

A Study on the Warning Sound System for Smombie Accident Prevention Using the RFID Tag

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Abstract: Smombie is a synonym for smartphone and Zombie and is a new word for people who are addicted to smartphones. They are very dangerous because they look like smart Zombies without a soul when they walk. The accident caused by the slippery rain has already become a social problem not only in many countries but also in Korea. In order to prevent accidents, we have used a warning sign an LED floor signal, a special walkway for Smombie and a sticker for Smombie. In addition, the researcher has proposed a system that generates an alarm sound in the smartphone itself. The system proposed in this study is based on a satellite based on GPS and GIS but it requires a more precise beeping system because it has a large error range. To solve this problem, RFID (Radio Frequency Identification) chip was used and supplemented. In order to examine the suitability of RFID, it is compared with the barcode system which is used in wireless communication in various fields.

Key words: Body weight, accident prevention, satellite, RFID, barcode system, beep

INTRODUCTION

Smartphones are now becoming personal necessities and they are doing personal secretaries, entertainment and friends. As a result, smart phones have become a necessity for modern people and many people do not keep them from their hands. This phenomenon seems to be a little addiction phenomenon but safety in the room is guaranteed to some extent but when you walk the streets outdoors or on the crosswalk, the act of concentrating on smartphones like Zombies is likely to cause big thinking. We call these smartphone addicts a sneaky word that combines smart phones and Zombies and is called Ssambi. They are particularly dangerous on crosswalks without traffic lights, on highways not separated from India as well as on India. Furthermore, those who have such a severe degree often go on a hike when they climb or drive or they walk on seashores. As a result of this seriousness, many countries around the world have come up with social measures to prevent accidents. Examples include caution signs, LED bottom lights, walkways dedicated to Szambi and stickers for Szombatzki. However, the number of accidents does not decrease but rather increases. Although, the increase in penetration rate and the increase in the age of use is also the cause, it is thought that more active preventive measures are needed.

The researcher has proposed a system to prevent accidents by using a satellite (Sung-Hoon and Myung-Jin, 2007; Anonymous, 2013; Finkenzeller, 2010; Want, 2006). However, due to the problem that the error range of Ssangwi accident prevention alarm system which is based on the satellite is interlocked with GPS and GIS, a more precise alarm system is required. As a solution to this problem, this study complements and studies the RFID (Radio Frequency Identification) chip used to recognize objects in various environments. In order to examine the suitability of RFID, we introduced the concept of RFID, reviewed the application examples, In addition, the accuracy and reliability of the proposed system are verified in comparison with the existing barcode systems used in various fields (Sung-Hoon and Myung-Jin, 2007; Anonymous, 2013).

MATERIALS AND METHODS

Outline of electric power simple transportation device: RFID (Radio Frequency Identification) refers to a device that stores information necessary for a small IC chip and attaches the device, the study or living creature to each other and wirelessly communicates with the host and the terminal. The RFID system using the resonance principle of electromagnetic wave has a wide application field

Table 1: Comparison of RFID and Barcode

| Variables | RFID | Barcodes |
|--|-------------------------|-------------------------|
| Communication medium | Using radio waves | Visible light, infrared |
| Recognition method | Non-contact, non-aiming | Contact, aim |
| Recognition distance | Distance | Near |
| Number of simultaneous recognition information | Multiple information | Single information |
| Recognition information capacity | Large capacity | Small capacity |
| Move information recognition | Possible | Impossible |
| Obstacle permeation | Possible | Impossible |
| Changing information | Possible | Impossible |

because it can be widely used from a remote area than a barcode system which is used for similar functions (Table 1).

An RFID chip is a principle that reads information of a semiconductor chip attached to or embedded in an object through radio frequency communication. PRFID is an ultra-small chip that can be attached to a necessary object by means of tags, labels, cards, etc. and can be read by a dedicated terminal, a computer or a smart phone. The RFID recognition system is called an electronic tag or a smart tag, an electronic label or a wireless identification. RFID system consists of tag, reader and antenna for communication. RFID recognition system. It is a recognition system that reads data stored in a semiconductor IC chip remotely using radio frequency and can recognize and manage information in various fields. There is a conventional barcode method that recognizes the information. It can recognize the data by directly touching the object or orienting the reader. In addition, it is impossible to recognize or modify multiple pieces of information at the same time and it is impossible to recognize information even when there is an obstacle between the tag and the reader. The RFID recognition system can compensate for the disadvantages of the bar code method and can read a plurality of information freely from various directions in a non-contact manner from a distance and can process a larger amount of data than a bar code method. The speed of reading data is also faster than the barcode method of the RFID recognition system and the reliability of the result of processing the data is high. The RFID system consists of a tag, an antenna and a reader. The tag and the antenna send the information wirelessly from several meters to several 10 m and the reader receives the signal and decodes the product information and sends it to the computer. All of the tagged items can be checked or tracked automatically anytime and anywhere and the tag can be updated and modified with the built-in memory. It is also, possible to record data repeatedly according to the type of the RFID tag and it can be used semi-permanently as long as there

is no physical damage Finkenzeller, 2010; Want, 2006; Juels, 2006; Kyu-Young and Yun-Hee, 2014; Sung-Hoon and Myung-Jin, 2007).

We investigated RFID tag system to utilize RFID tag for the accident prevention sound system. RFID tag system is a recognition technology to share information through wireless. Similar tag system is used for various purposes such as barcode system and beacon system. Among them, RFID tag is a validated wireless information sharing system and it is suggested that it is suitable to be used in the system of accident prevention alarm system. The RFID system requires a reader that can read RFID tags and RFID chip tags and it needs an intermediate relay antenna (Want, 2006; Juels, 2006; Kyu-Young and Yun-Hee, 2014; Sung-Hoon and Myung-Jin, 2007; Chan-Jung and Myung-Jin, 2007; Tae-Min, 2007).

The RFID tag can be divided into an active type requiring power depending on whether there is a power supply or a passive type operated by an electromagnetic field of a reader without supplying power directly from the inside or the outside. Active type has the advantage of reducing the required power of the reader and distancing the recognition distance from the reader. However, because it requires a power supply unit, it is limited in operation time and is disadvantageous in that it is expensive compared to passive type. On the other hand, the passive type is very light and cheaper than the active type and can be used semi-permanently but it has a short recognition range and consumes much more power in the reader.

The RFID reader has an electronic circuit part that sends and receives radio waves toward the tag. The microprocessor in the reader is stored in the memory which is a storage device and has a function of converting the signal coming from the tag, verifying the signal of the data and transmitting the data. The antenna used in the reader may be included in the case together with the electronic circuit part which can exchange radio waves or it may be separated by itself. The tag has an antenna connected to the semiconductor chip and a condenser for the radio wave tuning. The size of the semiconductor chip has recently been developed up to a size of 0.4 mm. The size of the electronic tag depends on the built-in battery and the frequency band (Finkenzeller, 2010; Hoon and Jin, 2010; Poole *et al.*, 2005; Beckers *et al.*, 2004; Doo-Hoon and Myung-Jin, 2013; Park and Bae, 2016; Kyoung and Jin, 2015).

RFID processing system RFID technology is classified into low frequency and high frequency systems according to operating frequency. Low frequency systems with frequencies below 300 MHz are typical

frequencies of 125 kHz and 13.56 MHz. Low tag, small amount of data storage, short reading distance and omnidirectional antenna. The high-frequency system has an operating frequency of 400 MHz or more, 860–930 and 2.450 MHz. It has a long read distance, especially, from a few meters to 10 m or more and is suitable for moving objects or multi-tag packages that need to be recognized very quickly and has a directional antenna.

The RFID system operates by inputting information suitable for the purpose of use in an RFID tag, attaching the information to objects related to people, objects, animals, etc., detecting the RFID tag through the antenna and transmitting the wireless signal to the reader (Fig. 1). The RFID tag can store various information and transmit the data stored in the RFID tag to the reader in response to the reader's signal through the antenna. The digital signal information of the RFID received by the reader through the antenna is decoded by the original program and processed by the main CPU. The reader which reads the digital information stored in the RFID through the antenna is attached to a smart phone, a workstation, a terminal, a tablet PC or other unique equipment.

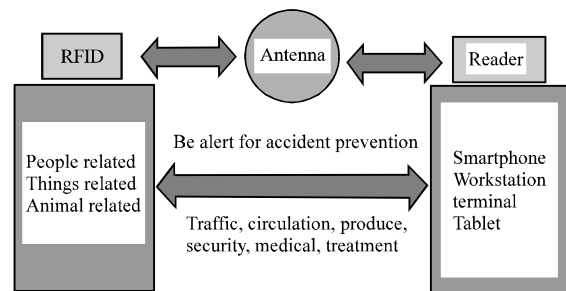


Fig. 1: RFID operation overview

RESULTS AND DISCUSSION

Application examples of RFID: RFID is already widely used in our everyday lives. The information sharing system using RFID is composed of RFID tags, antennas and readers and tags attached to various objects can be utilized by storing customized information according to the situation and environment as needed. For example, information about the whole process of production, distribution, storage and consumption is recorded in the RFID tag, so that, the reader can read this information through the antenna, so that, the transparency, safety and ease of management of the distribution process. It is also useful in many other places around us (Fig. 2).

The daily traffic card is one of the typical RFID tags and RFID tags are attached to the objects in high pass systems, libraries, marts and department stores on the highways. In addition to this, it is used to check the movement, import and export information of products in the distribution/logistics/transportation field to reduce the labor cost and management cost and it is also used for the management of attendance and access control do. It is also used for the purpose of preventing the forgery and alteration of the history of agricultural products such as Korean beef and ginseng and the management of medicines. RFID is considered to be the next generation recognition technology to replace the barcode used for goods management in the distribution field. It is used in conjunction with information systems in connection with satellite or mobile communication network. When applied to a large discount store, the price of goods can be counted as soon as they pass through the cash register which can save a great deal of time. And the point that you can modify or delete information is also different from the barcode (Juels, 2006; Kyu-Young and Yun-Hee, 2014).

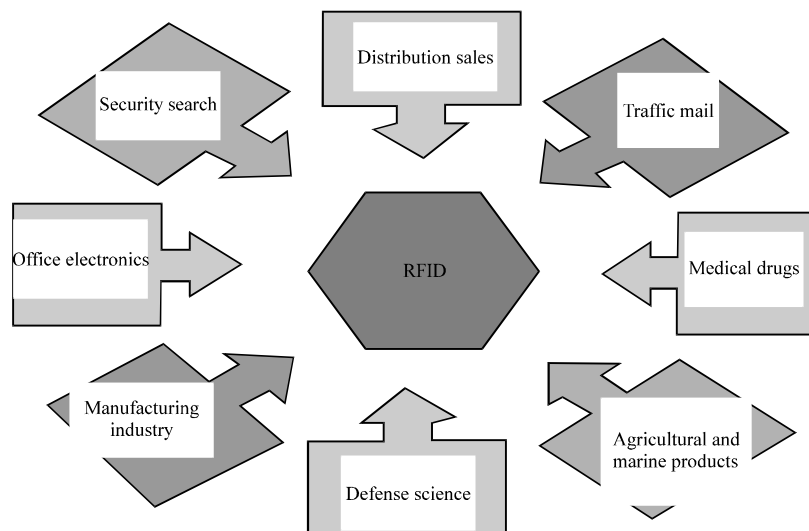


Fig. 2: RFID application example

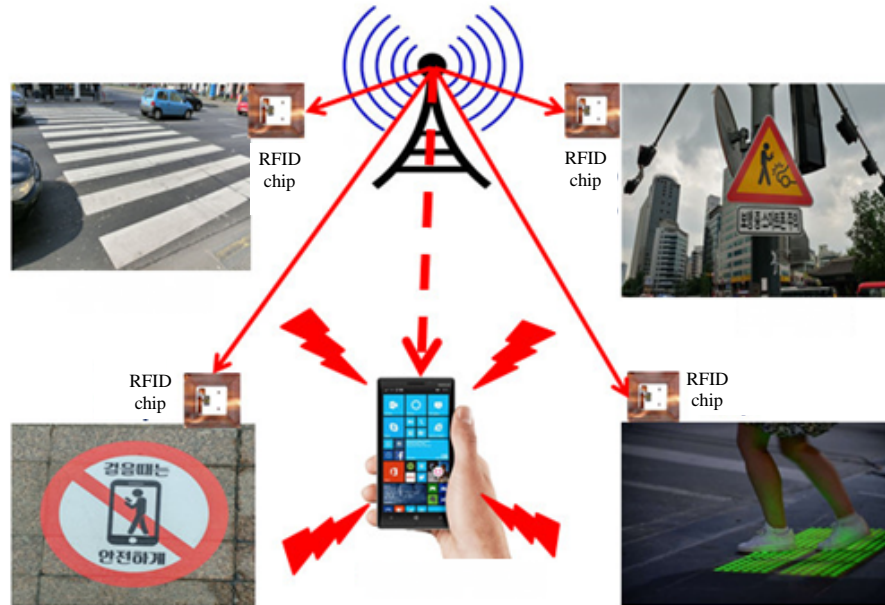


Fig. 3: Warning sound system for prevention of accidents by using RFID

Use of RFID to prevent accidents: The proposed beeping system for the prevention of the accident is proposed to use GPS and GIS through satellite but it is suggested to use RFID device because of the large error range of satellite for measuring distance from smartphone. The anti-spam warning system using RFID tags is a more aggressive warning system that attaches RFID tags to warning signs, dangerous roads, crosswalks, various objects, accident-dangerous areas and branches, beep system (Sung-Hoon and Myung-Jin, 2007; Chan-Jung and Myung-Jin, 2007) (Fig. 3).

CONCLUSION

The accident caused by the accident is very serious and a solution is urgently needed. Various measures have been taken and implemented in order to prepare countermeasures against accidents in the world as well as all over the world. For example, the sign for Ssangwi is the road for Daumjisumbi, the signal for Ssumbi LED bottom and the sticker for Ssgmbi. However, because the number of accidents is increasing rather than decreasing, a more active preventive system is needed. As an alternative, we proposed a system to prevent accidents by using a satellite. However, since, the satellites are relatively low in accuracy, this study proposes a new system for the prevention of accidents by using more accurate RFID. An RFID chip is a recognition technology that shares information with an IC (Integrated Circuit) chip through wireless communication. The RFID chip attaches to moving objects and dangerous structures or boundary

points and works with the smartphone to generate a beep when a danger is detected. Although, the barcode system is used in various fields with similar principle, it is concluded that it is not enough to apply it to the accident prevention system for accident prevention due to its narrow range of applications. In the future, it is hoped that various materials will be developed and studied and it will be applied to the accident prevention system for accident prevention.

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