

Library Management System Using Arduino

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ABSTRACT

In a library there will be more than thousands of books which cannot be maintained accurately in a less time by humans. To make this process easy we have designed a Arm. This searches the book using RFID tag and picks the book from the shelf and place it in a delivery box. After returning, arm takes the book from returning box and place it in a respective shelf. This process reduces the human work and also reduces the time.

1. INTRODUCTION

To manage a library and to arrange the books accurately we use an arm. Here a microcontroller and RFID system is implemented. It is designed for searching the book in the library without the help of human, where it saves the time and manual work, hence here we use a microcontroller Atmega328P. We use a servo motor to rotate the arm which will be easy to lift the book. RFID tag is used to detect the book type. This process will be easy to maintain a large library in a easy manner.

2. EXISTING SYSTEM

2.1. Manual Process

In a large library it is difficult to find the books, where in need to search the books one by one is difficult for a library staff. Each time when we take a book from a library it is difficult to return it to a same place, it takes large amount of time.

2.2. Computer Based

In computer based we enter the title, book number, author in a system, then the required book will be found in the system with rack number, then the library staff will take the book from the rack. Returning the books is difficult in this process. This process takes a lot of time and human work.

3. PROPOSED SYSTEM

In our proposed system an arm is focused on following the white line to track and take the book from shelf and keep the book in concerned place accurately. The book that has to be taken is recognized by RFID number. When the customer returns the book, it will take book from returning box and place it in the same shelf.

4. ARCHITECTURE OF ATmega328P

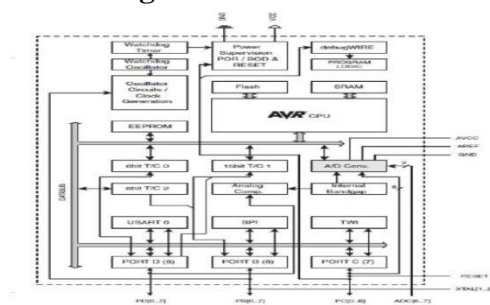


FIGURE 1: ARCHITECTURE

5. HARDWARE USED FOR THE PROPOSED METHODOLOGY

- Arduino
- DC geared motor
- ServoMotor
- Bluetooth Module
- Radio Frequency Identification(RFID)
- Gripper SG90
- Motor DriverL298N

5.1.Arduino

Arduino is an open source electronic platform which is used to handle both hardware and software .In this Project We are using 2 Arduino .It commands to the sensors and motors as per our code we wrote. Arduino simplifies the process of microcontrollers



FIGURE 2: ARDUINO

5.2. ServoMotor

A servo motor is an electrical device which is used to rotate an object with highest precision. We use MG995 Specification servo motor, this lifts the books according to its weight. Here we have used 4 servo motor. Servo motor is used to rotate the arm in particular direction.



FIGURE 3: RELAY

5.3. BluetoothModule:

In Our project, Bluetooth module is used to interchange the information between the two things In this we are connecting mobile phone via Bluetooth to the microcontroller, in that they transfer the input or contents to the microcontroller. It is mainly used for communication purpose.

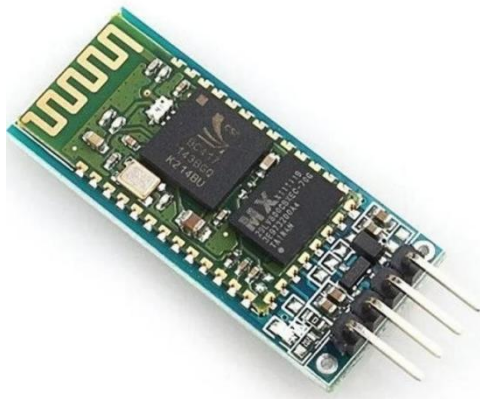


FIGURE 4: BLUETOOTHMODULE

5.4. Radio Frequency Identification(RFID)

It uses electromagnetic fields which will identify and track the tags attached to objects. Here RFID tag is attached to each rack, then it compares the details of the book and the book matches with RFID reader and buzzer will be turned ON.



FIGURE 5:RFID TAG

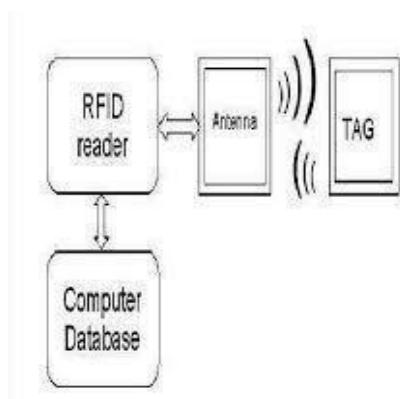


FIGURE 6: BLOCK DIAGRAM OF RFID

5.5. Gripper SG90

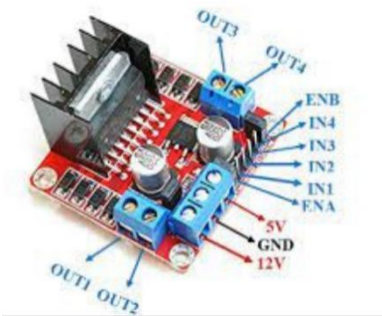
Here we used gripper as an arm. where when the gripper will get open when servo motor goes to 90 degree and 180 degree it gets closed. It is easily attached to other hardware components.



FIGURE 7: GRIPPER

5.6: Motor Driver

We used L298N motor driver which can drive motors which have 5V to 35V. It is used to control the two dc geared motor at once.



5.7: DC geared motor

We use 10RPM geared motor with 12V. Here we used it for rotatory purpose. Movement of dc motor is continuous. We used 2 geared motor in wheel.

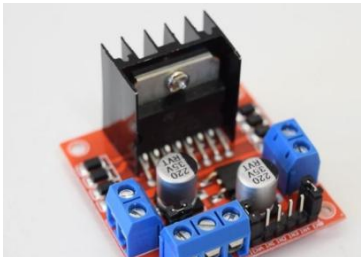


FIGURE 8 : MOTOR DRIVER L298

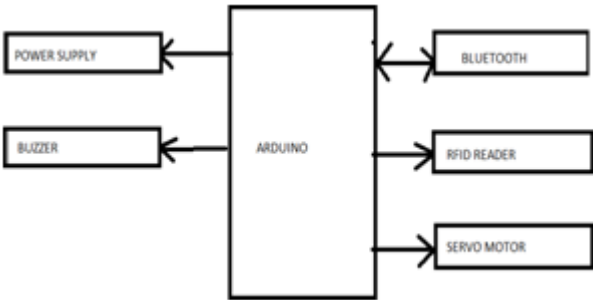


FIGURE 9.1: BLOCK DIAGRAM(Arduino 1)

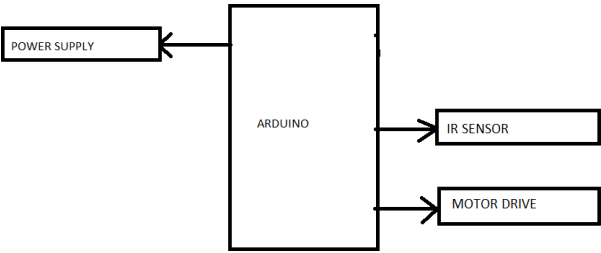


FIGURE 9.2:BLOCK DIAGRAM(Arduino2)

6. HARDWARE RESULT

CASE 1: CONNECTING BLUETOOTH

- Connect the Bluetooth with the mobile application.
- Select the device.
- Hardware Results: Person selecting the book using mobile app



CASE 2:
After connecting Bluetooth select the required subject



CASE 3: STARTS TRACKING

After receiving the command, the microcontroller start moving along the white line and reaches the shelf. The IR sensor contest with the shelf. The RFID reader scrutinize for the RFID tag and contest with the respected book.

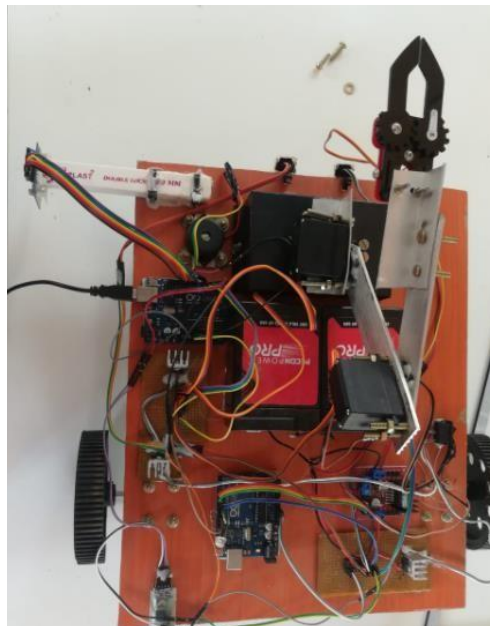


FIGURE 11 : STARTS TRACKING

CASE 4: ARM PICKS UP AN OBJECT

If both the RFID reader and the shelf end get synchronized the arm rotates in particular degree according to the shelf position which has been coded already.

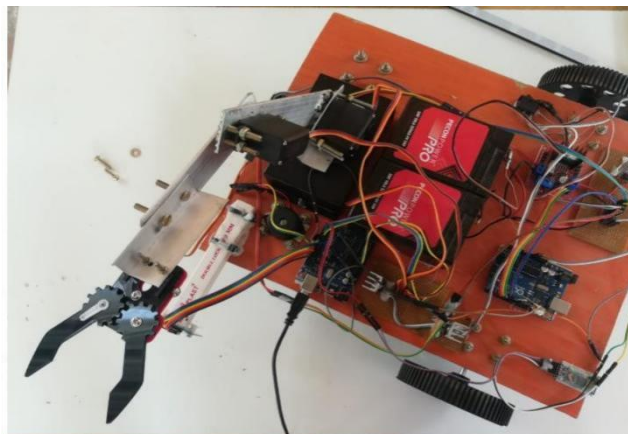


FIGURE 11: ARM PICKING UP AN OBJECT

CASE 5: IN STATION

The system will be in station untill the next cycle begins. It gets ready for the next cycle from the user.

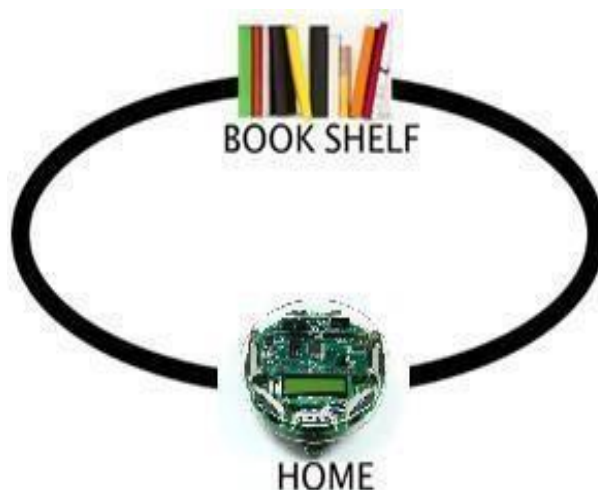


FIGURE 12: PROCESS

7. CONCLUSION

As the technologies are evolving to reduce the human efforts. Our project is also do the same. As our product's cost is low, our invention can be adopted in smaller and larger library. There is a arm designed to pick the book. We used a microcontroller, servo motor, RFID tag

This not only reduce the efforts of the librarian but also the people who come in Search of a book. In a library. In this proposed system gives the result to find the book. It reduces the man work. Our proposed system totally saves our time and human effort.

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