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Survey on Automatic Library System

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ABSTRACT: In current libraries there are number of books which are stored in random manner, so it is difficult to search a book easily. So the aim of this project is to search book in an easier manner and also put books in proper place. So we have planned to design Robot, which will be interfaced with microcontroller. Also LCD and KEYPAD are used for selecting carry in or carry out. All information about books i.e. book name, number, author of library will be saved in microcontroller memory. Our project is based on Embedded System. Also PROTEUS, EMBEDDED C software will use. This project will consume time and it helps to search book easily.

KEYWORDS: LCD, Keypad, Microcontroller, Embedded System.

I. INTRODUCTION

A. PROBLEM STATEMENT:

A robot is a mechanical or virtual agent, usually an electro-mechanical machine that is guided by a computer program or electronic circuitry. In this project the Barcode technology is used. It is mainly focused on the book detection and reducing the human work. Bar codes are an integral part of most backup and archive procedures but are often taken for granted and implemented without too much thought. However, bar codes can play a much more significant role, embedding intelligence into the archiving process. A Barcode contains the ID number of the product which can be used by the register to gather information from the server such as its price and name. Robotics is the branch of technology that deals with the design, construction, operation, and application of robots, as well as computer systems for their control, sensory feedback, and information processing. These technologies deal with automated machines that can take the place of humans in dangerous environments or manufacturing processes, or resemble humans in appearance, behavior, and cognition. Many of today's robots are inspired by nature contributing to the field of bio-inspired robotics.

The Asimov laws of robotics:

- a. A robot may not injure a human being or, through inaction, allow a human being to come to harm.
- b. A robot must obey the orders given to it by human beings, except where such orders would conflict with the
- c. First Law. A robot must protect its own existence as long as such protection does not conflict with the First or Second Law.

Library is a fast growing organism. The ancient methods of maintaining it are no longer dynamic and efficient. For Expedient retrieval and dissemination of information and better service for the clientele, application of modern techniques has become absolutely indispensable. A properly computerized library will help its users with quick and prompt services. Library automation refers to mechanization of library housekeeping operations predominantly by computerization. The most commonly known housekeeping operations are acquisition control, serials control, cataloguing, and classification and circulation control. Library automation or Integrated Library System (ILS) is an enterprise resource planning systems for a library, used to track items owned, order made, bills paid etc. Since the



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advent to the term automation in 1936, Plethora's of definitions are found in library literature. Sometimes the terms mechanization and automation looked overlapped, although there is a different of one degree between the two. Automation is the name gives to an automation system of working.

B. AREA OF PROJECT:

- Embedded System
- Software
- Robotics

C. NECESSITY:

- More time to work with the library users Speedup of searching for users
- Better access to the collection
- Allows easy sharing of resources sharing with other libraries
- More interface with the library users with other information resources Better facilities for the users as other libraries are also automating
- Enhances consistency in the collection, streamlines circulation Time saving of clerical and repetitive tasks
- Ease of maintenances of statistics and over dues. Report to the management.

II. RELATED WORK

The literature study in previous system could give more references in system development process. All the advantages in the previous system can be implement during the system development. The characteristic of the previous system such as interface, module flow, process and security level should be improve and enhance from the previous system. The library management feasibility study encompasses all of the research activities that will discuss in this chapter. In this chapter, there are discussions about the information that related from library management concepts includes fact- finding, project theory, previous system study and result from literature study. Library Management System Version 1.0 is the system that been created and modified from the problem that occur on current/manual system. Specific researches need to be form to expel all the weaknesses and strengths of current library systems. There are four types of source on how to get the evidence for the research purpose: - Systems are created to solve problems. The former case study can think of the systems approach way of dealing with a problem. The purpose of former case study implementation is: -

1. To understand and define the different phases of system developments life cycle
2. To know and studied the components of system analysis
3. To know the components of system designing
4. Describe phase objectives, inputs, deliverables, tools and techniques, and critical issues.
5. Specify relationship between project and company organizational structures.
6. Appropriately identify and respond to configuration issues.
7. Initiate and manage a software quality assurance program.
8. Ask the right strategic questions and assess the quality of responses.
9. Request key documentation and assess the quality of its content.

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III. MODELING/DEVELOPMENT OF SYSTEM

A. WORKING OF PROJECT

When system will be in ON condition, LCD will have two options carry in and carry out, this options will be selected by keypad. Then depending on option, we will select book number through keypad and send information to microcontroller. Robot is interfaced with microcontroller, so microcontroller gives command to the Robot for carrying in/OUT. All information will store in microcontroller.

B. BLOCK DIAGRAM:

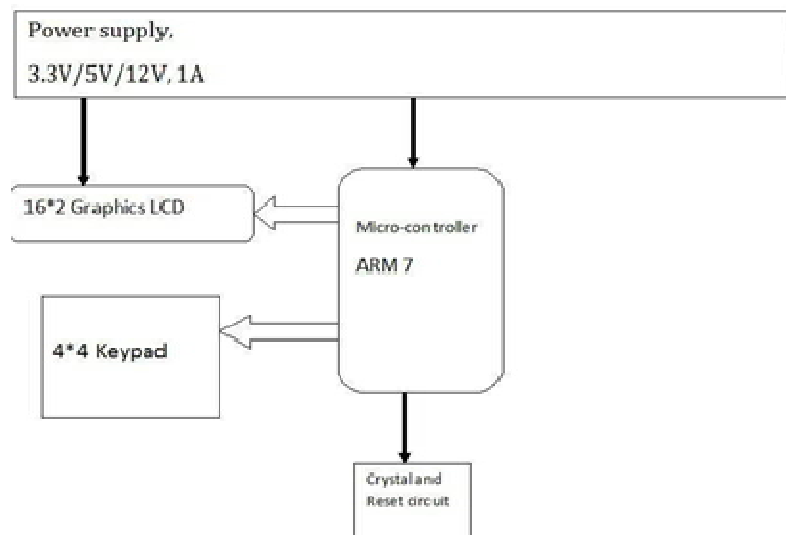


Fig.1 Block Diagram for Transmitter

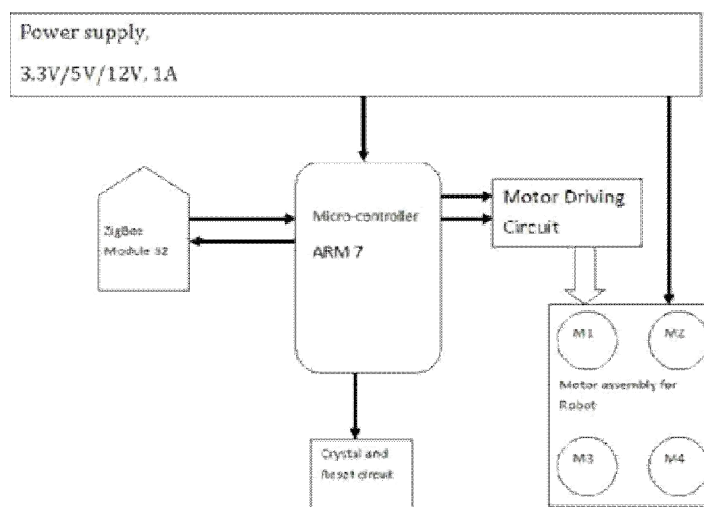


Fig.2 Block Diagram for Receiver



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a. Power Supply:

For our system we require two types of power supply, one for microcontroller and its peripheral devices which are operated over 5V and other for motor and conveyor belt assembly i.e. 12V. Hence we design both power supply simultaneously. We are using 12V/3A adaptor for our system from which we will generate 5V required supply. The current requirement can be fulfilled by using current boost components like capacitors and MOS-FETS. Basically we are using two different power supply units, one for transmitter and other for receiver section. But design of both supply will be same. Both power supply will be adaptor based.

b. Microcontroller:

For multiple task operation and high speed processing we are using ARM7 family or equivalent microcontroller. It will operate over 5V supply giving the output with same range, i.e. 5V. Microcontroller with built in features operates LCD and wireless device Zigbee with the help of program that we are going to write. Any family microcontroller will have an inbuilt memory that contains the hex program for its operations. Once the microcontroller selection part is over we can select the software tool in which we can write our program in C language. Microcontrollers are used in automatically controlled products and devices, such as automobile engine control systems, implantable medical devices, re-mote controls, appliances, power tools, toys and other embedded systems. By reducing the size and cost compared to a design that uses a separate microprocessor, memory, and input/output devices, microcontrollers make it economical to digitally control even more devices and processes. Mixed signal microcontrollers are common, integrating analog components needed to control non-digital electronic systems. Some microcontrollers may use four-bit words and operate at frequencies as low as 4 kHz, for low power consumption (single-digit mille watts or microwatts). They will generally have the ability to retain functionality while waiting for an event such as a button press or other interrupt; power consumption while sleeping (CPU clock and most peripherals) may be just Nano watts, making many of them well suited for long lasting battery applications. Other microcontrollers may serve performance-critical roles, where they may need to act more like a digital signal processor (DSP), with higher clock speeds and power consumption.

c. ZigBee:

Zigbees an IEEE 802.15.4-based specification for a suite of high-level communication protocols used to create personal area networks with small, low-power digital radios, such as for home automation, medical device data collection, and other low-power low-bandwidth needs. The technology defined by the ZigBee specification is intended to be simpler and less expensive than other wireless personal area networks (WPANs), such as Bluetooth or Wi-Fi. Applications include wireless light switches, electrical meters with in-home-displays, traffic management systems, and other consumer and industrial equipment that require short-range low-rate wireless data transfer. Its low power consumption limits transmission distances to 10100 meters line-of-sight, depending on power output and environmental characteristics. ZigBee devices can transmit data over long distances by passing data through a mesh network of intermediate devices to reach more distant ones. ZigBee is typically used in low data rate applications that require long battery life and secure net-working (ZigBee networks are secured by 128 bit symmetric encryption keys.) ZigBee has a defined rate of 250 Kbit/s, best suited for intermittent data transmissions from a sensor or input device. ZigBee was conceived in 1998, standardized in 2003, and revised in 2006. The name refers to the waggle dance of honey bees after their return to the beehive.

d. 16*2 LCD:

We are using LCD display to display the welcome message, error message, or book number to be submitted or to collect.

Whenever user will enter the book name and number by keypad, LCD will display the details. It is interfaced with microcontroller. Alphanumeric displays are used in a wide range of applications, including palmtop computers, word processors, photocopiers, point of sale terminals, medical instruments, cellular phones, etc. The 16 x 2 intelligent alphanumeric dot matrix display is capable of displaying 224 different characters and symbols. A full list of the characters and symbols is printed on pages 7/8 (note these symbols can vary between brand of LCD used). This booklet provides all the technical specifications for connecting the unit, which requires a single power supply (+5V). Available as an optional extra is the Serial LCD Firmware, which allows serial control of the display. This option provides much



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easier connection and use of the LCD module. The firmware enables microcontrollers (and microcontroller based systems such as the PICAXE) to visually output user instructions or readings onto an LCD module. All LCD commands are transmitted serially via a single microcontroller pin. The firmware can also be connected to the serial port of a computer

e. 4*4 Keypad:

It is 16 keys connected in matrix format and interfaced with microcontroller to load some information. We used keypad for user convenience, to enter the required book details or to enter the book details to be submitted. Matrix keypads use a combination of four rows and four columns to provide button states to the host device, typically a microcontroller. Underneath each key is a pushbutton, with one end connected to one row, and the other end connected to one column. In order for the microcontroller to determine which button is pressed, it rst needs to pull each of the four columns (pins 1-4) either low or high one at a time, and then poll the states of the four rows (pins 5-8). Depending on the states of the columns, the microcontroller can tell which button is pressed.

f. DC Motor:

It is used for building a 4 wheel robot that will take commands from microcontroller and operates as per that. It is used to carry books from shelf or to the shelf. A DC motor is any of a class of electrical machines that converts direct current electrical power into mechanical power. The most common types rely on the forces produced by magnetic fields. Nearly all types of DC motors have some internal mechanism, either electromechanical or electronic, to periodically change the direction of current flow in part of the motor. Most types produce rotary motion; a linear motor directly produces force and motion in a straight line. DC motors were the first type widely used, since they could be powered from existing direct-current lighting power distribution systems. A DC motor's speed can be controlled over a wide range, using either a variable supply voltage or by changing the strength of current in its field windings. Small DC motors are used in tools, toys, and appliances. The universal motor can operate on direct current but is a lightweight motor used for portable power tools and appliances. Larger DC motors are used in propulsion of electric vehicles, elevator and hoists, or in drives for steel rolling mills. The advent of power electronics has made replacement of DC motors with AC motors possible in many applications.

DC motor Driving Circuit:

Normal DC gear-head motors require current greater than 250mA. ICs like 555 timers, ATmega16 Microcontroller, 74 series ICs cannot supply this amount of current. If we directly connect motors to the output of any of the above IC's, they might get damaged. There is a need of a circuitry that can act as a bridge between the above mentioned ICs and the motors. There are several ways of making it, some of them are mentioned below.

Using Transistor.

Using L293D/L298

Using relays

Using Transistor:

If you want to rotate your motor in only one direction, then this is the easiest way to do so. Here power transistor is used as a switch to turn a motor on or o depending upon the applied voltage at base. Its circuit is shown below. The same motor driver circuit is used in making a simple line follower robot. For controlling motor in both directions H bridge circuit is used.

Using L293D/L298:

L293D and L298 are dual H-bridge motor driver ICs. We can control the rotation of two motors in both clockwise and anti-clockwise direction.

Using Relays:

Relays are electromechanical switches. They have very high current rating and both AC and DC motors can be controlled through them because motor will be completely isolated from the remaining circuit. Relays consist of an



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electromagnet, armature, spring and electrical contacts. The spring holds the armature at one electrical contact and as soon as a voltage is applied across the electromagnet, it coils the armature, changes its contact and moves to another electrical contact.

PROPOSED WORK REGARDING PROJECT

- Collect all detailed information about project.
- Collection of all required data sheets and documents.
- Study of hardware and software requirement regarding to block schematic. According to circuit design creates the PCB artwork.
- Soldering and interfacing of all components
- Design a software programming of Embedded C
- Testing of project after completion of all works regarding hardware and software.

IV. FUTURE SCOPE

There is a future scope of this facility that many more features such as online lectures video tutorials can be added by teachers as well as online assignments submission facility, a feature Of group chat where students can discuss various issues of engineering can be added to this project thus making it more interactive more user friendly and project which fulfills each users need in the best way possible.

V. CONCLUSIONS

There is a future scope of this facility that many more features such as online lectures video tutorials can be added by teachers as well as online assignments submission facility, a feature Of group chat where students can discuss various issues of engineering can be added to this project thus making it more interactive more user friendly and project which fulfills each users need in the best way possible.

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