Booklet Counting Machine

[1]Bathina Madhuri, [2]Ashok Ramya, [3]Borkut Premsagar, [4]Mr. M. Gouse Basha
[1]Student, [2]Student, [3]Student, [4]Assistant Professor
Geethanjali College of Engineering and Technology

***Abstract* - Booklet counting machine proposes the idea of fast and efficient counting of booklets without human effort. Here, for the functioning of the machine employs Infra-Red (IR) sensing technology to sense the booklet and sends the signal to the controller board. Eventually, it sends the signal to the input terminals of display board to show to count that has been counted and Peripheral Interface Controller (PIC) Microcontroller is employed. It makes the machine to function more accurate. It uses two modes of counting viz., Infinite counting and finite counting modes. In finite counting mode, the booklets to be counted is given as input, whereas infinite counting mode is used to count the number of booklets loaded in the tray. It finds a numerous application in many fields. This project is proposed as a remedial measure for the problem raised in the exam cell of the college.**

***keywords* - PIC Microcontroller, Infra-red Sensor, Infinite counting, Finite counting.**

I. INTRODUCTION

The earlier machines were available only to count the Booklets. But there is a need in the exam cell of every educational institutions and universities to count the question and answer booklets and distribute to concern exam halls. Here, it needs extra human effort to do it and there is a chance for the human error to occur. This may lead to mess at the time of examinations. Hence, we come up with the idea of project to count the booklets in an efficient manner. Booklet counting machine employs the embedded system Peripheral Interface Controller for the functioning of the machine. It makes the machine more accurate in functioning. The usage of PIC controller makes the interfacing of the display and programming of the proposed project more convenient and efficient. To perform this task, microcontroller is loaded with an intelligent program written using embedded 'C' language and Electrical and Electronics technology[1] is used.

II. LITERATURE SURVEY

Growing number of routine and research activities, in a wide variety of fields, have the counting of certain types of objects (cells, people, Stationary, etc.) as one of their main components. In most cases, such counting procedure is performed manually, for that reason, several methods for automatically counting the objects of interest have been proposed. Manual counting of different objects has been invented to reduced manual work like Cash/Currency counting machines, Paper counting machines, Color Sorting machines. Such advances accompanied by,

The first automatic bill counting machines (or money counting machines) were introduced in the 1920s in the United States and were produced by the Federal Bill Counter Company of Washington, D.C. These machines were designed to increase efficiency in tellers in the Federal Reserve Bank and reduce human error. The machine would stop once a set "batch" of notes was reached allowing a teller to insert a wooden block to keep batches separate.[2]

The Paper counting machine at the beginning of the third millennium B. MATIC designed and realized the "Pack Mover" the only paper counting equipment to count, pick and shift a pack of given number of sheets directly from the pile.

For Counting a booklet manually is time taking process, so in order to reduce it the booklet counting machine is to be designed and developed.

III. CONCEPTUAL BACKGROUND

An embedded system[3] is a computer system designed to perform one or a few dedicated functions often with real-time computing constraints. It is embedded as part of a complete device often including hardware and mechanical parts. By contrast, a general-purpose computer, such as a personal computer (PC), is designed to be flexible and to meet a wide range of end-user needs. Embedded systems control many devices in common use todayy and are controlled by one or more main processing cores that are typically either microcontrollers or digital signal processors (DSP). Since the embedded system is dedicated to specific tasks, design engineers can optimize it to reduce the size and cost of the product and increase the reliability and performance. Some embedded systems are mass-produced, benefiting from economies of scale. Physically embedded systems range from portable devices such as digital watches and MP3 players, to large stationary installations like traffic lights, factory controllers, or the systems controlling nuclear power plants. This booklet counting machine is concept based on the currency counting machine For Office automation We use systems like fax machine, modem, printer etc.

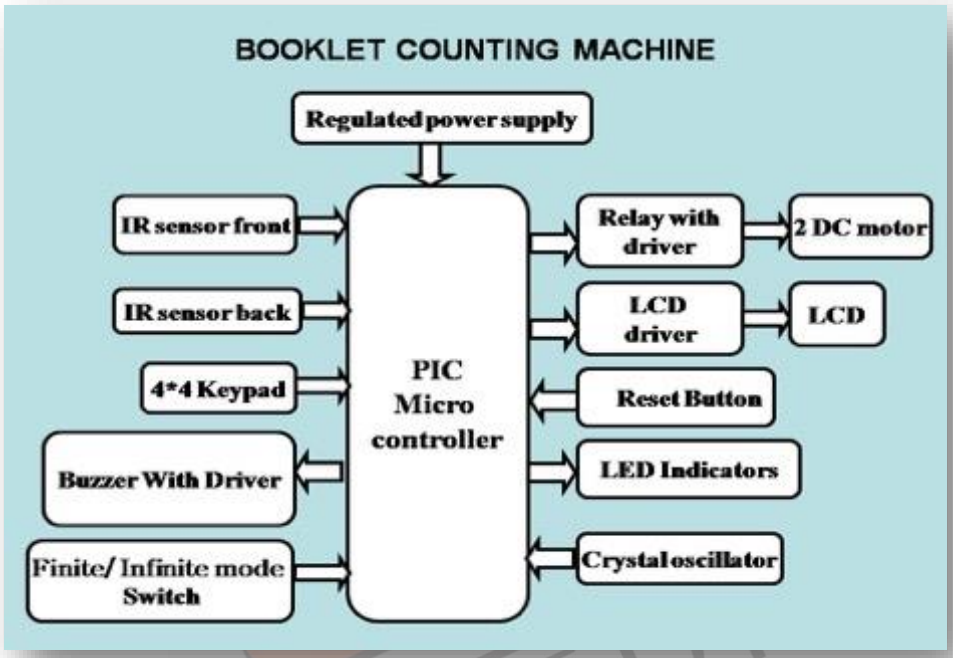
IV. BLOCK DIAGRAM &WORKING

The fundamental working principle of booklet counting machine is like the printer, copier machine and currency counting machine. It consists of Regulated Power Supply, PIC microcontroller, Relay with Driver, 4x4 Keypad, LCD display with Driver, IR Sensors, Crystal Oscillator, DC motor, Reset Buttons, Switches. In this machine, it has two modes of counting they are, Finite and Infinite modes. It works as when the booklets to be counted are loaded, next select the mode of counting with the switch. When it is switched to finite mode, it shows in LCD to enter the number of booklets to be counted through keypad, if the selected

mode is infinite mode, it starts the process of counting the booklets continuously till no booklet is left to count. The LCD display will display the message or error message if any. When there is no error, DC motor starts rotating. Then, the roller pushes the booklets down one by one and the IR sensors will identify the signal and sends its count to the LCD display, where the count is displayed the booklets are collected, they are two main subdivisions in counting the booklet, they are
A Finite Counting and
B Infinite Counting.

A. Finite counting:
In the finite counting, booklets are loaded in the tray. IR sensor is placed above the tray which is used to detect the booklets. When random number of booklets is entered in the display with the help of keypad, the IR sensor senses the booklet and pushes them to out with the help of roller. When the count is reached it stops counting the booklets.

B. Infinite counting:
In this mode of infinite counting, the inputs as the number of booklets to be counted is not given. Instead, the Infra-red sensor senses the booklets continuously, until the tray sensor stops receiving signal from the tray (i.e., Out of paper). Even after that, the paper can be loaded and resume its counting until we wish to stop the process. This mode is used to count the unknown set of papers. Since the count is infinite, it is called infinite mode of counting. The block diagram of booklet counting machine is shown below



1.2 Block Diagram

V. COMPONENTS DESCRIPTION

A. Regulated power Supply:
Power supply is a supply of electrical power. A device or system that supplies electrical or other types of energy to an output load or group of loads is called a **power** supply unit or PSU. The term is most commonly applied to electrical energy supplies, less often to mechanical ones, and rarely to others. A power supply may include a power distribution system as well as primary or secondary sources of energy such as Conversion of one form of electrical power to another desired form and voltage, typically involving converting AC line voltage to a well-regulated lower-voltage DC for electronic devices. Low voltage, low power DC power supply units are commonly integrated with the devices they supply, such as computers and household electronics, Batteries etc.

1.3 Block diagram of RPS

B. PIC Microcontroller:
The microcontroller[4] used in this project is PIC16F877A. The PIC families of microcontrollers are developed by Microchip Technology.[5] PIC stands for Peripheral Interface Controller given by Microchip Technology to identify its single-chip microcontrollers. Pic16f877A is a 40-pin microcontroller. It has 5 ports port A, port B, port C, port D, port E. All the pins of the

ports are for interfacing input output devices. Port A consists of 6 pins from A0 to A5, Port B consists of 8 pins from B0 to B7, Port C consists of 8 pins from C0 to C7, Port D consists of 8 pins from D0 to D7, Port E consists of 3 pins from E0 to E2, The rest of the pins are mandatory pins these should not be used to connect input/output devices. Pin 1 is MCLR (master clear pin) pin also referred as reset pin. Pin 13, 14 are used for crystal oscillator to connect to generate a frequency of about 20MHz. Pin 11, 12 and31, 32 are used for voltage supply Vdd (+) and Vss (-). PIC microcontroller can be programmed with different software's that is available in the market. There are people who still use Assembly language to program PIC MCUs. The below details are for most advanced and common software and compiler that has been developed by Microchip itself. In order to program the PIC microcontroller, we will need an IDE (Integrated Development Environment), where the programming takes place. A compiler, where our program gets converted into MCU readable form called HEX files. An IPE (Integrated Programming Environment), which is used to dump our hex file into our PIC MCUs. To dump or upload our code into PIC, we will need a device called **PICkit 2.** The **PICkit 2** programmer/debugger is a simple, low-cost in-circuit debugger that is controlled by a PC running MPLAB IDE (v8.20 or greater) software on a Windows platform. The **PICkit 2** programmer/debugger is an integral part of the development engineer's tool suite.

C. LCD Display:

One of the most common devices attached to a micro controller is an LCD display. Some of the most common LCD's connected to the many microcontrollers are 16x2 and 20x2 displays. This means 16 characters per line by 2 lines and 20 characters per line by 2 lines, respectively. The LCD requires 3 control lines as well as either 4 or 8 I/O lines for the data bus. The user may select whether the LCD is to operate with a 4-bit data bus or an 8-bit data bus. If a 4-bit data bus is used the LCD will require a total of 7 data lines (3 control lines plus the 4 lines for the data bus). If an 8-bit data bus is used the LCD will require a total of 11 data lines (3 control lines plus the 8 lines for the data bus). The three control lines are referred to as **EN(Enable)**, **RS (Register Select)**, and **RW(Read/Write)**.

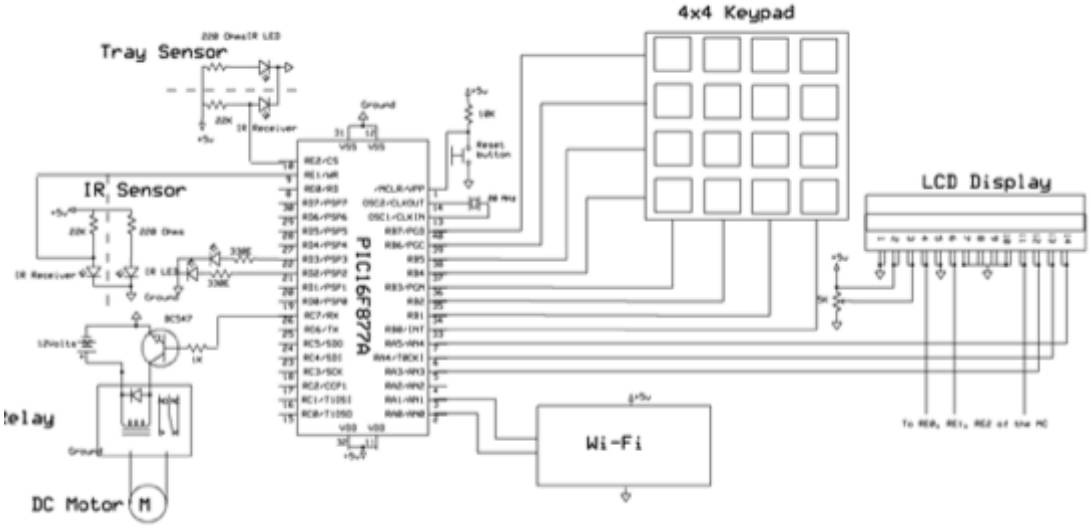
D. DC Motor:

A dc motor uses electrical energy to produce mechanical energy, very typically through the interaction of magnetic fields[6] and current-carrying conductors. The reverse process, producing electrical energy from mechanical energy, is accomplished by an alternator, generator or dynamo. Many types of electric motors can be run as generators, and vice versa. The input of a DC motor is current/voltage and its output is torque (speed). The DC motor has two basic parts: the rotating part that is called the armature and the stationary part that includes coils of wire called the field coils. The stationary part is also called the stator. Figure shows a picture of a typical DC motor, Figure shows a picture of a DC armature, and Fig shows a picture of a typical stator. From the picture you can see the armature is made of coils of wire wrapped around the core, and the core has an extended shaft that rotates on bearings. You should also notice that the ends of each coil of wire on the armature are terminated at one end of the armature. The termination points are called the commutator, and this is where the brushes make electrical contact to bring electrical current from the stationary part to the rotating part of the machine.

E. Voltage Regulator:

A voltage regulator is designed to automatically maintain a constant voltage level. A voltage regulator may be a simple "Feed forward" design or may include negative feedback control loops. It may use an electromechanical mechanism, or electronic components. Depending on the design, it may be used to regulate one or more AC or DC voltages. Electronic voltage regulators are found in devices such as computer power supplies where they stabilize the DC voltages used by the processor and other elements. In automobile alternators and central power station generator plants, voltage regulators control the output of the plant. In an electric power distribution system, voltage regulators may be installed at a substation or along distribution lines so that all customers receive steady voltage independent of how much power is drawn from the line. A simple voltage regulator can be made from a resistor in series with a diode (or series of diodes). Due to the logarithmic shape of diode V-I curves, the voltage across the diode changes only slightly due to changes in current drawn or changes in the input. When precise voltage control and efficiency are not important, this design may work fine.

VI. CIRCUIT DIAGRAM



1.4 Circuit Diagram

VII. HARDWARE MODULE

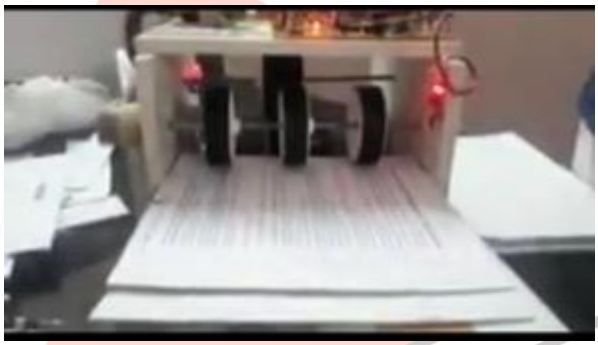


Fig 1.5 Side View of Module

Fig 1.6 Top View of Module

VIII. CONCLUSION

Every project work has a thought or purpose behind it. Our project may not promise to form the best Machine but it certainly promises to be able to be used as the base for further developments. The main feature of the project is its portability and

adaptability. Since it is implemented in small size this enables it to be a portable one and the ability to handle very easily at any kind of places. The machine implementation of the same can be used for many purposes like reducing man power in industries, in institutes etc. It will count hundreds of booklets effectively.

REFERENCES

[1] John Hiley, Keith Brown & Ian McKenie Smith, "Electrical and Electronic Technology", Tenth Edition.
[2] Wells, Donald (2004) The Federal Reserve System: A History (Chapter 6) New York: Digital Vision
[3] Embedded C –Michael. J. Pont.
[4] Raj Kamal –Microcontrollers Architecture, Programming, Interfacing and System Design.
[5] PIC Microcontroller Manual – Microchip.
[6] Fitzgerald A.E., Charles kingsley, Jr., Stephen D. Umans, "Electric Machinery", sixth edition.