International Journal of Science Engineering and Advance Technology (IJSEAT)
ISSN 2321-6905, Vol. 8, Issue 8, August -2020

Smart Trolley Using RFID in Super Markets

M. Chithambarathanu

Assistant professor , Dept. Of CSE , VFSTR-Deemed to be university Guntur,AP,India.
Chithambaramthanu@gmail.com

ABSTRACT:
The Supermarkets are the place where people usually go for the shopping to buy the products which they need and pay the bill for products. The cashier need to calculate the number of products as well as bill the products. The people also search their required products in the Supermarket. This is a time taking process for the customers as well as cashier. This process eliminates the traditional scanning of the products at the counter and speeds – up the entire process of shopping. By using, this system the customer shall know the total amount to be paid. Also the system has a feature to delete the scanned products further optimize the shopping experience of the customer. The hardware for the test run is based on the Arduino platform and RFID module as both are very popular in small scale research and wireless automation solution.

Keyword: smart trolley, arduino platform and rfid module.

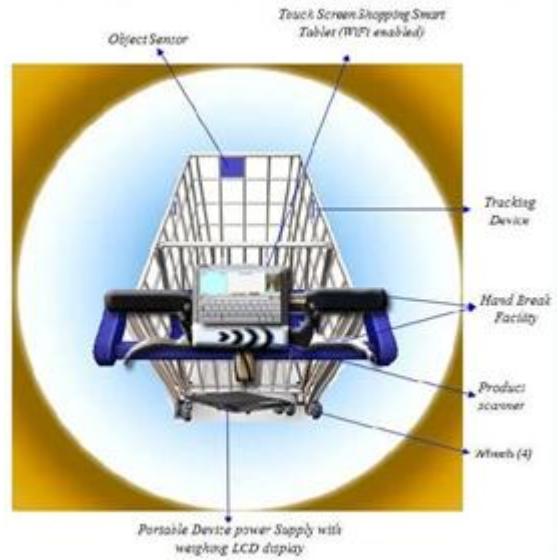
Introduction:
These days, numerous general stores are offering accommodation for shopping, one of which is shopping streetcar. It is utilized by clients inside the stores to ship the merchandise close to clerk and their-by places. It causes client to feel free and solace. The main shopping baskets was presented by "Woody Goldman", proprietor of Standard Food Market in Oklahoma. He gets numerous objections from his clients since they experience issues in conveying food supplies from his shop. Goldman attempted to tackle this issue and he returned with shopping bins at his shop. He put the bushel on a carriage with little wheels to help clients conveying staple goods. To encourage and fulfill his clients, he requested that a specialist plan an advanced shopping streetcar. From that point forward, the shopping streetcar is existed. Today we find various states of shopping streetcars in markets. After Goldman's, creation there are numerous sorts of examination and to improve the shopping streetcars. In current days numerous items are accessible in the general stores, it is a burden and exercise in futility to the clients who need to locate the ideal item by utilizing this conventional shopping streetcars. In 2009, analysts started to create models of mechanized setting mindful shopping streetcars by appending tablet PCs to conventional streetcars. The motivation behind the framework is to help shopping in stores by picking up client consideration. Hence, the intelligent streetcar helps clients in dealing with and discovering items. So that, they can discover the area of item without any problem. The underlying tests demonstrated that models can improve and change the shopping experience.
The main aim of our research is to calculate the bill of the item when it is kept in the cart and it also reduce the bill when the item is detached from the cart. And moreover, it also helps the customer for find the location of their desired product in the mall. So that, there is no need to wait in the queue for billing the each and every item, and calculating the bill. The customer should pay the bill directly to the cashier which is displayed on their shopping trolley. If a customer keep an item without scanning then the trolley, it will automatically detect it by the weight. It will also reduce the manual power and save the time.

The remainder of the paper is composed as follows: First, we discussed about smart trolley system in 2nd section, and then is followed by hardware design, in 3rd section . In 4th section, we discuss about software design. Furthermore, we report the experiment results in a smart trolley system based on location accuracy and trolley movement in 5th section and concluded our work with suggestions.

2.Smart Trolley System:

The essential idea of the shrewd streetcar framework is plan it into a robotized self-checkout framework on a shopping streetcar with a UI by utilizing surface processing which permits clients to look through the area of the thing in the shopping center, and it likewise assists with taking care of their tab which is shown on their truck. Lastly, the client should put the streetcar before departing the passageway of the store. Our keen streetcar configuration comprises of the accompanying segments, that is batteries, electronic showcase screen in which we utilize surface registering

innovation to peruse the standardized identification, RFID peruser, weight support and streetcar itself. It will important to require an adaptable plan that will draw in the clients to utilize the streetcar. Fundamentally, the conventional streetcar stays a basic aspect of the clients shopping experience, subsequently we wish to coordinate the versatile robot into customary streetcars to guarantee the plan will meet the necessity of the clients.



System is developed to help a person in everyday shopping in order to reduce their shopping time where they spent while purchasing. The main objective of proposed system is to provide a technology oriented, low-cost, easily handled, and efficient system for assisting shopping in person.

The proposed system has following important modules:

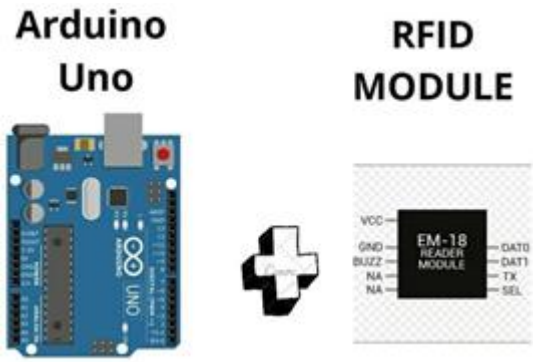
1. LCD interface which uses surface computing technology that displays the bill.

2. Raspberry-pi hardware for scanning QR code of the product.Trans-receiver for achieving wireless communication with server.

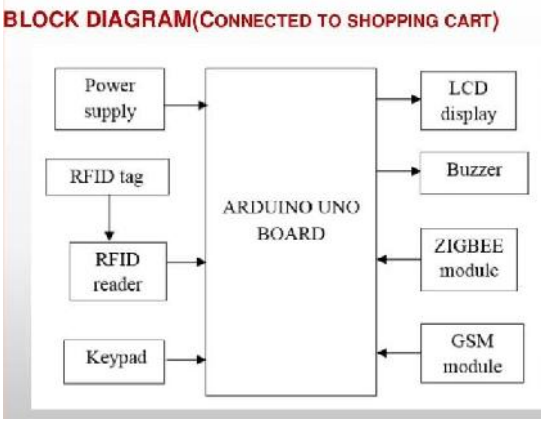
3. A weighted machine that reduce the bill when item is removed from the cart.

3. Hardware Design:

The conventional streetcar is utilized as a help for all parts utilized on the created brilliant streetcar. All parts are put at the lower part of the streetcar crate with a case for supporting batteries, miniature regulators, Arduino Uno, RFID module and DC engine drivers, as found in figure underneath. The streetcar wheels through pulleys to create enough force to move.

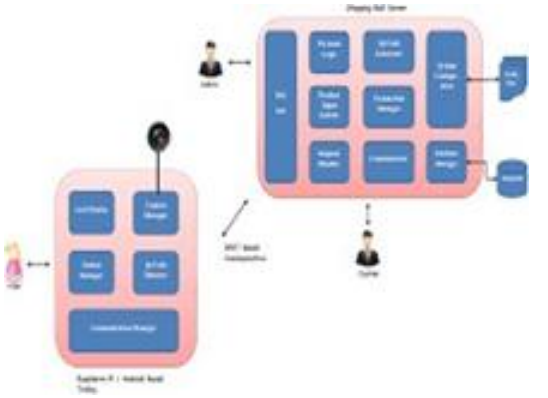


The Arduino Uno board is associated with RFID tag through RFID tag. A less complex and more affordable then Wireless Personal region network(WPANs, for example, Bluetooth or more broad remote systems administration, for example, Wi-Fi are associated through ZigBee details. The console is showed up on LCD screen which is use to look through the area of the thing in the shopping center just as it show the refreshed bill. The GSMmodule is an equipment gadget that utilizes GSM cell phone innovation to give an information connect to a far off organization. GSM modems ordinarily give TTL-level sequential interfaces to their host. They are normally utilized as a major aspect of an installed frameworks.



4. Software Design:

Savvy streetcar application is created on Android stage which is introduced in a tab that is joined to the streetcar. It is utilized to control and explore the streetcar and furthermore shows the client area dependent on their GPS perusing on an indoor guide. This application depends on Java programming language and some specific libraries, for example, Navisens and IOIOLibAndroid. It will ascertain the client's area dependent on information from accelerometer and spinner.



The primary advance of utilizing the savvy streetcar application is enlisting the client ID to a particular streetcar. This cycle ties the client and the streetcar by sending their own Unique ID to Firebase Real-time Database. From that point onward, the streetcar application will check the Firebase Database to ensure the client is the one, who filtered the QR Code and ensuring the client has control of the streetcar.

5. Conclusion:

Currently, the trolley at supermarkets is mainly used to carry goods while shopping. But the real situation that is faced by the customer is it is hard to estimate thecurrent total amount and pay at the cash counter. By, using this smart trolley it shows the actual amount to be paid by the customers after any paid deduction (discounted price). Customer will know the exact amount to pay, before reach the cash counter. Generally, customers may add total amount of goods by scanning its price tag. The system is also provide information to customers on other important information such as expired date, ingredients, country of origin and the net price after the discount. It prevents any fraud happening, the price shows are relatively not same with the actual amount to be paid when it is goes the cashier counter. By introducing this new smart trolley, it is targeted to help related bodies in preventing criminal related to fraud. With the extra space from the supermarkets, of it needs more time to walk in supermarket, thus this smart trolley assists customer to find products easily available on shelves. As a conclusion, from the market survey conducted it shows the advantages of the trolley with suggested technology are covered on shorting spend time to search for products or goods, can control the current budget shopping and provides information on product details and easy to figure out where the items are located. Based on market survey that have been conducted, this smart trolley must be adopted in super markets as smart trolley makes it easy for customers to find items faster than using a regular trolley.

Reference:

1. Goldman SN. US Patent: Combination basket and carriage. Patent; 1937. Report No.: US2155896A.

2. Black D, CNJ, SMB. Shopping in the Real World: Interacting with a Context-Aware Shopping Trolley. In Proc. of Mobile Interaction with the Real World (MIRW); 2009; Universität Oldenburg.

3. Ng YL, Lim CS, Danapalasingam KA, Tan MLP, Tan CW. Automatic Human Guided Shopping Trolley with Smart Shopping System. Jurnalteknologi. 2015; 73(3).

4. Gunawan AAS, William , Hartanto B, Mili A, Budiharto W, Salman AG, et al. Development of Affordable and Powerful Swarm Mobile Robot Based on Smartphone Android and IOIO board. Procedia Computer Science. 2017; 116: p. 342-350.

5. Solin A. CS,RE,KJ. Inertial Odometry on Handheld Smartphones. In IEEE; 2018; Cambridge. p. 1-5.

6. J. X. An Indoor Navigation System Using a Sensor Fusion Scheme on Android Platform. 2017.

7. S. M. Making Android Accessories with IOIO: Going Mobile with Sensors, Lights, Motors, and Robots. 1st ed. Oram A. HM, editor. Sebastopol: O'Reilly Media, Inc.; 2012.

8. Siegwart R, Nourbakhsh IR, Scaramuzza D. Introduction to Autonomous Mobile Robots: The MIT Press; 2011.

9. Milette G. SA. Professional Android Sensor Programming: John Wiley & Sons; 2012.

10. Yang C. SH. WiFi-based Indoor Positioning. IEEE Communications Magazine. 2015 March; 53(3).

11. Ji M KJJJCY. Analysis of positioning accuracy corresponding to the number of BLE beacons in indoorpositioning system. In 2015 17th International Conference on Advanced Communication Technology (ICACT); 2015; Seoul. p. 92-95.

12. Gigl T JGDVWKIZ. Analysis of a UWB

indoor positioning system based on received signal strength. In 2007 4th Workshop on Positioning, Navigation and Communication; 2007; Hannover. p. 97-101. 14. Mapbox. [Online]. [cited 2019 June

13. Available from: https://www.mapbox.com.

14. Indoor mapping & Wayfinding for Smart Buildings. [Online]. [cited 2019 June 14. Available from: https://www.mapwize.io.

15. Georgiou K CTLCPLCGZYD. Anyplace: A crowdsourced indoor information service. In 2015 16th IEEE International Conference on Mobile Data Management; 2015; Pittsburgh. p. 291-294.

16. Zeinalipour-Yazti D LC. The anatomy of the anyplace indoor navigation service. In SIGSPATIAL Special; 2017; New York. p. 3-10.