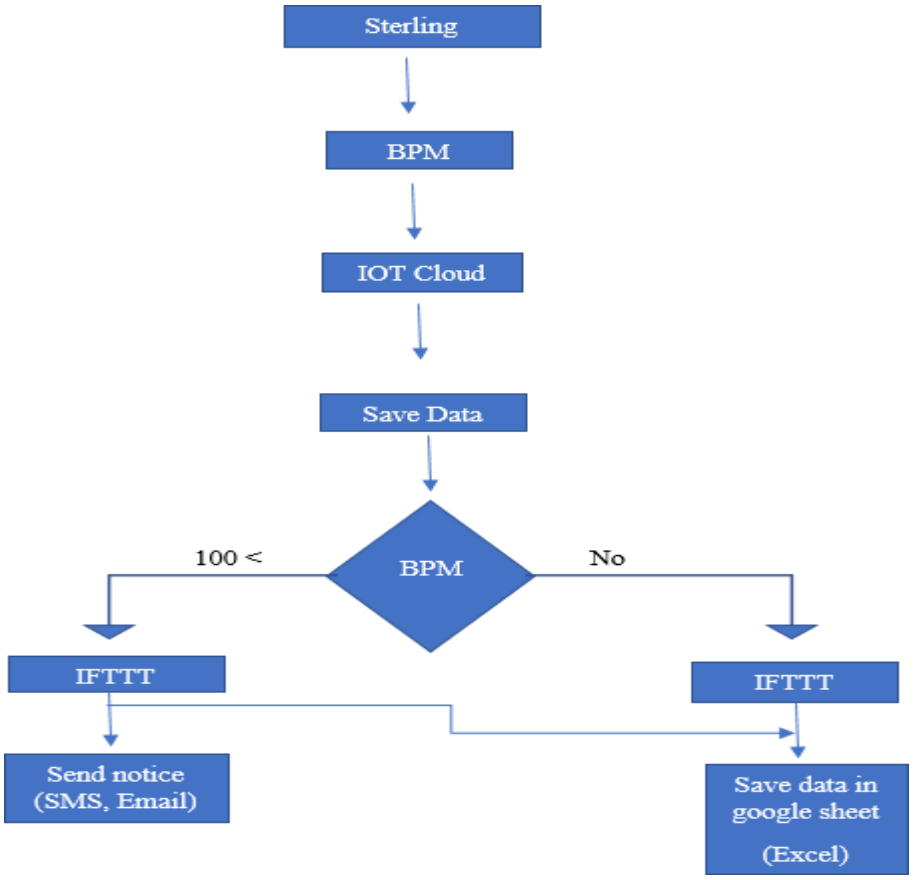


Figure 3.15 diagram of partial system N° 5 (see. Tab3.1).

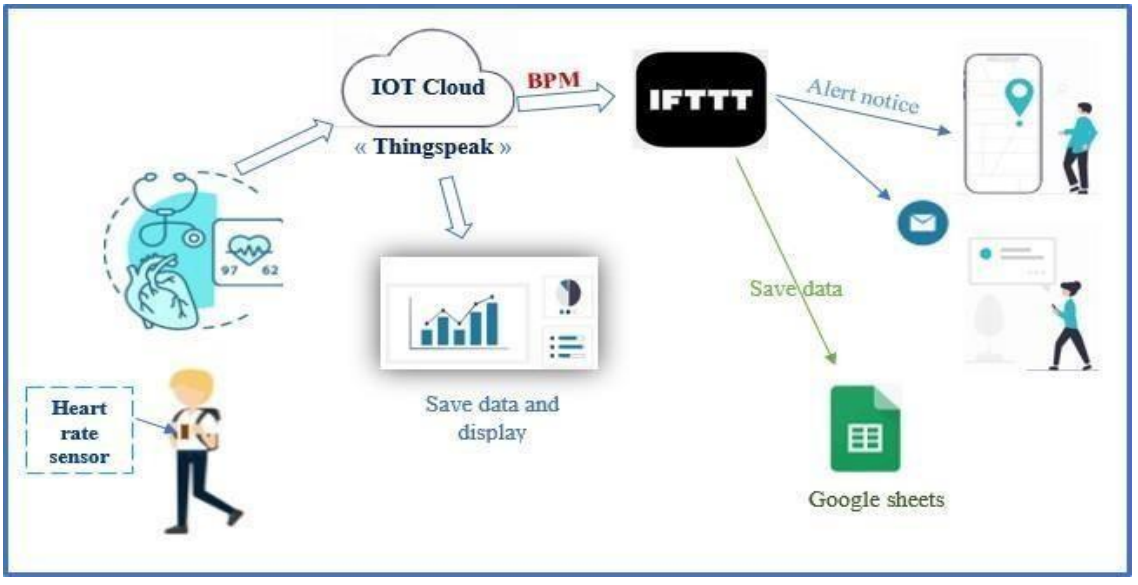


Figure 3.17 Illustration of the fifth partial system.

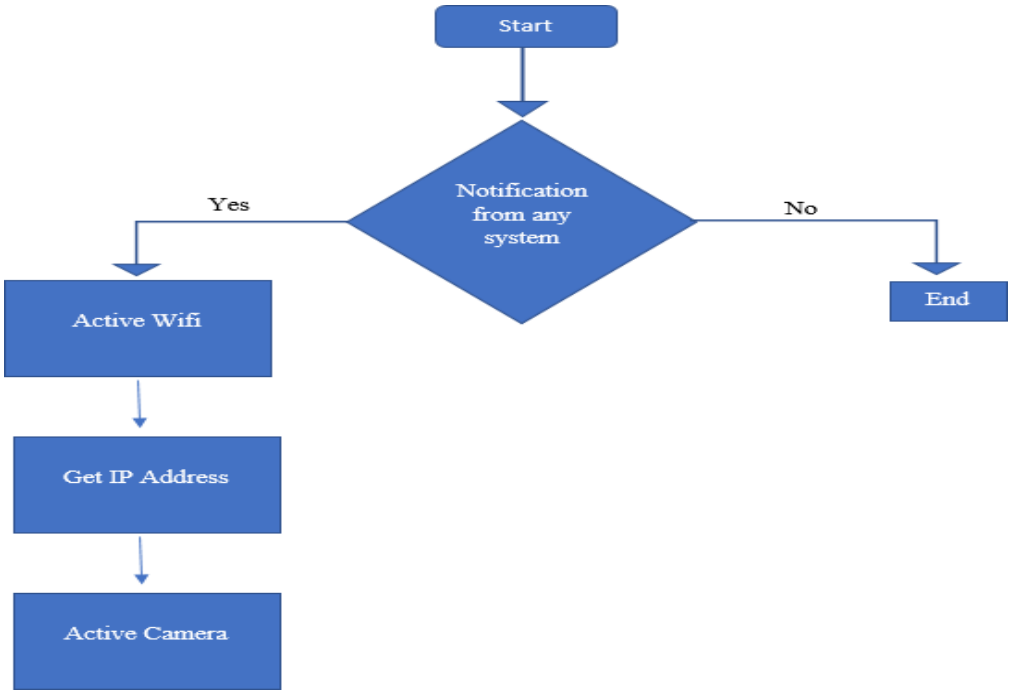


Figure 3.18 diagram of partial system N° 6 (see. Tab3.1).

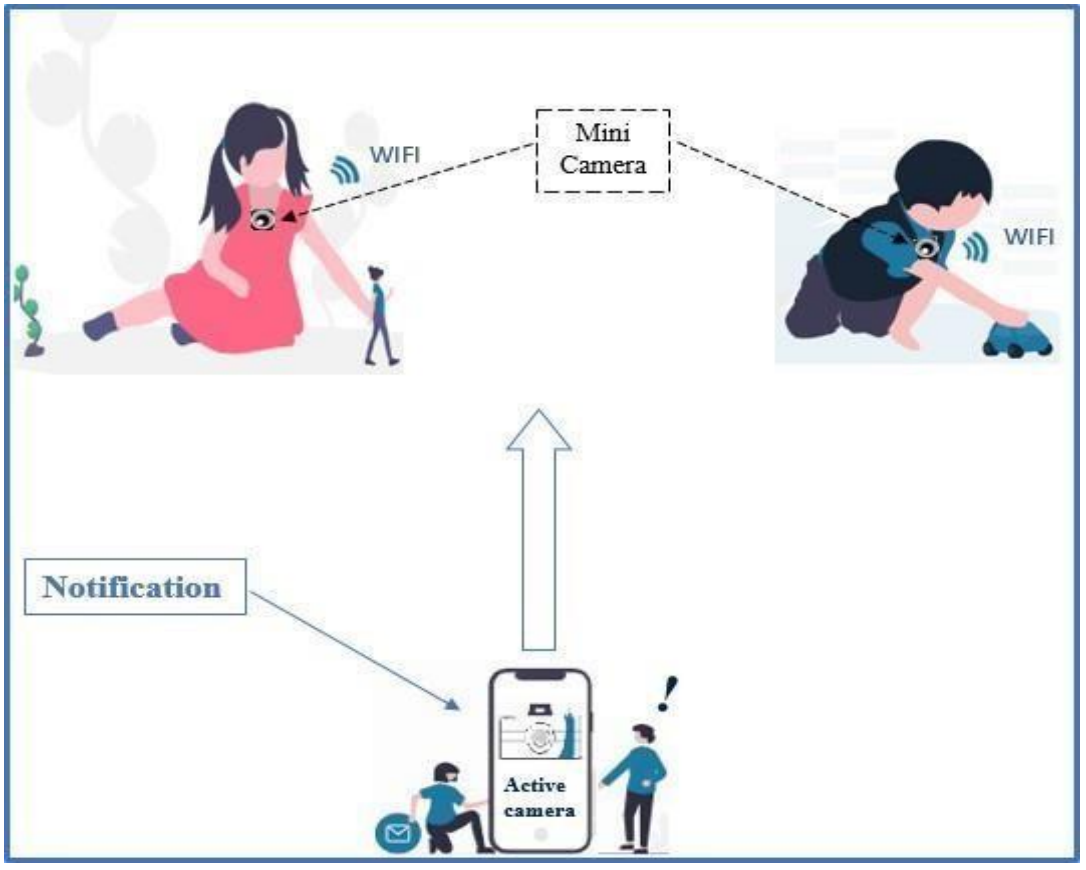


Figure 3.20 Illustration of VI partial system.

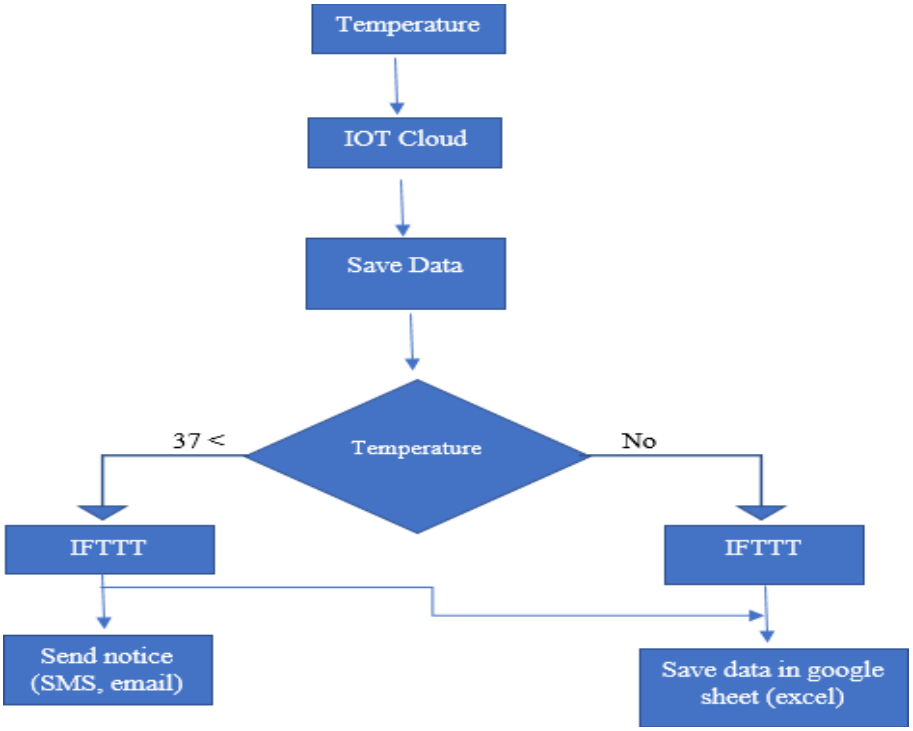


Figure 3.21 diagram of partial system N° 7 (see. Tab3.1).

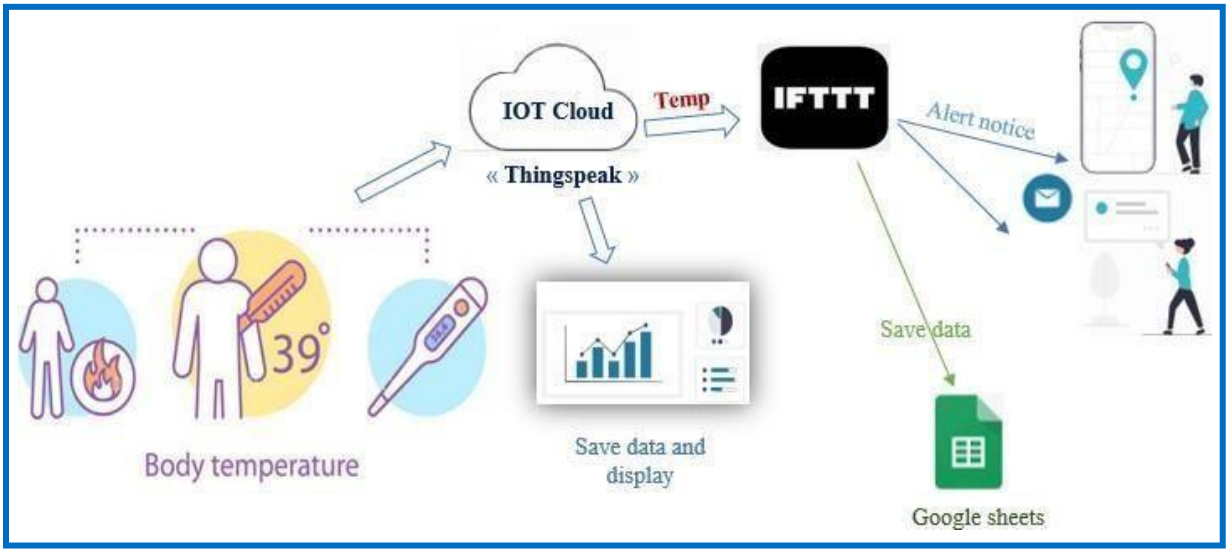


Figure 3.23 Illustration of the seventh partial system.

❖ Hardware implementation

Tracker device

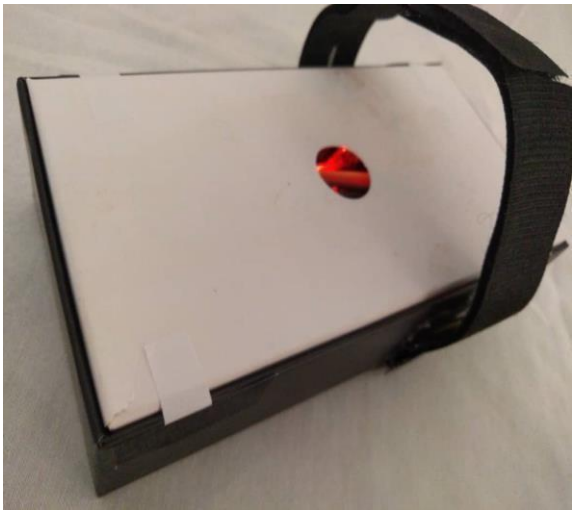


Figure 3.25 Implementation of tracker.

In the image above (Figure 3.25), we showed how to use the tracker and where you should wear it.

Its foot location was chosen just to monitor and confirm that someone carried the youngster or not; when he went to school, or he is outside the house

```
  uid=CacheHelper.getData(key:'userId');

  if(uid != null){
    widget = LayoutScreen();
  }else{
    widget = SplashScreen();
  }



  runApp(
      MultiBlocProvider(
        providers: [
          BlocProvider(
              create:(BuildContext context)=>SokarCubit()..getUserData()
          ),
        ],
        child: MyApp(
          startWidget :widget,
        ),
      ));
  //runApp(const MyApp());
}

class MyApp extends StatefulWidget {
  MyApp({Key? key,required this.startWidget}) : super(key: key);
  final Widget startWidget;

  @override
  State<MyApp> createState() => _MyAppState();
}

class _MyAppState extends State<MyApp> {
  // This widget is the root of your application.
  @override
  void initState() {
    FirebaseAuth.instance
        .authStateChanges()
        .listen((User? user) {
      if (user == null) {
```

```
                    screens[index];
                  });
                  print('Tab $currentIndex tapped');
                },
                iconSize: 30, // Change icon size
                titleStyle: TextStyle(fontSize: 14, fontWeight:
FontWeight.bold), // Change title style
                paddingVertical: 12, // Adjust vertical padding
                top: 16, // Adjust top spacing
                bottom: 16, // Adjust bottom spacing
                pad: 0, // Adjust spacing between icon and title
                duration: Duration(milliseconds: 600), // Change animation
duration
                curve: Curves.easeInOut, // Change animation curve
              ),
            ),
            if (currentIndex != null && currentIndex >= 0 && currentIndex <
tabItems.length)
              Positioned(
                top: 0,
                left: MediaQuery.of(context).size.width / tabItems.length *
currentIndex,
                child: Padding(
                  padding: const EdgeInsets.fromLTRB(25, 0, 0, 0),
                  child: Center(
                    child: Container(
                      decoration: BoxDecoration(
                        borderRadius: BorderRadius.circular(2.5),
                        color: Colors.blue, // Color of the line
                      ),
                      height: 5,
                      width: MediaQuery.of(context).size.width /
tabItems.length/2,
                    ),
                  ),
                ),
              ),
          ],
        ),
      ),
    );
  }
}
```

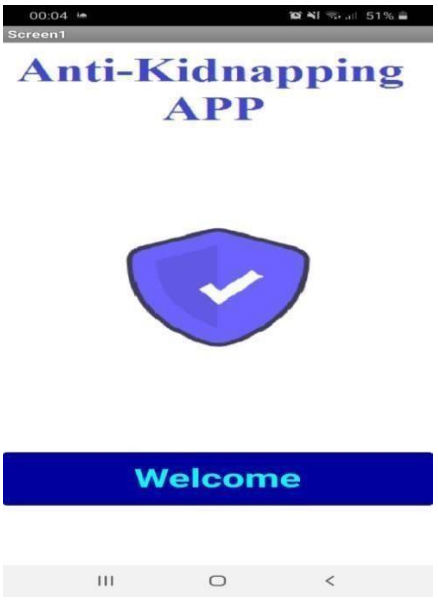
```
description: A new Flutter project.
# The following line prevents the package from being accidentally published
to
# pub.dev using `flutter pub publish`. This is preferred for private
packages.
publish_to: 'none' # Remove this line if you wish to publish to pub.dev

# The following defines the version and build number for your application.
# A version number is three numbers separated by dots, like 1.2.43
# followed by an optional build number separated by a +.
# Both the version and the builder number may be overridden in flutter
# build by specifying --build-name and --build-number, respectively.
# In Android, build-name is used as versionName while build-number used as
versionCode.
# Read more about Android versioning at
https://developer.android.com/studio/publish/versioning
# In iOS, build-name is used as CFBundleShortVersionString while build-number
is used as CFBundleVersion.
# Read more about iOS versioning at
#
https://developer.apple.com/library/archive/documentation/General/Reference/I
nfoPlistKeyReference/Articles/CoreFoundationKeys.html
# In Windows, build-name is used as the major, minor, and patch parts
# of the product and file versions while build-number is used as the build
suffix.
version: 1.0.0+1

environment:
  sdk: '>=3.0.3 <4.0.0'

# Dependencies specify other packages that your package needs in order to
work.
# To automatically upgrade your package dependencies to the latest versions
# consider running `flutter pub upgrade --major-versions`. Alternatively,
# dependencies can be manually updated by changing the version numbers below
to
# the latest version available on pub.dev. To see which dependencies have
newer
# versions available, run `flutter pub outdated`.
dependencies:
  flutter:
    sdk: flutter
```

```
import 'package:flutter/material.dart';
class MapScreen extends StatelessWidget {
  const MapScreen({super.key});

  @override
  Widget build(BuildContext context) {
    return Scaffold(
      appBar: AppBar(
        title: Text('Map'),
      ),
    );
  }
}
```

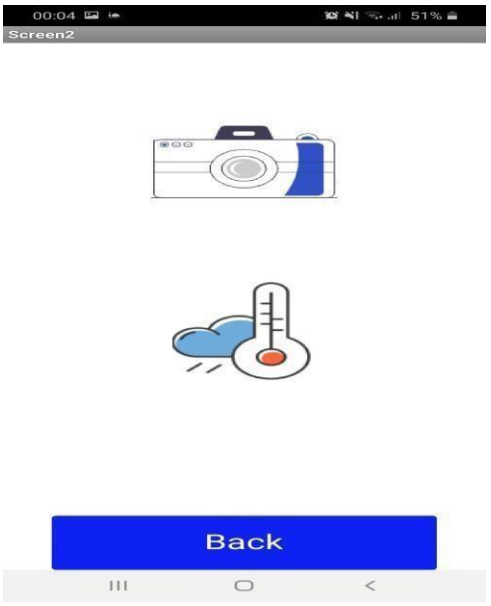
```
  // Future<void> userLoginl({
  //    required String email,
  //    required String password,
  // }) async {
  //    emit(LoginLoadingState());
  //    await
FirebaseFirestore.instance.collection('users').doc(uid).snapshots().forEach((
element) {
  //      if(element.data()?['emil'] ==email &&
element.data()?['password']==password){
  //        print('i user');
  //
  //      }else{
  //
  //      }
  //    });
  // }
  Future<void> userLogin({
    required String email,
    required String password,
    BuildContext? context
  }) async {
    emit(LoginLoadingState());
    try {
      var value = await FirebaseAuth.instance.signInWithEmailAndPassword(
        email: email,
        password: password,
      );
      emit(LoginSuccessState(value.user!.uid));
    } on FirebaseAuthException catch (e) {
      if(e.code == 'user-not-found'){
        print('no user found for that email ');
         showErrorDialog('no user found for that
email',context!,LoginScreen());

      }
      else if(e.code == 'wrong-password'){
        print('wrong password provided for that user ');
         showErrorDialog('wrong password provided for that
user',context!,LoginScreen());

      }

      print("Error during user login: $e");
      emit(LoginErrorState());
    }
  }

  UserModel? model;

  Future<void> getUserData() async {
    emit(GetUserLoadingState());
    FirebaseFirestore.instance
        .collection('users')
        .doc(uid)
        .get()
```

```
import 'package:awesome_bottom_bar/tab_item.dart';


import 'add device screen.dart';
import 'get data.dart';
import 'home screen.dart';

class LayoutScreen extends StatefulWidget {
  const LayoutScreen({Key? key}) : super(key: key);

  @override
  State<LayoutScreen> createState() => _LayoutScreenState();
}

class  LayoutScreenState extends State<LayoutScreen> {
  List<TabItem> tabItems = [
    TabItem(icon: Icons.home, title: 'Home'),
    TabItem(icon: Icons.spatial_tracking_outlined, title: 'location'),
    TabItem(icon: Icons.device_unknown_outlined, title: 'add device'),
  ];

  List<Widget>screens=[
    HomeScreen(),
    MapScreen(),
    // FaceBlurPage(),
    AddDeviceScreen()
  ];

  int currentIndex = 0;

  @override
  Widget build(BuildContext context) {
    return Scaffold(
      body:screens[currentIndex], // Your main content goes here
      bottomNavigationBar: Padding(
        padding: const EdgeInsets.fromLTRB(10,10,10,10),
        child: Stack(
          children: [
            Padding(
              padding: const EdgeInsets.fromLTRB(0,0,0,0),
              child: BottomBarFloating(
                items: tabItems,
                backgroundColor: Colors.white, // Customize your background
color
                boxShadow: [
                  BoxShadow(color: Colors.black.withOpacity(0.2), blurRadius:
5, offset: Offset(0, -3))
                ], // Add a custom box shadow
                borderRadius: BorderRadius.circular(20), // Make it circular
                color: Colors.grey, // Customize default icon color
                colorSelected: Colors.blue, // Customize selected icon color
                indexSelected: currentIndex, // Specify the initially
selected index
                onTap: (index) {
                  // Handle tap event
                  setState(() {
                    currentIndex = index;
```

We create an application mobile of this system to monitoring the health state of the child remotely. The App displays the data of the camera, heart rate, and temperature of the body.



"THE FIRST INTERFACE"



"THE SECOND INTERFACE"

"WHEN WE CLICK ON CAMERA BUTTON"

"WHEN WE CLICK ON TEMPERATURE BUTTON"

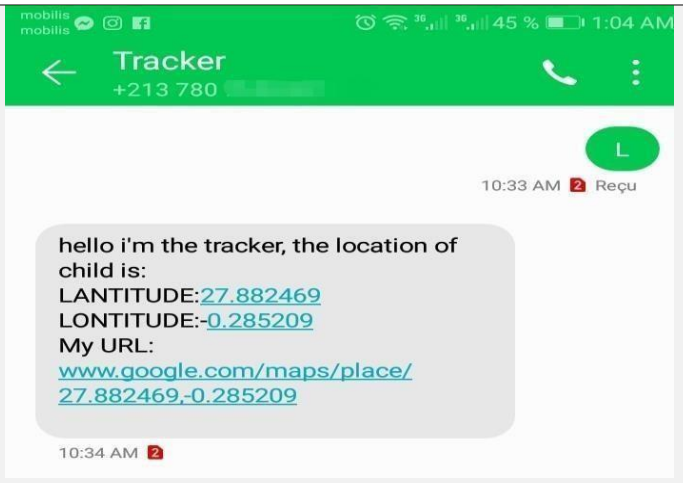
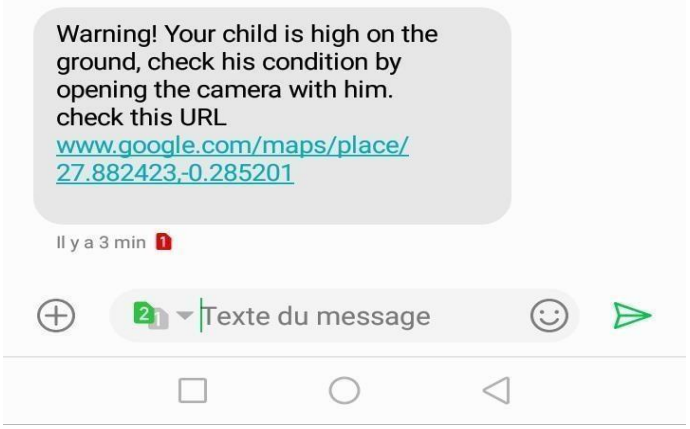
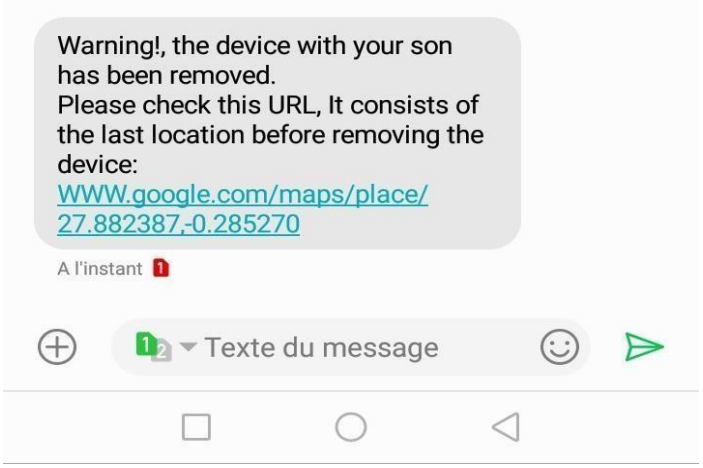
❖ Experimental results

.

There are many types of mini-cameras WIFI, we used in this work ESP32-CAM. where it able to connect with WIFI and give the IP address to see stream live by the camera.

Also, we display data of heart rate and body temperature in simple web page (Figure 3.27) and save it in Thing speak IoT in real time; to do more processing and analysis on data by using MATLAB or others programming languages "in future works".

❖

TITLE OF TEST	RESULT
SEND SMS “L” TO MAKE THE LOCATION OF THE CHILD.	
ALARM SMS, WHEN THE CHILD IS CARRIED.	
ALARM SMS, WHEN THE TRACKER IS DEVICE REMOVED.	

❖ **Tab 3.26 The results of tracker system.**

In the table below we present some test of the tracker (tab 3.2)

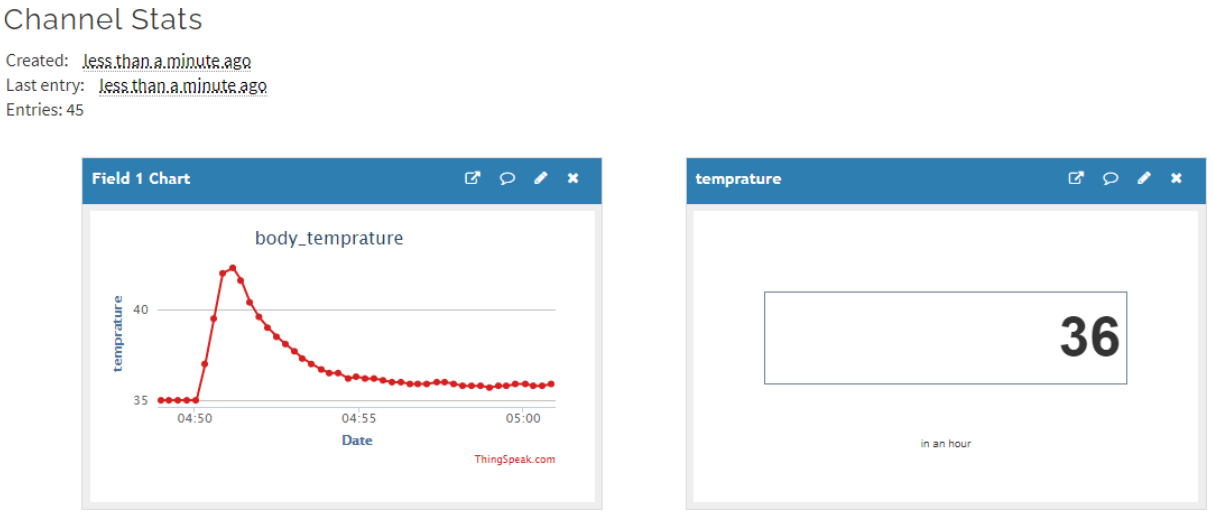


Figure 3.29 display and save data in Thing speak IoT

Thing speak web services it provides the link to share and process data with other IoT Services, such as IFTTT "IF

This Then That" web service; it provides all applications and devices to work together and use any social media to send alarms (SMS, Facebook, twitter, E-mail …etc.), or create other applets.

One of the services it provides by IFTTT is save data in real time in Google cloud, we use this service to store heart rate and temperature to collect more information.

IFTTT_Maker_ESP8266_temp

Fichier Édition Affichage Insertion Format Données

100% € % .0 .00 123 Par défaut …

G80

	A	B	C
75	June 19, 2021 at 08:45PM	body_temprature	36.00
76	June 19, 2021 at 08:46PM	body_temprature	36.00
77	June 19, 2021 at 08:46PM	body_temprature	36.00
78	June 19, 2021 at 08:46PM	body_temprature	35.90
79	June 19, 2021 at 08:47PM	body_temprature	35.90
80	June 19, 2021 at 08:47PM	body_temprature	35.90
81	June 19, 2021 at 08:47PM	body_temprature	35.90
82	June 19, 2021 at 08:48PM	body_temprature	35.90
83	June 19, 2021 at 08:48PM	body_temprature	35.90
84	June 19, 2021 at 08:48PM	body_temprature	35.80
85	June 19, 2021 at 08:49PM	body_temprature	35.90
86	June 19, 2021 at 08:49PM	body_temprature	35.90
87	June 19, 2021 at 08:49PM	body_temprature	35.90
88	June 19, 2021 at 08:50PM	body_temprature	35.90
89	June 19, 2021 at 08:50PM	body_temprature	35.90
90	June 19, 2021 at 08:50PM	body_temprature	35.90
91	June 19, 2021 at 08:51PM	body_temprature	35.90

Figure 3.30 example of data stored in google sheet.

Future Work

In this work, we demonstrated how to use the Internet of Things equipment and services to solve the hijacking phenomenon. In the stages of our work, we found many difficulties, obstacles, and shortcomings that could constitute an obstacle to the credibility of this work. Through this, we suggest some improvements and developments that we will make in the future. which is next:

- ***Monitoring system of battery status (Charging & Discharging) using IoT.***
- ***Change some of the equipment used, using other services that provide the same services as the device, for example: Replace GPS device using SIM card network services to determine the location through the card network used in the GSM module.***
- ***Processing and evaluating the acquired data using an artificial intelligence model to determine the situation in which the kid is.***
- ***Minimize the size of the tracker and camera as much as possible.***

Conclusion

We introduced in this chapter a detailed description of our system of anti-kidnapping by using IoT services (devices, cloud services).

We also provided some experiments from the total system. So, every molecular system.

He gives us a partial piece of information that allows us to monitor the child at risk, almost in real time.

General conclusion

The main objective of this work is to create a tracking system that can effectively inform us of the risk to which a person carrying the tracker device is exposed, and as noted in Chapter I on the use and applications of the Internet of things and their role in making things smarter and the facilities that have provided in different spheres of life. We proposed the phenomenon of kidnapping as a problem, and we assumed that the Internet of Things was the best way to solve this problem, especially the actual-time notifications and alerts that it provides using only the Internet or the mobile phone slice network. In chapter III, we created an integrated system capable of sending an alert message in each abnormal situation to which child can be exposed.

we cannot rely only on a single system to determine the situation in which the child is exposed, but in general, we can rely on several alarm messages to make sure if the child is really in danger or just the wrong message.

However, we consider this proposed model as a primary layer in the field of health monitoring and tracking systems, which can be improved and upgraded depending on the field of knowledge and artificial intelligence.

Reference

Reference:

- ***https://www.itransition.com/blog/iot-history .***
- ***https://trackinno.com/2018/07/06/how-iot-works-part-3-data-processing/.***
- ***https://hackr.io/blog/top-10-iot-applications .***
- ***https://legal.dictionary.thefreedictionary.com/kidnapping#:~:text=The%20crime%20of%20unlawfully%20seizing,away%20at%20a%20later%20time.&text=Most%20state%20and%20federal%20kidnapping,courts%20fill%20in%20the%20details.***
- ***https://www.britannica.com/topic/kidnapping***
- ***https://www.ctdatacollaborative.org/story/abducted-victims***
- ***https://knoema.com/atlas/Algeria/topics/Crime-Statistics/Assaults-Kidnapping-Robbery-Sexual-Rape/Kidnapping .***
- ***https://www.arduino.cc/en/guide/introduction.***
- ***https://coreelectronics.com.au/tutorials/compare-arduino-boards.html***
- ***https://www.orbit-dz.com/product/sim800l/***
- ***https://nettigo.eu/products/sim800l-gsm-grps-module#:~:text=SIM800L%20is%20a%20miniature%20cellular,that%20require%20long%20range%20connectivity.***
- ***https://www.theengineeringprojects.com/2018/10/introduction-to-hc-sr04-ultrasonic-sensor.html***
- ***https://www.alarabiya.net/north-africa/algeria/2013/10/08/%D8%A7%D9%84%D8%AC%D8%B2%D8%A7%D8%A6%D8%B1-***
- ***%D8%A7%D9%84%D9%82%D8%A8%D8%B6-%D8%B9%D9%84%D9%89-***
- ***%D8%A7%D9%84%D9%88%D8%AD%D8%B4-%D9%82%D8%A7%D8%AA%D9%84-***
- ***%D8%A7%D9%84%D8%B7%D9%81%D9%84%D8%A9-***
- ***%D8%B4%D9%8A%D9%85%D8%A7%D8%A1***