IROBOT CREATE: PROGRAMMED AS PROVIDER

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Abstract—**This paper elucidates the research and implementation of guiding robots to a predetermined path. The robot is programmed through an 8 bit micro controller. The input to the robot for a particular path can be given by pressing available buttons. The advantage of the robot is that it can help transport things from one place to another by keeping the item over the tray on the robot. It has been installed with voice recognition system, which can take voice command to stop in case of emergency, and xbox kinect which can be used to help robot know its surroundings. In future the robot can be used for proving help to people in their daily life routine for carrying things from one place to another. It is programmed in such a way that source to destination navigation path is preprogrammed.**

 The user can also make the robot learn the path that he must follow, when asked, and save the navigation, which can be accessed from one of the buttons.

 Xbox Kinect is added to one of the DB9 port. Kinect for Windows consists of the Kinect for Windows hardware and Kinect for Windows SDK, which supports applications built with C++, C#, or Visual Basic by using Microsoft Visual Studio 2010. The robot can be used for improved skeletal tracking and enhanced speech recognition.

Keywords —Atmel AVR ATMegal 168 micro-controller and Microsoft Kinect.

I.   INTRODUCTION

The interesting part of the project is mainly the use of the robot as people imagine robot can do, which is helping them doing day to day task. It gives a programmed sense to robot. Robot is capable of understanding the path that he must follow when a particular button is pressed. The programming is done using the command module.

II.   IMPLEMENTATION FRAMEWORK

The robot is programmed in the manner that the system has to be trained physically to move from one place to another by the user so that the navigated path can be saved into the memory unit with the robot. It uses an 8 bit micro- controller provided by the kit. The robot is powered by an Atmel AVR ATMega168 micro-controller (figure) which can program motor, lights, sounds and sensors. Own Hardware can be added via DB-9 ports. C or C++ programming compatible. Programming on Windows XP platform. An 8 bit, 18 MHz micro controller uses the WinAVR suite, which includes the GNU GCC compiler, avrdude downloader, and the Programmers Notepad IDE[3]

III. I-ROBOT CREATE

Create is an affordable mobile robot platform for educators, students and developers - used to experiment and learn.

Program behaviors, sounds and movements attach sensors, electronics, cameras, grippers and more. Beginners can observe the robot's behavior in any of the 10 demonstration modes or program the robot by downloading scripts with any basic terminal program. Advanced users can write custom software using a variety of methods that take advantage of the robot's "streaming sensor data" mode for more control of the robot. And highly advanced users can write programs for completely autonomous behavior[1].
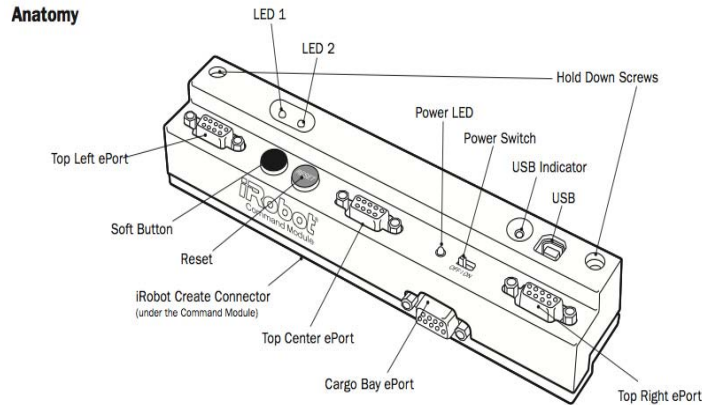

Figure 1: Command Module

Figure 2: I-robot Create

IV. XBOX KINECT

The Kinect for Windows SDK enables developers to create applications that support gesture and voice recognition, using Kinect sensor technology on computers running Windows 7, Windows Embedded Standard 7, and Windows 8 Developer Preview (desktop applications only)[6].

The kinect is installed with the robot and is used to watch the environment as the robot goes on the preprogrammed path embedded into the command module. This is done to give the ability to detect the changes to the path. If any obstacle is encountered then the path of the robot will be reframed around the obstacle if possible.

If there is no space of required length seen through the camera of the kinect then there will be sound of "beep" which can be heard from different room. And it will stop.

If the new path can be accessed by the robot then it will take that path and will take the detour to reach the assigned path programmed.

The obstacles can be of many types, which can be stair case or a human standing in between the path or any other object.

The robot can be commanded through voice recognition system which sends an interrupt to the robot if moving and can be commanded to stop in case of emergency stops for security of the robot.

V. LIGHT SENSORS

Two light sensors are put into one of the DB9 port. These are used when we want the robot to learn the path that he must follow and the path traveled can be saved into one of the buttons of the micro-controller.

The learning mode of the robot can be set by pressing the button (3 times with short intervals) into which the navigation is needed to be saved.

A LED is installed in one of the other DB9 port which tells if the robot is in learning mode or not .If the LED is on then the robot is in learning mode and if no light is emitted by the LED then the robot is not in learning mode.

When the robot is in learning mode then the user can put a source of light in front of the robot where the light sensors are installed.

Two LEDs are put at a distance from each other in front of the robot. They measure the light intensity and travels in the direction where the light intensity becomes equal in both the light sensors. This way the robot can be made to follow the light in the direction the user takes the torch (light source) in his hand.

When the robot has travelled the distance required, user can switch off the learning mode by pressing the same button used to put the robot in the learning mode thrice. This will save the navigation path into that button.

The learning task is better done if it is done with dark environment to disallow any other light source to interfere with the torch in the hands of the user.

This ability of the robot to be able to save the path to be followed, gives any kind of user to save the path without having the knowledge to program the robot.
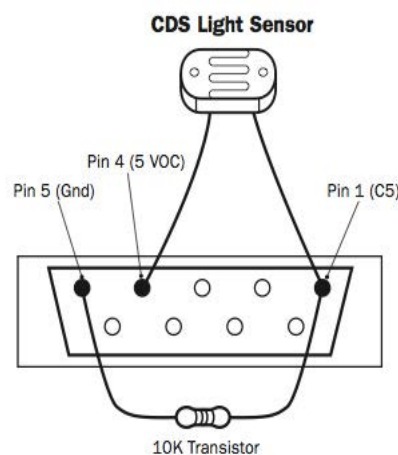

Figure 2: Light Sensor in DB9 port

VI.   USES

A.It helps move things for elder people.

B.It helps transfer things from one room to another.

C.It can serve guests with snacks or drinks kept on the tray, from kitchen.

D.The robot can be used in homes as a servant, work place to carry files, guide visitors in an organization, hospitals to carry surgical instruments from room to room.

VII.   FUTURE SCOPE

 The robot may be used as a shopping cart in shopping complexes with automated billing and carrying the items to the cash counter.

VIII. LIMITATIONS

  The robot uses preprogrammed coding and can only be reprogrammed by sophisticated users.
  The speed of the movement of the robot is limited and has only few external ports to offer addition of other hardware.
  The amount of weight that can be put on the robot is limited to 2- 3 kilos.

IX.SUMMARY AND CONCLUSION

   This project aims at programming highly cost effective robot which would take care of the daily needs of the people of carrying objects.

   The robot can be easily programmed to suit the needs of the different requirements. The project is aimed to make such a robot which when told to move an object kept on it to another place (room), it can decide the path it must follow to reach its destination.

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AUTHORS PROFILE

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