A Review on IOT Based Smart GPS Device for Child and Women Safety Applications

Niti shree

Dept. Of Electronics & Telecommunication, Chouksey Engg. College,Bilaspur

Chhattisgarh Swami Vivekananda Technical University,Bhilai(Chhattisgarh)

neeti355@gmail.com,7735107209

Abstract— This paper is based on IOT (Internet of Things). As we know in present era everything is based on digital technology. Nowadays every person is connected with each other by many ways,where most popular communication is internet so it is internet which connects people. This paper proposes an Android based solution to aid parents to track their children in rea ltime. Different devices are connected with a single device through channels of internet. The concerned device is connected to server via internet.The device can be used by parents to track their children in real time or for women safety. The proposed solution takes the advantage of the location services provided by GSM. It allows the parents to get their child's location on real time by SMS. Here,a prototype model (device) is created which is simulation based. The work comprises ARM-7 LPC2148 as microcontroller, along with GPS and GSM module. Embedded C core compile using Keil and virtual simulation check using Proteus 8.1 is done.A server is created which will collect all the data generated by our prototype system and send the same to server using GPRS. A Dummy server will be created by using Filezilla. This device will also have the facility of Emergency help key (SOS), if anyone presses the key , automatic help message will be sent to 3 registered mobile numbers on Server.

Keywords— Embedded System,Smart System,Internet,

1.INTRODUCTION

The Internet of Things (IoT) refers to the use of intelligently connected devices and systems to exploit data gathered by embedded sensors and actuators in machines and other physical objects [11]. IoT refers to the ability of network devices to sense and collect data from the world around us, and then share the data across the Internet where it can be processed and utilized for various purpose.

The IoT is comprised of smart machines interacting and communicating with other machines, objects, environment and infrastructures. Almost every device today has an embedded processor typically a microcontroller or MCU, along with user interfaces, that can add programmability and deterministic "command and control" functionality. The electrification of the world and the pervasiveness of embedded processing are the keys to making objects "smart." Your old toaster that mechanically controlled the color of your toast now has an MCU in it, and the MCU controls the color of your toast. The toaster completes its task more consistently and reliably, and because it is now a smart toaster, it has the ability to communicate with you electronically using its touchpad or switches. After a device becomes smart through the integration of embedded processing, the next logical step is remote communication with the smart device to help make life easier. For example, if I am running late for the office, can I turn on my house lights for security reasons using my laptop or mobile phone?

Communication capability and remote manual control lead to the next step … how do I automate things , based on my settings having sophisticated cloud-based processing, make things happen without my intervention? The ultimate goal of some IoT applications is to connect with the Internet to achieve the goal,for which they must first become "smart" (incorporate an

MCU/embedded processor with an associated unique ID) then connected and, finally, controlled. Those capabilities can then enable a new class of services that makes life easier for users.

The term Internet of Things was first coined by Kevin Ashton in 1999 in the context of supply chain management. However, in the past decade, the definition has become more inclusive covering wide range of applications like healthcare, utilities, transport, etc. Although the definition of 'Things' has changed as technology evolved,however, the main goal of making a computer sense information without the aid of human intervention remains the same. The evolution of current Internet into a Network of interconnected objects not only harvests information from the environment (sensing)and interacts with the physical world (actuation/command/control), but also uses existing Internet standards to provide services for information transfer, analysis, applications, and communications. Fueled by the prevalence of devices enabled by open wireless technology such as Bluetooth, radio frequency identification (RFID), Wi-Fi, and telephonic data services as well as embedded sensor and actuator nodes, IoT has stepped out of its infancy and is on the verge of transforming the current static Internet into a fully integrated Future Internet. The Internet revolution led to the interconnection between people at an unprecedented scale and pace. The next revolution will be the interconnection between objects to create a smart environment. Only in 2011 did the number of interconnected devices on the planet overtook the actual number of people. Currently there are 9 billion interconnected devices and it is expected to reach 24 billion devices by 2020.

In today's world, over 80% of the world population, including children around the age of eight or seven, owns smart phones. This is due to many reasons. One of them is the remarkable features and capabilities that new smart phones offer especially Android based smart phones. GPS offers outstanding capabilities in locating position and this can be used to develop resourceful application that helps in locating missing or lost children [1].

The essential idea of the *IoT* has been around for nearly two decades, and has attracted many researchers and industries because of its great estimated impact in improving our daily lives and society [2]. When *things* like household appliances are connected to a network, they can work together in cooperation to provide the ideal service as a whole, not as a collection of independently working devices. This is useful for many of the real-world applications and services, and one would for example apply it to build a smart residence; windows can be closed automatically when the air conditioner is turned on, or can be opened for oxygen when the gas oven is turned on. The idea of IoT is especially valuable for persons with disabilities, as IoT technologies can support human activities at larger scale like building or society, as the devices can mutually cooperate to act as a total system [2]. The Internet revolution led to the interconnection between people at an unprecedented scale and pace. The next revolution will be the interconnection between objects to create a smart environment [10].

The wide variety of potential IoT applications needs a software development environment that ties together the applications, the command, control and routing processing and the security of the node and system. While the importance of software in MCU solutions has increased during the past few years, for MCUs supporting the IoT, even more software, tools and enablement will be needed. A broad ecosystem with easily accessible support is key to enabling the development of embedded processing nodes and IoT applications [9].

These days, however, with technology growing at a fast pace, automated vehicle tracking system is being used in a variety of ways to track and display vehicle locations in real-time. In this project we are using the concept of tracking the child instead of vehicle. One device is connected with server via internet. Using that device parents will track their children in real time or women safety. The proposed solution takes the advantage of the location services provided by GSM since kids carry that device. It allows the parent to get their child's location on a real time by SMS.

2. Literature Review

Ten "critical" trends and technologies impacting IT for the next five years were laid out by Gartner [5]. The Internet is expanding into enterprise assets and consumer items such as cars and televisions. The problem is that most enterprises and technology vendors are yet to explore the possibilities of an expanded Internet and are not operationally or organizationally ready. Gartner identifies four basic usage models that are emerging:

- Manage
- Monetize
- Operate
- Extend

These can be applied to people, things, information, and places, and therefore the so called "Internet of Things" will be succeeded by the "Internet of Everything."

The Internet of Things is not a single technology, it's a concept in which most new things are connected and enabled such as street lights being networked and things like embedded sensors, image recognition functionality, augmented reality, near field communication are integrated into situational decision support, asset management and new services. These bring many business opportunities and add to the complexity of IT. To accommodate the diversity of the IoT, there is a heterogeneous mix of communication technologies, which need to be adapted in order to address the needs of IoT applications such as energy efficiency, security, and reliability. In this context, it is possible that the level of diversity will be scaled to a number of manageable connectivity technologies that address the needs of the IoT applications, adopted by the market, that have already proved to be serviceable, supported by a strong technology alliance. Examples of standards in these categories include wired and wireless technologies like Ethernet, Wi-Fi, Bluetooth, ZigBee, and Z-Wave. Distribution, transportation, logistics, reverse logistics, field service, etc. are areas where the coupling of information and "things" may create new business processes or may make the existing ones highly efficient and more profitable. The Internet of Things provides solutions based on the integration of information technology, which refers to hardware and software used to store, retrieve, and process data and communications technology which includes electronic systems used for communication between individuals or groups. The rapid convergence of information and communications technology is taking place at three layers of technology innovation: the cloud, data and communication pipes/networks and device. The synergy of the access and potential data exchange opens huge new possibilities for IoT applications. Already over 50% of Internet connections are between or with things. In 2011 there were over 15 billion things on the Web, with 50 billion+ intermittent connections.

Enabling technologies for the Internet of Things considered can be grouped into three categories: i) technologies that enable "things" to acquire contextual information, ii) technologies that enable "things" to process contextual information, and iii) technologies to improve security and privacy. The first two categories can be jointly understood as functional building blocks required building "intelligence" into "things", which are indeed the features that differentiate the IoT from the usual Internet. The third category is not a functional but rather the de facto requirement, without which the penetration of the IoT would be severely reduced. The IOT development implies that the environment, cities, buildings, vehicles, clothing, portable devices and other objects have more and more information associated with them and/or the ability to sense, communicate, network and produce new information. In addition, the network technologies have to cope with the new challenges such as very high data rates, dense crowds of users, low latency, low energy, low cost and a massive number of devices, The 5G scenarios that reflect the future challenges and will serve as guidance for

further work are outlined by the EC funded METIS project [2]. As the Internet of Things becomes established in smart factories, both the volume and the level of detail of the corporate data generated will increase. Moreover, business models will no longer involve just one company, but will instead comprise highly dynamic networks of companies and completely new value chains. Data will be generated and transmitted autonomously by smart machines and these data will inevitably cross company boundaries. A number of risks are associated with this new context – for example, data that were initially generated and exchanged in order to coordinate manufacturing and logistics activities between different companies could, if read in conjunction with other data, suddenly provide third parties with highly sensitive information about one of the partner companies that might, for example, give them an insight into its business strategies. New instruments will be required if companies wish to pursue the conventional strategy of keeping such knowledge secret in order to protect their competitive advantage. New, regulated business models will also be necessary – the raw data that are generated may contain information that is valuable to third parties and companies may therefore wish to make a charge for sharing them. Innovative business models like this will also require legal safeguards (predominantly in the shape of contracts) in order to ensure that the value added created is shared out fairly, e.g. through the use of dynamic pricing models.

United States border security has become a major concern in the recent past. In order to enhance border security, a system must be put in place to allow the tracking of shipments from origin to destination. U.S. Department of Homeland Security requests proposals of cargo transportation security tools for U.S. Customs and Border Protection (CBP). This project is to develop a centralized, internet based security tool which utilizes RFID and GPS technologies to identify drivers and track the load integrity. The system will accomplish the security testing in real-time using the internet and the U.S. Customs' database (ACE). A central database and the interfaces between the database and ACE will be established. After the vehicle is loaded, all openings of the tanker are sealed with RFID tags (E-seals). Then the RFID antenna and tag reader received and transmitted the signal, wirelessly connected with the databases. Also the GPS tracker traced the cargo's location at any time and reported to the system when necessary. This will serve as testing grounds for the implementation of security measures that can help prevent future terrorist attacks and help in assuming that the goods & products are not compromised while in transit. The system will reduce the labor work of security check to its minimum. It will also help in online billing. This technology's two main focuses are private companies and the government. It can be used by a company to expedite the shipment and receiving process, streamline the billing and invoicing process, and to automate potential Federal Government container racking requirements. The government can utilize this technology for shipping container validation, verification of load integrity, potential notification of special scenarios such as late or lost shipments, and as a tool to interact with the U.S. Customs and Border Protection's ACE database for border control [7].

Many types of smart devices are available in the world. Some devices for personal safety and some are for vehicle tracking. This project is designed to be used by parents and aimed to help locating missing or lost children. It takes advantage of the fact that many of today's children own smart phones which is convenient for this kind of situation. In this work, GPS is combined with one of the basic service of a smart phone which is GSM, more specifically SMS, in one system. An application at the parent's side will allow parents to send a location request to child side then retrieve the location from the request reply and display it on the map. On the other hand, the application at the child's side gathers the necessary information of the smart phone that will be used to locate the smart phone. Information such as GPS coordinates and time are gathered and sent to the parent smart phone that's preregistered on the application. The communication between the parent and the child applications is done using Short Message Service (SMS). It will allow the system to work without the need of internet connection thus allows the application to be implemented on smart phones that don't support GPRS, 2G or 3G internet connectivity. The system sends the location of child's smart device to parent's smart phone when the parent wishes to check on the child [1].
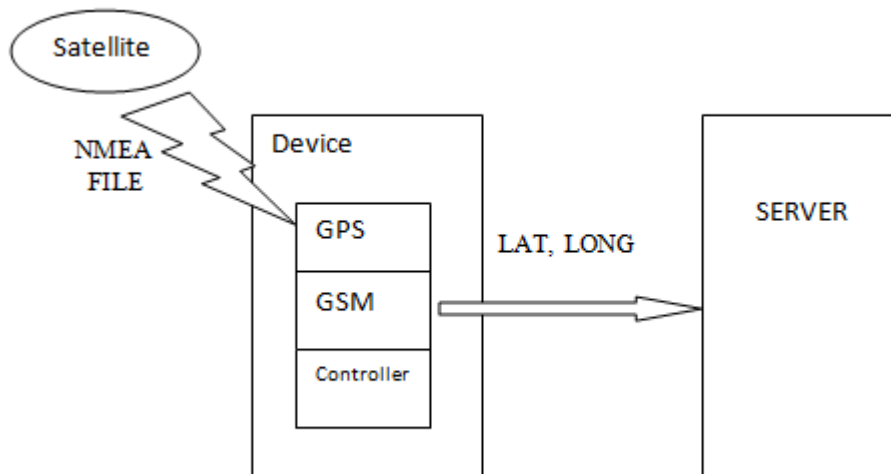
Fig.1 Architecture of the Proposed System

Recently, new device models have dropped to sizes wearable in a wristwatch capacity [6]. Some research uses stand-alone GPS chips alongside several other off-the-shelf embedded development components to create a GPS-based statistical wristwatch for runners. Some existing products utilize accelerometers to gather data such as velocity. A GPS-based, watch-sized device could deliver more consistent, higher precision velocity data as well as location data. Runners could view this data to compete with themselves for their best time up. Several current solutions exist for runners who desire the functionality our proposed device offers. Cellular phones are often the bane of specialized devices, and applications exist which provide GPS-based running data [6].

CONCLUSION

We have already seen the wide application of IOT. More objects are becoming embedded with sensors and gaining the ability to communicate.There are many types of applications emerging one of most common being tracking system i.e monitoring the behavior of persons,things,or data through space and time.The solution proposed in this paper takes advantage of the rich features offered in Androids smart phones. This work presents a model which is based on GPS tracker system.Here,ARM-7 LPC2148 is to be used as microcontroller,along with GSM and GPS module.The programming is done using Keil and the simulation check will be done by Proteus 8.1.A server will be created which will collect all data generated by the prototype system.By help of GPRS,same is sent to the server.The main feature of this application is to get the child's location without its interaction in the process with simple and cost effective method,done by use of GSM and SMS.

The device will also have the emergency key (SOS).In case of any emergency,if anyone presses the key ,automatic help message will be sent to any 3 registered mobile numbers on the server. like any software product or design, there is still room for enhancement. Features can be added to enhance the system. The proposed system will be implemented, continued, reviewed And improved in a later work.

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