

Smart Shopping Cart for Automatic Billing in Supermarket

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Abstract

The most valuable thing in today's world is time, people are referring those things which consumes less time. Billing in Shopping mall takes lot of time. Billing of products from mall is quite difficult because it takes more time as people have to wait for a long time in a queue for billing. Looking at the advancement in technology, we came up with an innovative idea of "Smart Shopping Cart for Automatic Billing in Supermarket. This project consists of RFID reader, motion detector sensor, Liquid Crystal Display, push buttons, switches and Zigbee. If user wants to use smart trolley functions then start button should be pressed. When a user put some product in trolley then its code will be detected using RFID reader and cost of a product added to the list and sensor will sense the direction of motion of the product for fault detection and buzzer will be on if fault detected. In case, if user wants to remove some product then user should press the remove switch and product code will be detected by RFID reader and again for any false activity buzzer will be on. At last, counter with least number of queues will be detected and displayed on the cart LCD. Then, the final bill will be transferred to the costumer using GSM.

Keywords— LCD, RFID module, GSM, RFID tag, sensors

I. INTRODUCTION

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 in 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 businesses across the globe. In their journal "Consumer perception of privacy, security and trust in ubiquitous commerce" mentioned that the proliferation of electronic commerce technologies has utterly transformed the way business is conducted, causes range from the 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 cause the sharing of information between business patterns to impure operational performance, consumer service and solution development. Businesses have evolved from the sharing and co-ordination of information to the sharing of knowledge and advanced co-operation practices. The emergence of new technologies such as radio frequency identification device (RFID) and wireless network makes the traditional retail processes faster, transparent and efficient. The technology represent to retails and opportunity to reduce costs and to impure services, allowing to attain clients quickly, precisely and supplying personalized services. The advances manufacturing, distribution and information combined with the urbanization of modern society and social demographical challenges 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 clear control transference from the manufacturers and retailers to the consumer. Strong competition between larger retail changes caused the minimization of profit margins as a form of keeping aggressive prices and winning more clients. Today, this is

no longer enough. One has to bet on offer differentiation and in the adoption of client retention strategies through the strengthening of the relation with the consumer, allowing adequate answers to the clients' needs through personalized service and promotion plans that augment their satisfaction and, most importantly, their enthusiasm. RFID tag, or simply "tags", are small transponders that respond to queries from a reader by wirelessly transmitting a serial number or similar identifier. They are heavily used to track items in production environments and to label items in supermarkets. They are usually thought of as an advanced barcode. However, their possible area of use is much larger. This paper presents a few new applications that are possible using RFID technology such as locating lost items, tracking moving objects, and others. RFID tags are expected to proliferate into the billions over the next few years and yet, they are simply treated the same way as barcodes without considering the impact that this advanced technology has on privacy. This paper presents possible exploits of RFID systems and some proposed solutions as well. RFID is the special type wireless card which has inbuilt the embedded chip along with loop antenna. The inbuilt embedded chip represents the 12 digit card no. RFID reader is the circuit which generates 125KHz magnetic signal. This magnetic signal is transmitted by the loop antenna connected along with this circuit which is used to read the RFID card no. In this project RFID card is used as security access card. So each project name. RFID reader is interfaced with microcontroller. Here the microcontroller is the flash type reprogrammable microcontroller in which we already programmed with card no. the microcontroller is interfaced with keypad.

II. LITERATURE SURVEY

In[1], The authors "Galande Jayshree, Rutuja Gholap, Preeti Yada" proposed RFID based automatic billing trolley, with this model the system consists RFID reader and the products in the malls equipped with RFID tags. When a person puts any product in the trolley its code will be detected by RFID reader and the price of the product will be stored in the memory. At the billing counter the total bill data will be transferred to the pc by wireless RF modules.

In[2], The authors "S.Sainath, K.Surender, V.Vikram Arvind" proposed a model Automated Shopping Trolley for supermarket Billing system in which the automated shopping trolley is a smart trolley which integrates a raspberry pie embedded chip with two barcode scanners and a battery kit to allow users to self check out at supermarket.

In[3], the authors "Mr. Yathisha L, Abhishek A, Harshit R, Darshan Koundinaya" proposed a model automation of shopping cart to ease queue in mall by using RFID module and Zigbee module.

In this system we are using RFID tags instead of bar codes, whenever a customer puts a product into a trolley, it will get scan by RFID reader and product price and it will be displayed on the LCD. We are using zigbee transmitter which is used to transfer the data to the main pc.

In[4], the authors "Jadhav Rahul, Pradeep, Nandkumar, Tarali ShivkumarJ" proposed a model of RFID based automated billing trolley. In this technology, the communication is in between RFID tag and reader, each tag has magnetic strip with specific code and tag is read by RFID Reader module. The automated billing system based on the passive RFID provides suitable solution to the manual billing method in shopping mall.

In[5], The authors "Udita Gangwal, Sanchita Roy, Jyotsna Bapat" proposed a system of smart shopping cart for automated billing purpose using wireless sensor networks. In this paper authors describing the implementation of a reliable, fair and cost efficient shopping card using wireless sensor networks.

In[6], the authors "Kalyani Dawkar, Shraddha Dhoma, Samruddhi Mahabaleshwarkar" " proposed a model of electronic shopping cart for effective shopping based on RFID in which a system consist of smart trolley will have RFID reader, lcd display. When the person puts a product in trolley it will scan and the cost, name and expiry date of the product will be displayed.

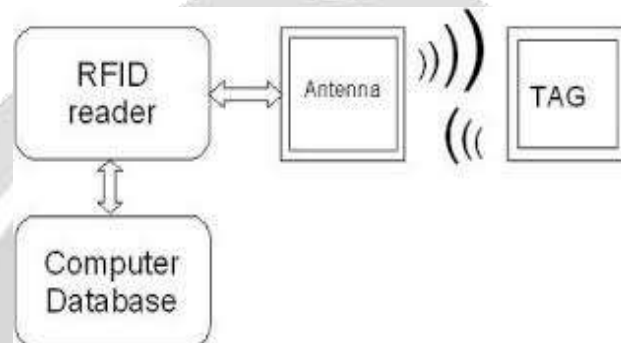
In[7], the authors "Ynajun Zuo" describes the importance of RFID for automatic item identification and data capture. He developed a secured tag reader authentication protocol to ensure the authenticity of RFID readers.

III. SYSTEM METHODOLOGY

RFID Tag- An RFID tag is comprised of an integrated circuit (called an IC or chip) attached to an antenna that has been printed, etched, stamped or vapor-deposited onto a mount which is often a paper substrate or PolyEthylene Therephtalate (PET). The chip and antenna combo, called an inlay, is then converted or sandwiched between a printed label and its adhesive backing or inserted into a more durable structure.

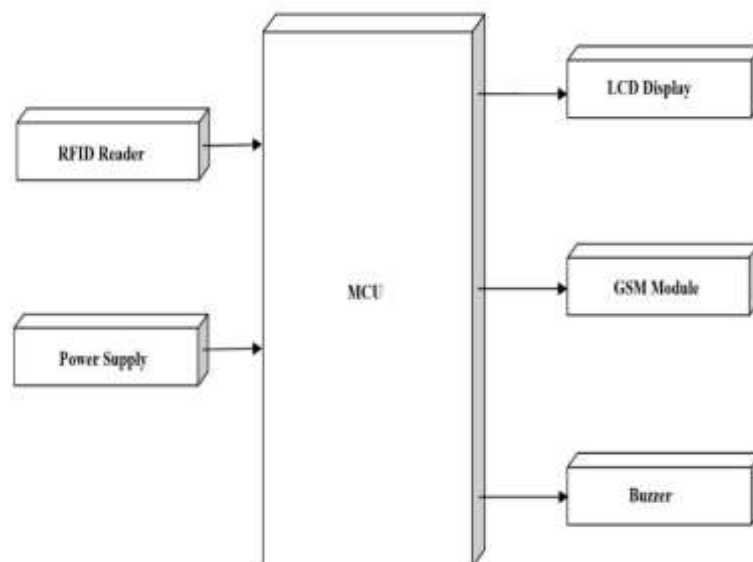


RFID Tag

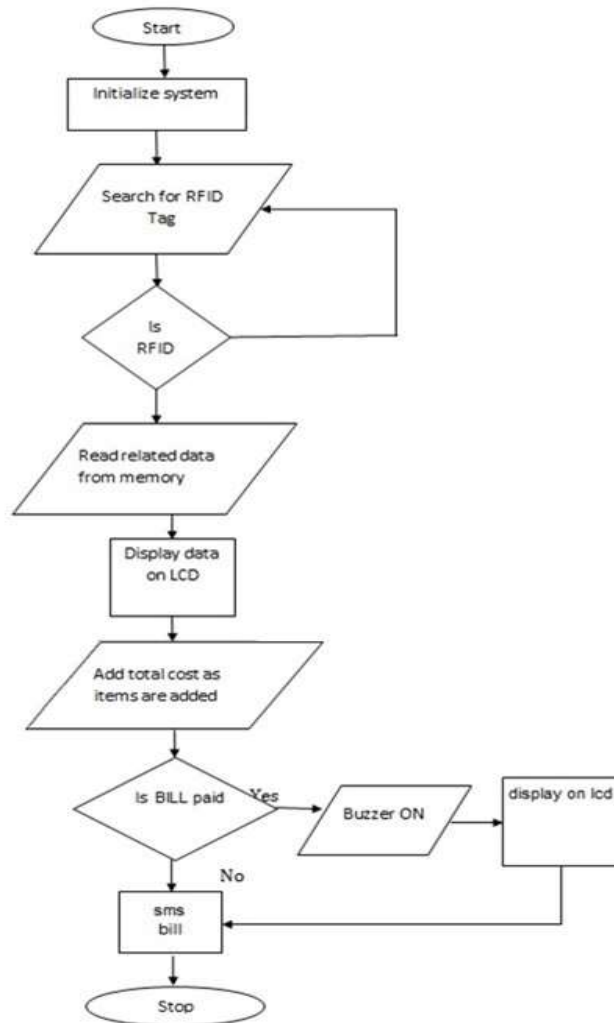


RFID Reader

IV. SYSTEM DESIGN



V. SYSTEM ARCHITECTURE



VI. CONCLUSION

This RFID system can be used in shopping malls for various ranging food products, electrical appliances, clothing etc and can be used for security applications by keeping data confidential. In future card payment facility will be available on the cart itself. Previous shopping list of user will be displayed on the cart. Location of the product will be directed to the user on the cart.

References

- [1] G. Eason, B. Noble, and I. N. Sneddon (April 1955), "On certain integrals of Lipschitz-Hankel type involving products of Bessel functions," *Phil. Trans. Roy. Soc. London*, vol. A247, pp. 529–55.
- [2] J. Clerk Maxwell (1892), *A Treatise on Electricity and Magnetism*, 3rd ed., vol. 2. Oxford: Clarendon, pp.68–73.
- [3] I. S. Jacobs and C. P. Bean (1963), "Fine particles, thin films and exchange anisotropy," in *Magnetism*, vol. III, G. T. Rado and H. Suhl, Eds. New York: Academic, pp. 271–350.
- [4] Y. Yorozu, M. Hirano, K. Oka, and Y. Tagawa (August 1987), "Electron spectroscopy studies on magneto-optical media and plastic substrate interface," *IEEE Transl. J. Magn. Japan*, vol. 2, pp. 740–741.
- [5] M. Young (1989), *The Technical Writer's Handbook*. Mill Valley, CA: University Science.