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An automated cereal/grain dispenser

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ABSTRACT: *An automated cereal dispensing system is proposed to disperse the cereals or grains through Public Distribution System (PDS) or through the general stores and malls without human intervention. The system ensures that leakage of cereals is negligible. In an ordinary grocery store, when we go to buy grains or cereals we have to fill the bag by ourselves which is* ***not accurate*** *and a lot time consuming and hectic. . To make this process more accurate and easier using technology we chose this topic for our final year project.*
Key Words: *grain , dispenser*

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I. INTRODUCTION

In an ordinary grocery store, when we go to buy grains or cereals we have to fill the bag by ourselves which is **not accurate** and a lot time consuming and hectic. . To make this process more accurate and easier using technology we chose this topic for our final year project. customers have to fill the plastic bags with cereal or grain with an approximate amount of cereal or grain they want. Then they go to the weighing machine, where one employee weighs the product and calculate the price of that product according to its weight. Sometimes, it happens that customer wants more amount but due to approximation they got less or more quantity. As of now there is no exactly similar product is made as we want to make. But there was some products which are similar in some manner. Automating the existing system is our primary solution to the various problems existing. The various things that we can do to automate this system are explained below. Quantity of cereals or grains that the customer desires need to be entered using a keypad. More details of the project and its soft wear and hard wear building is to be discussed ahead.

PROBLEM STATEMENT

In an ordinary grocery store, when we go to buy grains or cereals we have to fill the bag by ourselves which is **not accurate** and a lot time consuming and hectic. To make this process more accurate and easier using technology we chose this topic for our final year project.

II. PROPOSED SOLUTION

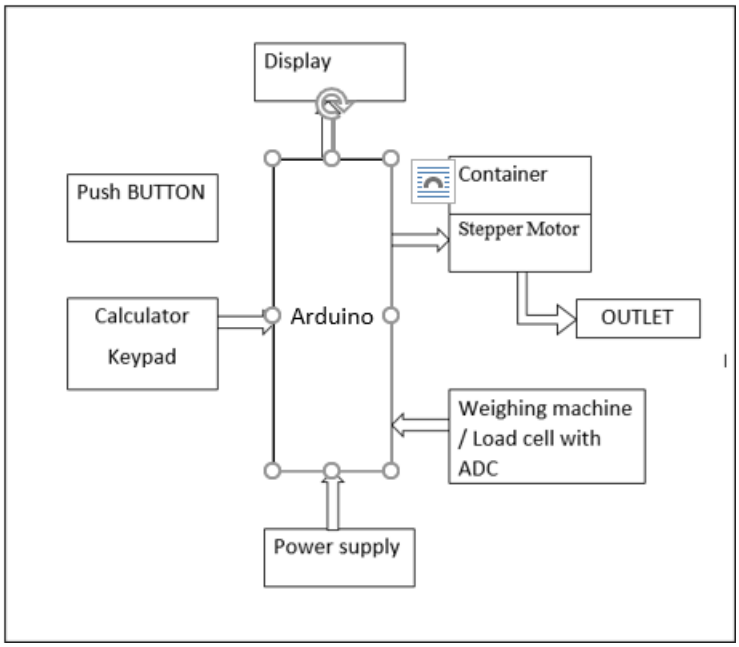
Automating the existing system is our primary solution to the various problems existing. The various things that we can do to automate this system are explained below. Quantity of cereals or grains that the customer desires need to be entered using a keypad. The quantity is in terms of the kilogram. The customer needs to ready the bag for filling. Once the bag is ready, the customer should press the button on the keypad. The dispenser will start filling the bag. The exact amount of cereal or grain will be dispensed.

III. LITERATURE REVIEW

As of now there is no exactly similar product is made as we want to make. But there was some products which are similar in some manner.

- Development of an Automatic Dispensing System for Traditional Chinese Herbs by Chi-Ying Lin and Ping-Jung Hsieh
- Automatic pet feeder machine by B. Ravi Babu , P. Pavan Kumar , Dr. P. G. Kuppusamy
- Automatic medicine dispensing system by S. Mukund and N.K.Srinath

IV. BLOCK DIAGRAM



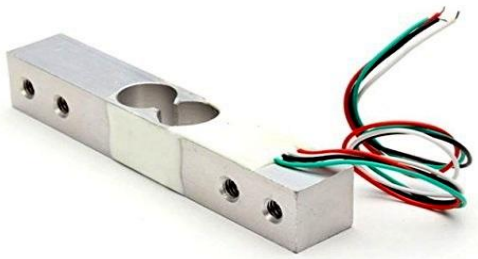
V. COMPONENTS:

- **Arduino:** The core of the system consists of Arduino to monitor and control the operation of the entire system. The Arduino is responsible for data collection from Human-Machine Interface (HMI) devices such as keypad and generates appropriate output for the LCD and motors (Stepper and DC motor) to operate.

- **CALCULATOR KEYPAD :** 4x4 keypad consists of 4 rows and 4 columns. Switches are placed between the rows and columns. A key press establishes a connection between corresponding row and column between which the switch is placed.

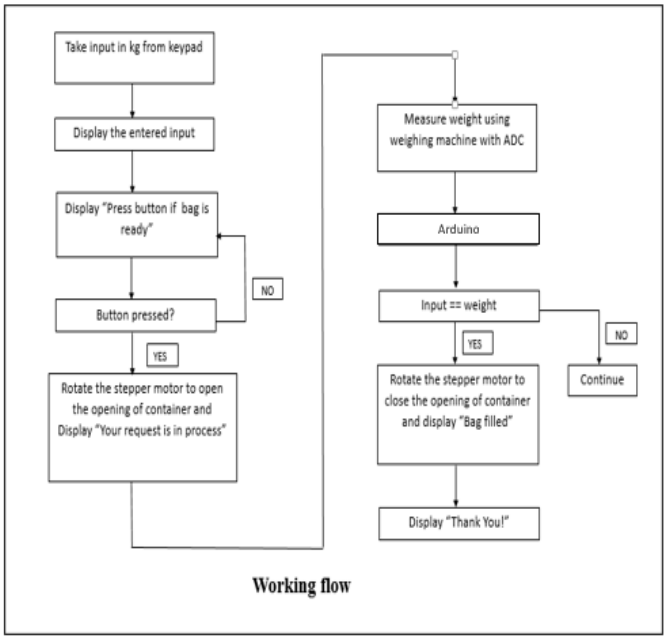
- **LCD**: We use 16*2 LCD. It has 16 Columns and 2 Rows. There are a lot of combinations available like, 8×1, 8×2, 10×2, 16×1, etc. but the most used one is the 16×2 LCD. So, it will have (16×2=32) 32 characters in total and each character will be made of 5×8 Pixel Dots. Main purpose of LCD in our project is to display entered input and to display appropriate messages.

- **YZC-133 weighing load cell 10 Kg :** An electronic weighing machine uses a load cell to measure the load or pressure produced by the load, here most load cells follow the method of the strain gauge, which converts the pressure (force) into an electrical signal, these load cells have four strain gauges that are hooked up in a Wheatstone bridge formation.



- **HX711 ADC 24-bit:** HX 711 is a precision 24-bit analog to digital converter (ADC) specially designed for Weigh scales and industrial control applications to interface directly with a bridge sensor. By connecting the module to microcontroller we will be able to read the changes in the resistance of the load cell; and with some calibration.

VI. WORK FLOW



HARDWARE DESIGN TECHNIQUES: The main component is Arduino Uno. The keypad is connected to take input from customer about the grain quantity. Input is taken from keypad and passed to Arduino. The LCD connected gives the details about steps to be taken by the customer. It displays the messages like which key should be pressed and when to keep the bag ready etc. Respective data is displayed according to keys pressed from keypad .The load cell is connected along with Hx711 which gives the exact measure of grain quantity. It passes the information to Arduino.Servo motor is connected to open and close the nozzle. When the condition of grain quantity matching is fulfilled the servo motor starts rotating accordingly and helps to open and close the nozzle

SOFTWARE DESIGN : In our project, we were interface keypad, 16*2 LCD, Load cell, Servo motor with Arduino. For interfacing load cell we had to use HX711 ADC. We adjust the calibration factor for weight measurement. We setup our scale and start the sketch without weight on the scale. Once readings were displayed, we placed weight on scale. According to our code, we have to press +/- or a/z to adjust the calibration factor until the output readings match the known weight. By this process we got our calibration factor as 250.After doing this, load cell will give appropriate value of weight.For keypad interfacing, we use 4*4 matrix in our code. Each [row][column] place will represent key on the keypad. For detecting the key after pressing it, we used getkeys() from keypad library. In this we assign '#' key to clear the entire LCD content and '*' key to clear one character back from the current cursor position.For LCD, we include <LiquidCrystal.h> library. From this we used lcd.print , lcd.setCursor, lcd,clear() at appropriate positions.we took help of #include<Servo.h>, for servo motor interfacing. We declare variable pos1 for storing rotational position of servo. For controlling servo motor, we took help of for() loop.

MERITS :
Easy to store and preserve grain for long period.
Most important advantage of this system is contact less so hands never come in direct contact with grain.
The dispenser protects grain from germs and prevents them from going stale in fresh air.
Simple to use available in different storage capacity.
24*7 availability
Decrease cost of labor.
Revolutionary method for grocery packing.
Time saving for the people.
Makes the grocery shopping fun !

DEMERITS:
Occupy large space.
Remain fixed at one point.

Requires maintenance

APPLICATION:
Can be widely installed at grocery stores conveniently.
Can be use as animal or fish feed dispenser
Can be installed at public distribution system (Ration shop) to reduce the corruption and illegal food supplying.
People can get non-traditional amounts of grains and any less or more as they want.
A very efficient way without causing traffic

SOCIETY BENIFITS
The Automated Cereal Dispenser can be installed at grocery stores from small scale to large scale, like at D-Mart or Reliance Market.
As it is automated, people won't have to fill the grocery bags by themselves.
People will not have to keep refilling or pour back the cereals to get accurate amount which will keep the grain clean.
There will be less chances of spilling the grain.
Less human contact to the cereals and less crowd at the cereals station.

VII. CONCLUSIONS

We got to work on the project as a groupAlso learned the process of product manufacturing.With more research , ideas , resources and financial planning , there is much room for improvements and upgrading the system.For the future scope , using voice commands instead of the keypad and LCD system is definitely one.Improving the size and Quality of the container is an idea too.This way , the container will be able to store bigger amounts of grains.

ACKNOWLEDGEMENT

We take much pride in presenting our project **"Automatic Grain Dispenser".**In our path if we do not mention the names of certain individuals, without whose assistance, our project would have been difficult undertaking indeed. The first and foremost, among them is our **Principal Prof. (Dr.) P. V. KADOLE** further our **H.O.D. of Electronics Department** and our **Guide PROF. S. M. KARMUSE.**Their contribution to our project came in all forms, as assisting us in all the technical shortcomings, and further providing us with all the useful information regarding the hardware and software, required material and their details. It was certainly most heartwarming experience to see our teachers and guide the following student's endeavors with such zeal, we are indeed thankful to them.Finally we express our gratitude towards the people who directly or indirectly contributed to success of our maiden venture in to practical electronics.

VIII. RESULT AND FUTURE SCOPE

- We got to work on the project as a group.
- Also learned the process of product manufacturing.
- With more research , ideas , resources and financial planning , there is much room for improvements and upgrading the system.
- For the future scope , using voice commands instead of the keypad and LCD system is definitely one.
- Improving the size and Quality of the container is an idea too.
- This way , the container will be able to store bigger amounts of grains.

REFERENCES

[1]. https://en.wikipedia.org/wiki/Dispenser
[2]. http://downloads.hindawi.com/journals/jhe/2017/9013508.pdf
[3]. https://www.researchgate.net/publication/268588469_Design_of_Automatic_Medication_Dispenser
[4]. https://components101.com/16x2-lcd-pinout-datasheet
[5]. http://www.iosrjournals.org/iosr-jece/papers/Vol.%2014%20Issue%204/Series-1/B1404011316.pdf
[6]. https://www.google.com/search?q=calculator+keypad&rlz=1C1CHBD_enIN916IN916&oq=calculator+&aqs=chrome.1.69i57j0i67i457j0i433l6.3769j0j7&sourceid=chrome&ie=UTF-8
[7]. https://patents.google.com/patent/CN2408088Y/en