

# Grocery Theft and Monitoring using IoT for Stock Management Application

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## ABSTRACT

*In recent days, there was a problem in public distribution system in that dealers itself doing self-hiding of the grocery items. This leads to make more people not to get their appropriate groceries with their reputed kg. So this is one of the problems faced by many of the consumers. Now a day all begins to automation, which reduces the man work. The method we are going to propose is the loads that are in a stock are being analyzed every day by the stock manager or worker who is responsible for store room in a hotel or other managements. And these people may have a chance to hide the loads for their personal use without getting permission of the management or owner. So, to reduce these type of theft and to save loads, providing benefits for the owner or the management an application is created and informing the information of the loads that are available in the stock directly to the management or owner. By this method we can reduce the theft of groceries from the illegal people. The loads are measured using the load cell and it is connected to the hx711 ADC and the digital input is given to the raspberry pi controller. Using the raspberry pi controller we can send the information to our mobile by installing an application. Whenever there is a need of loads we can arrange it by getting the messages. By this method we can reduce theft of groceries in store room and we can provide the benefits to the manager.*

**Index Terms :** IOT, Raspberry controller, Load cell, ADC, Strain gauge.

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## I. INTRODUCTION

The **Internet of Things (IoT)** is the network of physical devices, vehicles, home appliances and other items embedded with electronics, software, sensors, actuators, and connectivity which enables these objects to connect and exchange data. Each thing is uniquely identifiable through its embedded computing system but is able to inter-operate within the existing Internet infrastructure. The online capable devices increased 31% from 2016 to 8.4 billion in 2017. Experts estimate that the IoT will consist of about 30 billion objects by 2020. It is

also estimated that the global market value of IoT will reach \$7.1 trillion by 2020. The IoT allows objects to be sensed or controlled remotely across existing network infrastructure, creating opportunities for more direct integration of the physical world into computer-based systems, and resulting in improved efficiency, accuracy and economic benefit in addition to reduced human intervention.

## II. EXISTING SYSTEM AND PROPOSED WORK

### A. Existing system

In this era of modern technology, the industrial companies are becoming more systematic in every

term possible but to create a systematic system for data reporting, the cost of this systems are high which causes the company to create an unfriendly report because that is where the stock management system is done manually without the help of any technology or system. The recent stock management control system uses 1D and 2D barcodes which is difficult to maintain because it is not durable and reusable and also the barcodes are not rewritable. The researched based project is about managing stock using android smartphone with RFID technology system.

An android application has to be developed and designed using Android Studio software where the android smartphone requires having the NFC enabled in it, so it can in-cooperate with the RFID tags to allow the data transfer between the smartphone and the RFID tag. The software prototype of the SSMC was created and tested based on different types of testing approach. And the system has zero errors visible because the approach of the programming of the application and debugging the codes ensures that the errors can be located and solved within a short period of time. The system would be more realistic if the database created is based on real time events where auto syncing is available directly to computer instead of backing up manually on SD card and transfer via wireless. Moreover

The graphical user interface of the software prototype can be improved to make it more professional.

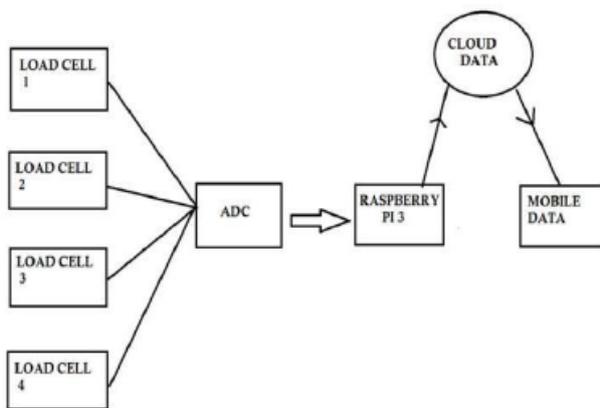


Fig. 2.1: Block diagram of proposed system

### B. Proposed system

Fig.2.1 explains the management for the stocks that are available in the store room. The load cell will have different types of groceries in the store room. The load cell will measure the loads and gives the information to ADC which converts the analog to digital signal.

Here the use of the ADC converter is the output from the load cell is analog signal the raspberry controller works with the digital signal. Hence the analog signal from the load cell is get converted into digital signal using the ADC converter and then given to the raspberry controller.

This digital signal is given to the raspberry controller. The raspberry controller process with signals and passes the message to the mobile.

### III. OPERATION

The load cell will have different types of groceries in the store room. The load cell will measure the loads and gives the information to ADC which converts the analog to digital signal. Here the use of the ADC converter is the output from the load cell is analog signal the raspberry controller works with the digital signal. Hence the analog signal from the load cell is get converted into digital signal using the ADC converter and then given to the raspberry controller. This digital signal is given to the raspberry controller. The raspberry controller process with signals and passes the message to the mobile. The load cell has four output wires, they are E+, E-, S, S- each are in different colors. These output pins are getting connected to the hx711 ADC converter which converts the analog signal to digital signal. The digital signal is given to the raspberry controller. Where the raspberry controller have the 40 input output pins. The hx711 ADC converter has the four input pins and four output pins. The input pins are E+,E-,S,S- and the output pins are VCC, GND, SCK, and DT. From the output pins the VCC and GND are get connected to the supply and ground of the raspberry controller. The SCK and DT are the digital signals. These digital signals are getting connected to the respective GPIO pins of the raspberry controller. There is no programming needed for the internal registers. All controls to the HX711 are through the pins. The raspberry controller needs the program to give respective output. The programming language is python. Whenever there is a need of loads we can arrange it by getting the messages.

#### IV. HARDWARE IMPLEMENTATION

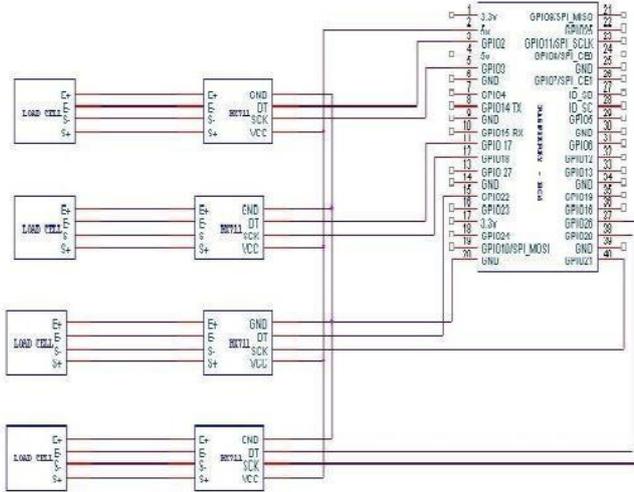


Fig 4.1. Hardware interface

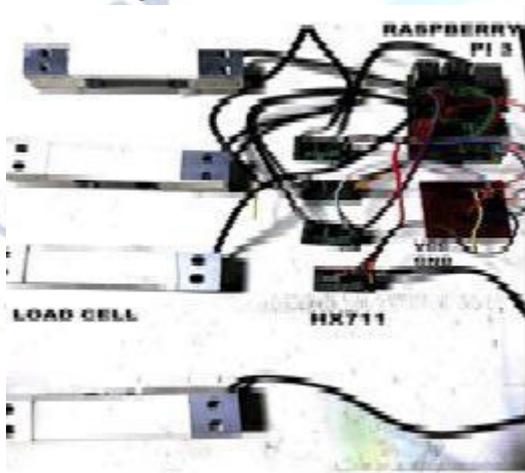


Fig 4.2. Hardware kit

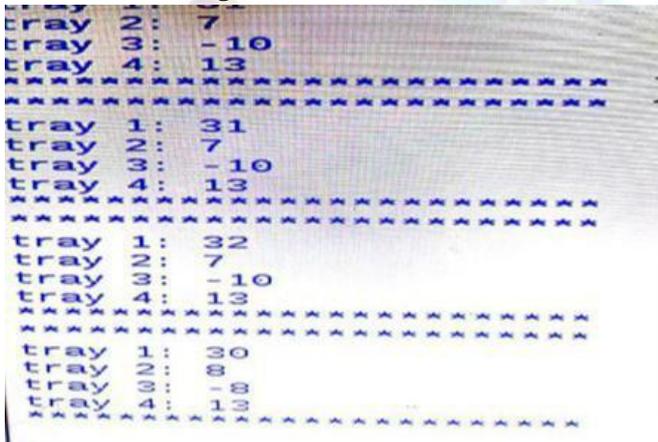


Fig 4.3. Hardware output

#### V. RESULT AND FUTURE ENHANCEMENT

In ration shops more theft is occurring. The in charge to the ration shops may have a chance for self-hiding. To avoid that a load cell are placed at an every grocery items in the ration shops. For the variation of the load the message will be send to the customer. The IP address of the every customer is

entered in the VNC viewer and the load changes is informed as a message.

By this method we can reduce the theft of the groceries in the ration shop. The groceries that are sponsored by the government will be utilized by everyone. And there also a chance to change the grocery items instead original things. That is stone also giving a weight in the rice tray, so it can be minimized by using the image processing technique in the raspberry pi 3 controller.

#### VI. CONCLUSION

Hence by this process the loads available in the store rooms are analyzed in the mobile phone itself. There no need to check the loads daily. The details of the grocery items are get uploaded in the webpage for every 5 seconds. The history for the grocery items are provided in the webpage, so we can refer the details of the groceries in the store room. For the decreases of the load there will be message notification in the mobile, hence the theft of the groceries can be prevented which provides the benefits for the owner.

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