Application of Rfid Technology in Intelligent Electronic Shopping Cart

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ABSTRACT
The obvious advantage of RFID is that you now know exactly where your goods are at any given point in time and can develop processes to act on this information. However, the amount of information that will be generated by RFID infrastructure is on the verge of exploding. RFID technology, while generating an unprecedented amount of data, is only as valuable as the resulting information and knowledge that can be derived. The mere data is of little or no value. This proposed project is for shopping paths and their relationships to the purchased items. In this experiment, we build a data set generator for shopping paths and purchased items of customers, and the results show that our model is applicable to real-time application.

Keywords: RFID tag, RFID reader, Transceiver, RFID technology, Intelligent cart.

1. INTRODUCTION
The recent decade has seen an increasing trend in the adoption of radio-frequency identification (RFID) technology in supply-chain management. Concomitant with growth in importance of efficiency in supply chains, the motivation for business world to employ RFID technology is evident. Several influential retail-chain conglomerates have already adopted or are seriously considering to adopt RFID technology. Given its outstanding features of being used without direct line of sight and being able to store detailed item-level information, RFID tags benefit supply-chain management with tracking, locating, and identifying individual items throughout the supply chain. Zigbee protocol transmits the data from trolley to PC. Each and every product will be attached with RFID card to detect the products from trolley. Controlling and data transferring is done by Microcontroller unit which is already programmed according to our convenience. A switch is connected for the control. Whenever the RFID card or products with RFID label is shown to the RFID reader, the factors such as cost of the product, expiry date are sensed by the controller and displayed on the LCD. Also, the number of products taken can be displayed on the LCD. If the product is retrieved back from the trolley to replace it in the shelf, then the product count is decremented. All these details sensed will be sent to the PC at the billing section simultaneously.

2. LITERATURE SURVEY
In recent years a deep structural change has occurred, with consequences on economic growth and society, especially in factors such as territorial occupation, urbanization, openness to global markets, demography, family structures and cultural and consuming patterns. Innovation in communication and information technologies have caused a revolution in values, knowledge and perceptions in practically all areas of human understanding, deeply carving the so-called “Age of Information and Knowledge”.

The grocery industry sector is nowadays extremely important in worldwide economy, with its recent evolution in technological, political, social and economic terms making it one of the most convenient and diverse business across the globe. In their journal “Consumer perceptions of privacy, security and trust in ubiquitous commerce”, it has been mentioned that the proliferation of electronic commerce technologies has utterly transformed the way business is conducted. Causes range from the introduction of new mobile technologies and ubiquitous computing, to the recognition by business of the strategic benefits offered by the implementation of communication and ubiquitous computing structures, to the emergence of new business models made possible due to the new technologies and to the development of new economies that can be
used to understand and value the ubiquitous commerce activity. The challenges and opportunities created by electronic business in the supply chain have caused the sharing of information between business partners to improve operational performance, consumer service and solution development. Businesses have evolved from the sharing and coordination of information to the sharing of knowledge and advanced cooperation practices. The emergence of new technologies, such as Radio Frequency Identification (RFID) and wireless networks, makes the traditional retail processes faster, transparent and efficient. The technology represents to retailers an opportunity to reduce costs and to improve services, allowing to attend clients quickly, precisely and supplying personalized services. The advances in manufacturing, distribution and information combined with the urbanization of modern society and socio-demographical changes created the so-called new consumer. The consumer has a deeper understanding in comparing product costs; is more versatile in brand preferences; shows little loyalty to retailers; has great expectations in services and client regard; is self-sufficient and is more demanding towards supplied information. There was a clear control transference from the manufacturers and retailers to the consumer. Strong competition between larger retail chains caused the minimization of profit margins as a form of keeping aggressive prices and winning more clients.

3 OBJECTIVES

The RFID powered electronic shopping cart is built to enhance the overall shopping experience of consumers. Upon placing an item in the shopping cart, the consumer can get the product information, product specifications. This proposed model has made a practical attempt with RFID deployment model for collecting shopping paths and purchased items of customers. RFID (radiofrequency identification) technology offers the ability to provide many new services and conveniences in the retail environment. Smart shopping carts with electronic displays are in communication with a retail computer system. The smart cart, also equipped with RFID tags, can also verify the purchase of the items as they are placed in the cart and communicate with a billing system to automatically bill the shopper for the purchases.

3 BLOCK DIAGRAM

3.1 Trolley section

Each and every product will be attached with RFID tag to detect the product from the trolley. ZIGBEE protocol transmits the data from trolley to PC. Controlling and data transferring is done by Microcontroller unit which is already programmed according to our convenience. A switch is connected for the control.

3.2 Billing section

The data is received by the receiving ZIGBEE module. ZIGBEE is a specification for a suite of high level communication protocols using small, low-power digital radios based on an IEEE 802 standard for personal area networks. An RS-232 serial port interface is connected to the PC and the received data is displayed in the billing section.

Figure 3.1 Transmitter Block Diagram

Figure 3.2 Receiver Block Diagram
3.3 RFID

Radio-frequency identification (RFID) is an automatic identification method, relying on storing and remotely retrieving data using devices called RFID tags or transponders. The technology requires some extent of cooperation of an RFID reader and an RFID tag. An RFID tag is an object that can be applied to or incorporated into a product, animal, or person for the purpose of identification and tracking using radio waves. Some tags can be read from several meters away and beyond the line of sight of the reader. There are different types of RFID systems out in the market. They are categorized according to their frequency ranges. Some of the most commonly used RFID kits are as follows:

4. CONCLUSION

We have also learned the architecture of the system that can be used in the shopping systems for intelligent and easy shopping in the malls to save time, energy and money of the consumers. It is clear that the false reading is a serious problem that needs to be addressed before RFID tags gain widespread use. Since RFID generated data are among the lowest level inputs in a firm’s decision-making process, they have the potential to translate to significant levels of magnitude through bullwhip effect. Our model performs poorly when multiple readers simultaneously result in low read-rate accuracy, even though such a situation is rare but not impossible to encounter in any realistic setting. RFID has a wide scope in the supply chain management. In the future, if all studies are favourable, we will advance with the implementation of a prototype for proposed architecture for testing in a real hypermarket scenario because RFID is a technology that has the potential to improve our lives to a very great extent.

5. FUTURE SCOPE

When arriving at the supermarket, the consumer heads towards a shopping cart that has a technological system on its handle-bar which consists in a touch-screen monitor a client card automatic reader, a positioning transmitter and a product reader. Nevertheless, all these technologies become transparent to the consumer because only monitor interaction will occur. Through the client card, the consumer logs in to the system; the system then welcomes the consumer and displays the shopping list. With the help of the shopping cart’s navigation system, the client is directed to the locations where the products in the shopping list can be found. The client places the products in the shopping cart in the usual way and begins to receive multiple information: the products found inside the cart; the ones missing; total paying amount; total promotional savings; product details; amongst others. If the client needs 200g of sliced cheese from the cheese-dairy section, it can be ordered through the system. By passing the wine aisle, a message appears referring to an interesting promotion on the client’s favorite red wine. The client places two bottles in the shopping cart because one of them is free.

Meanwhile, a message advertises that the sliced cheese order is available near the cheese-dairy section. The client passes through and places it on the cart. Suddenly, it comes to her/his mind she/he has not thought of the dinner yet and checks the recipes that the system has to offer. By choosing a recipe, the client orders the system to add to the shopping list the needed products and sends the recipe to the client’s e-mail box. After the remaining products are found in the shopping cart, the client heads towards the exit where it is not necessary waiting to pay. At the exit, the client sees on a screen the list of products in the cart, the total paying amount and the total promotional savings and offerings. The client confirms the payment through the client-card and leaves the previous scenario completely revolutionizes the present way of shopping. It becomes evident that an RFID network needs to handle a lot of different data attributes other than tagged product information. So, an RFID solution will have to be specifically engineered to recognize and make sense of new data attributes. What becomes readily apparent is that a new paradigm is needed to manage the raw data generated by an RFID network

6. SIMULATION RESULT
REFERENCES


