Modelling of obstacle avoidance robot using LABVIEW

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ABSTRACT

Robotics is one of emerging technology from past few decades. Now a days most of industries depends on robotic automation. Robotics made human life easier. This paper is overview of such implementation. As we know now a days there are such areas where human cannot work efficiently, with the help of this moving wheeled robot and visual programming platform called as LabView we have proposed kinematic model of moving wheeled robot with consideration of obstacles. This model can work efficiently in any uncertain conditions without human intervention. This model also tracks trajectory and location of robot. Output can be analysed with the help of graphs on LabView

Keywords: Microcontroller, LabView, GSM, XBEE, NI, MyRIO

I. INTRODUCTION

Now a days many countries are doing intensive work in the field of robotics technology. To reduce human efforts and time people are going towards automation. Robotics is one of fastest growing technology in past few decades. The aim of robotics is to design intelligent system that can help and assist humans in their day-to-day lives and stay everyone safe. The main advantage that ensures the development of mobile robots is the possibility of their use in extreme conditions where the presence of people is dangerous or impossible such as inspection of radioactive materials, bomb detection and deactivation, manufacturing processes, or where humans cannot survive in environment like in space, underwater, in high heat, and clean up and containment of hazardous materials and radiation. The purpose of development of mobile robotics involves research aimed at expanding technological capabilities of mobile robots in an uncertain environment by increasing their intellectual abilities. For the effective functioning of mobile robots, it is necessary to design accurate model of a motion control system that performs assigned task and allow making adequate decisions in uncertain situations.

Thus, we propose to consider the issues of designing a motion control system for a tracked robot based on LabView, which provides a robotic platform with efficiency and accuracy to move along a given trajectory despite various environmental disturbances. LabView is environment of graphic programming, which is also sometimes called the language G. Visualization of program code in form of functional blocks is an advantage of LabView.

II. LITERATURE SURVEY

[1] Various researches have been done to control robot through various platforms. This research has been done specially on robot which is controlled by voice using LabView. The use of virtual instrument technology a kind of speech recognition system has been developed. this system recognizes the voice over for robotics to operate the movements of the robot it uses LINX module for speech recognition. microphone fetches audio signal and send to LabView. then this signal is analysed, and it gives output signal as command to robot via Bluetooth it also uses SSP protocol for communication. and controller will activate accordingly. Using the speech processing unit makes the system work with better ease and accuracy. The robot is simple to design and works with better efficiency, thus making the system reliable and cheap. Further the system can be used in different applications for improved use to serve for humans. This helps in better quality output, less overhead of humans, cost efficient, with increased accuracy and efficiency.

[2] This research demonstrates the differential drive configuration of robot. In this system trajectory tracking control for differential mobile robot based on polar co-ordinates is implemented where it will be compared with LQR controller. The controllers based on polar coordinates and LQR were implemented in an experimental prototype of a differential mobile robot where the NI myRIO embedded hardware and the LabView Software were used. The objective of this work was the comparison of two methods of control to achieve the trajectory tracking of a wheeled mobile robot based on kinematics model. here the LQR showed a better potential to achieve the trajectory tracking control with a reasonable performance than using polar coordinates control. Differential robot is used because of its simple mathematical model and low computational cost which allows for easy implementation of several specific task. the performance system can be improved using robust methods for the trajectory tracking, although it could lead to higher computational cost

[3] This research guides nonholonomic mobile wheeled robot along predefined path. Here adaptive LINEar (ADALINE) neural network has been used to implement the controller. also, it uses Widrow-Hoff algorithm to control adaptive neural network. Also, it has been tested offline and online to calculate control signals. simulation and results are shown by using virtual platform LABVIEW.

[4] Proposed a work elaborating the uses XBEE communication to control the mobile wheeled robot and to detect object it uses sensor this controlled of robot is achieved by application which is implemented in LABVIEW The implementation of the robot with

XBee communication permits a two way communication between mobile platform and remote controlling device. This system uses with a two tracks mobile platform actioned by two DC motors, controlled wireless from a PC or a remote-control module. The DC motors direction is controlled with PWM technique using a H-bridge driver (L298n), while the entire mobile robot control is implemented with Atmega 328 microcontroller, using an Arduino Uno board

[5] This research demonstrates control of robotic arm using NI myRIO. For implementation National instruments my RIO with wide variety of sensors, actuators and displays has been used. The robot used was virtual agent, usually electromechanical device that is guided by LABVIEW programming. This paper exhibits an automated framework that is capable for both grabbing and discharging micro objects with high precision, reliability and speed. The robot has possessed the capacity to pick the object and place it adequately with the use of NI myRIO

III. PROPOSED METHODOLOGY

One of the most actual problems in robotics today is the orientation of the mobile robot in space and its attainment of the specified coordinates, including direct response to the encountered obstacles and extreme conditions. Remote control robot task, the active human participation in the process, has been solved in general. However, fully autonomous robot control requires advanced algorithms search which continues to this day.

Purpose of this work is to achieve specified co-ordinates and develop algorithm in such way that even strikes to obstacles on the path it achieves specified co-ordinates. The effectiveness and efficiency of algorithm is analysed by using visual programming model called as LabView. Visualization of program code in form of functional blocks is an advantage of LabView. This simplifies understanding of a model and its subsequent development and scaling. Furthermore, LabView supports interaction with a plurality of sensors and measuring instruments.

In proposed system object used is mobile robot with two fixed wheels and one centrally oriented wheel. This robot is controlled by 2 electric motors, drives combined into single controlled system executive-enforcement mechanisms and computing devices. Here the controller sends control signal to LabView. To monitor the output that shows it follows algorithm. As robot starts it locates the co-ordinates as defined by algorithm and follows it to reach specified destination. when it strikes to an obstacle then with use of sensor it detects obstacle changes its path and creates new co-ordinates to follow same algorithm and reaches to specified final destination co-ordinates. output of this algorithm is analysed on LabView with help of graphs.

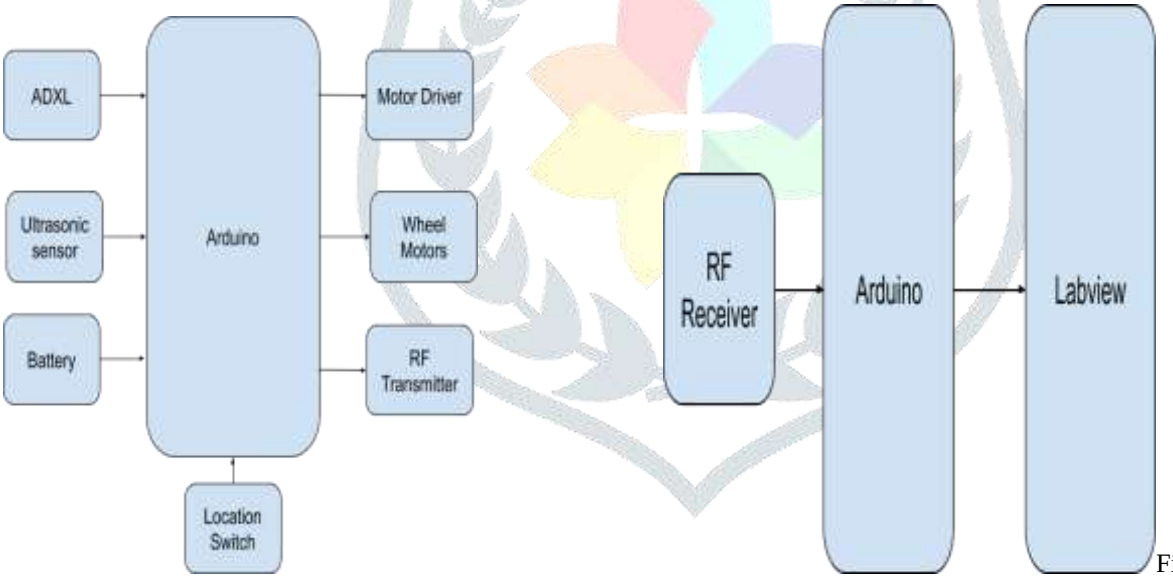

Fig. Robot side block diagram

Fig. LabView side block diagram

Block Diagram of Proposed System

IV.CONCLUSION

This model allows investigating the movement of the robot in the task of achieving the specified coordinates, with the ability to set the start and end coordinates, the control coefficients of the linear and angular velocities even if it strikes to obstacles, This model is able to avoid that obstacle and reaches to end co-ordinates specified earlier. This model can work efficiently in any uncertain conditions without human intervention. With this model trajectory can be tracked and can be analysed on LabView.

REFERENCES

[1] Shwetha Patil, Assistant Professor, Dept of ECE "Voice Controlled Robot Using LabView"

[2] Jair Cornejo, Jose Magallanes, Eddy Denegri, Student Member, IEEE "Trajectory Tracking Control of a Differential Wheeled Mobile Robot: A Polar Coordinates Control and LQR Comparison"

[3] Ahmine Yacine, Chourieb Fatima, Bencherif Aissa "Trajectory Tracking Control of a Wheeled Mobile Robot Using an ADALINE Neural Network"

[4] Adrian Ioan LITA, Rodica Mihaela TEODORESCU "LabVIEW Application Used for Remote Control of a Mobile Robot with XBee Communication International Conference – 8th Edition Electronics, Computers and Artificial Intelligence"

[5] Yogesh Angal, Anita Gade "LabVIEW Controlled Robot for Object Handling Using NI myRIO" 2016 IEEE International Conference on Advances in Electronics, Communication and Computer Technology

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