

## Automation in Farming Industry

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**Abstract:** 21<sup>st</sup> Century is the era of technological advancements. Automation is taking over the work that is rudimentary. Farmers uses error prone method to catalogue their goods, they use pen and paper to keep track of their produces, and here human error is bound to happen. With the help of this project we tend to automate the cataloguing process for farmers. This recedes chances of error in cataloguing. With the use of this project there will be a reduction in cases of hoarding. This project uses database to store this information which can be viewed by general masses thereby increasing transparency between farmers and customers. This project will use open source technology such as Raspberry pi, Arduino for hardware, ASP.NET Core for website development etc. Data stored in database will be available on website in an interactive manner. Users will need to make an account on the website where they can keep track of their produces, the website displays the data in form of charts thereby making it easy to comprehend the data and take smart decisions based on it. Instead of entering which object is placed on weighing machine manually we can use RFID tags or QR code or Image processing to automatically identify the object so user don't have to tell the machine about the object.

**Keywords:** Transparency, Automated, Manually, Information, Middle Man

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### I. Introduction

Through this project we are planning to automate the process of cataloging information about farm produce by introducing a weighing machine which is very similar to other standard weighing machine available in the market and it will handle all the cataloging process. All the data collected by weighing machine will be stored in online database. User can access all this data through web interface. This will also help to increase transparency between farmers and customer.

Usually farmer used book and pen to catalog information about their farm produce or some uses excel sheet or Google spreadsheet. All the information is cataloged manually by person and this method is prone to human errors. If there is second person is hired to do cataloging process than he or she may perform some malicious activity and might enter wrong data. It will be easier if there is way to do this entire thing automatically without human intervention. So, there needed a way to perform this entire task automatically. Since weighing machine is crucial part in farming, it will be easier to integrate automation process in weighing machine. Through weighing machine all the data will be recorded and stored in database.

### II. Requirement specification

#### 2.1 Software requirement

ASP.NET Core 1.0.1 for backend  
Entity Framework Core for database connectivity and migrations  
AdminLTE bootstrap template for front end of website  
Visual Studio 2015 IDE for coding  
Solid works 2015 software for CAD modeling  
POSTMAN software for API testing  
SQL Server Management Studio 2014 for database management  
Microsoft Azure platform for hosting purpose

#### 2.2 Hardware Requirement

Raspberry Pi  
Load Cell  
Graphical LCD  
Arduino

### III. Methodology

Load cell will be used to measure the weight of the entity. It uses Wheatstone bridge. It has one register on top and one resistor at the bottom. When weight is applied on the load cell top resistor will stretch and bottom resistor will shrink causing voltage difference between two points. We can use this change in the voltage to determine the weight of the object. The voltage difference produce is usually very small hence we need amplifier to amplify the signal. Raspberry pi is the main heart of this machine. It will handle all the calculation to measure the weight, interaction between keypad and LCD, storing data and transferring it to server. Since Raspberry Pi doesn't have enough GPIO pins to handle both LCD and keypad, one Arduino will be used to interface keypad. LCD will be interfaced with Raspberry Pi. For LCD, we are using 128x64 Graphical LCD. For keypad, and we are using 4x4 keypad with tactical feedback. Using 4x4 keypad we will get more number of keys which can include full number pad and other keys. Website backend will be made using ASP.NET Core which is developed by Microsoft. Along with ASP.NET, MVC6 will be used to separate logical concern, database concern and business logic. The front end of the website will be made using AdminLTE template which is an open source Bootstrap template. We are going to use web API to communicate between machine to server, server to machine, website to server and server to website. Advantages of using web API is that it provides additional layer of security. It is fast and it can be used in Android, iOS or Windows phone application hence it will make developing mobile application much easier. To store data Microsoft SQL Server will be used. Data first will be stored locally in raspberry then it will be transferred to server. This is to prevent data loss means if server is not working then data will be safe in raspberry pi local database and if the machine is not working then data will be safe in server database. Entity Framework core by Microsoft is being used for database communication.

### IV. Impact Analysis

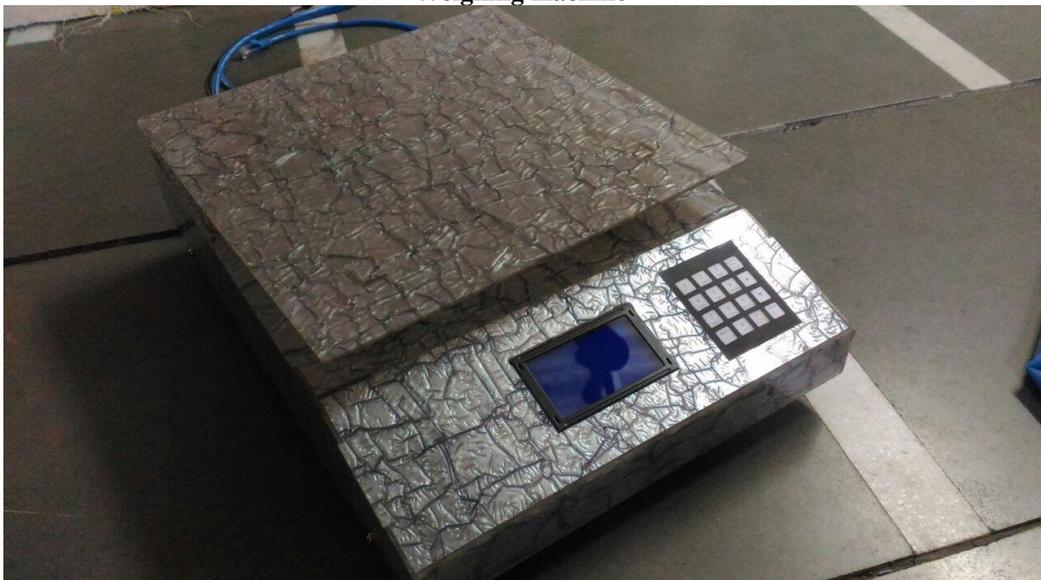
One of the reason to build this project is to reduce hoarding in food supply. There is a limited quantity of products that trader can hoard for sales purposes but if they hoard more than allowed limit for increasing profits it is illegal. If Famers use this machine then hoarding will turn down to minimum possible level. Since customer can view the data on the website it will become very difficult for the hoarders. This increases transparency between customers and farmers

### V. Application

In our weighing machine the information need not be entered manually. The machine is connected to a database with will be storing all the information and this information can be easily retrieved from a website. The information stored in the website is analyzed and represented in such a way that it is beneficiary for the end user. Only registered users can access the information from the website our machine will provide a robust way to catalogue information. Our machine can be used in different industries like Dairy Products, Farming and Fish Market etc. To use this machine user, need not have technical knowledge about the machine.

### VI. Figures

**Weighing machine**



Snapshots of website Dashboard

verification.

**Dashboard** Overview of your data. All data except charts are auto updated. To update the charts, either refresh the page or press on 'Go!' button.

**352.56**  
Weight in KG(s)

More info

**13**  
Products

More info

**3**  
Locations

More info

**Cotton**  
Last Updated

More info

**Location Wise Product Information**

Select location: All Go!

**Month Wise Total Weight**

Show data from: May 2016 to December 2016 Go!

**All Products Monthly Information** Show data from: May 2016 to December 2016 Go!

**SWM** Sign Out

**Bhavesh Jadav**

MAIN NAVIGATION

- Dashboard
- Show Data
- Contact

This is a test user account. You won't be able to submit any data to database. The purpose of this user account is to demonstrate functionality, design and layout of this website. [Contact Us](#) to get a real user account information. All products and locations are added by admin when creating new a account. Products and locations are added by admin after verification.

**Show Data** Data collected from weighing machine shown in tabular form

Default sort order is by date and time. Click on column name to sort by that column. Use search box to search the specific data.

Show  entries Search:

No.	Name	Weight	Date And Time	Location	Machine ID
1	Cotton	885	27/12/2016, 05:11:31 AM	Athari, Sitamarhi	70000
2	Potato	737	23/12/2016, 10:54:31 PM	Chandan, Bhagalpur	70000
3	Tobacco	1987	19/12/2016, 08:34:04 PM	Chandan, Bhagalpur	70000
4	Potato	1603	18/12/2016, 12:37:22 AM	Athari, Sitamarhi	70000
5	Peanut	2727	14/12/2016, 05:02:35 AM	Gothe, Jamkhandi	70000
6	Cotton	979	10/12/2016, 10:55:20 PM	Athari, Sitamarhi	70000
7	Tobacco	2477	07/12/2016, 02:59:29 PM	Gothe, Jamkhandi	70000
8	Potato	903	05/12/2016, 05:40:41 AM	Athari, Sitamarhi	70000

Interactive Graphs

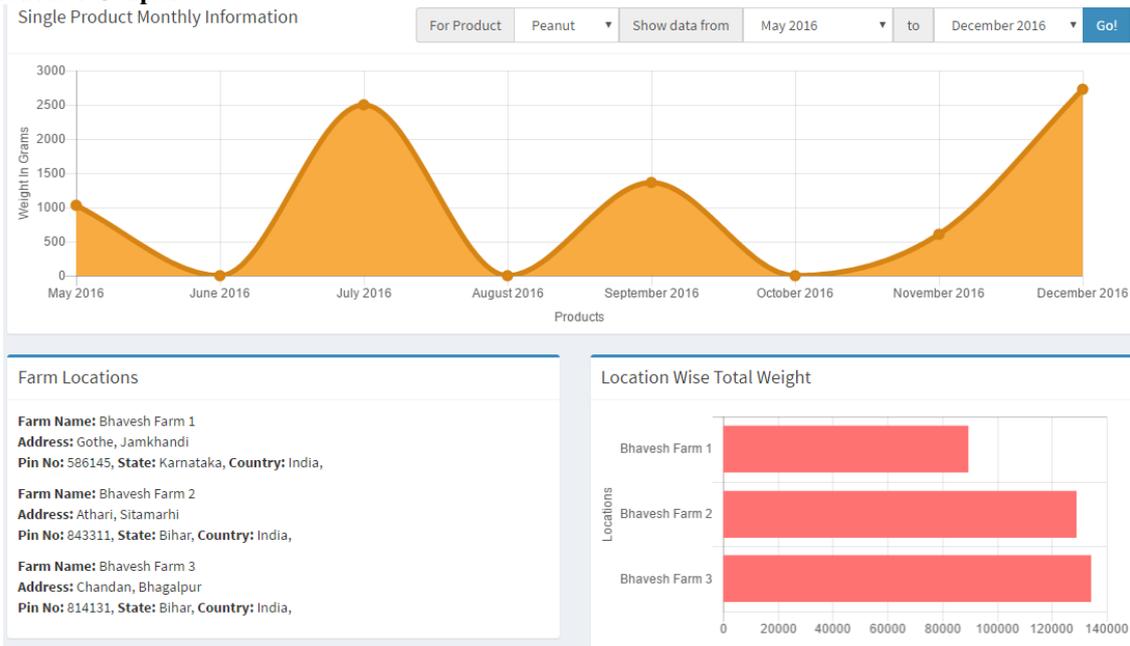
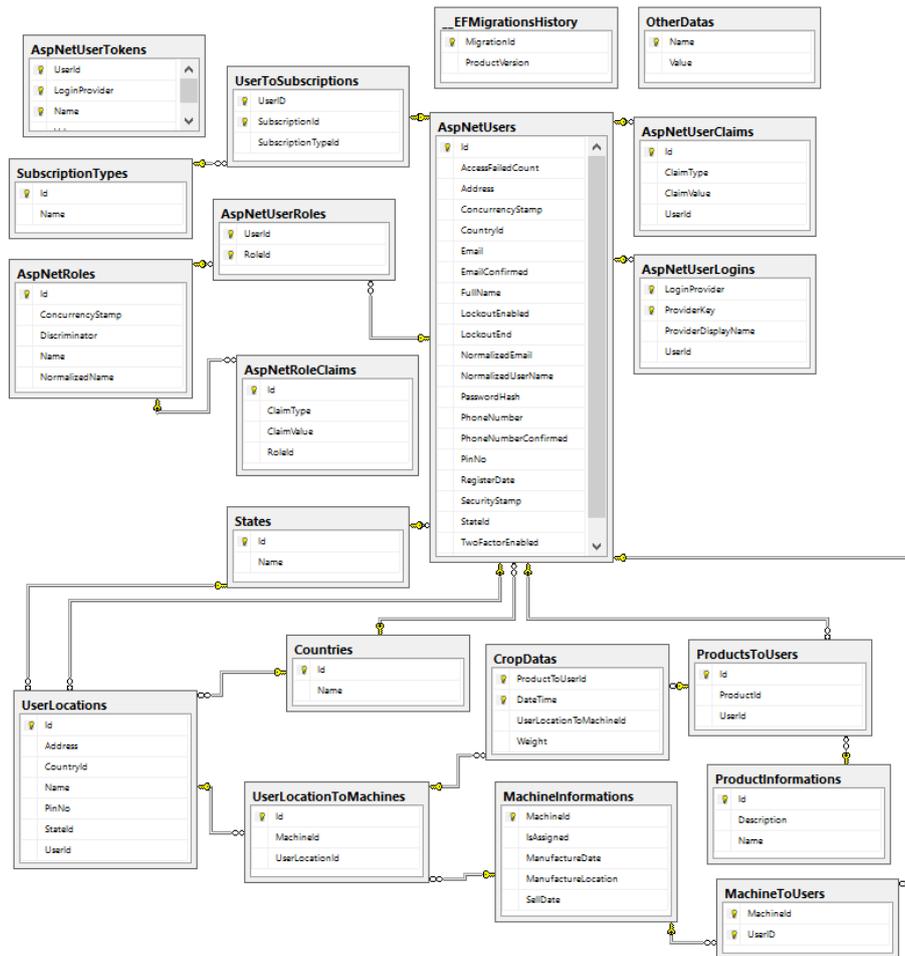


Fig. 3 Database Model



## VII. Conclusion

By making this project we are hoping that it will help people such as farmers to automate the cataloging process by using this weighing machine and will reduce the human errors. We also planning to reduce hoarding with this project and increase transparency between farmers and customers.

To achieve required results, all the necessary steps are taken. By analyzing this results, it is feasible and possible to build this project in given amount of time with all the mentioned functionalities and features. With this project, we are also plan to increase transparency between customer and farmers. Customer will know about farm produce in less time instead of waiting days

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