Library Management Robot

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ABSTRACT

This paper demonstrates the application of Robot for library inventory management system. A robot is design sensor operated motors to keep track the library book shelf arrangements. Robot get the data of book which going to be search from the pc through ZigBee, The robot carries a barcode reader which collects the barcode data from the books arranged in a vertical manner and compares the decoded barcode data with the input. If the particular book which is to be found out by the robot, then the robot gives location of the book to the librarian's system through Zigbee, in which the robot is used for searching purpose. In case of any difficulty faced by the robot when it does the searching process, the robot halts and sends an alarm. Misplaced books can be identified using the pre-programmed data in the robot which helps to maintain the books in an order. This helps and simplifies the job of monitoring the arrangement of books and also reduces the manual routine work done by the library staff.

Keywords-*IR unit,Zigbee transceiver,Relay driver,Battery.*

1. INTRODUCTION

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 it's 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, orresemble humans in appearance, behavior, and cognition. Many of today's robots are inspired by nature contributing to the field of bio-inspired robotics. The concept of creating machines that can operate autonomously dates back to classical times, but research into the functionality and potential uses of robots did not grow substantially until the 20th century. Throughout history, robotics has been often seen to mimic human behavior, and often manage tasks in a similar fashion. Today, robotics is a rapidly growing field, as technological advances continue, research, design, and building new robots serve various practical purposes,whether domestically, commercially, or militarily. Many robots do jobs that are hazardous to people such as defusing bombs, mines and exploring shipwrecks.

1.1 The Asimov laws of robotics:

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

It provides a very powerful and flexible approach to demonstrate a variety of engineering concept. Robots are used internationally by Police, Army, Navy and Air force organizations. Robotic technology is used to deal with hazardous situations such as dealing with suspicious packages, rates and for the collection of

foreign intelligence. robot**,** any automatically operated machine that replaces human effort, though it may not resemble human beings in appearance or perform functions in a humanlike manner. By extension, robotics is the engineering discipline dealing with the design, construction, and operation of robots.

2. LITERATURE REVIEW

In older days libraries required more manual power to manage, for example, maintaining records and available resources like how many text books are there in a shelf which are belonging to same group. They maintain with the advancement of technology, we can overcome above drawbacks we are going this proposed method. In this method we are going to maintain a library using my controller based system. As Liu and Wu suggest, the field of cooperative robotics began in the late 1980's 0when researchers began investigating issues in multiple mobile robot systems. Up to this point, most of the research had focused on either single robot systems or distributed problem-solving involving non-robotic components. When these two ideas were merged, the field of cooperative robotics (also referred to in the literature as distributed robotics) was born. The work of two of the groups to first present the ideas of distributed robotic systems is presented below. Fukuda and Nakagawa introduce the idea of a dynamically reconfigurable robotic system (DDRS) which allows a robot to autonomously reconfigure its parts based on the goals of a specific task. DDRS consists of robotic "cells" which are defined as fundamental components with a single mechanical function such as a mobile base, gripper, or arm joint. These cells communicate with each other and can approach, detach, and combine themselves in different ways depending on task definition and allowable workspace. The research is motivated by biological cells which, although they have simple single functions, show very complex and new behaviors when combined in groups. DDRS is proposed for use in space, factory, and hostile environments. This theoretical research progresses to an actual robotic system called CEBOT . Asama *et. al.* present ACTor-based Robots and Equipments Synthetic System (ACTRESS) which is a distributed multi-robot system designed for maintenance The autonomous components of this system are termed "robotors" and can be mobile robots or any component that has at least two basic functions: 1) the ability to sense surroundings, make decisions, and act on these decisions and 2) the ability to communicate to other robotos for purposes of cooperation and interference avoidance. ACTRESS is shown in simulation with the cooperative task of two mobile robots pushing boxes to the sides of a room. Inspired by the novel ideas introduced by these two groups and a few others, the field of cooperative robotics grew rapidly. The field gained popularity due to its applications in hazardous environments and the promise of performing tasks more efficiently.

3. PROPOSED TECHNIQUES

3.1 Explanation of Robot side block diagram:

The heart of this system is obviously microcontroller. Microcontroller used here is ARM base LPC2148 . Another block is Zigbee Transceiver which is used for communication purpose.
.The proposed system consists of three main units:

- Barcode Reader
- Zigbee Transceiver
- Robotic ARM

The heart of this system is obviously microcontroller. Microcontroller used here is ARM base LPC2148 . Another block is ZigbeeTransceiver which is used for communication purpose.The Zigbee supports unique needs of low-cost, low-power wireless sensor net-works. The modules require minimal power and provide reliable delivery of data between remote devices. Both modules operate within the ISM 2.4 GHz frequency band and are pin-for-pin compatible with each other. For motor driver we are using L293D IC.Generally, even the simplest robot requires a motor to rotate a wheel or performs particular action. Since motors require more current then the microcontroller pin can typically generate, you need some type of a switch (Transistors, MOSFET, Relay etc.,)

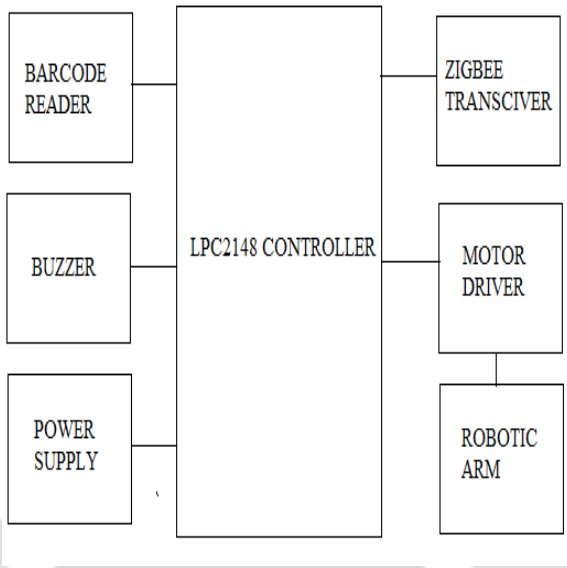

Fig. Robot side block diagram

which can accept a small current, amplify it and generate a larger current, which further drives a motor. This entire process is done by what is known as a motor driver.

3.2 System Side Block Diagram

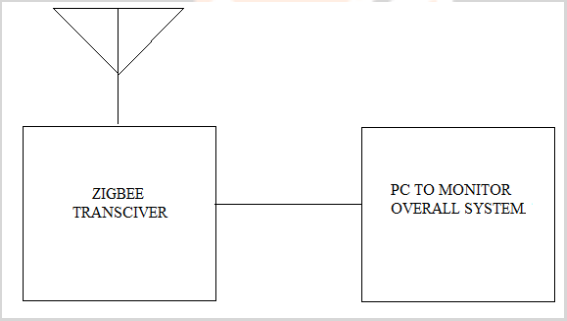

Fig. System side block diagram

Overall system can be monitor on PC using Zigbee Transceiver. X-CTU is a MaxStream-provided software program used to interface with and configure Max- Stream RF Modules. A terminal program is built into the X-CTU Software. Other terminal programs such as "HyperTer-minal" can also be used. The ZigBee firmware comes in different versions to support the API interface (AP 1, 2 modes) or the AT command set (AP 0 mode).

4. FUTURE SCOPE & CONCLUSION

In this project the proposed system give the result of find thebook,Misplacing of the books can be identified easily. It reduces the manual work. With the proposed architecture, if constructed with at most accuracy, the robot will pick the book. It will act as a basic platform for the generation of more such devices for the book picking.

This helps and simplifies the job of monitoring the arrangement of books and also reduces the manual routine. As development in Robotics is growing fast, we can make robot more autonomous and sophisticated .Also we can develop this system with real time camera implementation.

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