CHAPTER 1

INTRODUCTION

1.1 OVERVIEW

In the work presented here, a technique has been developed to read all the information from a centralized server automatically using the internet for computers. In the proposed system, every family will have a separate RFID (Radio Frequency Identification Device) card. These cards are magnetic and they will contain beneficiary's information. Whenever a beneficiary gets the commodities from FPS (Fair price shops) all the transactions are recorded in the server. The system not only reduces the labor cost but also increases the accuracy and save some amount of time.

1.2 INTRODUCTION

As we all know that India is famous for its rich culture and diversity, India is worlds second most populated country with around **1,407,125,048** population as per the Worldmeter elaboration in July 2022. In the country like India if want to supply food for every people means it is a big challenging thing for the government. Nearly around **664,369** villages are there in India according to the 2011 census and we have more than **5.5lakh** ration shops all over the India it is one of the largest distribution networks in the world. The Planning commission of India said to the PDS system in its 2005 report that if government has spent Rs.4 on PDS means only Rs.1 is reaching to the poor people in India that means almost 57% people in the rural areas not getting the ration only. The Public distribution system (PDS) in India was established under the Ministry of Consumer Affairs, Food, and Public Distribution**.** PDS supply food grains to the poor people with affordable price which operates under the joint of central and state government. under this system presently they are distributing commodities like wheat, rice, sugar and kerosene. PDS was introduced around World War II time in that time ration distribution was dependent on imports of food grains later in 1970s it was evolved into universal scheme for distribution of food grains.

An embedded system is a computer system design which will do some specific functions often with the real time constraints. It is an embedded system so it has both hardware and software parts. From basic to large application, we make use of this embedded system in our every day-to-day life. Embedded systems control many devices now a days. Embedded systems are usually controlled by one or more main processing cores that are microcontrollers or digital signal processors (DSP). The key characteristics of an embedded system is that it has dedicated do particular task.

In our proposed system i.e., the Automated ration dispensing system it is also an embedded system as it includes both hardware and software parts. Like many other embedded applications, it consists of microcontroller, serial communication connection, other peripheral circuits and power supply. As the name suggest Automated ration distribution system is the important concept which resolves various problems involved in the classical system.

The classical system of Public Distribution System (PDS) was established by the Indian government to provide food security to the people. There are various ration shops in the entire nation where the people get various commodities like oil, kerosene, grains etc. At the end of every month the ration will be provided by the ration shops which is located in the village. The customer has to go to the ration shop and ask the employee who is allocated by the public distribution system of the respective state government to provide the commodity he needs. Then the beneficiary has to provide the ration card provided by the food corporation of India (FCI). The employee then manually gives the ration to the customer. This all transaction is monitored and added into the ration card. This is the entire total interaction which take place in the ration shop between beneficiary and the employee. This system has various loopholes from beginning to till the end of the process. As there are manyration shops and customers are coming to take their commodities provided by the government at ration shop normally there are people who are below poverty line and some are illiterates, the customers are fooled to a large extent. There are complaints related to the quality of the product they receive, the quantity they receive many times is less than the quantity provided by the government. Moreover, the employees working in the shop steel form it. Also, the quantity which is added in the ration card is wrong. So, there is a lot of cheating and fooling of the customers that takes place.

In this project we proposed a solution to overcome from these malpractices which are happening in the ration shops by 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. The quantity of weight required is being is pre-calculated to the machines, so that the quantity cannot be manipulated by human intervention and will be authenticatedby customer itself. Once the item is selected, the customer can place a bag/container near the respective dispenser. Now instead of him/her manually taking the ration weight, the customer can scan the card that would be provided by the government. Once he/she scan the card it will display the name of the customer and registered mobile number will get the four-digit OTP which can be used as a password then he/she has to enter the OTP manually then it shows what are the commodities available in the ration shop with quantity specified in it. Once the start button is clicked the respective dispenser will open and pour the specified quantity of grains to respective bag/container. Based on the delay or pre-calibration done to dispense the amount grains or oil then that will be dispensed by activating the solenoid valve.When the number of grains reaches the quantity that was entered by the customer, the solenoid valve which opened the door-like opening in the container of grains; it will close that opening, as the required quantity has been reached. Thus, the main fallacies involved in the fooling of customer where they receive fewer amounts than what they have asked for and end up paying more, false entries in the ration card like making false entries or double entriesetc., are all dealt with in this implementation of the system.

Conventional Ration distribution system, however, includes several structural shortcomings including:

1.) Many Fair price shop keepers do malpractice, illegal diversions of the commodities for poor people, black marketing because of their low wages.

2.) Unavailability of ration in some areas, and lack of communication and transparency between shopkeepers and Govt. Officials.

3.) In traditional system, all the records are in paper form which can be changed easily, and also some people tend to get fake ration card through which they buy more than necessary ration at very lower rate when compared to market price. This results in poor people missing the ration that they are entitled to get.

4.) No centralized database to monitor the activities of the ration shops and customer's buying behavior in any area at any given instance.

5.) Shopkeepers sometimes tend to forget the expiry of the ration available in their shop. This may result into serious health issue for the person who may consume these expired food items.

Why needs automation?

- To reduce the waste in Ration
- To make sure entitled customers get their ration
- To mitigate the corruption involved
- To escalate efficiency
- To reduce the wastage
- To observe buying behavior for future improvements.

1.3 CHALLENGES

- Analysis of TPDS has revealed several gaps in implementation.
- These challenges pertain to the inaccurate identification of households and a leaking delivery system.
- Expert studies have shown that PDS suffers from nearly 61% error of exclusion and 25% inclusion of beneficiaries, i.e. the misclassification of the poor as non-poor and vice versa.
- Another challenge is the leakage of food grains during transportation to the FPS and from the FPS itself into the open market.

1.4 PROBLEM STATEMENT

The classical system of Public Distribution System (PDS) established by the Indian government for provides food security to the people. There are various ration shops in the entire nation where there are employees who give the people various commodities like food grains, oil, kerosene etc. The customer has to go the ration shop and ask the employee to give the commodity he needs. The employee then manually gives it to the customer. This transaction also needs to be added in to the ration card. This is the total interaction which takes place. This system faces with various problems. As there are many ration shops and the customers coming to buy from ration shops are normally believed to be below poverty line and illiterate, the customers are fooled to a large extent. There are complaints related to the quality of the product they receive, the quantity they receive is many a times less than the quantity demanded by them as the employees steal from it. Moreover, they end up paying more for the quantity they receive. Also, the quantity which is added in the ration card is wrong. So, there is a lot of cheating and fooling of the customers that takes place.

1.5 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. The quantity of weight required is being pre-calibrated to the machines, so that the quantity cannot be manipulated by human intervention and will be authenticated by customer itself. Once the item is selected, the employee can place a container on the weighing machine. Now insteadof him manually taking the grains weight, the customer /employee can show the card that would be provided by the govt. Once the start button is clicked, a small door-like opening ina container placed at a height, above the place where the container is put for collecting the required type of grains, will be opened by a solenoid valve.

The grains start getting collected in the container. Based on the delay or pre-calibration done to dispense the amount grains or oil then that will be dispensed by activating the solenoid valve. When the amount of grains reaches the quantity that was entered by the customer, the solenoid valve which opened the door-like opening in the container of grains; it will close

that opening, as the required quantity has been reached. Thus the main fallacies involved in the fooling of customer where they receive fewer amounts than what they have asked for and end up paying more, false entries in the ration card like making false entries or double entries etc., are all dealt with in this implementation of the system.

1.6 OBJECTIVES

The objective of the project is to automate the task of distribution of items efficiently. The project is aimed to stop corruption and inconsistency created in distribution shops. Here the system must perform the following.

- ➢ To design and implement automatic ration dispensing system using solenoid valve and DC Gear motors which is controlled by LPC2148 microcontroller.
- ➢ To deliver the food grains to public on timely basis, and maintain the transparency in it.
- ➢ SMS notifications on the mobiles of the beneficiaries.
- ➢ Stock maintenance in the distribution center.

1.7 ORGANIZATION REPORT

The report includes the following contents: Chapter 2 deals with Literature Survey which includes various paper descriptions in brief. Chapter 3 deals with Design and methodology, Components descriptions, flow chart, hardware requirements, software requirements, Implementation and Pin Configuration. Chapter 4 deals with Result and Discussions with Snapshots. Chapter 5 deals with Advantages, Disadvantages and Applications. Lastly the conclusion, future work and references.

CHAPTER 2

LITERATURE SURVEY

2.1 SURVEY DESCRIPTION

In this paper title named **"**Automatic Ration Material Distribution Based on GSM and RFID Technology" authors S.Valarmathy, R.Ramani, Fahim Akhtar stated that Automatic Ration Materials Distribution Based uses GSM and RFID. To avail the benefit of government user has to scan the code using the reader to fetch the details of items allocated to the user, and then the microcontroller of system checks user's details and quantity allocated to user. The amount details are shown after authentication. Then customer need to select the necessary materials by using user interface. After receiving order, controller sends the information to authorities and customer through GSM technology.

In this paper title named "Multi-Modality Biometric Assisted Smart Card Based Ration Distribution System" authors Yogesh Kumar Sharma, K B Shiva Kumar stated that it uses technique of fingerprint scanning as well as face detection. The database stores the records of users purchase history. They use a centralized cloud system so that transparency is maintained and users can access their details of record at some other fair price shop.

In this paper title named "Automization of Rationing System" authors Shivabhakt Hanamant, Suraj V. S, Moresh Mukhedkar stated that it proposes atomization of distribution system at the ration shop as well as maintaining the database at one main control station and updating the database so that the shopkeeper cannot cheat the people. The tags are used for authentication of valid users. For updating, GSM is used.

In this paper title named "Smart Ration Distribution and Controlling" authors Kashinath Wakade, Pankaj Chidrawar, Dinesh Aitwade stated that this paper uses the technique of PDA devices and the tags instead of current booklet of ration card. The device that is provided by government in this case is used as authentication card, and the e cards are used as bank credit cards to swipe and fetch the details.

In this paper title named "Automatic Rationing System" authors Shubham B. Parsewar, Pooja.P.Polawar Gayatree V. Paul stated that Corruption has been around for a very long time and unless governments can figure out effective ways to combat it, corruption will remain in the future. The aim of this paper has been to organize and summarize existing work on corruption, to identify opportunities for further research. The Public Distribution System (PDS) can be modernized with the help of computerization. This paper has discussed various strategies that were adapted in using ICT to control diversion and leakage in the delivery mechanism. 0.78million farmers have received computer-generated cheques without any delay as an outcome of the project. In monitoring the PDS involvement of common people has been increased.

In this paper title named "Automatic Ration Distributions Based on GSM and RFID Technology" authors S.Valarmathy, R.Ramani, Fahim Akhtar stated that Ration card is very important for every home nowadays. It is used for fetching the details of family members, to get a gas connection. It also acts as address proof for various purposes. To buy various materials such as sugar, rice, oil, kerosene, etc. from the ration shops, all the people have a ration card. But this system has two drawbacks, viz. Due to human mistakes weight of the material may be inaccurate, they will sell the materials to others without any intimation to the government and customers. They proposed an Automatic Ration Materials Distribution Based on GSM and RFID technology instead of ration cards in this paper in this paper. The customer needs to show the RFID tag into the RFID reader to get the materials in ration shops, then the customer code will be checked by the controller. The system will give the account details after verification.

In this paper title named "Smart Rationing System Using ARM 7" authors A. N. Madur, P. N. Matte stated that Corruption & leakage of goods is involved in today's public distribution. As the PDS system is manual and has many drawbacks, food article doesn't reach poor people. Actual quality food doesn't reach to people. They have replaced manual PDS with smart PDS in this paper, which can prove to be helpful to Govt. of India's PDS System and to various other disciplines. It is a vast concept in terms of feasibility and an interesting task to perform.

In this paper title named "Cloud-Based Ration Card System Using RFID And GSM Technology" authors K. Bala Karthik stated that There are numerous problems with the existing conventional ration card system, right from the basic issues of renewing the ration card every year which has to be done manually by the employees to the malpractices like diverting food grains to open market done by the ration store dealers to make profits. Irregularity in opening shops and false announcements of the deficit in food grains is also a problem. All the above problems can be tackled by this proposed ration card system using RFID. The user can buy whatever he wants by just flashing the ration card at the RFID reader at the ration store. The user authentication is done by sending a random password text to the user mobile which has to be entered in a keypad. Only after the details are entered in a windows application which is connected to the cloud which stores the user's personal and purchase information, the purchase is validated by the employee. Above all, the details of purchase can be checked by the user on a particular website.

CHAPTER 3

DESIGN AND METHODOLOGY OF RDS

3.1 BLOCK DIAGRAM

The block diagram of the Ration Dispensing System is shown in the fig 3.1. This gives us an overview of the complete project and its components used.
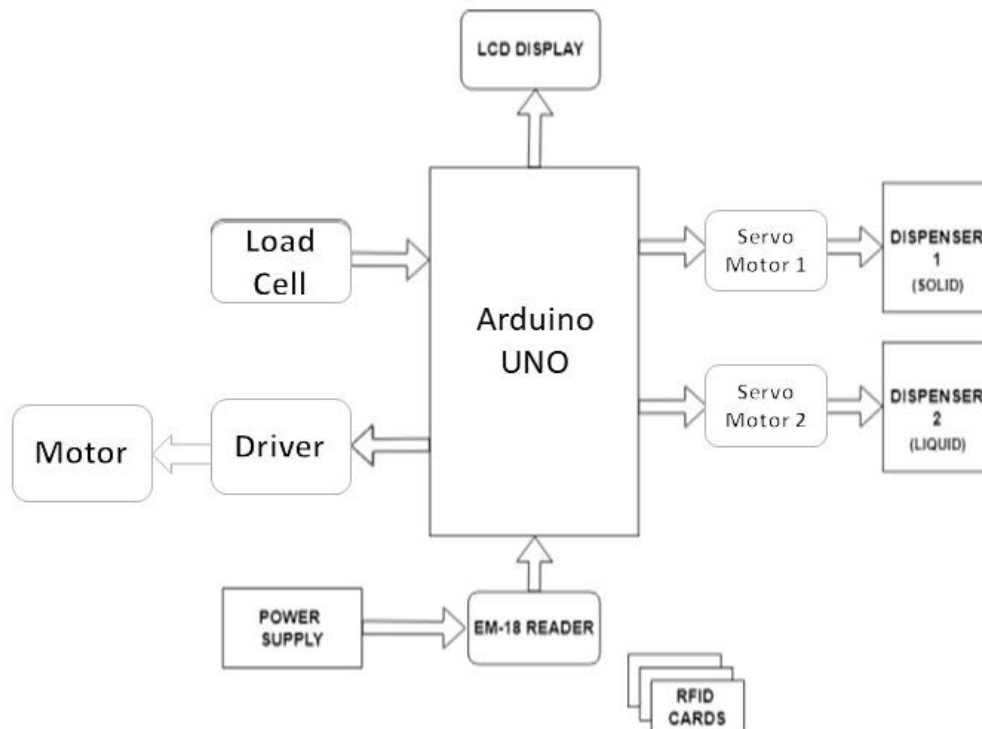
Fig. 3.1: Block diagram.

The transformer which we are using for the purpose of the power supply is connected to the bridge rectifier it is been used to rectify the supply. The entire system is supplied with the external power supply which is turned on using the 12V DC Adapter. The system contains the main module i.e., Arduino uno micro controller which will be the main controller of the project.

The Arduino uno board will control the entire working and also will perform the tasks based on our requirements. This Arduino uno board will help the working of entire logic. Since the system is RFID based which is the main advantage of the system proposed. This RFID is an individual card with a unique identification number distributed to each eligible person for the ration supply. When buyer swipe the smart card to the EM-18 module will transfers information to the controller. If it is wrong card or if ID is not valid then user will be notified stating it is an invalid card, else the process will move further. The OTP (One Time Password) is also verified through the keypad option. The controller will then check if it's grains or liquid and then turn on the specific driver based on the quantity entered in the Keypad. Based on the keypad details specific driver will be on and the dispenser will be opened so that specific quantity of the ration will be dispatched. The entire system will be controlled and the information will be displayed in the LCD Display that is integrated to the Arduino uno board. This entire process will be looped through from scanning the RFID cards.

Two cases were identified in this system for dispense the ration materials automatically i.e.,

> Case 1:

- If ration preferred is liquid, the keypad is activated and will wait until quantity is entered. Then the valve for dispensing the liquid ration will open and the dispenser will dispense the ration.

- The same step repeats from waiting for a new card to be placed on the reader to dispense the next round of the ration.

> Case 2:

- The other case, if the ration is grains, the quantity is asked and then proceeded to start the driver to open the gateway to grains distribution and after the required amount of grains is delivered then the system is stopped.

- The same step repeats from waiting for a new card to be placed on the reader to dispense the next round of the ration.
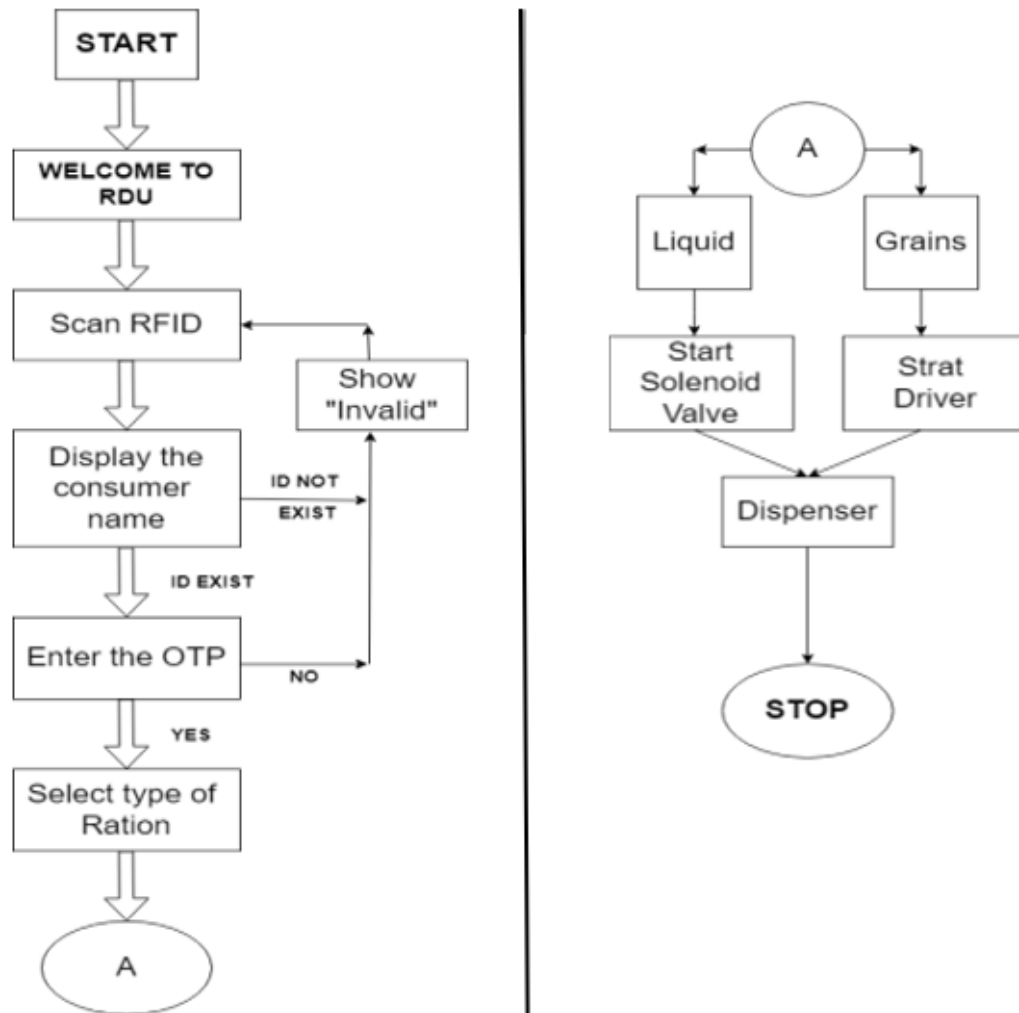
3.2 FLOW CHART

Fig. 3.2: Flow Chart

WORKING

In this project we are making use of RF ID Card to authenticate the user, once the user shows the card in front of the RFID reader then that data is fetched to the microcontroller.

➢ Every consumer is provided with a RFID card who are registered in the Food Corporaion of India throug PDS.

➢ When consumer goes to the Fair Price shop (FPS), he/she has to carry the smart card and mobile phone.

➢ Now the customer has to scan the RFID card.

➢ If the RFID card is valid it displays the consumer name in LCD display. If the card is invalid means it display "INVALID CARD".

➢ The above step is correct means registered mobile number receives an OTP which can be used as password.

➢ Now the customer has to enter the 4 digit OTP received the mobile through keypad.

➢ Based on type of material chosen by the consumer, the motor or solenoid valve is activated.

➢ After collecting proper quantity material, motor or solenoid is disabled.

CHAPTER 4
HARDWARE AND SOFTWARE REQUIREMENTS

4.1. HARDWARE REQUIREMENTS

1. Arduino Uno
2. RFID Reader & Tag
3. 16*2 LCD Display
4. Motor Driver (L298N)
5. Servo Motor
6. DC Gear Motor
7. Load Cell
8. DC-DC Converter
9. Power Supply.

4.2 SOFTWARE REQUIREMENTS

1. Arduino IDE

4.1 HARDWARE COMPONENTS DESCRIPTION

4.1.1 ARDUINO UNO

The **Arduino Uno** is an open-source microcontroller board based on the Microchip ATmega328P microcontroller and developed by Arduino.cc and initially released in 2010.[2][3] The board is equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards (shields) and other circuits.[1] The board has 14 digital I/O pins (six capable of PWM output), 6 analog I/O pins, and is programmable with the Arduino IDE (Integrated Development Environment), via a type B USB cable.[4] It can be powered by a USB cable or a barrel connector that accepts voltages between 7 and 20 volts, such as a rectangular 9-volt battery. It is similar to the Arduino Nano and Leonardo.[5][6] The hardware reference design is distributed under a Creative Commons Attribution Share-Alike 2.5 license and is available on the Arduino website. Layout and production files for some versions of the hardware are also available.

Fig 4.1.1a. Arduino uno

TECHNICLE SPECIFICATIONS

- Microcontroller:

  - IC: Microchip ATmega328P[9]

  - Clock Speed: 16 MHz on Uno board, though IC is capable of 20MHz maximum at 5 Volts

  - Flash Memory: 32 KB, of which 0.5 KB used by the bootloader

  - SRAM: 2 KB

  - EEPROM: 1 KB

  - UART peripherals: 1

  - I2C peripherals: 1

  - SPI peripherals: 1

  - Operating Voltage: 5 Volts

  - Digital I/O Pins: 14

  - PWM Pins: 6 (Pin # 3, 5, 6, 9, 10 and 11)[11]

  - Analog Input Pins: 6

  - DC Current per I/O Pin: 20 mA

  - DC Current for 3.3V Pin: 50 mA

  - Length: 68.6 mm

  - Width: 53.4 mm

  - Weight: 25 g

  - ICSP Header: Yes

Power Sources:

USB connector. USB bus has a voltage range of 4.75 to 5.25 volts. The official Uno boards have a USB-B connector, but 3rd party Uno boards may have a miniUSB or microUSB connector.

5.5mm/2.1mm barrel jack connector. Official Uno boards support 6 to 20 volts, though 7 to 12 volts is recommended. The maximum voltage for 3rd party Uno boards varies between board manufactures because various voltage regulators are used, each having a different maximum input rating. Power into this connector is routed through a series diode before connecting to VIN to protect against accidental reverse voltage situations.

As we discussed we know that Arduino Uno is the most standard board availableand probably the best choice for a beginner. We can directly connect the board to the computervia a USB Cable which performs the function of supplying the power as well as acting as a serial port.
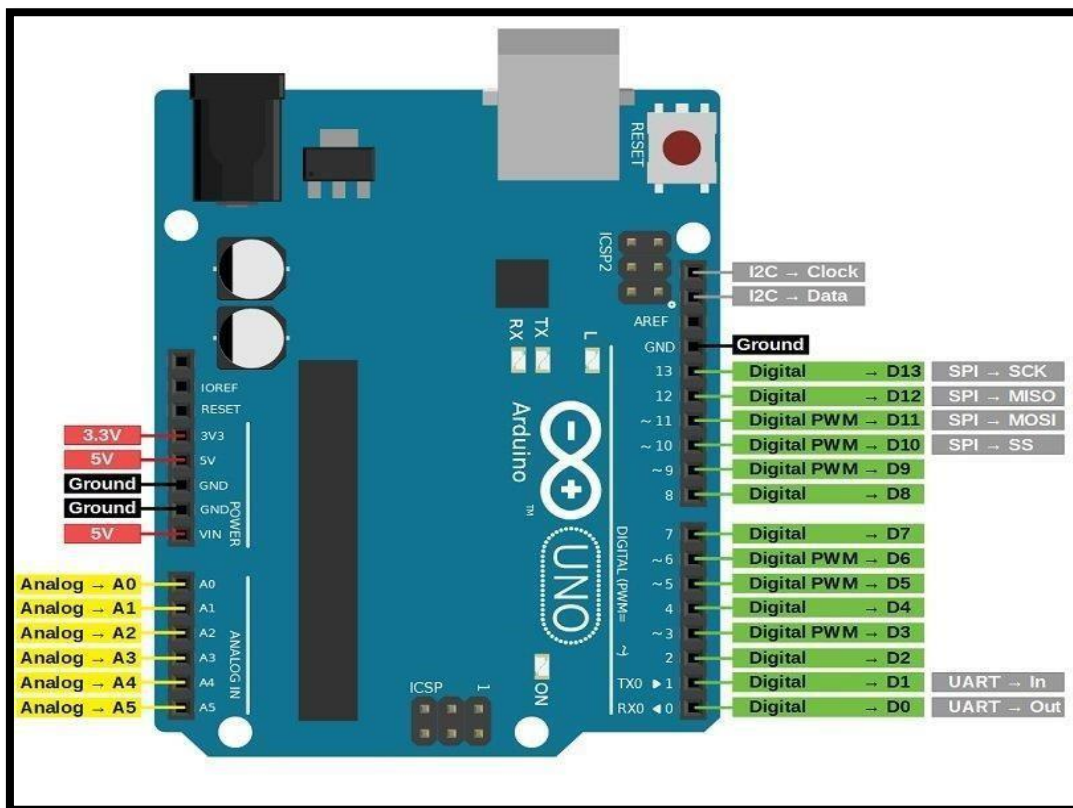

Figure 4.1.1b: Arduino Uno Pin configuration.

Vin: This is the input voltage pin of the Arduino board used to provide input supply from anexternal power source.

5V: This pin of the Arduino board is used as a regulated power supply voltage and it is used togive supply to the board as well as onboard components.

V: This pin of the board is used to provide a supply of 3.3V which is generated from a voltageregulator on the board

GND: This pin of the board is used to ground the Arduino board.

Reset: This pin of the board is used to reset the microcontroller. It is used to Resets themicrocontroller.

Analog Pins: The pins A0 to A5 are used as an Analog input and it is in the range of 0-5V.

Digital Pins: The pins 0 to 13 are used as a digital input or output for the Arduino board.

Serial Pins: These pins are also known as a UART pin. It is used for communication between theArduino board and a computer or other devices. The transmitter pin number 1 and receiver pinnumber 0 is used to transmit and receive the data respectively.

External Interrupt Pins: This pin of the Arduino board is used to produce the External interruptand it is done by pin numbers 2 and 3.

PWM Pins: This pin of the board is used to convert the digital signal into an analog by varyingthe width of the Pulse. The pin numbers 3,5,6,9,10 and 11 are used as a PWM pin.

SPI Pins: This is the Serial Peripheral Interface pin, it is used to maintain SPI communication withthe help of the SPI library. SPI pins include:

SS: Pin number 10 is used as a Slave Select.

MOSI: Pin number 11 is used as a Master Out Slave In.

MISO: Pin number 12 is used as a Master in Slave Out.

SCK: Pin number 13 is used as a Serial Clock.

LED Pin: The board has an inbuilt LED using digital pin-13. The LED glows only when thedigital pin becomes high.

AREF Pin: This is an analog reference pin of the Arduino board. It is used to provide a referencevoltage from an external power supply.

4.1.2 BREADBOARD:

A breadboard is a rectangular plastic board with a bunch of tiny holes in it. These holes let you easily insert electronic components to prototype (meaning to build and test an early version of) an electronic circuit, like this one with a battery, switch, resistor, and an LED (light-emitting diode). The connections are not permanent, so it is easy to remove a componentif you make a mistake, or just start over and do a new project.
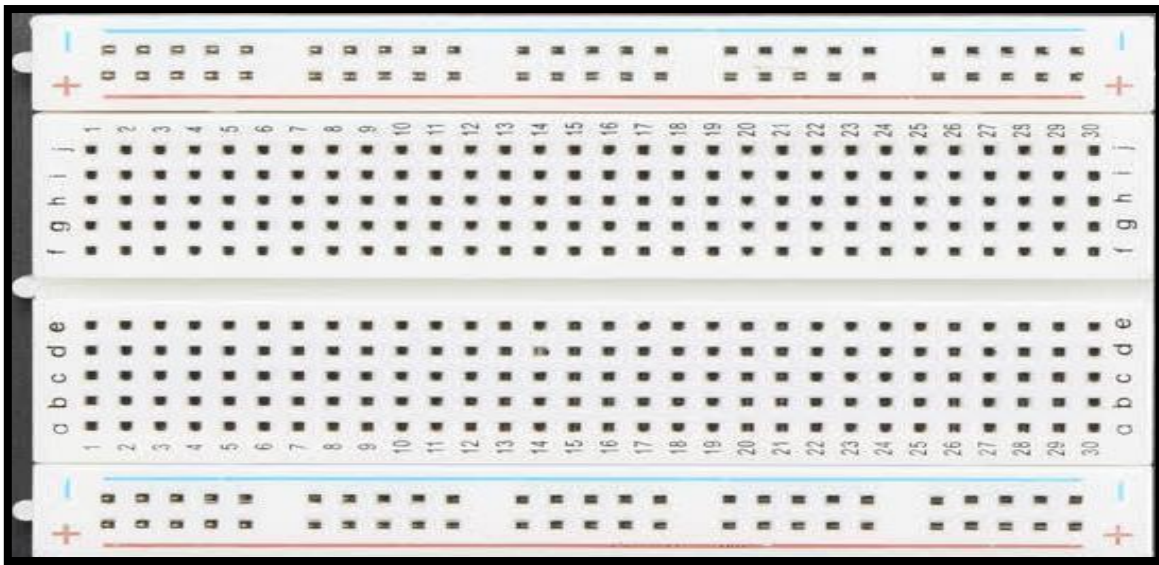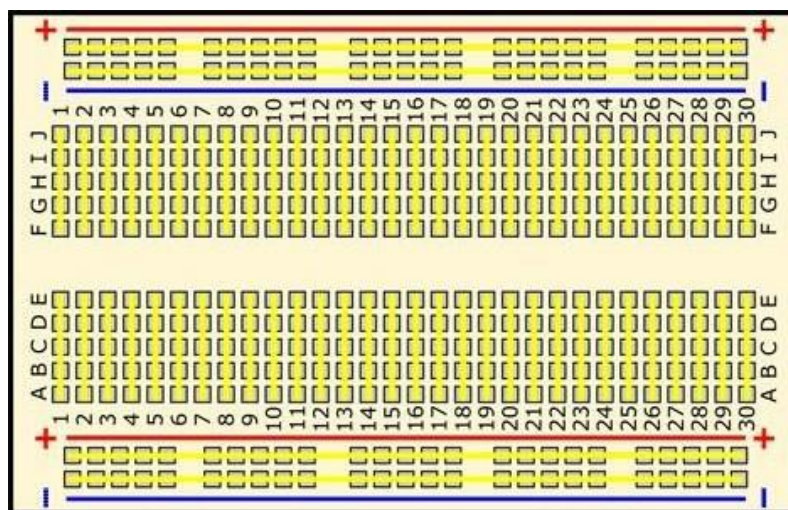

Figure 4.1.2a: Breadboard.

Modern breadboards are made from plastic, and come in all shapes, sizes, and even different colours. While larger and smaller sizes are available, the most common sizes you will probably see are "full-size," "half-size," and "mini" breadboards.

Technically, these breadboards are called solderless breadboards because they do not require soldering to make connections. Many electronic components have long metal legs called leads. Sometimes, shorter metal legs are referred to as pins instead. Almost all components with leads will work with a breadboard. Breadboards are designed so you can push these leadsinto the holes. They will be held in place snugly enough that they will not fall out (even if youturn the breadboard upside-down), but lightly enough that you can easily pull on them to remove them.

These strips are typically marked by red and blue (or red and black) lines, with plus (+) and minus(-) signs, respectively. They are called the buses, also referred to as rails, and are typically used to supply electrical power to your circuit when you connect them to a battery pack or other external power supply. You may hear the buses referred to by different names; for example, power bus, positive bus, and voltage bus all refer to the one next to the red line withthe plus (+) sign. Similarly, negative bus and ground bus both refer to one next to the blue (orblack) line with the minus (-) sign.

Positive	Negative
Power	Ground
Plus, sign (+)	Minus sign (-)
Red	Blue or black

Buses on opposite sides of the breadboard are not connected to each other. Typically, tomake power and ground available on both sides of the breadboard, you would connect the buses with jumper wires, like this. Make sure to connect positive to positive and negative to negative (see the section on buses if you need a reminder about which colour is which)

Figure 4.1.2b: Breadboard buses connections.

Note that exact configurations might vary from breadboard to breadboard. For example, some breadboards have the labels printed in "landscape" orientation instead of "portrait" orientation. Some breadboards have the buses broken in half along the length of the breadboard (useful if youneed to supply your circuit with two different voltage levels). Most "mini" breadboards do not have buses or labels printed on them at all. There may be small differences in how the buses

are labelled from breadboard to breadboard. Some breadboards only have the coloured lines and no plus (+) or minus (-) signs. Some breadboards have the positive buses on the left and the negative buses on the right, and on other breadboards, this is reversed. Regardless of howthey are labelled and the left or right positions, the function of the buses remains the same.

Advantages of Breadboard:

- It has easy to quick to check for easy and complex circuits both and it has easily verifiedcircuits at the initial stage, so it can save time.
- Quick to check component around.
- It is easy to adjust.
- It is flexible.
- No soldering required.
- It can be debugged easily.
- A solderless connection makes it reusable.
- Cheap and connections can be changed.

Disadvantages of breadboard:

- It is unreliable.
- Difficult to replicate.
- It is temporary.
- It is heavier.
- A breadboard is noisier than properly laid-out circuit boards, sometimes far too noisy.
- It is difficult to troubleshoot due to human error and some poor connections problem.

4.1.3 RFID READER

RFID is a short form of Radio Frequency Identification. It is working under inductive coupling principle, based on a radio frequency or radio waves. RIFDs uses electromagnetic field to identify objective or tracking the objects automatically even 100 meters distance.

The objectives may be books, products in shopping mall, cars etc., not only a car objects it can be a used for tracking of Pet animals also. The RFID tag is used to attach to the object which we want to track. This RFID reader are designed to send the data automatically in real time. Also we can change the value in the real time.

Whenever the object is in the range of the reader, the RFID tag are used to transmit feedback signal to the reader. The RFID Contains a transmitter and receivers. So it is very similar to the technology used in bar code. In the case of the bar code the scanner should be in a line of site. RFID is a not a line of technology as far as the object is in range of the reader object is able to identify the reader and able to send the feedback signal to reader. (The object can be in random position). By using RFID technology, we can track multiple objects at the same time.

Fig. 4.1.3a: RFID Reader And Tag

What is inside RFID system?

RFID system contains two components

- RFID reader
- RFID tags

RFID tags are three types, they are

- Active tag
- Passive tag
- Semi passive tag

Active tag

In case of active tag is used to have its own power supply but transmit signal back to the reader also they depend on the own power supply.

Passive tag

The passive tag is not having its own power supply. So, this passive tag depends of the radio waves which are coming from the RFID reader from the source of energy.

Semi passive tag

In semi passive type used to have an own power supply but for transmitting feedback signal back to the RFID reader they used to depend on the signal which is coming from the RFID reader.

Inside RFID reader

RFID reader is coming in many sizes and shapes. RFID reader may be handheld reader or as it may be size of door is in shopping malls.

RFID reader mainly consists of three components.

- RF signal generator
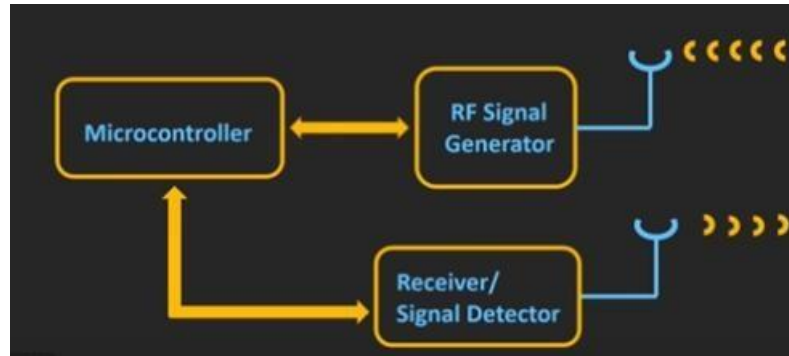
- Micro controller

- Receiver/signal detector

Fig. 4.1.3b: Inside RFID Reader

RF signal generator

This signal generator generates a radio wave transmitted using antenna and the same is used to receive the feedback signal coming from the tag. The RFID reader also have receiver or signal detector and process the information send by the RFID tag. This RFID have micro controller many times the RFID is directly connected to the computer.

Most of the RFID used passive tags because passive tags are quite cheaper compared to active tags as they do not require any power source and quite compact. The passive tags are coming in many forms they are like key chain or it could be a size of credit card or it may be like label.

Basic components inside RFID tag

- Transponder

- Rectifier circuit

- Controller

- Memory
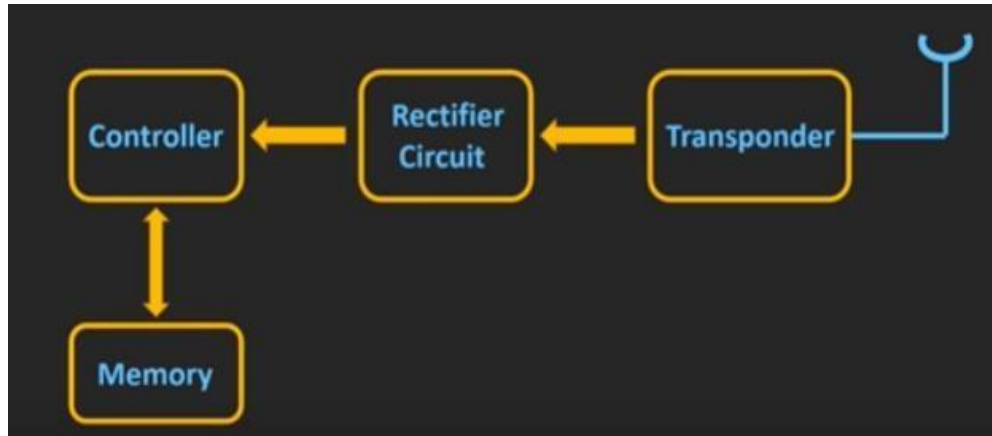
Fig 4.1.3c: RFID Tag

Transponder receives the radio waves which are coming from the reader which are sent the feedback signal to the reader. The passive tags do not have the own power supply so they dependent on the radio waves so they get the energy from the radio waves. Rectifier circuits the energy coming from the radio waves code across the capacitor. This energy used as the supply for the controller as well as the memory.

Frequency of RFID used for operations

RFID tags are operated in three frequencies. They are

Low frequency

The low frequency operates in the range of 125 KHZ to 134 KHZ. This frequency travels very short distance up to 10 cm.

High frequency

The high frequency operates in the range of 13.5 MHZ. this frequency travel up to1 meter.

Ultra-high frequency

This frequency operates from 860 to 960 MHZ. this frequency travels up to 10 to 15 meter.

Working principle

RFID depends on the frequency of operation for low frequency and high frequency operation based on the inductive coupling (near field coupling)

While in case of UHF tags working is based on the electromagnetic coupling (far field coupling)

RFID reader continuously sends radio waves at a particular frequency. The radio waves which are send by the reader is of three purposes.

- It includes enough power into tag

- It provides synchronization clock tag to passive tag

- Acts as a carrier for return data from tag
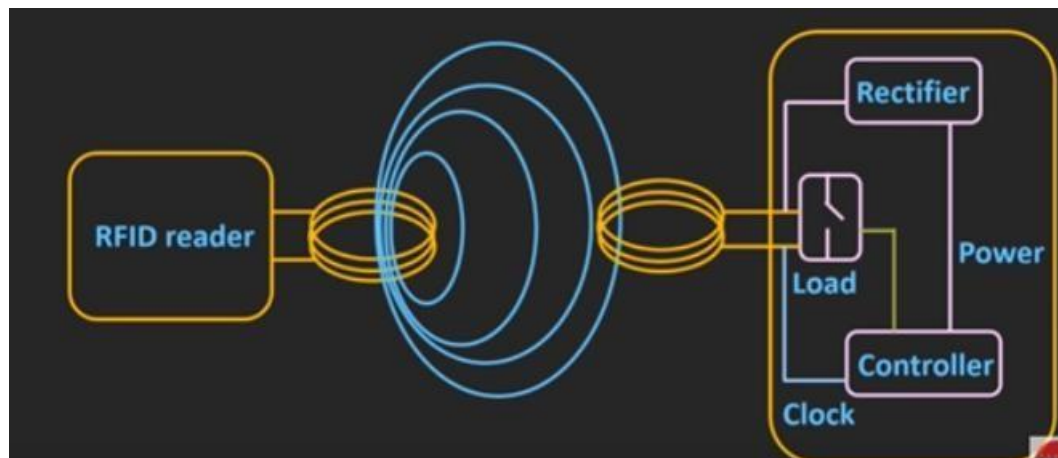
Fig. 4.1.3d: Working of RFID and Tag

The low and high frequency operation the RFID reader and tag are very close to each other. So, working principle is based on the inductive coupling just like transformer action. The field which is generated by RFID reader is used to couple with the antenna of a RFID tag, because of the mutual coupling voltage will get induced across the coil of the RFID tag.Some portion of voltage is rectified uses a power supply for the controller and memory elements.

RFID reader sending radio waves of a particular frequency so that voltage will be induced across the coil at a particular frequency. This induced voltage is used to synchronizing the clock of the controller. Suppose if we connect load across the coil, the current will start flowing through the connected load. If we change the impedance of load, simultaneously the current flowing through load will also change (Ohms Law), suppose if we switch ON/OFF load current will also ON/OFF. The switching of current the rate of change of current also generates the voltage in as RFID reader. The switching ON/OFF the load is known as theload modulation.

4.1.4 16*2 LCD DISPLAY

The term LCD stands for liquid crystal display. It is one kind of electronic display module used in an extensive range of applications like various circuits & devices like mobile phones, calculators, computers, TV sets, etc. These displays are mainly preferred for multi-segment light-emitting diodes and seven segments. In our system, 16x2 LCD is interfaced with the microcontroller. This LCD will act as a User Interface where customer will be able to see the information such as Product Key, Instructions, etc. Also, 4x4 matrix keypad is interfaced serially with Atmega32. User will use this keypad to enter the command and information such as Product Key for Ration, Quantity required, etc.

Fig.4.1.4. 3.13: LCD Display

4.1.5 SERVO MOTOR

A **servo motor** is a type of motor that can rotate with great precision. Normally this type of motor consists of a control circuit that provides feedback on the current position of the motor shaft, this feedback allows the servo motors to rotate with great precision. If you want to rotate an object at some specific angles or distance, then you use a servo motor. It is just made up of a simple motor which runs through a **servo mechanism**

Fig. 4.1.5: Servo motor

4.1.6 MOTOR DRIVER

A motor driver circuit designed specifically for robotic projects using high power collector motors with or without PWM modulation with a Microcontroller or debug card to fully control two motors. It is commonly used in autonomous robots and RC cars L2938N and L293D are the most regularly utilized motor driver chips.
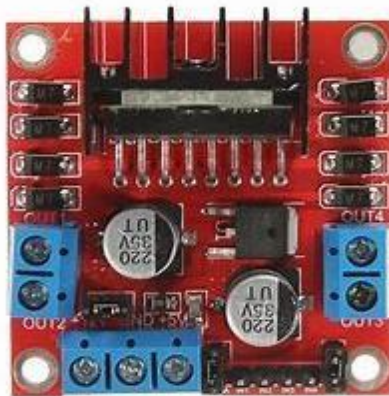

Fig. 4.1.6: Motor Driver

4.1.7 JUMPER WIRE:

A jump wire (also known as jumper, jumper wire, DuPont wire) is an electricalwire, or group of them in a cable, with a connector or pin at each end (or sometimes without them – simply "tinned"), which is normally used to interconnect the components of a breadboard or other prototype or test circuit, internally or with other equipment or components, without soldering.

Individual jump wires are fitted by inserting their "end connectors" into the slots provided in abreadboard, the header connector of a circuit board, or a piece of test equipment.
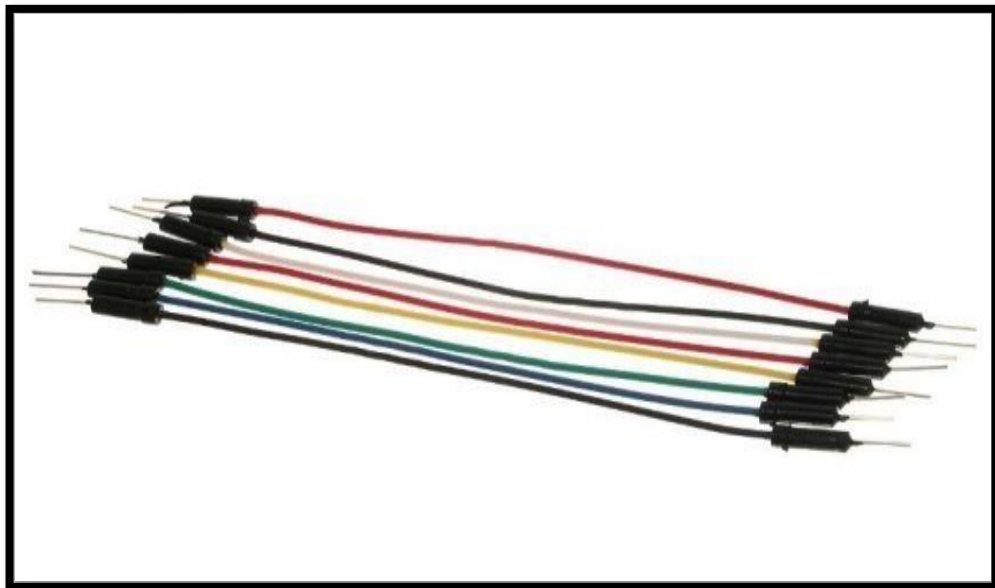
Figure 4.1.7: Jumper wires.

4.1.8 POWER SUPPLY

All electronic circuits have power input connection, which receives power from a source, and give power to one or more output connections that deliver current to the load. The power supply is essential to operate any electronic circuit. In our system, mainly +5V and +12V power supply is developed to give power to components microcontroller, L298Motors, Drive circuit, EM-18 RFID module, LCD display.


Fig. 4.1.8: Power Supply

4.2 SOFTWARE COMPONENTS REQUIREMENTS

4.2.1 ARDUINO IDE SOFTWARE:

Arduino IDE is an open-source software, designed by Arduino.cc and mainly used for writing, compiling & uploading code to almost all Arduino Modules. It is an official Arduino software, making code compilation too easy that even a common person with no prior technicalknowledge can get their feet wet with the learning process. It is available for all operating systems i.e. MAC, Windows, Linux and runs on the Java Platform that comes with inbuilt functions and commands that play a vital role in debugging, editing and compiling the code.

A range of Arduino modules available including Arduino Uno, Arduino Mega, Arduino Leonardo, Arduino Micro and many more. Each of them contains a microcontroller on the board that is actually programmed and accepts the information in the form of code. he main code, also known as a sketch, created on the IDE platform will ultimately generate a Hex File which is then transferred and uploaded in the controller on the board

As you download and open the IDE software, it will appear like an image below:
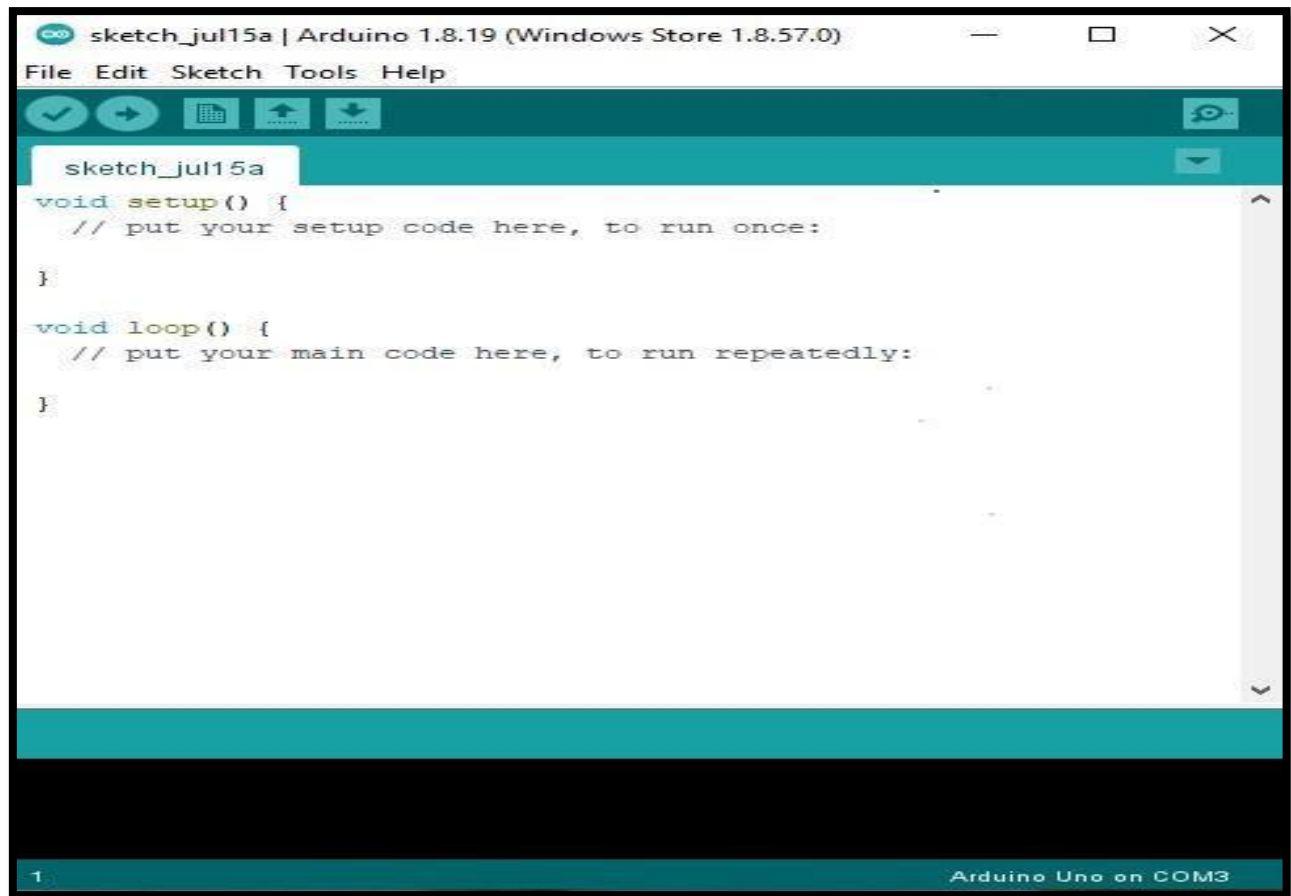
Figure 4.2.1a: Arduino IDE Software.

Developer   Arduino Software.

Stable release   1.8.19v / 20 December 2021

Repository   https://github.com/arduino/Ardunio.

Written in   Java, C, C++.

Operating system   Windows, Mac OS, Linux.

Platform   32 bits,64 bits, ARM, ARM64.

Type   Integrated development environment.

Website   www.arduino.cc/en/Main/Software.

The Six Buttons appearing under the Menu tab are connected with the running program asfollows.
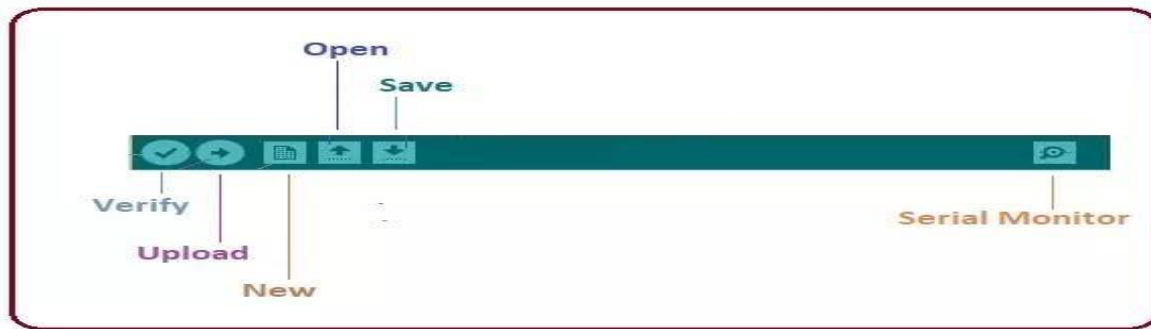
Figure 4.2.1b: Arduino IDE Software menu bar.

The checkmark appearing in the circular button is used to verify the code. Click thisonce you have written your code.

The arrow key will upload and transfer the required code to the Arduino board.

The dotted paper is used for creating a new file.

The upward arrow is reserved for opening an existing Arduino project.

The downward arrow is used to save the current running code.

The button appearing on the top right corner is a Serial Monitor - A separate popupwindow that acts as an independent terminal and plays a vital role in sending and receiving the Serial Data. You can also go to the Tools panel and select Serial Monitor, or pressing Ctrl+Shift+M all at once will open it instantly. The Serial Monitor will actually help to debug the written Sketches where you can get a hold of how your program is operating. Your Arduino Module should be connected to your computer by USB cable in order to activate the Serial Monitor.

Figure 4.2.1c: Arduino IDE Software output window.

The bottom of the main screen is described as an Output Pane that mainly highlightsthe compilation status of the running code: the memory used by the code, and errorsthat occurred in the program. You need to fix those errors before you intend to upload the hex file into your Arduino Module.

Libraries are very useful for adding extra functionality into the Arduino Module.

There is a list of libraries you can check by clicking the Sketch button in the menubar and going to Include Library.

Most of the libraries are preinstalled and come with the Arduino software. However,you can also download them from external sources.

In order to upload the sketch, you need to select the relevant board you are usingand the ports for that operating system.

Just go to the "Board" section and select the board you aim to work on.

After correct selection of both Board and Serial Port, click the verify and then upload button appearing in the upper left corner of the six-button section or you cango to the Sketch section and press verify/compile and then upload.

The sketch is written in the text editor and is then saved with the file extension. ino.

Once you upload the code, TX and RX LEDs will blink on the board, indicating thedesired program is running successfully.

4.2.8 EMBEDDED C

Embedded C is most popular programming language in software field for developing electronic gadgets. Each processor used in electronic system is associated with embedded software.

Embedded C programming plays a key role in performing specific function by the processor. In day-to-day life we used many electronic devices such as mobile phone, washing machine, digital camera, etc. These all-device working is based on microcontroller that are programmed by embedded C.

The C Standards Committee produced a Technical Report, most recently revised in 2008 and reviewed in 2013 providing a common standard for all implementations to adhereto. It includes a number of features not available in normal C, such as fixed-pointarithmetic, named address spaces and basic I/O hardware addressing.

CHAPTER 5

IMPLEMENTATION

5.1 PIN DETAILS AND CIRCUIT DIAGRAM:
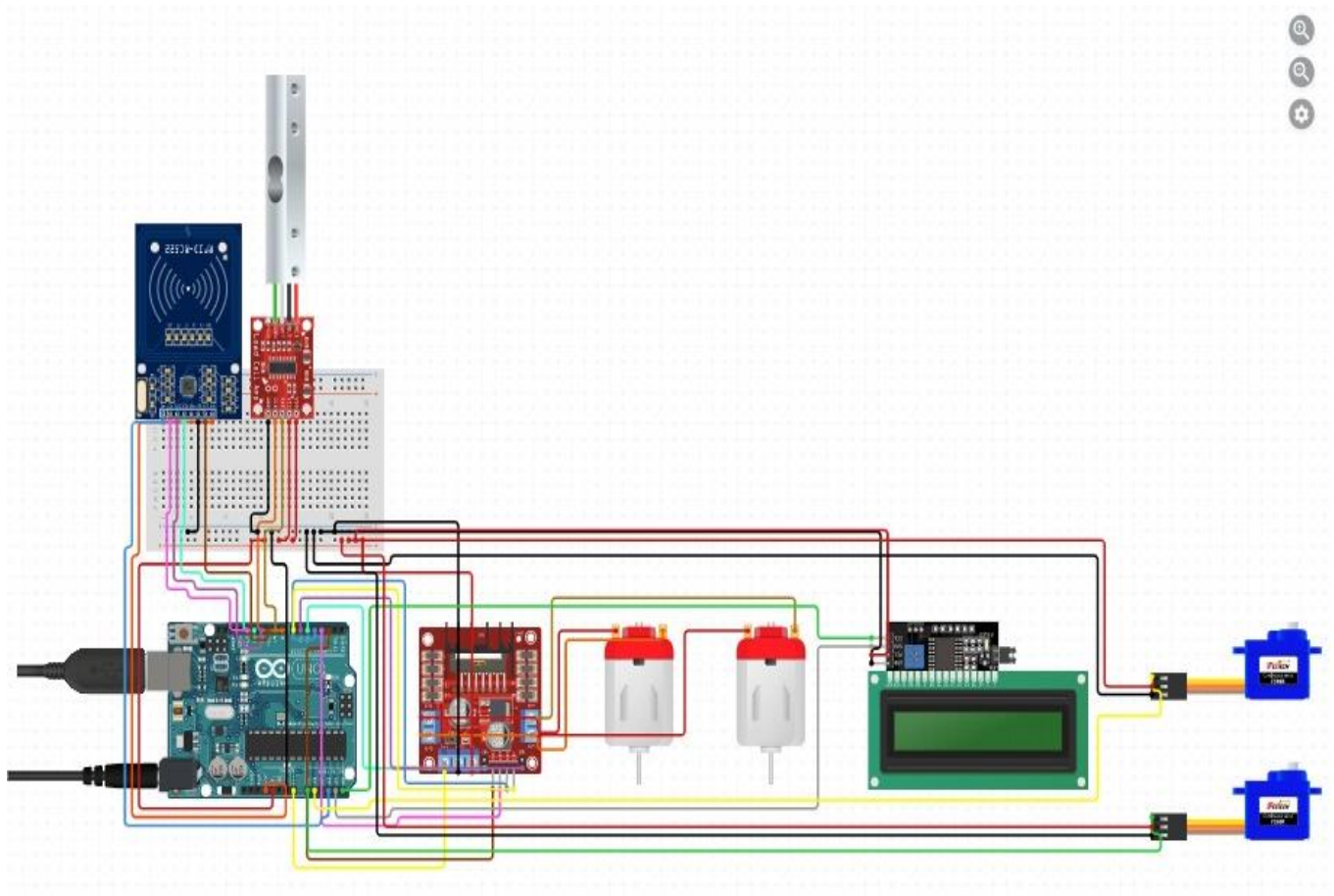
Fig.5.1 Pin Diagram of Praposed System:

PIN NUMBERS:

Components Name	Components Pins	Arduino uno pins
RFID Tag Reader	3.3V RST GND IRQ MISO MOSI SCK SDA(SS)	3.3V 9 GND - 12 11 13 10
HX711 Amplifier	VCC DAT CLK GND	3.3V 2 3 GND
Servo Motor 1	VCC GND PWM	5V GND 4
Servo Motor 2	VCC GND PWM	5V GND 5
Motor Driver	VCC GND C1 A C1 B	5V GND 6 7
LCD Display(I2C)	SDA SCK VCC GND	SDA SCK VCC GND

CHAPTER 6

ADVANTAGES, DISADVANTAGES AND APPLICATIONS

6.1 ADVANTAGES

- Easy to use
- Data Integrity
- No mediator Cheating
- Flexibility
- The purpose of project is useful for the society at Panchayat Level for ration distribution.
- The government services are reached to poor people and also the corruption in PDS can be reduced or avoided to a great extent.
- The main advantage here is that the beneficiaries get their rightful entitlement in terms of quantity.
- Less man power required.
- It becomes easy to the needy people to access the ration without any Hassel.
- We can maintain the centralized monitoring system to monitor each and every area about the usage.

6.2 DISADVANTAGES

- Loss of user tag can be used by unauthorized person.
- Initial Implementation cost is high.
- In case of power failure, we need to use an alternate power source.

6.3 APPLICATIONS

- The ration items will be effectively delivered to the valid ration card holders who are below poverty line.

- The main advantage here is that the beneficiaries get their rightful entitlement in terms of quantity. What's meant for them cannot be diverted to the open market because of maintaining the database correctly.

- A common practice adopted by commission agents who run FPS is that they charge people more than the mandated rates, and they often under-weigh the commodities. But using this technique they cannot do so because each and every item will be having its own code and the price will be generated from that code and hence no overcharge can be done.

- The government services are reached to poor people effectively and also the corruption in PDS and FPS can be reduced or avoided to a great extent.

CHAPTER 7

RESULTS AND DISCUSSIONS

Ration Dispensing automation is a growing trend that shows no sign of slowing down. Continued automation technology will drive system/organizations to an ever-greater level of efficiency and performance. In order to stay competitive in your particular market, we have to upgrade the system and educate the people.

7.1 SNAPSHOTS

Fig. 7.1.a: Smart Distribution System Setup

Fig. 7.1.b: Distribution unit

Fig. 7.1.c: RFID scanner

Fig. 7.1.d: Ration distribution shop

Once all the above procedure completed successfully the respective dispenserwill be activated and automatically dispenses the rations. after the dispensing completed the conveyor belt move towards the outside then the consumer get ration and he leaves the shop.

7.2 COMPARISION TABLE AND GRAPH PLOTS

➢ Following experimental analysis shows the efficient and transparent behavior of our developed PDS.

➢ For demonstration purpose, rice is used as solid material and water is used as liquid material to test the entire setup.

Below is the accuracy table 1 with rice as dispensing material for 250 g.

Table 1: Accuracy table for 250 g solid item

| NO. OF TRAILS	EXPECTED LEVEL (GRAM)	ACTUAL LEVEL (GRAM)	PERCENTAGE OF ACCURACY
1	250	230	92
2	250	210	84
3	250	250	100
4	250	210	84
5	250	220	88
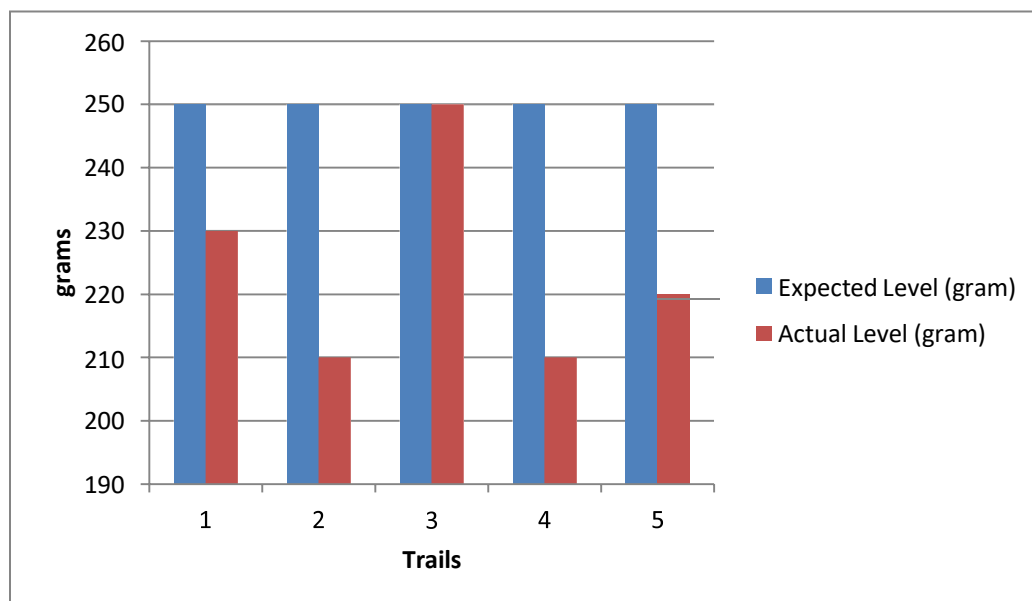
Fig. 7.2.a: Graph 1 showing 250 g solid item plot

Below is the accuracy table 2 with rice as dispensing material for 420 g.

Table 2: Accuracy table for 420 g solid item

NO. OF TRAILS	EXPECTED LEVEL (GRAM)	ACTUAL LEVEL (GRAM)	PERCENTAGE OF ACCURACY
1	420	410	97.6
2	420	420	100
3	420	400	95.2
4	420	405	96.4
5	420	410	97.6
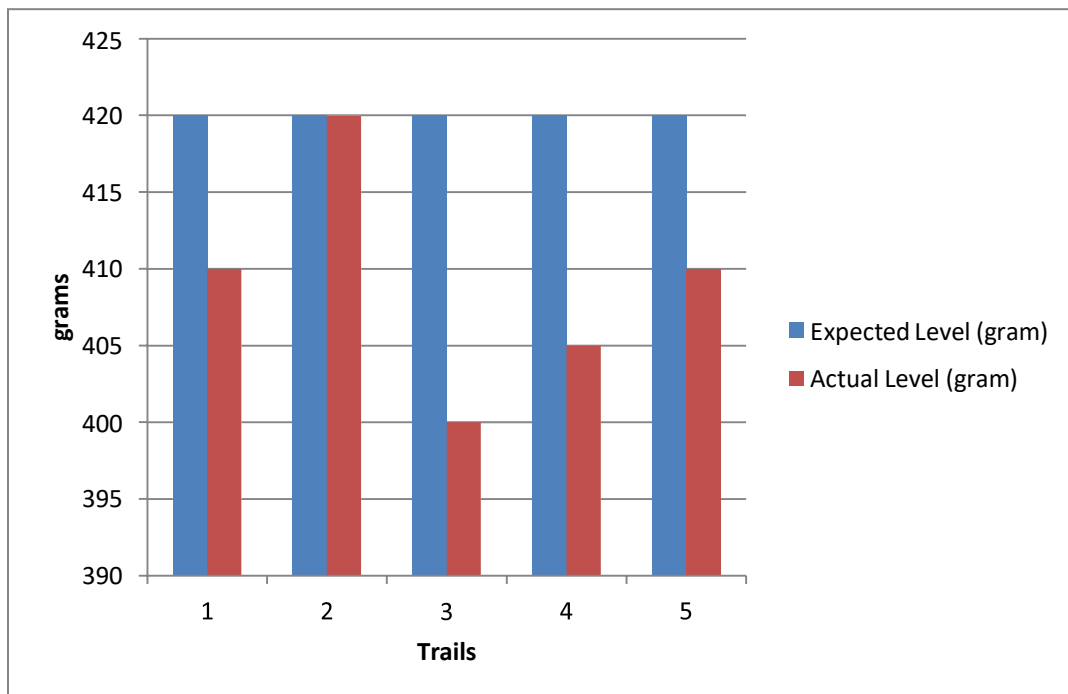
Fig. 7.2.b: Graph 2 showing 420 g solid item plot

CONCLUSION AND FUTURE SCOPE

The current classical method has two flaws. Firstly, human error might lead to an incorrect estimate of the goods weight. Secondly, without notifying the customers, the commodities may be sold to others if they are not purchased at the ration shop during the month. The suggested solution can be used to resolve the above limitations. Due to its high accuracy, thisdevice is suitable for actual-time applications. Under the digital India, we may furtherimprove the use of face recognition and biometric identification. Hence, on the basis of a review of literature survey and by looking at the current system. We have determined that therecommended device will help to automate the system. Initially implementation of this project takes time once if it is implemented all the people who are eligible for these facilities will get food supply under the Act of right to equality and Consumer rights and we can ableto educate them the new technologies so that they will be updated in future to use the upcoming automated system.

FUTURE SCOPE

In future, high-quality sensors and hardware can be used for efficient implementation.

This Automatic rationing system can be converted in different regional languages.

In future, Payment can be done online by connecting customers bank account directly to the GPS tracking of the PDS delivery trucks can also be done. Online quotation can be opened for farmers, connecting them directly with the government authorities.

Apart from being limited to this specific domain, the application of this particular improvement in the current working of the ration shop has a lot of scope in various other areas. This system can be re sized up to handle a large number of items which can be chosen from a single controller. Furthermore, the technology introduced can be used in a variety of places such as malls, supermarkets, and so on. We can also offer a one-time password that functions similarly to an ATM card. If a system is profitable, some companies could choose to implement it.

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