

Automated Billing System in Super Markets Using RFID Technology

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Abstract: A Supermarket is a place where customers purchase their daily products and pay accordingly, it is a hectic to stand in a long queue for billing all goods. The person at the billing counter prepare a bill using barcode reader. To overcome this technology, we are proposing an automated smart trolley with RFID technology. All the products in a supermarket are equipped with RFID tags, so when a customer drops any product in a trolley. The tags are automatically read by RFID reader, finally when the shopping is completed total cost and number of products are displayed on LCD screen which is equipped on trolley. And the same data will be sent to the host system through AWS which is helpful to owner regarding product sales and can observe real time business done in supermarket.

Keywords: RFID, AWS

1. Introduction

With the growing economy urbanization and industrial growth. Now a days there has been a significant impact in the market with the grocery store playing vital role in a worldwide economy. The emergence of RFID makes the traditional retail process efficient. This technology presents an opportunity to the retailer to reduce cost and to improve services allowing the customers to attend quickly and satisfying them successfully. The bill is generated automatically on the LCD display when the reader detects the products RFID tag. This new technology is useful in today's life by reducing the lots of efforts and human work.

2. Literature Survey

Bichlein Hoang, Ashley Candill and Mandeep Kaur have discussed about radio frequency identification technology. They described radio frequency principles, standards and areas where it can work.

P. Rohitha, P. Ranjeet Kumar, Prof. N. Adinarayana, Prof. T. VenkatNarayanarao and Dr. S. S. Riaz Ahmed have discussed about Zigbee technology. They described Zigbee technology applications, characteristics, different types of Zigbee technologies, architecture.

S. Raghupathi and V. Karthikeyan have discussed about Context Aware Shopping Trolley (CAST) technology. They described the implementation steps for automatic billing using CAST technology.

3. System Architecture

- When the customer enters into a supermarket, she/he picks a shopping trolley. Each trolley is associated with RFID reader, LCD display and Raspberry Pi board.
- Every product in supermarket has a RFID tag which contains a unique id. They are fed into the database assigned to the corresponding products.

- When the customer drops any product into a trolley, then the tag is read by RFID reader, the data of the product is extracted and displayed on the LCD screen.
- Once the shopping is done customer need to swipe a confirm tag over a RFID reader to ensure that the shopping is completed.
- If the customer wants to reset the shopping after the completion of shopping, he as a choice of resetting the shopping by swiping a reset tag over a RFID reader.
- If the customer wants to delete the particular item/product from the cart, he as a choice of deleting that specific item/product by swiping a delete tag over a RFID reader.
- Here we used AWS for authorization and authentication of data. AWS is a secure cloud service platform, purpose of AWS is used to store a data on cloud.
- The cart is encrypted with a Raspberry Pi. It is connected with internet as well, it runs through battery. All the interactions in the cart are updated in the shopping complex in real-time.
- Each RFID system is connected with the main host of shopping complex using internet. This connectivity helps in faster billing process without any delay and easy management of shopping complex is assured.
- The communication between an AWS and Raspberry Pi is enabled by an effective medium called MQTT. MQTT enables fast communication from sender to receiver. Here now in AWS data received from RFID reader is cross checked and stored in a shadow buffer.
- After a data authentication is done by AWS. First it sends the data to the database i.e., Dynamo DB. Dynamo DB is a noSql database run by AWS. The database is stored in a cloud but programs can be tested and developed locally.
- Second, AWS will send the message to the customer through email or by a SMS and finally it will send the data to stock agency regarding product sales. This overall process is completed in few seconds.

4. Advantages

- 1) More efficient compared to existing system.
- 2) Huge rush at billing counter can be reduced.

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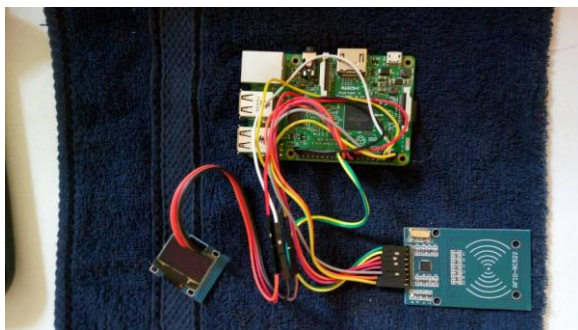
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- 3) No need of repetitive checkouts.
- 4) Time consuming is less.
- 5) This is reliable system.

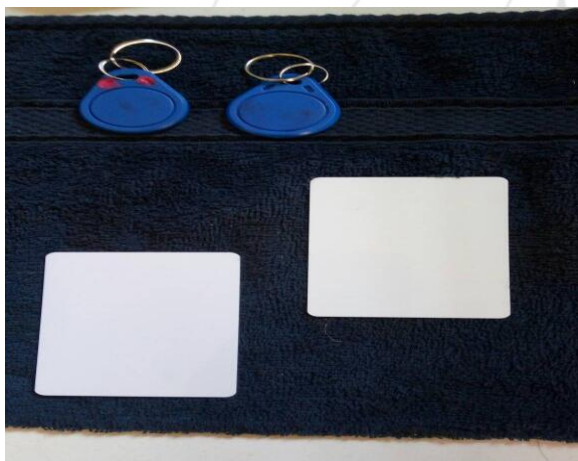
5. Disadvantages

- 1) It cannot operate in high/low temperatures.
- 2) Initial implementation cost is expensive.
- 3) RFID technology is expensive than barcode technology.
- 4) RFID technology is bit harder to understand.
- 5) RFID tags are larger than barcode labels.

6. Snapshots



1. View of RFID product



2. RFID tags

7. Conclusion

By means of this paper, we intent to simplify the billing process by using RFID technology. The developed product is easy to use, cost-effective and does not need any special training. This system based on RFID technology is efficient, and it shows the promising performance.

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