An Intelligent Buggy System using IoT

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Abstract - Nowadays, peoples were getting too busy in their work, but they need to spend some time for shopping. In Shopping malls, customers were facing some difficulties during the process of billing, in a huge crowd. The peoples were getting more struggle for searching the product location in the shopping malls. To get the better of the above problems, the Buggy system is designed. The Android application Arduino is proposed for getting the location of the product. The location of the products was detected through the WiFi. To increase the pace of a billing process and to describe the cost of that products the Barcode scanner is used then it will update the details of the product on the LCD screen and in mobile phones. The details of the products are stored in the server of the shopping mall. After reading the products it is placed in the trolley. While the customer buys the product, it adds to its list. The ON/OFF switch is used for deleting the product from the list of the system. The items detail is directly stored in the server database. Customer get direct bill in their mobile phone which is already stored in the database and it automatically reduces the queue in the billing section. Then the customer can pay the bill amount in the billing section without any struggle. The whole shopping details were updated to the customers mobile phone via message which are already in the server database of the shopping mall.

Keywords - Barcode Scanner, LCD display, Keypad, Arduino, Switch, Wi-Fi module.

I. INTRODUCTION

In the recent years, lifestyle of the human was moving fast more than the earth revolution. The technology was developing more by the human beings which supports and fulfill their basic needs in a proper way." Time thunders like a storm". So, customers were suffering a lot during shopping. Though shopping in malls gives the benefit for time saving, people have time during airing to visit commercial center and they were struggling more for searching the location of an item in a mall. To get this, the "Digital Card" is proposed using Barcode scanner, keypad, LCD display and Wi-Fi module. It helps the user to self-scan the barcode of the purchased product and the wrongful entries can be corrected at the end of the shopping. The main aim of this model is to locate proper location of the product which is present in the shopping mall. This is proposed for the process of time-consuming during shopping.

II. LITERATURE REVIEW

[1] R.Rajeshkumar , R.Mohanraj , M.Varatharaj on "Automatic Barcode Based Bill Calculation by Using Smart Trolley" The purpose of this project is to utilize the updated new trends and technologies and suppresses the difficulties during shopping in mall. In order to keep away from the long queue in billing section we are introducing smart trolley technology in all shopping mall for considering those difficulties. The WSN (Wireless Sensor network) is propsed using microcontroller as a technology updated in order to fulfill the needs and technologies had came forward for implementing several automatic detection technologies. The RFID (Radio frequency identification) is used in the shopping trolley in order to save the shopping time and it can calculates the material, and do calculation by providing the total amount which is the item added in the purchasing trolley.

[2] Rajesh Nayak , Ravi S Raikar , Yogendra , Vishwas proposed "Automated Trolley for Shopping" Shopping mall is a place where people get their daily necessities. The huge crowd at the malls on holidays and weekends. People purchase different items and put them into trolley. After completion of purchases, one need to go to billing section for payment. At the billing counter the cashier prepares the bill using bar code reader which consume less time for process and controlds a long queue at billing section. There demand for quick and easy payment of bills in shopping malls. To overcome these problems we have designed a smart trolley. The Automated Trolley is integrates with Barcode Scanner, Arduino, GSM module, Weighing Sensor in it. The items were scanned by the customer which will automatically log into the database and thereby can generate bill for purchased items. The weighing sensor will check the weight of the items send to the database. These modules are integrated into an embedded system and are tested to satisfy the functionalities.

[3] Ms. Neha, et.al.., on "Smart Trolley System Based on Android" The wireless technologies and newly invented communication techniques in E-commerce has become a popular . The newly developed technologies leads to comfort, effective and convenient in daily life. This project is mainly used for developing an application which is based on android .In this proposed system the customers have to scan every product using barcode with android mobile which they wish to purchase and drop into the shopping cart and then proceed to checkout at the billing counter. The billing process is quite difficult and highly time consume. This "Smart Trolley System Based on Android" that aims to reduce and possible to eliminate the total waiting time of customers i.e. other system takes 10 minutes while this proposed system takes 5 minutes, lower the total manpower requirement from billing counter and increase the overall efficiency .

[4] Dhavale Shraddha D., DhokaneTrupti J., Shinde Priyanka S on "IOT Based Intelligent Trolley for Shopping Mall" At present shopping in big malls is a everyday activity in metro cities. One can see huge crowd at malls on holidays and on special occasions. People purchase different product and put it into the trolley & go to billing section for payments. At the billing counter the cashier get ready with the bill using barcode reader. Aim of this task is to develop a system that can be used solve the above-mentioned problems. The system with RFID tags will be placed in all the trolleys in the mall. All the items in the malls were furnished with RFID tags. When a person puts any materials in the trolley, its code will be detected and the price of those products will be stored in database, its details and cost will be displayed on LCD and will be sent to billing section by wireless modules. Also this whole information of the product will be send through Ethernet module to internet. Also we use ESP method which is helpful to retailer shopkeeper.

[5] P.T. Sivagurunathan, P. Seema, M. Shalini, R. Sindhu presented on "Smart Shopping Trolley Using RFID". The different items were purchased in shopping mall or markets with help of shopping trolley. This product acquirement is some difficult process. For the convenient of the customer they have to pull the trolley for each time to collecting items and repeatedly. After purchasing, customer want to pay the bill for their purchasing product. At the same time, they have to wait in a long queue to get their bill, the product were scanned using RFID reader with help of barcode Scanner. To modify that and customer has to purchase in smart way in shopping mall. Each and every product has to place a RFID barcode to scan the product with RFID reader. The smart trolley will consist of a RFID reader, LCD display and ZigBee transmitter. When customer if want to buy any product is insert in the trolley. It will scan and read the product detail and displays the cost and the name of the product in LCD display. The total cost of all the purchased products will be added to the final bill, in that final bill will be saved in the Arduino is will be act as a memory. These are all performed in the transmitter side. In receiver side, it is wireless transmitting process. ZigBee transmitter is used for sharing the information of the products to the billing counter. By this way customer will consume their time and also they need not to wait in a long queue. A new concept has been introduced which is the 'SMART SHOPPING TROLLEY'. This project is used to improve the security performance and the speed.

III. **PROPOSED DESIGN**

To save customers precious time in the billing section, we propose a Smart Trolley System (STM). The system implementation will use Wireless Access Network and RFID technologies.

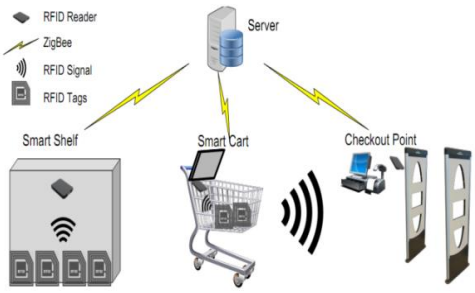

Fig. 1 Block Diagram

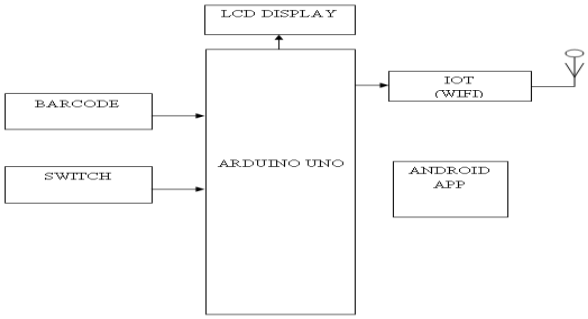

Fig. 2 Block Diagram

The Automated Trolley is connected to the main server of the store. Customer needs to login to store's website where he will be able to see the list of items purchased. The Smart Trolley is equipped with an RFID scanner along with the other hardware components all the items in the store will have RFID tag fitted to them. All the cost and quantity with respect to the item is stored in the server database. When the item is kept in front of the RFID scanner present in the Smart Trolley the item RFID is scanned one (Quantity of items added) and "Total Amount" gets updated. The "Total number of items in trolley" and "Total Amount" is displayed on LCD screen attached to the trolley handle. It also has provisions of removing the purchased item from the trolley, the "Total number of items in trolley" and "Total Amount"

gets decremented, when the customer has finished shopping he simply has to pay the Total Amount" displayed by LCD and LOGOUT from the stores' website.

IV. **PROPOSED SYSTEM**

ARDUINO UNO:

Arduino/Genuino Uno is the microcontroller board which is based on the ATmega328P . It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with an AC-to-DC adapter or battery to get started. You can tinker with your UNO without worrying too much about doing something wrong, worst case scenario you can replace the chip for a few dollars and start over again.

Fig. 3Adruino

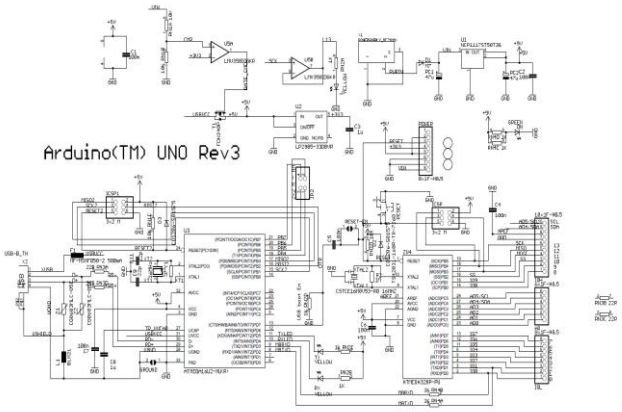

Fig. 4 Arduino diagram

"Uno" means one in Italian and was chosen to mark the release of Arduino Software (IDE) 1.0. The Uno board and version 1.0 of Arduino Software (IDE) were the reference versions of Arduino, now evolved to newer releases. The Uno board is the first in a series of USB Arduino boards, and the reference model for the Arduino platform; for an extensive list of current, past, or outdated boards see the Arduino index of boards. You can find here your board warranty information's. Getting Started You can find in the Getting Started section all the information you need to configure your board, use the Arduino Software (IDE), and start tinker with coding and electronics.

- On the Software on the Arduino Forum
- On Projects on the Arduino Forum
- On the Product itself through our Customer Support

Table 1. Technical specs

Microcontroller	ATmega328P
Operating Voltage	5V
Input Voltage (recommended)	7-12V
Input Voltage (limit)	6-20V
Digital I/O Pins	14 (of which 6 provide PWM output)
PWM Digital I/O Pins	6
Analog Input Pins	6
DC Current per I/O Pin	20 mA
DC Current for 3.3V Pin	50 mA
Flash Memory	32 KB (ATmega328P) of which 0.5 KB used by bootloader
SRAM	2 KB (ATmega328P)
EEPROM	1 KB (ATmega328P)
Clock Speed	16 MHz
Length	68.6 mm
Width	53.4 mm
Weight	25 g

POWER:

The Arduino/Genuino Uno board can be powered via the USB connection or with an external power supply. The power source is selected automatically.

External (non-USB) power can come either from an AC-to-DC adapter (wall-wart) or battery. The adapter can be connected by plugging a 2.1mm center-positive plug into the board's power jack. Leads from a battery can be inserted in the GND and Vin pin headers of the POWER connector. The board can operate on an external supply from 6 to 20 volts. If supplied with less than 7V, however, the 5V pin may supply less than five volts and the board may become unstable. If using more than 12V, the voltage regulator may overheat and damage the board. The recommended range is 7 to 12 volts. The power pins are as follows:

- Vin. The input voltage to the Arduino/Genuino board when it's using an external power source (as opposed to 5 volts from the USB connection or other regulated power source). You can supply voltage through this pin, or, if supplying voltage via the power jack, access it through this pin.
- 5V.This pin outputs a regulated 5V from the regulator on the board. The board can be supplied with power either from the DC power jack (7 - 12V), the USB connector (5V), or the VIN pin of the board (7-12V). Supplying voltage via the 5V or 3.3V pins bypasses the regulator, and can damage your board. We don't advise it.
- 3V3. A 3.3 volt supply generated by the on-board regulator. Maximum current draw is 50 mA.
- GND. Ground pins.
- IOREF. This pin on the Arduino/Genuino board provides the voltage reference with which the microcontroller operates. A properly configured shield can read the IOREF pin voltage and select the appropriate power source or enable voltage translators on the outputs to work with the 5V or 3.3V.

Memory

The ATmega328 has 32 KB (with 0.5 KB occupied by the bootloader). It also has 2 KB of SRAM and 1 KB of EEPROM (which can be read and written with the EEPROM library).

Input and Output

See the mapping between Arduino pins and ATmega328P ports. The mapping for the Atmega8, 168, and 328 is identical.

Each of the 14 digital pins on the Uno can be used as an input or output, using pinMode(), digitalWrite(), and digitalRead() functions. They operate at 5 volts. Each pin can provide or receive 20 mA as recommended operating condition and has an internal pull-up resistor (disconnected by default) of 20-50k ohm. A maximum of 40mA is the value that must not be exceeded on any I/O pin to avoid permanent damage to the microcontroller.

In addition, some pins have specialized functions:

- Serial: 0 (RX) and 1 (TX). Used to receive (RX) and transmit (TX) TTL serial data. These pins are connected to the corresponding pins of the ATmega8U2 USB-to-TTL Serial chip.
- External Interrupts: 2 and 3. These pins can be configured to trigger an interrupt on a low value, a rising or falling edge, or a change in value. See the attachInterrupt() function for details.
- PWM: 3, 5, 6, 9, 10, and 11. Provide 8-bit PWM output with the analogWrite() function.
- SPI: 10 (SS), 11 (MOSI), 12 (MISO), 13 (SCK). These pins support SPI communication using the SPI library.
- LED: 13. There is a built-in LED driven by digital pin 13. When the pin is HIGH value, the LED is on, when the pin is LOW, it's off.
- TWI: A4 or SDA pin and A5 or SCL pin. Support TWI communication using the Wire library.

The Uno has 6 analog inputs, labeled A0 through A5, each of which provide 10 bits of resolution (i.e. 1024 different values). By default they measure from ground to 5 volts, though is it possible to change the upper end of their range using the AREF pin and the analogReference() function.

There are a couple of other pins on the board:

- AREF. Reference voltage for the analog inputs. Used with analogReference().
- Reset. Bring this line LOW to reset the microcontroller. Typically used to add a reset button to shields which block the one on the board.

Communication

Arduino/Genuino Uno has a number of facilities for communicating with a computer, another Arduino/Genuino board, or other microcontrollers. The ATmega328 provides UART TTL (5V) serial communication, which is available on digital pins 0 (RX) and 1 (TX). An ATmega16U2 on the board channels this serial communication over USB and appears as a virtual com port to software on the computer. The 16U2 firmware uses the standard USB COM drivers, and no external driver is needed. However, on Windows, a .inf file is required. The Arduino Software (IDE) includes a serial monitor which allows simple textual data to be sent to and from the board. The RX and TX LEDs on the board will flash when data is being transmitted via the USB-to-serial chip and USB connection to the computer (but not for serial communication on pins 0 and 1).A Software Serial library allows serial communication on any of the Uno's digital pins.

The ATmega328 also supports I2C (TWI) and SPI communication. The Arduino Software (IDE) includes a Wire library to simplify use of the I2C bus; see the documentation for details. For SPI communication, use the SPI library.

Automatic (Software) Reset

Rather than requiring a physical press of the reset button before an upload, the Arduino/Genuino Uno board is designed in a way that allows it to be reset by software running on a connected computer. One of the hardware flow control lines (DTR) of the ATmega8U2/16U2 is connected to the reset line of the ATmega328 via a 100 nano-farad capacitor. When this line is asserted (taken low), the reset line drops long enough to reset the chip. The Arduino Software (IDE) uses this capability to allow you to upload code by simply pressing the upload button in the interface toolbar. This means that the bootloader can have a shorter timeout, as the lowering of DTR can be well-coordinated with the start of the upload. This setup has other implications. When the Uno is connected to either a computer running Mac OS X or Linux, it resets each time a connection is made to it from software (via USB). For the following half-second or so, the bootloader is running on the Uno. While it is programmed to ignore malformed data (i.e. anything besides an upload of new code), it will intercept the first few bytes of data sent to the board after a connection is opened. If a sketch running on the board receives one-time configuration or other data when it first starts, make sure that the software with which it communicates waits a second after opening the connection and before sending this data.

The Uno board contains a trace that can be cut to disable the auto-reset. The pads on either side of the trace can be soldered together to re-enable it. It is labelled "RESET-EN". You may also be able to disable the auto-reset by connecting a 110 ohm resistor from 5V to the reset line; see this forum thread for details.

Revisions

Revision 3 of the board has the following new features:

1.0 pinout: added SDA and SCL pins that are near to the AREF pin and two other new pins placed near to the RESET pin, the IOREF that allow the shields to adapt to the voltage provided from the board. In future, shields will be compatible with both the board that uses the AVR, which operates with 5V and with the Arduino Due that operates with 3.3V. The second one is a not connected pin, that is reserved for future purposes.

- Stronger RESET circuit.
- Atmega 16U2 replace the 8U2.

LCD DISPLAY:

Fig. 5 LCD display

Fig. 6 LCD display Board

A liquid crystal display (LCD) is a thin, flat electronic visual display that uses the light modulating properties of liquid crystals (LCs). LCs do not emit light directly.

They are used in a wide range of applications including computer monitors, television, instrument panels, aircraft cockpit displays, signage, etc. They are common in consumer devices such as video players, gaming devices, clocks, watches, calculators, and telephones. LCDs have displaced cathode ray tube (CRT) displays in most applications. They are usually more compact, lightweight, portable, less expensive, more reliable, and easier on the eyes. They are available in a wider range of screen sizes than CRT and plasma display, and since they do not use phosphors, they cannot suffer image burn-in. LCDs are more energy efficient and offer safer disposal than CRTs. Its low electrical power consumption enables it to be used in battery-powered electronic equipment. It is an electronically modulated optical device made up of any number of pixels filled with liquid crystals and arrayed in front of a light source (backlight) or reflector to produce images in color or monochrome. The earliest discovery leading to the development of LCD technology, the discovery of liquid crystals, dates from 1888. By 2008, worldwide sales of televisions with LCD screens had surpassed the sale of CRT units.

BARCODE:

An optical scanner that reads the printed barcode of a product is a Barcode reader or a Barcode scanner it decodes the data contained in the barcodes and update the data to a computer which is presented in the billing counter of the shopping mall. The flatbed scanner consists of a light source, a lens and a light sensor translate to the optical impulses into an electrical signal. All the barcode reader consists of a decoder circuit that analyses the barcode's image on the products and the data provided by the sensor will intimate the barcode's content to the scanner's output port (server database of the

shopping mall).A barcode-based system has three main parts. First, there is a central computer running a database (record system) that keeps a tally of all the products which in used for selling, it will detect the cost and stocks in the malls. Second, the barcode is printed on all the items. Finally, the barcode reader read all the barcodes of each products. Barcode scanners read the black-and-white zebra lines on products quickly and feed the information to the computer or checkout terminal, which can identify the product details immediately by the customer with help of the retailer shops database. The Barcode are the simple on-off, binary patterns with each black line corresponding to a one and each white line a zero.

Fig.7 Barcode Scanner

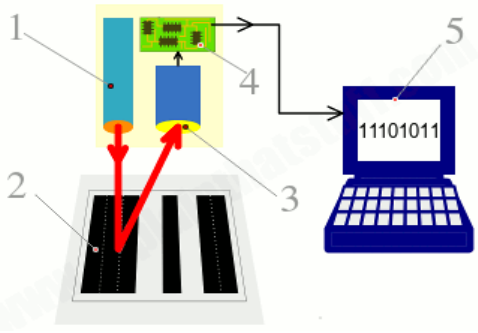

Fig.8 Process of barcode scanning

1. Scanning head shines LED or laser light onto barcode.
2. Light reflects off barcode into a light-detecting electronic component called a photoelectric cell. White areas of the barcode reflect most light; black areas reflect least.
3. As the scanner moves past the barcode, the cell generates a pattern of on-off pulses that correspond to the black and white stripes. So for the code shown here ("black black black white black white black black"), the cell would be "off off off on off on off off."
4. An electronic circuit attached to the scanner converts these on-off pulses into binary digits (zeros and ones).
5. The binary digits are sent to a computer attached to the scanner, which detects the code as 11101011.

In some scanners, there's a single photoelectric cell and, as you move the scanner head past the product (or the product past the scanner head), the cell detects each part of the black-white barcode in turn. In more sophisticated scanners, there is a whole line of photoelectric cells and the entire code is detected in one go. In reality, scanners don't detect zeros and ones and produce binary numbers as their output: they detect sequences of black and white stripes, as we've shown here, but convert them directly into decimal numbers, giving a decimal number as their output.

SWITCH

In electronics, a switch is an electrical component that can break an electrical circuit, interrupting the current or diverting it from one conductor to another.[1][2] The Most familiar form of switch is a manually operated electromechanical device with one or more sets of electrical contacts. Each set of contacts can be in one of two states: either 'closed' meaning the contacts are touching and electricity can flow between them, or 'open', meaning the contacts are separated and no conducting. A switch may be directly manipulated by a human as a control signal to a system, such as a computer keyboard button, or to control power flow in a circuit, such as a light switch. Automatically-operated switches can be used to control the motions of machines, for example, to indicate that a garage door has reached its full open position or that a machine tool is in a position to accept another work piece. Switches may be operated by process variables such as pressure, temperature, flow, current, voltage, and force, acting as sensors in a process and used to automatically control a system. For example, a thermostat is a temperature-operated switch used to control a heating process. A switch that is operated by another electrical circuit is called a relay. Large switches may be remotely operated by a motor drive mechanism. Some switches are used to isolate electric power from a system, providing a visible point of isolation that can be pad-locked if necessary, to prevent accidental operation of a machine during maintenance, or to prevent electric shock.

V. CIRCUIT DIAGRAM DESCRIPTION

POWER SUPPLY

Block diagram

The ac voltage, typically 220V rms, is connected to a transformer, which steps that ac voltage down to the level of the desired dc output. A diode rectifier then provides a full wave rectified voltage that is initially filtered by a simple capacitor filter to produce a dc voltage. This resulting dc voltage usually has some ripple or ac voltage variation.

A regulator circuit removes the ripples and also remains the same dc value even if the input dc voltage varies, or the load connected to the output dc voltage changes. This voltage regulation is usually obtained using one of the popular voltage regulator IC units.

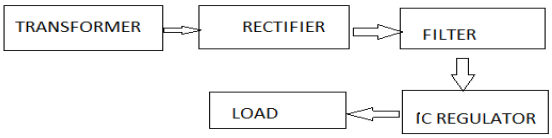

Fig. 9 Block Diagram

WORKING PRINCIPLE

TRANSFORMER

The potential transformer will step down the power supply voltage (0-230V) to (0-6V) level. Then the secondary of the potential transformer will be connected to the precision rectifier, which is constructed with the help of op–amp. The advantages of using precision rectifier are it will give peak voltage output as DC, rest of the circuits will give only RMS output.

BRIDGE RECTIFIER

When four diodes are connected as shown in figure, the circuit is called as bridge rectifier. The input to the circuit is applied to the diagonally opposite corners of the network, and the output is taken from the remaining two corners. Let us assume that the transformer is working properly and there is a positive potential, at point A and a negative potential at point B. the positive potential at point A will forward bias D3 and reverse bias D4. The negative potential at point B will forward bias D1 and reverse D2. At this time D3 and D1 are forward biased and will allow current flow to pass through them; D4 and D2 are reverse biased and will block current flow. The path for current flow is from point B through D1, up through RL, through D3, through the secondary of the transformer back to point B. this path is indicated by the solid arrows. Waveforms (1) and (2) can be observed across D1 and D3.

One-half cycle later the polarity across the secondary of the transformer reverse, forward biasing D2 and D4 and reverse biasing D1 and D3. Current flow will now be from point A through D4, up through RL, through D2, through the secondary of T1, and back to point A. This path is indicated by the broken arrows. Waveforms (3) and (4) can be observed across D2 and D4. The current flow through RL is always in the same direction. In flowing through RL this current develops a voltage corresponding to that shown waveform (5). Since current flows through the load (RL) during both half cycles of the applied voltage, this bridge rectifier is a full-wave rectifier. One advantage of a bridge rectifier over a conventional full-wave rectifier is that with a given transformer the bridge rectifier produces a voltage output that is nearly twice that of the conventional full-wave circuit. This may be shown by assigning values to some of the components shown in views A and B. assume that the same transformer is used in both circuits. The peak voltage developed between points X and y is 1000 volts in both circuits. In the conventional full-wave circuit shown—in view A, the peak voltage from the center tap to either X or Y is 500 volts. Since only one diode can conduct at any instant, the maximum voltage that can be rectified at any instant is 500 volts. The maximum voltage that appears across the load resistor is nearly-but never exceeds-500 v0lts, as result of the small voltage drop across the diode. In the bridge rectifier shown in view B, the maximum voltage that can be rectified is the full secondary voltage, which is 1000 volts. Therefore, the peak output voltage across the load resistor is nearly 1000 volts. With both circuits using the same transformer, the bridge rectifier circuit produces a higher output voltage than the conventional full-wave rectifier circuit.

IC voltage regulators

Voltage regulators comprise a class of widely used ICs. Regulator IC units contain the circuitry for reference source, comparator amplifier, control device, and overload protection all in a single IC. IC units provide regulation of either a fixed positive voltage, a fixed negative voltage, or an adjustably set voltage. The regulators can be selected for operation with load currents from hundreds of milli amperes to tens of amperes, corresponding to power ratings from milli watts to tens of watts. Circuit diagram (Power supply). A fixed three-terminal voltage regulator has an unregulated dc input voltage, Vi, applied to one input terminal, a regulated dc output voltage, Vo, from a second terminal, with the third terminal connected to ground. The series 78 regulators provide fixed positive regulated voltages from 5 to 24 volts. Similarly, the series 79 regulators provide fixed negative regulated voltages from 5 to 24 volts.

- For ICs, microcontroller, LCD - 5 volts
- For alarm circuit, op-amp, relay circuits 12 volts

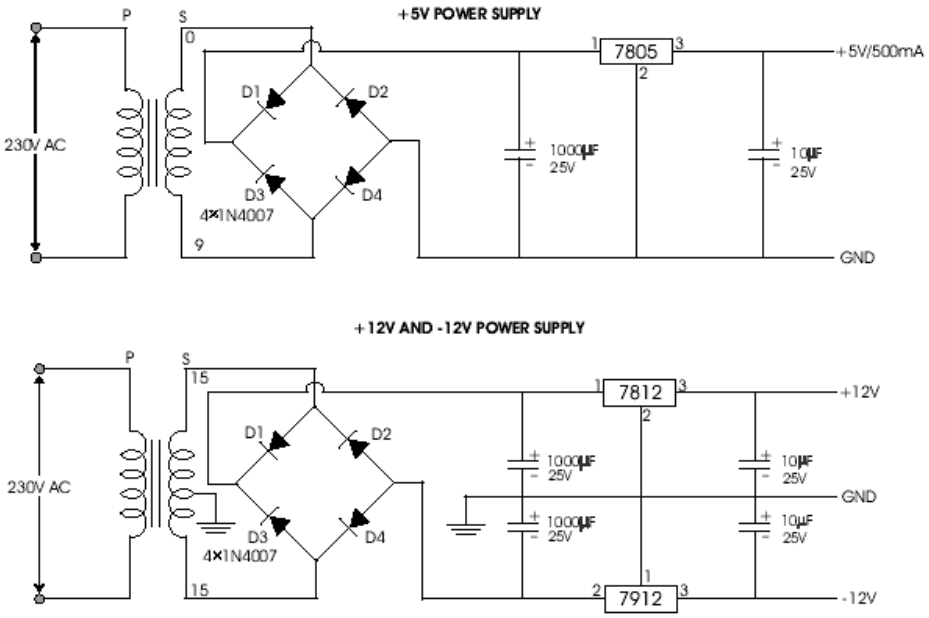

Fig. 10 Circuit diagram for Regulator

Algorithm

1. The location of the product detail is tracked at first.
2. After tracking the location will be displayed in the customer mobile phone.
3. After getting the location detail customer will start purchasing the items.
4. The item was scanned through the Barcode scanner and lift it into the trolley.
5. With the help of the ON/OFF switch the items can be deleted from the trolley.
6. Then the total item detail and the product bill were updated to the customer via message.

Advantages

- Reliable
- Low Cost
- Higher Efficiency
- Easy to Implement.

Application

- It used to monitor the Trolley items in shopping complex.
- Easy to monitor buy and cancelled accessories in shopping complex they are wirelessly updated and monitored by IOT APP.

VI. RESULT AND DISCUSSION

The utility of the trolley is mainly used for the commercial use. This system records the information of each products with help of the suitable sensors like Barcode scanner. The recorded data helps the shopkeepers with detailed analysis of shopping by the customer & their preferences through the computer; printout of the same can be obtained. In this Automated trolley, there is no need to search the product location in the shopping mall, need not to wait in queue billing. The Arduino based trolley automatically follows the WiFi connection in the shopping mall and update location detail to the customer. Also, it maintains proper distance between customer and itself. It gives number of products in trolley and total cost of the products on the spot. And the whole purchasing details will be updated to the customer's mobile phone via message.

VII. CONCLUSION

In this effective way we are designing a smart trolley based IOT technology. The main feature of this project is IOT based system continuously monitoring the All the in and out things in trolley and it will displayed in IOT server and android app and it will monitor by the super market Owner The implementation is easy, very economical and will reduce the time required at the billing counter. In our project, we designed automated shopping trolley for the billing system, which can be used in any supermarket and by any person easily. The Buggy System was designed to function as a self-checkout system which provide users with the flexibility to make transactions from it within the commercial mall. It is designed to be highly effective and fully synchronized with the shopkeeper's current system.

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