

# Automation of Library System Using Firebird V

<sup>[1]</sup> Rohit Kelkar <sup>[2]</sup> Mohit Deshmukh <sup>[3]</sup> Nihar Pawde <sup>[4]</sup> Aditya Chauhan

<sup>[1][2][3][4]</sup> Final Year, CSE, Prof. Ram Meghe Institute of Technology & Research, Amravati, India.

<sup>[1]</sup> rohit.kelkar@gmail.com <sup>[2]</sup> mohitdeshmukh43@gmail.com <sup>[3]</sup> niharonedm@gmail.com

<sup>[4]</sup> adityachauhan82@gmail.com

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**Abstract:** -- Though the ease of dealing with the library services has evolved in past few years, there are still some chances of finding human errors and locating books in library. The automation technology has developed rapidly in the last two decades and so as the ease of dealing with things in day to day life. In this paper we have tried to demonstrate a prototype of Autonomous Robot Fire Bird V which will automate the book issuing system in library. The robot will take input from the user and search for the desired book among library shelves. Upon getting the respective book, it will hand it over to the user thereby reducing human work.

**Keywords**— Line following robot, RF module, LCD, Barcode Scanning, Programming, Robot, ATMEGA2560 Microcontroller.

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## I. INTRODUCTION

Though the ease of dealing with the library services has evolved in past few years, there are still some chances of finding human errors and locating books in library. The automation technology has developed rapidly in the last two decades and so as the ease of dealing with things in day to day life.

Almost all of us agree with the fact that robots can be faster and more accurate than human can possibly ever be. Robots are being developed to minimize the human efforts and maximize the output. Hence to optimize the issue of book in a library system, Firebird V robot is used to replace the manual searching of books. Using the Fire Bird V platform, the robot is used as a companion to search and get the appropriate book in a library system.

The robot will be given an input to locate the position of the desired book in library. It will move to the specified location and get the book using an arm mounted on the surface. Then it will bring the book to the user and will hand it over by dropping it. This is the static delivery technique we are implementing now. For the dynamic service, we will be using Barcode scanning and detecting to maximize the accuracy.

Precision position encoders make it possible to have accurate position control. Which will help us in achieving accurate locations for Book delivery? It is powered by high performance rechargeable NiMH batteries. The 2.4 GHz ZigBee module provides a state of

the art secure and multi-channel wireless communication up to a range of one kilometer.

Firebird V robot has many applications in various fields like Artificial Intelligence, Control systems, Autonomous navigation, Mobile sensor network, Collaborative robotics, Real-Time systems, Automotive technologies.

A robotic arm is used with Firebird V. It is a robotic manipulator, which is usually programmable with similar functions to a human arm. Humans can pick things up without thinking about the steps involved. In order for a robot or a robotic arm to pick up or move something, someone has to tell it to perform several actions in particular order — from moving the arm, to rotating the ‘wrist’ to opening and closing the ‘hand’ or ‘fingers.’ .So, we can ultimately control each joint through computer interface. One of its very prominent features is the arm is very user friendly because of the computer interface developed by us, even layman could operate it.

Searching manually for the books in library is tedious when a large library system is concerned. To make the process human-less, we can use an automated robot which when given a proper input ,will bring the appropriate book to the user thereby reducing the efforts and minimizing the time spent for searching the books.

## II. RELATED WORK

Firebird V has been put to use in following areas such as Sensor detection, Locomotion (line following), Obstacle avoidance, GSM communication, Artificial Intelligence, Multi-Agents System, Control systems,

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Autonomous navigation, Mobile sensor network, Collaborative robotics, Real-Time systems, Automotive technologies. A number of applications have been developed using the platform and presented at E-Yantra, a robot development competition jointly organized by Ministry Of Human Resource & Development Govt. Of India.

Considering each sector, we can see that there are numerous applications of Firebird V robot and the robotic arm. Using the Firebird V for the book issuing in library system and replacing humans in the process, we are trying to improve and increase its credibility as a robot and improve the process on the whole.

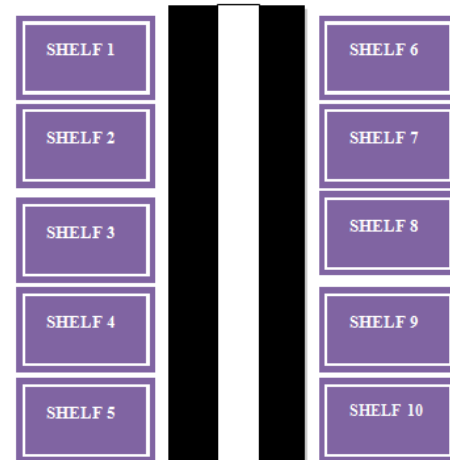
### III. METHODOLOGY

Fire Bird V provides an excellent environment for experimentation, algorithm development and testing. Its modular architecture allows us to control it using multiple processors such as 8051, A T mega 2560, etc. Modular sensor pods can be mounted on platform as dictated by intended applications. Firebird V will follow black line to locate the books in library. It will deliver the book whose input was given to it.

Firebird V will detect the white line on which it is moving using the white line sensors. It will detect the obstacles using proximity sensors and infrared sensors depending upon the range of obstacle,

A robotic arm is used with Firebird V. The robotic arm will be used to pick the books. It is a robotic manipulator, usually programmable, with similar functions to a human arm.

The programming for the movements of the Firebird robot will be done in the embedded C. The programming for interfacing will help the robot to move efficiently along the ' black line and perform other operations like turning right or left in the desired angle, picking up the books which is done by the robotic arm and delivering the books to the preferred location. The sensors play a vital role in determining the line on which it has to move or the obstacles in the path using proximity sensors, etc



**Fig. White Line Follower between Book Shelves**

### IV. CONCLUSION

Automation of issuing books a library system will thus apparently overcome the drawbacks of human book searching. The reduced human efforts, time saving, more accuracy are evidently the salient features of automation of issuing books in library

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