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Efficient Id Based Secured Trolley Systems Using Rfid and 802.15.4 Technology

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ABSTRACT -A shopping mall or complex is a place where people buy products for their regular use. Customers have to wait in long queues to get their products scanned using bar code scanner and get it billed. To overcome this, we propose 'Smart Shopping Trolley using RFID (Radio Frequency Identification). This implementation is used to assist a person while shopping and also helps to avoid standing in long queue and thus saving time. The smart shopping trolley would consist of a Microcontroller, RFID Reader and an Electronic Display. The products in the shopping centers will have RFID tags to retrieve access information about it. When a customer places a product in the smart trolley, the RFID Reader will read the Product ID and the information related to it will be stored in controller. There will be communication between main server and billing system (gate system) via transmitter and receiver module. The total amount of the products in the trolley will be calculated using android device and will be updated on server and the Central billing System.

Key Words: IoT, RFID, Arduino, android application, Bluetooth, smart shopping cart, sensors.

I. INTRODUCTION

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 businesses across the globe. In their journal "Consumer perceptions 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 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.

II. LITERATURE SURVEY

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Now a day's interest in shopping malls is widely increasing among people. People get daily necessities from shopping malls. There is an emerging demand for easy and quick payment of bills in shopping malls. Shoppers are frustrated at locating the items on the shopping list when shopping in shopping malls and when no assistance is available in shopping. To eliminate these problems, each product in the shopping mall will be provided with a RFID tag, to identify its type. Each shopping cart is implemented with a Product Identification Device (PID) that contains a microcontroller, an LCD, RFID reader and a ZIGBEE transmitter. RFID reader will read the purchasing product information on the shopping cart and the information about the product is displayed on LCD which is interfaced to the microcontroller. At the billing counter, the total bill will be transferred to PC at the counter side by using ZIGBEE module.

Sustainable Online Shopping Logistics For Customer Satisfaction And Repeat Purchasing Behavior

This study examines the impact of the quality of online shopping logistics services on customer satisfaction and in driving subsequent repeat purchasing behaviour. Five hypotheses are established to represent the relationships between customer satisfaction and each factor of logistics services: quality of information, quality of order, quality of delivery, price of delivery, and customer service. The research includes surveys conducted over two months from 1 December, 2016, to 31 January, 2017, targeting mostly young Chinese customers with experience purchasing products online, thus representing e-commerce. A questionnaire was distributed to each subject in a sample of 150 Chinese

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customers with online shopping experience. The empirical analysis indicates that logistics service quality, and primarily the quality of delivery, has a statistically significant impact on customer satisfaction, which, in turn, has a statistically significant impact on repeat purchasing behavior. The results provide insight into the strategy behind China's rapidly growing online shopping industry, which focuses on maintaining stability through long-term customer relationship management

Machine-To-Machine Wireless Communication Technologies For The Internet Of Things

Machine-to-Machine (M2M) communication technologies enable autonomous networking among devices without human intervention. Such autonomous control is of paramount importance for several deployments of the Internet of Things (IoT), including smart manufacturing applications, healthcare systems and home automation just to name a few. As a result, several M2M technologies are nowadays available on the market as either proprietary solutions or the effort of standardization initiatives, each targeted for a specific class of IoT applications and characterized by unique features in terms of achievable performance, frequency in use and supported network topologies. In this paper, we aim to organize the existing M2M approaches and technologies into a consistent framework that provides an in-depth vision of the main trends, future directions and open issues. We provide three main contributions in this survey. First, we identify the main use cases and requirements of M2M scenarios and we introduce a multi-layer taxonomy for M2M solutions, taking into account both deployment types and PHY/MAC characteristics. Second, in light of such characteristics, we provide an in-depth review of the existing M2M wireless technologies, considering both proprietary and open/standardized solutions for proximity-based, short-range and large-scale networks. Finally, we perform a critical comparison of the surveyed solutions over different M2M use cases and requirements, and we identify the research directions and open issues that still have to be addressed.

III. PROPOSED METHODOLOGY

In our project we implement easy way of purchasing by using RFID based Trolley. Our implemented Trolley has LCD display, keypad and Voice board. LCD displays added amount for each product we purchased. Voice board gives information about each product like product name, any offer and product expire details. So duplication of product is avoided. And also there is no need for guidance to explain about the product details. Then we can assign the fixed amount, while we purchase if the buying product exceed the particular fixed amount its gives warning via buzzer. Those data will transmit in counter section to display in PC to generate a bill. Also we are using RF communication for child unit. If child cross a particular zone alerts given via buzzer.

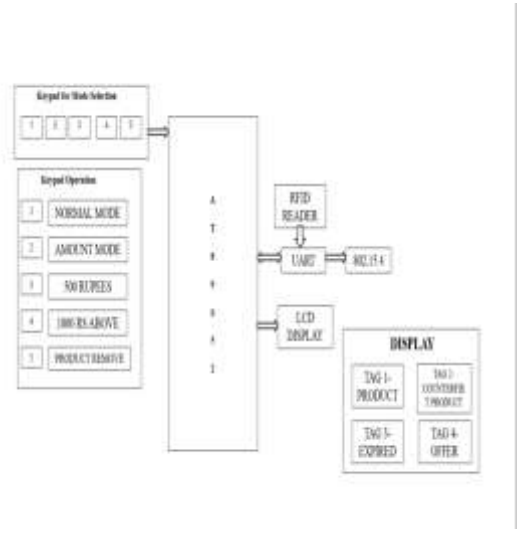

Figure 3.1 Block diagram of the Proposed Trolley system

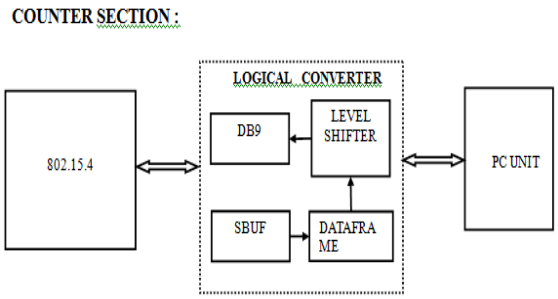

Figure 3.2 Block diagram of the Proposed Counter Section

ADVANTAGES OF PROPOSED SYSTEM

1. Easy to use and reduces man power.
2. Safe, secured and needs low power.
3. It is echo friendly; with this we can eliminate usage of paper.
4. It very attractive and eye catching.
5. Easy to shop
6. Easy to use
7. Flexible

AT89S52 MICROCONTROLLER

The AT89S52 is a low-power, high-performance CMOS 8-bit microcontroller with 8K

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bytes of in-system programmable Flash memory. The device is manufactured using Atmel's high-density non-volatile memory technology and is compatible with the Indus-try-standard 80C51 instruction set and pin out. It is mainly used to control all the operations performed by the system.

RFID

RFID devices have been used for years to identify dogs, for a means of permanent identification. Dog owners had long used tattoos, permanent ink markings, typically on the ears. However, these can fade with age and it may be difficult to get the animal to sit still while you examine him for markings.

Many musical instruments are stolen every year. For example, custom-built or vintage guitars are worth as much as $50,000 each. Snag, a California company specializing in RFID microchips for instruments, has embedded tiny chips in 30,000 Fender guitars already. The database of RFID chip IDs is made available to law enforcement officials, dealers, repair shops and lathers.

RFID - THE APPLICATIONS

RFID systems can be used in a variety of ways. There are many RFID applications which have gained popularity over the past years:

- Store product identification - RFID technology can be used within shops and stores as a form of alert for goods that have / have not been paid for.
- Asset tracking - RFID systems can monitor when RFID tags pass given points and in this way track the assets.
- Airline baggage identification - airlines need to monitor where baggage is and route it to the required destination. RFID tags can be attached to the bags to automate baggage routing
- Parts identification - Data can be written to an RFID tags defining the identity of a part. This can then be used within a manufacturing, stock holding or other process to identify and locate parts.
- Production control - when items are manufactured they pass through many stages. RFID tags can be attached to items. These can be updated each time the item passes through a stage in production. This will enable the manufacturing system to track all items and know what stage they are at, and any other information such as test failures, etc.

A RFID label includes a microchip that contains recognizing data and a recieving wire that will transmit this information remotely to a peruser. The chip will contain a serialized identifier, or tag number, that particularly recognizes that thing, like the way many standardized identifications are utilized today. Be that as it may, a key distinction is that RFID labels have a higher information limit than their scanner tag partners. The time and date of proprietorship exchange or refreshing the repair history of a settled resource are the cases for last ability. While these are the most exorbitant of the three label sorts and are not functional for following reasonable things, future guidelines for electronic item codes (EPC) seem, by all accounts, to be traveled toward this path.

RFID TAGS

Frequencies: There are an assortment of frequencies or spectra through which RFID labels can speak with perusers like every single remote correspondence. There are additionally exchange offs among cost, execution and application necessities.

EPC Tags: EPC alludes to "electronic item code," a rising determination for RFID labels, perusers and business applications initially created at the Auto-ID Center at the Massachusetts Institute of Technology.

RF TRANSCEIVER:

The RF handset is the wellspring of RF vitality used to actuate and control the latent RFID labels. The RF handset might be encased in an indistinguishable bureau from the peruser or might be in a different bit of gear. The handset is regularly alluded to as a RF module when given as a different bit of gear.Typical Applications for RFID include:

1. Automatic Vehicle identification
2. Inventory Management
3. Work-in-Process and Progress
4. Container or Yard Management
5. Document tracking or Jewellery tracking
6. Patient Monitoring in medical stream.

The Advantages of RFID Over Bar Coding:

- There are no "line of sight" requirements: Bar code reads can sometimes be limited or problematic due to the need to have a direct "line of sight" between a scanner and a bar code but RFID tags can be read through materials without line of sight.
- They have greater data capacity: RFID tags can be easily encoded with the product details such as lot and batch, weight, etc.
- It has "Write" capabilities: Because RFID tags can be rewritten with new data as supply chain activities are completed. As they move

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throughout the supply chain tagged products carry updated information.

LCD

LCD (Liquid Crystal Display) screen is an electronic display module and find a wide range of applications. A 16x2 LCD display is very basic module and is very commonly used in various devices and circuits. These modules are preferred over seven segments and other multi segment LEDs. The reasons being LCDs are economical easily programmable have no limitation of displaying special & even custom characters (unlike in seven segments), animations and so on.A 16x2 LCD means it can display 16 characters per line and there are 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix.

UART

A universal asynchronous receiver-transmitter /ˈjuːɑːrt/) is a computer hardware device for asynchronous serial communication in which the data format and transmission speeds are configurable. It sends data bits one by one, from the least significant to the most significant, framed by start and stop bits so that precise timing is handled by the communication channel. The electric signaling levels are handled by a driver circuit external to the UART. Two common signal levels are RS-232, a 12-volt system, and RS-485, a 5-volt system.

It was one of the earliest computer communication devices, used to attach teletypewriters for an operator console. It was also an early hardware system for the Internet.

Data Buffer 9

DB9 is a commonly known connector used in Serial Asynchronous Data Transmission that are are designed to work with the EIA/TIA 232 serial interface standard.The DB style connector is a common connector used in many computer, audio/video, and data applications

Level Shifter

A level shifter (level translator), in digital electronics, also called logic-level shifter or voltage level translation, is a circuit used to translate signals from one logic level or voltage domain to another, allowing compatibility between ICs with different voltage requirements, such as TTL and CMOS. Modern systems use level shifters to bridge domains between processors, logic, sensors, and other circuits. In recent years, the three most common logic levels have been 1.8V, 3.3V, and 5V, though levels above and below these voltages are also used

Serial Buffer

A Serial buffer (or just buffer) is a region of a physical memory storage used to temporarily store data while it is being moved from one place to another. Typically, the data is stored in a buffer as it is retrieved from an input device (such as a microphone) or just before it is sent to an output device (such as speakers). However, a buffer may be used when moving data between processes within a computer. This is comparable to buffers in telecommunication. Buffers can be implemented in a fixed memory location in hardware—or by using a virtual data buffer in software, pointing at a location in the physical memory. In all cases, the data stored in a data buffer are stored on a physical storage medium. A majority of buffers are implemented in software, which typically use the faster RAM to store temporary data, due to the much faster access time compared with hard disk drives. Buffers are typically used when there is a difference between the rate at which data is received and the rate at which it can be processed, or in the case that these rates are variable, for example in a printer spooler or in online video streaming. In the distributed computing environment, data buffer is often implemented in the form of burst buffer that provides distributed buffering service

Data Frame

A **data frame** is a table or a two-dimensional array-like structure in which each column contains values of one variable and each row contains one set of values from each column. Following are the characteristics of a **data frame**. The column names should be non-empty.

IV. RESULTS AND DISCUSSION

The implementation of realization of **"EFFICIENT ID BASED SECURED TROLLEY SYSTEMS USING RFID AND 802.15.4 TECHNOLOGY"** is implemented successfully. Without any interference between different modules in the design, the communication is properly implemented. It is designed to meet all the specifications and requirements as well.

The performance of the device has been verified in both software simulator as well as hardware design. The total circuit is verified functionally and it is following the application software. Conclusions are that the design implemented in the present work provide portability, flexibility and the data transmission is also done with very low power consumption.

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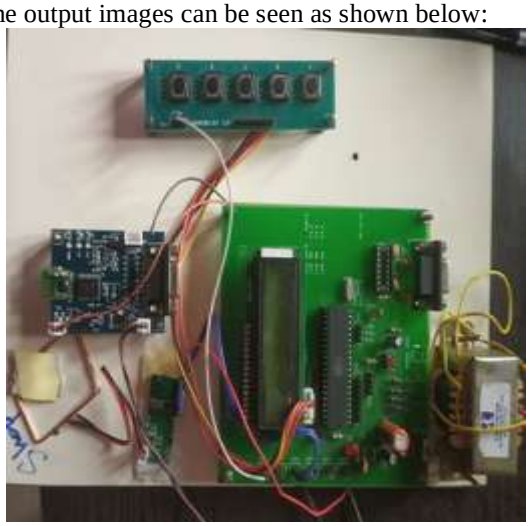
The output images can be seen as shown below:



The intended objectives were successfully achieved in the prototype model developed. The developed product is easy to use, economical and does not require any special training. This project simplifies the billing process, makes it swift & increases the security using RFID technique. This will take the overall shopping experience to a different level.

V. CONCLUSION

The intended system design for automation of the shopping process by merging different technologies like Arduino Uno, RFID, and Android mobile application. That can be divided into two major categories Electronic components and Software components. In Electronic Components, Arduino Uno operating as an intermediary microcontroller, which controls the RFID technology and Built, communication between RFID technology and software components like android mobile application through Bluetooth module. In software components, there is an android mobile application in which customer's login to the proposed system by using different proposed methods that can secure customer privacy. Searching for the product in the shopping mall becomes easy because of the searching module based on product position allocation on the map. As a lesson receives a proposed system can easily be implemented in real-life scenarios to support the shopping process by automation of shopping trolley

FUTURE WORK

In future, we can pay the bill amount via online by using the smart phone by scanning the QR code of that particular supermarket. And get the soft copy of the bill receipt to check out from the super market.

This project aims at reducing time consumption in grocery stores, it may be developed by adding child safety measurements unit and android device can be included.

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