



BioTechnology

An Indian Journal

FULL PAPER

BTAIJ, 10(4), 2014 [977-981]

Design and implementation anti-lost children system based on internet of things

Fei Mingming¹, Shi Yanli²

¹China University of Geosciences (Beijing), Beijing, (CHINA)

²Post-doctoral Mobile Station, School of Economics and Management, Beijing Jiaotong University, Beijing, (CHINA)

ABSTRACT

This paper presents for tracing the whereabouts of missing children is an effective solution for the use of real-time information on Internet of Things, track access, update information technology, which utilizes the most high-profile of RFID radio frequency technology, which is a non-contact automatic identification system. In this paper, a combination of the EPC tag chip data reading, RFID automatic acquisition, cloud storage, wireless sensor networks and wireless remote positioning and other functions, to simulate the real scene of the incident, and security risks can be pre-estimate of the corresponding proposed solution. Through the paper, we hope to try and improve, and make appropriate promotion and expansion, loss of practical help to families of children and social harmony and stability, combating trafficking of children. © 2014 Trade Science Inc. - INDIA

KEYWORDS

Networking;
Child missing;
RFID radio frequency
technology;
Cloud technology.

INTRODUCTION

Internet of Things are kind of objects with full awareness of information has a reliable connection between objects and intelligent network to transmit information processing capabilities. At present, some people moral failure caused by rapid social and economic progress, causing serious loss of children, Internet of Things to improve this situation, the protection of the family happy and promote social harmony is great significance. Globally, Internet of Things in life applications including sensor manufacturers, chip manufacturers, equipment manufacturers, network services, network operators, software developers and service providers and so on. Despite the current support Internet of Things related to life technology is not mature, not able to achieve the full

application in life the short term, however, this aspect of China's vast market in size and have materials, technologies, devices, systems and networks, making China a great advantage in achieving the life of this aspect of Internet of Things.

In recent years, Internet of Things systematic system, visualization have also made tremendous progress, radio frequency identification^[1] (Radio Frequency Identification, RFID) is an automatic identification technology for two-way data via non-contact radio frequency mode communication, the target to be identified and access to relevant data. As the radio frequency identification technology is used in the electronic tag, which has a large storage capacity, strong anti-jamming capability, portable, safe, can work in a variety of harsh environments, etc., supply chain management, logistics

FULL PAPER

management, medical health, retail management, and transportation and many other industries are widely used.^[1](Radio Frequency Identification, RFID)^[4].

RFID technology in China is still at an early stage of development, especially in terms of lost children, or almost a blank. Therefore, the RFID technology to track lots of development space on the missing child, there is a huge market potential.

In other countries, the development of RFID technology is already quite mature in the playground industry, such as: Sn. Mountain Amusement RFID technology has been successfully applied to identify the staff, visitors and logos identifying rentable ski and equipment, and you can use plastic RFID smart wristband purchase goods, services and ski cable car ride. In addition, there are many theme parks using RFID technology in Japan, mainly in several areas access control, visitor management, playground, for example, the number of automatic management of each ride rides, roller coasters for high-speed video recording services and children's pre-login system etc. RFID in Taiwan has also been applied in the field of entertainment games new progress which was inspired by Subject Exposition Aichi in Japan. In Taipei Pokémon paradise, RFID technology will be used for "hunting" game, through a built-in RFID tag spherical device, whereby the player can experience the feeling of hunting Pokémon stimulus. Malaysia Sunway Amusement^[2] using RFID wristbands management and consumer visitors to this amusement park, rather than cash, to enter the park's attractions and pay for products and services consumption^[6].

With economic development and the process of urbanization continues to accelerate in China, the floating population is also increasing in some areas increasingly prominent phenomenon of missing children, and showed a growing trend. Children lose has become a major concern of public nuisance Chinese society in general has become popular and social stability is related to a major event. Although there are small spaces (parks or playgrounds) has been through the use of radio frequency identification technology to provide our visitors with a comprehensive set of services. To help solve this problem as soon as possible, to reduce the probability of occurrence of this event, this paper presents a missing child's whereabouts for an effective solution. This paper focuses on children's location information col-

lection, information tracking, monitoring all stages of information in the Internet of Things. Popular, message tracking is through modern technological means for data processing in the future, you can understand the general location of the real-time target position. Networking applications in this article is mainly used for children constantly updated information on the actual location of the real-time data to confirm the safety of children. Real-time query location is the core of the system of children, such as the system will be based on the collected children's location information to help parents understand the appropriate information: the specific location of the child, whether the child is in a safe range.

IOT-BASED SYSTEM DESIGN ANTI-LOST CHILD

Background

Internet of Things have plenty of spaces to grow as a new industry. From two aspects prospects of Internet of Things: First, from the economy, the domestic have many studies blank area in this regard, fewer competitors, have great profits to be made, we can first step in the line. secondly, from the development of society, the child safety issues related to the future of the country, associated with social stability connected the family's happy, we put Internet of Things applied to solve real-life problems will get strong support from the government, society and all walks of life. Therefore, the product information Things collection, tracking, etc. functions applied to solve real missing child case is necessary. It is a sudden loss event and eager to solve the case. If the child can readily obtain information on the location of the address, which can be in large part to protect the child's safety and can give parents peace of mind. RFID technology has greatly improved the position of timely access to information and timely updates and other efficiencies, which in addition to bulk read, but also has a small size, large capacity, long life, reusable, fast read and write, non-visual identification, mobile identification and so on. By labeling each child in the body, laminated or implantable RFID tag, you can always learn to identify the child's location information, real-time tracking, to help reduce the harm to children.

Internet of Things prospects in this area coupled

with the rapid development of RFID technology to solve this thorny problem provides a feasible solution, then contact the negative effects brought about by the rapid development of society, the paper argues that Internet of Things in life as part of the application can be an effective way to solve the problem of missing children.

RFID technology consists of four parts electronic tags, readers, middleware and back-end application system components, shown in Figure 1. Tag and the tag antenna generally dedicated chip tags, each tag has a unique electronic code (EPC Electronic Product Code^[7]), and attached to the object to be detected, when the tag reader receives a signal transmitted after i.e. wake-up and complete the action according to the instruction transmitted reader, and the response data to the reader, the reader receives the tag data, first, a simple process, and to be useful beloved transfer data over the network background middleware system to further process the data,

and finally put these data processing middleware system again after a pass to the top-level application systems via a network, the upper application system to perform the appropriate action based on the data they have acquired, such as : offer some tips or other information associated with the user service information to the user^[6].

Introduction of networking technology

2005, held in Tunis WSIS, the International Telecommunication Union (ITU) has released “The Internet Report 2005: Internet of Things,” a text, formally proposed the “Internet of Things” concept^[8]. “Internet of Things technology” is still the core and foundation of the “Internet technology”, is based on Internet technology extension and expansion of a network technology^[6]: extended and expanded its client to any goods and items of Rooms, information exchange and communication. Internet of Things technology means through various

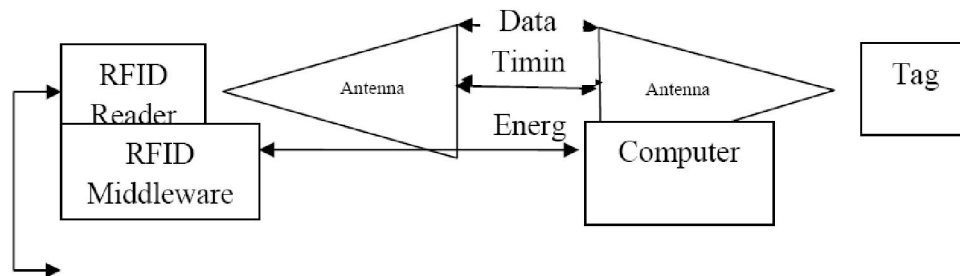


Figure 1 : The overall architecture of RFID system

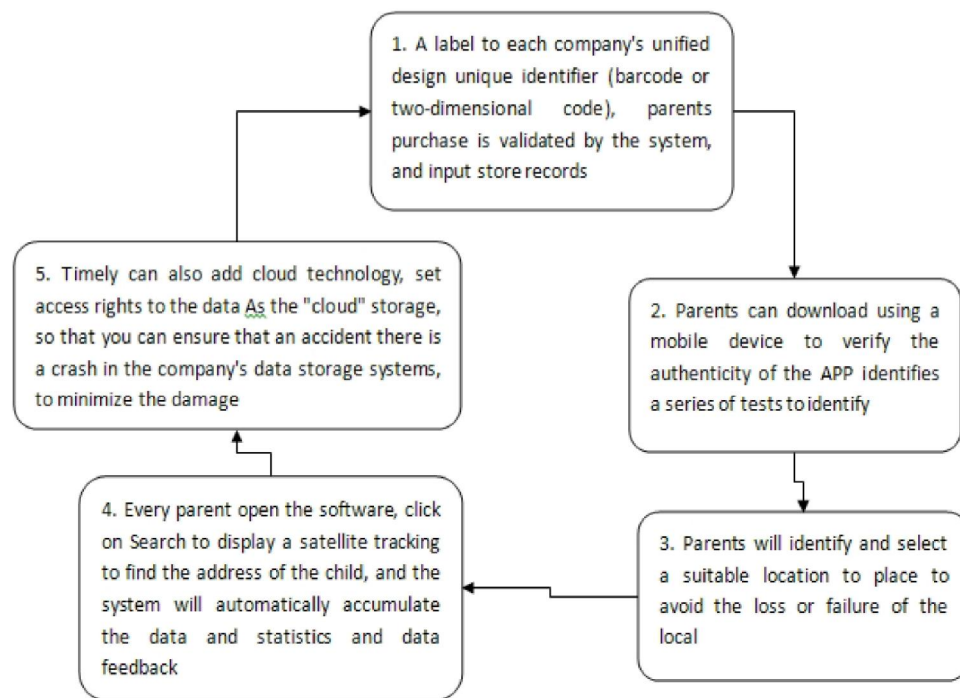


Figure 2 : Simulate real application scenarios

FULL PAPER

sensing devices, radio frequency identification technology (RFID), EPC encoding, infrared sensors, global positioning systems, laser scanners and other information sensing device, according to the agreed protocol, based on the need to achieve interconnection items interoperable network connections, information exchange and communication in order to achieve intelligent identification, positioning, tracking, intelligent monitoring and management of network technology.^[10]

Simulation scenarios

Due to the current market environment, there are some gaps in the relevant areas, and thus “Internet of Things” and “Children’s location tracking” data linking is particularly small. In view summarizes a lot about Internet of Things related to information technology and application after application scenarios can be simulated initially shown in the following figure^[9]:

By describing Figure 2, it is vividly demonstrated by the Internet technology to determine the location of the child is very accurate and necessary. In the shortest time, it is to ensure the safety of children and to reduce this event for children and parents some psychological trauma.

ARCHITECTURE AND IMPLEMENTATION OF THE SYSTEM

Architecture

After a lot of information to read and summarize,

based on the current understanding of the architecture of the Internet of Things applications^[8] as shown in Figure 3:

As can be seen from Figure 3, the whole architecture is divided into three layers: the perception layer, network layer and application layer. Perception layer is mainly composed of two parts: the intelligent reader module and RFID tags. Network layer mainly composed of a network communication module, a mobile network, Unicom network, telecommunication network, WIFI routers etc^[3].

The last layer is the application layer, it has a scanning device, cloud, mobile device, the application database management procedures. Three-tier architecture interrelated and mutually distinguish their duties to ensure the further implementation of applications.

Security risks and solutions

For technical and features of the system, consider the security risks include:

- 1) In terms of location privacy to prevent attackers major illegal tracking of RFID tags or damage of any kind.
- 2) In terms of safety certification label layer is mainly to ensure that only legitimate reader to communicate.
- 3) In the data processing can be mainly high density encryption operation.
- 4) In terms of social stability is to prevent illegal copy-

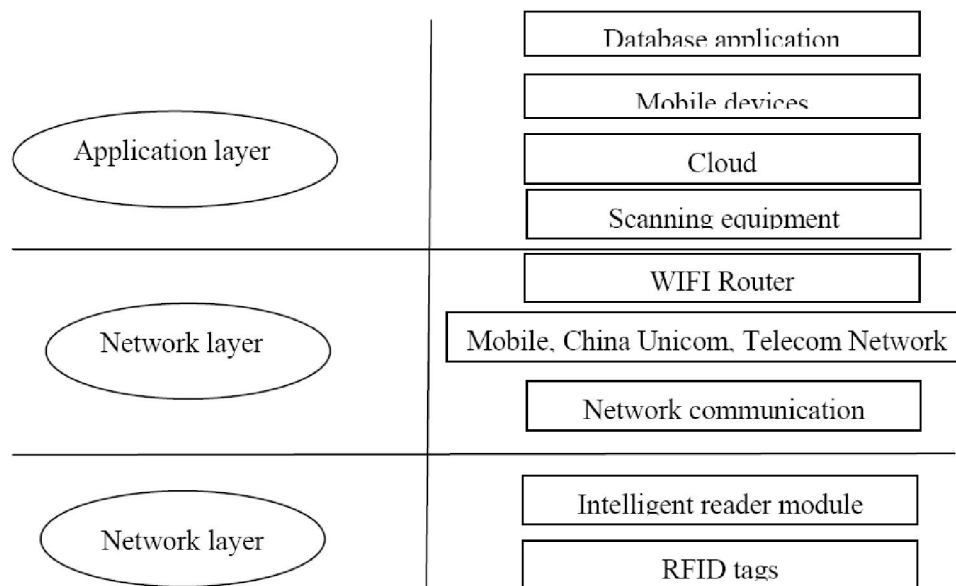


Figure 3 : Architecture

ing elements from using RFID tags to trade.

In order to prevent the presence of RFID tags hidden in children safe, you need to use certain technical conditions to solve this problem, taking into account the current methods are: First, the label can be worn in children, such as ear rings, anklets, nails and other decorations in the form of relatively secluded place; Second, the label can be embedded in the child's physical, this method is mainly to prevent the approach of a phenomenon caused by the loss of the label, but there is some risk in this approach, it is still not implemented.

To ensure that only the label layer and the corresponding communication legitimate reader can uniquely identify an unsolicited radio signal interference, so that the user can label a device active broadcast radio signals, or for preventing damage the nearby reader operation, thereby enabling the communication only with the corresponding reader. In order to maintain social stability and prevent terrorists from using RFID tags to carry out terrorist activities, the need for regular testing RFID tag application environment, to ensure social security and stability.

EPILOGUE

In this paper, the current rapid development of society for children brought to this reality is lost, combined with existing and emerging technologies, "Internet of Things" in life related application solutions proposed, which can be determined at any location to avoid the safety of children parents worry about other issues. Although at present no specific implementation, and the idea is still preliminary stage, but levels of the method, rationality, practicality and applicability have good theoretical basis, and the method utilizes advanced technology, with good scalability and adaptability, with some room for development, there is a certain profit margin.

REFERENCE

- [1] S.Jaberi, A.M.Rahmani, A.K.Zadeh; Trusted data fusion by using cellular automata in wireless sensor networks [C]// Proceedings of the 8th Annual Collaboration, Electronic messaging, Anti-Abuse and Spam Conference (CEAS'11). New York, NY, USA:ACM Press, 145-151 (2011).
- [2] L.Atzori, A.Iera, G.Morabito; The Internet of Things:A Survey [J]. Computer Networks, **54(15)**, 2787-2805 (2010).
- [3] D.W.Engels, S.E.Sarma, L.Putta et al; The Networked Physical World System [C]//Proceedings of the IADIS International Conferrnce WWW/Internet(ICWI2002). Lisbon, Portugal: IADIS Press, 104-111 (2002).
- [4] E.W.Schuster, S.J.Allen, D.L.Brock; Global RFID: The value of the EPC global network for supply chain management [M], Berlin Heidelberg:Springer-Verlag, (2007).
- [5] T.Zhang, X.Wang, J.Chu, X.Liu, P.Cui; Automotive recycling information management based on the internet of things and RFID technology. In: Proceedings of the 2010 IEEE international conference on advanced management science (ICAMS), 620-622 (2010).
- [6] B. Yan, G.Huang; Supply chain information transmission based on RFID and internet of things. In: Proceedings of the ISECS international colloquium on computing, communication, control, and management (CCCM), 166-169 (2009).
- [7] P.Engel, P.Misra; Special issue on GPS :the global positioning systems. Proc IEEE, **87**, 3-172 (1999).
- [8] K.Whitehouse, C.Karlof, D.Culler; A practical evaluation of radio signal strength for ranging-based localization. ACM SIGMOBILE Mob Commun Rev., **11**, 41-52 (2007).
- [9] P.Bahl, V.N.Padmanabhan; RADAR : An in-building RF-based user location and tracking system. In: Proceedings IEEE. INFOCOM 2000. Nineteenth annual joint conference of the IEEE computer and communications societies, **2**, 775-784 (2000).
- [10] K.Yedavalli, B.Krishnamachari, S.Ravula, B.Srinivasan; Ecolocation: a sequence based technique for RF localization in wireless sensor networks. In: Proceedings of the 4th international symposium on information processing in sensor network (IPSN'05), 285-292 (2005).