Library Automation

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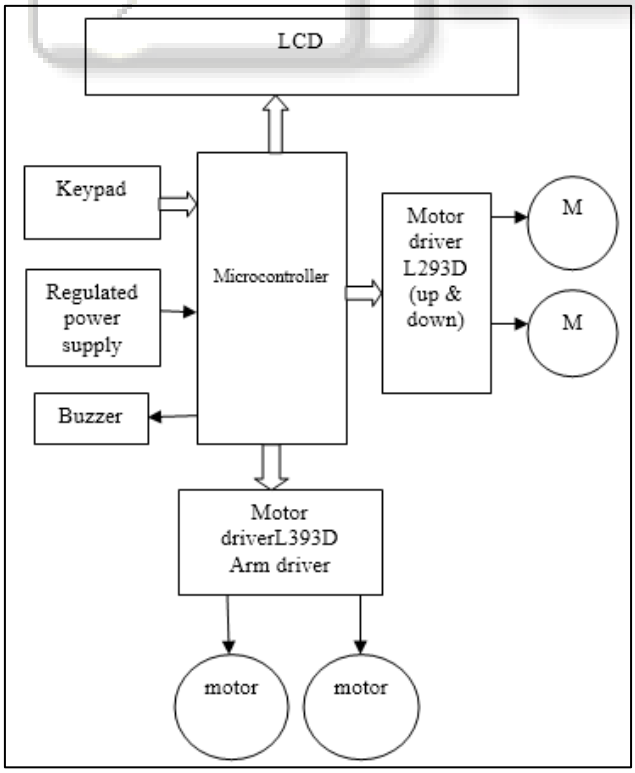
Abstract— This paper describes book placement and book searching method for performance enhancement of existing library system. The book placement and receiving mechanism is used to ensure the placement of book inside the shelf according to assigned code. [3] The name of book that has to be taken is give as an input to the system. If we have to take the book then press the issue button and select the book from the list after that system pick the book from the shelf and put it on conveyer belt and book reached to user. Similarly when user wants to return the book to library the same process is to be followed.

Key words: Library Management, Shelf Unit, Text Recognition Based Book Placement

I. INTRODUCTION

System is the key technology in the modern world. Modern systems are usually an electro- mechanical machine guided by electronic circuit. In this paper we present a library automation which is used to detect and pick the book and provide to the user.[1] Library are the source of knowledge and wisdom, but with increasing the educational branches and new researches, millions of books are being added to the library. Manual sorting and placement of these books in shelves is a time consuming and cumbersome process for human.[3] This often result incorrect placement of books in shelves. The people have to wait for searching the desired book, if the book is not available or issued to some other person then more time is wasted.



A distant search mechanism is therefore desired so that the users get information regarding the availability of the book .To automate this process of finding and picking, we suggest a system of library automation which will be able to find out the book with the required tag and bring it to the desk.

If we have to take the book then press the issue button and select the book from the list after that system pick the book from the shelf and put it on conveyer belt and book reached to librarian. Similarly when user wants to return the book to library the same process is to be followed.

The system is implemented as library automation. First the power supply is given to microcontroller and keypad. After that microcontroller send the signal to LCD and LCD turn ON. After that the option of receive or submit of books will displayed on screen for user. If user wants to receive the book then he has to select the receive option, the list of books available in library is displayed. User have to select the book from list which he wants, if the book is available in library then the signal is send from microcontroller to the motor driver L293D for up and down motion, and further for left and right movement. When system reached to the required book the microcontroller send the signal to the arm driver to pick the book and place it on roller. Then microcontroller sends the signal to the motor of roller and book is reached to the user.

In other hand if user wants to submit the book then he has to select submit option and keep the book on roller, then microcontroller send the signal to motor of roller and book is kept at proper place by system. If the book is not available in library then the buzzer will come in operation and by that user will get information about unavailability of book in the library.

II. ELECTRIC SYSTEM DESIGN

Our system contains the following hardware component-

1) DC gear motor 10rpm
2) Arm with motor
3) L293 D motor driver
4) 89S52 minimum system board
5) 12v ,2amp power supply
6) 16*2 LCD
7) Keypad
8) Buzzer

A. DC gear motor 10rpm-

For this system we are using four DC geared motor of 10rpm. All motors are operate on 12V power supply. Very easy to use and available in standard size. Nut and threads on shaft to easily connect and internal threaded shaft for easily connecting it to the wheel.

Out of this 4 motors we are using two motors for the up and down mechanism of system. And one motor for the left and right mechanism of system. And one motor is for arm operation.

1) FEATURES-

- 10rpm 12v DC motors with gear box
- 125gm weight

- Same size motor available in various rpm
- 2kgcm torque
- No load current -60mA (max), load current -300mA (max)

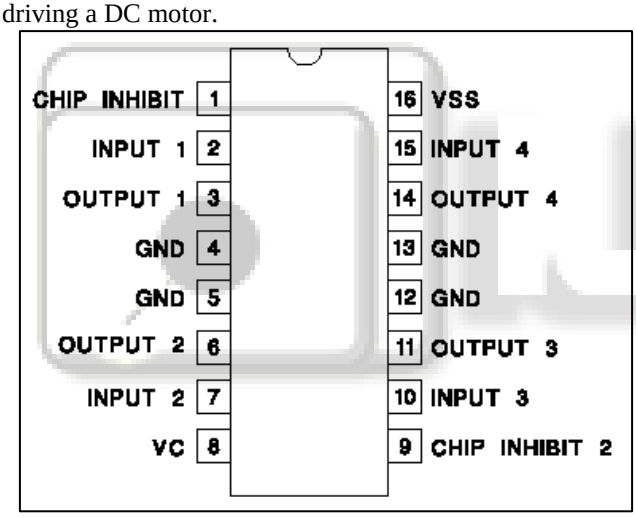
B. Arm with motor-

A systemic arm is a type of mechanical arm, usually programmable with similar function to a human arm. The operating voltage of arm is 12 V.And used to pick and place the book.[2]

C. L293 D motor driver-

L293 D is a typical motor driver is motor driver IC which allows DC motor to drive on either direction. L293 D is a 16 pin IC which can control a set of 2 DC motor simultaneously in any direction. I t means that you can control 2 DC motor with single L293 D IC. L293D can drive small and quite big motors as well, check the voltage specification. The operating voltage is 12V.[1]

It works on the concept of H-bridge. H-bridge is a circuit which allows the voltage to be follow in either direction. As we know voltage need to change its direction for being able to rotate the motor in clockwise or anticlockwise direction, hence H-bridge IC are ideal for driving a DC motor.



1) Working-

There are four input pins for L293 D, pin2, 7 on the left and pin 15, 10 on the right as shown in the pin diagram. Left input pins will regulate the rotation of motor connected across left side and right input for motor on right hand side. The motors are rotates on the basis of the inputs provided across the input pins as LOGIC 0 or LOGIC 1. In simple we need to provide Logic 0 or Logic 1 across the input pins for rotating the motor.

D. 89S52 minimum system board-

For this system we are using 89S52 micrincontroller.This microcontroller works on 5V supply. The supply for microcontroller is given through 7105 IC. Low power, high performance. CMOS 8-bit microcontroller 8kb of ISP flashes memory. The device uses microchip high density, non volatile memory technology the on chip flash allows the program memory to be reprogrammed in system.

In our system 89S52 minimum system board is used to control all motors operation. The whole system control is done by the microcontroller.

The AT89 series remains very popular as general purpose microcontroller, due to their industry standard instruction set, and low unit cost. This allows a great amount of legacy code to be reused without modification in new applications.

1) Specifications-

- 8k bytes of in system reprogrammable flash memory
- Full static operation 0-33MHz
- 256*8-bit internal RAM
- 32 programmable I/O lines

2) Key Features –

- Compact and ready to use design
- On board 11.0592 MHz crystal oscillator
- Two layer high quality PTH, PCB
- Includes AT89s52 microcontroller.

E. 12v, 2amp power supply-

For this system power supply should be of 12v, 2amp.A regulated power supply is an embedded circuit, it converts unregulated AC in constant DC. Its function is to supply stable voltage to circuit or device that must be operated within certain power supply limits.

*F. 16*2 LCD display –*

A 16*2 LCD is used for displaying the name of books placed inside the shelf. LCD is connected to the P1 of microcontroller while control lines, enable and register select, are connected to P3.1 and P3.2 respectively

Liquid crystal displays have material which combines the properties of both liquid and crystals. An LCD consists of two glass panel, with the liquid crystal material sand witched in between them. The inner surface of the glass are coated with transparent electrodes which defines the characters, the symbols or patterns to be displayed polymeric layer are present in between the electrodes and the liquid crystal.[1]

The LCD's are light weight with only a few mm thickness. Since the LCD's consumes less power. The operating voltage is 5V.The LCD is used to display the name of books.

G. Keypad-

The keypad is a set of buttons arranged in a block or pad which bear digits, symbols or alphabetical letters. Pads mostly containing numbers are called a numeric keypad. Numeric keypads are found on alphanumeric keyboards and on other devices which require mainly numeric input such as calculators, push-button telephones, and vending machines, ATMs, Point of sale devices, combination locks, and digital door locks. Many devices follow the .161 standard for their arrangement.

The keypad is used to select the various options such as to select the book name and another option.

The operating voltage of keypad is 5V. And it is used to select the book name.

1) Modern Applications-

- Novelty uses
- Judging panels
- Educational purpose
- Annunciation panels

- Electronic metronomes
- Electrical alarms
- Sport events such as basketball games

H. Buzzer-

A Buzzer or beeper is an audio signaling device which may be mechanical, electromechanical or piezoelectric. Typical uses of buzzers and beepers include alarm devices, timers, and confirmation of user input such as a mouse click or keystroke.

Buzzer is used to give the indication of absence of book in the library. The buzzer operates on 5V supply.

III. Application

It is used in storage yard, medical, online stores.
It is very useful for the physically challenged people.

IV. Result & discussion

In this project the proposed system give the result of find the book, misplacing (avoiding misplacing) of the books can be identified easily. It reduces the manual work, by using this system 2 people can handle the whole library. This helps and simplifies the job of monitoring the arrangement of books. As development in system is growing fast, we can make system more autonomous and sophisticated. Also we can develop this system with real time camera implementation

V. Future scope

We can modify the rating and size of equipment in the system as per the weight of the object.
If user not submitted book on a specific date then penalization message will indicated by LCD which is helpful for management.

VI. Conclusion

In this paper, design of book search and book placement system is presented. The search system tells the user information about presence of book and list of books. The book placement system can be implemented by extraction of text on front cover of the book by image. This paper concludes that library assistant system can work very well instead of man and this is advantageous for a handicap person. We can use this technique for industrial purpose for picking and keeping manufactured products as well as raw materials.

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