Real Time Smart Shelf Inventory Management System

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Abstract

Object counting is a very common task performed in different industries. The conventional method for counting an object is manual, time consuming and in non-automatic form. Here is a smart rack, which automatically detect the out of stock product at a retail store and intimate the count details to the owner and the distributers, in case of reduction in the stock quantity.
Keywords: IR sensor, TI-CC3200, LCD, Energia software

I. INTRODUCTION

Nowadays, counting an object plays a vital role in the field of industrial, academics are on hike. Specifically when dealing with the industrial environment, this design can be used for the real time object counting to count the distinct types of object. In general, counting a object by manually takes lot of time to produces the result and there may be chance to get an analogous. Object counting is a simple task it depends on detection of target objects. Object counting is the challenging problem to count the target object in the high speed. The process of counting object is not always straight forward or trivial, even performed manually. The objects may occur in large number and overlapped making counting tricky and tedious that in turn leads to error. Manual methods are erroneous and time consuming. In current method of counting the objects were used by BLOB algorithm which can easily count and display the number of object and counted number will be delivered with the help of speaker, which may cause major disturbance to the public. BLOB refers Binary Larger Objects, the large specifies only objects of certain size are concern objects where the pixel of images will be vary for the each individual. This is the major drawback for the current counting objects. Hence the system has been developed to detect and count dynamic objects efficiently by using TI-CC3200.

II. PROPOSED SYSTEM

The canonical method of counting an object is manual, time consuming and in non-automatic form. Automatic counting is more reliable and accurate with automatic program than with manual counting. The real time object counting machine will detect the object through IR sensor. The sensor will automatically maintain the stock list and intimate to the owner, dealers for each and every product when there is any change in the stock list will displayed on the LCD and also can view through websites. That is, Products in Rack/shelf is detected using IR array sensor. Information about the products is sent to receiver which is located in the launch pad CC3200.Launch pad CC3200 has inbuilt WIFI which will transmit the information to the sever. Server will pass this information to owner and distributers. Distributes will refill the stock as required.

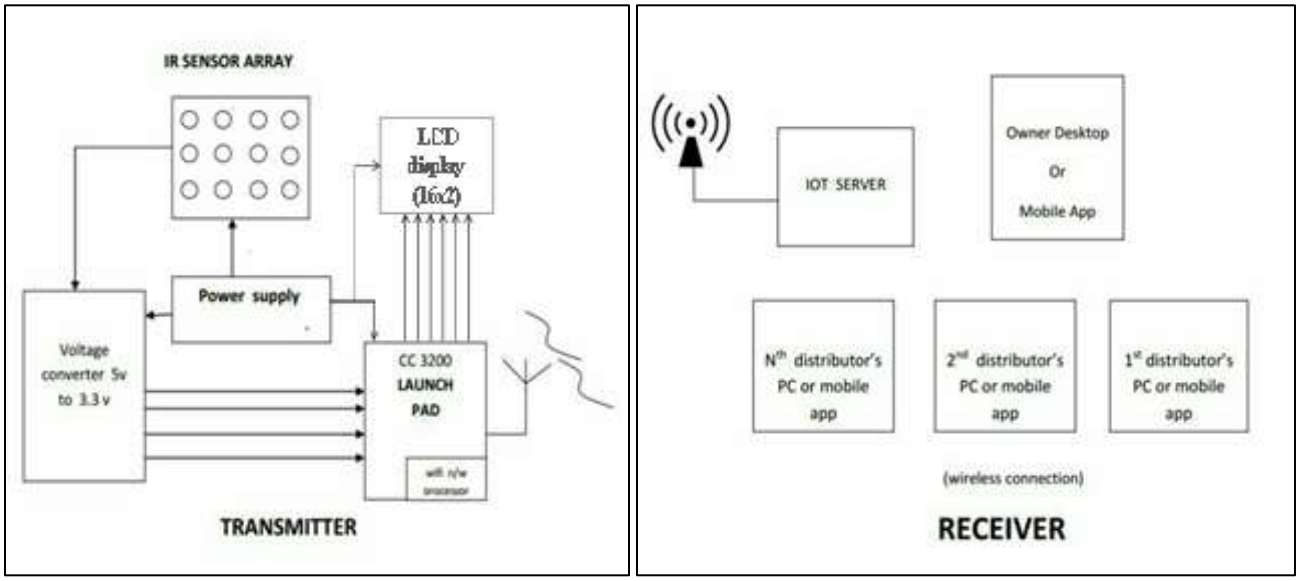


Fig. 1: Block diagram of the system

III. FLOWCHART

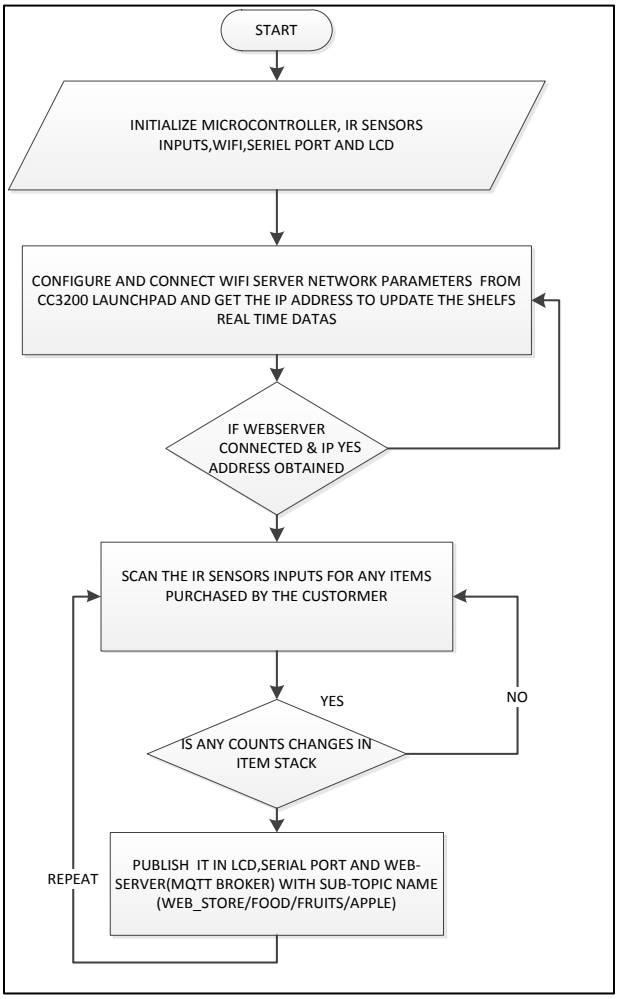


Fig. 2: Flowchart of the system

Initially the power is given to the Infrared sensor (IR) is used to detect the number of product are available this can be done with the help of controller. Here, the IR sensor is interface with the TI – CC3200 controller. Then the LCD module is interface with the controller, the LCD which can be used to indicate the numbers of products available in stocks. This method can be very easy to

understand for each and every person then with the help of MQTT App which is open source, will transmit the information about the product stock to the dealers and owners.

IV. HARDWARE IMPLEMENTATION

A. *TEXAS – CC3200*

CC3200 device is a wireless MCU that integrates a high-performance ARM Cortex-M4 MCU, allowing customers to develop an entire application with single IC. With on-chip Wi-Fi, Internet, and robust security protocols, no prior Wi-Fi experience is required for faster development. The CC3200 device is a complete platform solution including software, sample applications, tools, user and programming guides, reference designs, and the TI E2E™ support community. The device is available in a QFN package that is easy to layout.

Fig. 4.1: TEXAS-CC3200

B. *IR Proximity Sensor*

The IR Sensor used here is a multipurpose infrared sensor which can be used for obstacle sensing, line sensing and also as an encoder sensor. The sensor provides a digital output 1 or 0. The sensor outputs an logic 1 with +3.5V at digital output when an object is placed in front of the sensor and logic 0 with 0V,when there is no object in front of the sensor. The range of the sensor is about 10-15cm and the input supply voltage is 5V DC.

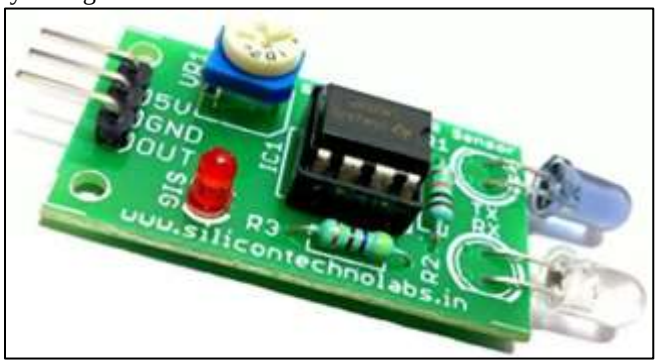


Fig. 4.2: IR Proximity Sensor

C. *LCD*

LCD (Liquid Crystal Display) is a type of screen that is used in many computers, TVs, digital cameras, tablets, and cell phones. Here 16x2 LCD are used which means 16 column and 2 rows. The LCD display is interface with the Texas CC3200 which can be used to indicate the numbers of products are available. This method can be very easy to understand for each and every person and then with the help of GSM module the product stock detail can be send to the dealers and owners.

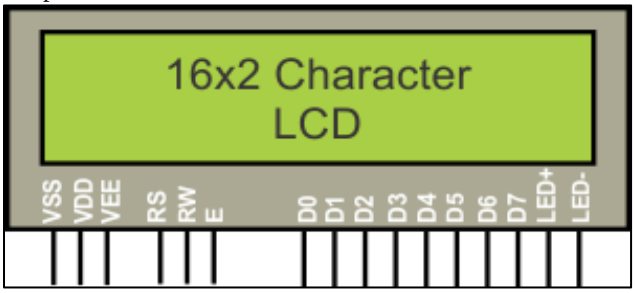


Fig. 4.3: LCD

V. SOFTWARE IMPLEMENTATION

A. MQTT (Message Queuing Telemetry Protocol)

MQTT is an ISO standard publish – subscribe based messaging protocol. It works on the top of the TCP/IP protocol. Simple communication between multiple devices (simple messaging protocols).The publish-subscribe messaging pattern requires a message broker (server). The basic concepts of MQTT are publish/subscribe, broker, message, topic.

B. MQTT Server (broker)

Server runs topics i.e., receive subscription from clients on topics receive messages from clients and forward these, based on client subscription to interested clients.

C. Topics

Technically topics are message queues. Topics support the publish/subscribe pattern for clients.
Example
Supermarket/iot_store/drinks/boost supermarket/iot_store/#

D. MQTT-Client (Publisher/subscriber)

Clients subscribe to topics to publish and receive messages.

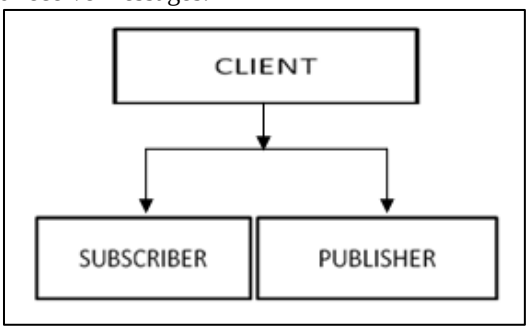
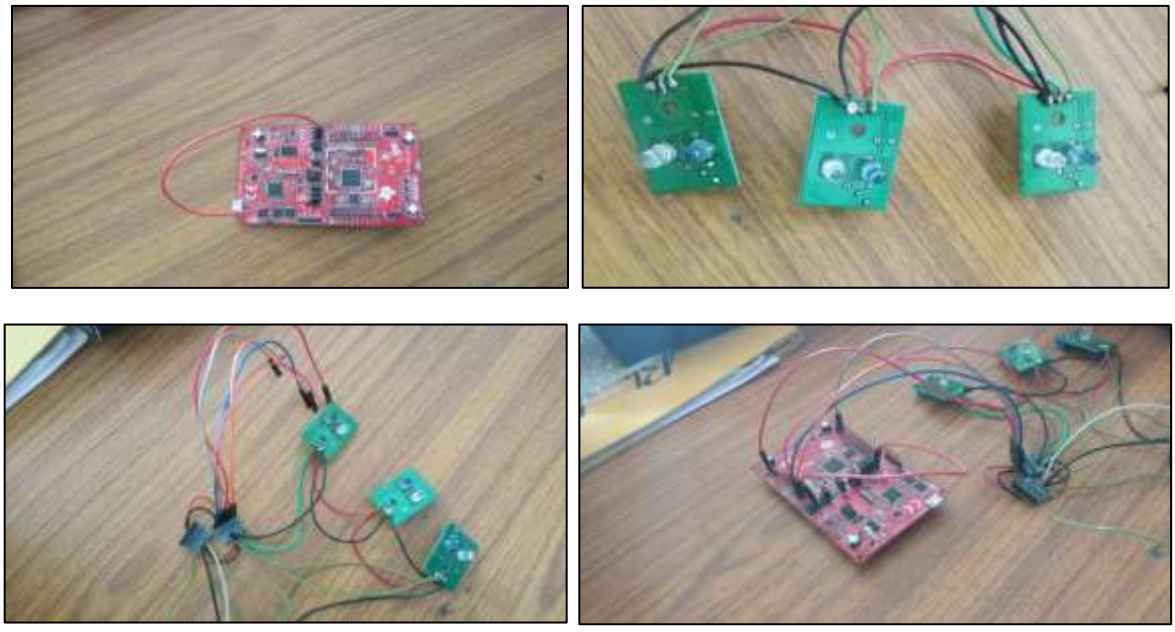


Fig. 5.3: MQTT Client

VI. INTERFACING OF MQTT WITH CONTROLLER

Whenever the product stocks are published by the CC3200, it will automatically connect to the server.From the server, the stock details are known in the app called MQTT.By the MQTT app, each individual user can able to know the stock of the particular product, which they already subscribed.

VII.EXPERIMENTAL RESULTS



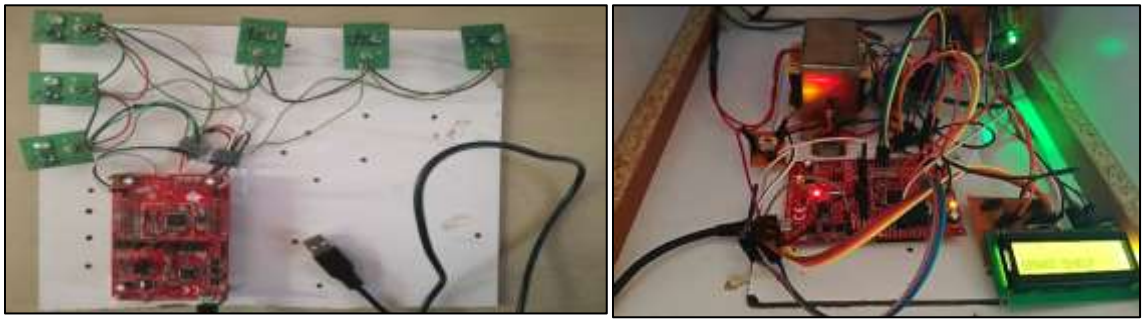


Fig. 7: Components Interfacing

VIII. CONCLUSION

In this paper, we proposed a method to count a real time object counting by developing a smart rack, which can count the object and intimate to all the clients. Thus, the stock details of the products are known by the owners, dealers and the customers from where they are by using an MQTT app and by using LCD shop manager can able to view the stock available.

IX. FUTURE SCOPE

As a future scope, the output of the proposed system can be used in the industry to monitoring the packing and quality control with the help of RFID along with Artificial Intelligence.

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