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MOVING ROBOTS – A SURVEY PAPER

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ABSTRACT
The Robot is the most effective technology in industrial applications where it is specially designed to be use in manufacturing industries for pick and place functions. This will reduces the human efforts in industrial operations like integral to many robotic applications, lifting heavy drums, heavy containers and put at proper place. The pick and place robot consists of a robotic vehicle and robotic arm placed on it. The pick and place arm with a soft catching grip to grab the objects with it. The robotic movements and pick and place functionality everything can be controlled by the Android application. A Bluetooth module will be connected to the robotic system for communicating between the android phone and robot. This pick and place function is most useful in the industries in abnormal conditions and unusual places where a human being can't enter, such as in high temperature and narrow areas. The microcontroller used in it receives the commands from the android phone through Bluetooth connected to it and controls the DC motor connected to the robotic wheels and as well moving arm.
Keywords: Android, Pick and Place, Wi-Fi.

I. INTRODUCTION

Moving robots are widely used in material handling applications in manufacturing applications. Typically moving robots need a repetitive motion. The evolution and improvement in the field of robotics and artificial intelligence made this scientific world automated. The robotics reduces the human efforts in the risky operations and for lifting heavy weights. For example in manufacturing process, to pick the items from the conveyer belt and place them for packaging.A robot is a reprogrammable, multifunctional manipulator designed to move the parts, items, and many special things based on a programmatically motion to perform different tasks. In industrial applications, there are some conditions where human can't be involve such as hazardous environmental conditions, in a repetitive task to be done many times and where accuracy should be maintained everytime in a single task. While implementing the robotic systems, the cost also will be a important concern based on the requirement.In the proposed system of robotic vehicle with moving robotic arms, the cost of the system will vary according to the size of the vehicle, arms and it's capability where we consider those arms based on the weights of the objects to be carried out with robotic vehicle. The manufacturing industries needs to carry heavy weights because of their products and materials are huge and robust; there we need the arms nearly in a size of heavy lifters. In our system, we are implementing a robotic manipulator which can hold a small items with it's arms and place them according to the given control command by the user.The most advanced and outstanding aspect in our robotic system is it's remote control withAndroid mobile. The remote control is a very important concern in robotic systems

implementation. According to the how much range we want to control the robot, we need to select an optimal solution for remote control technology. The reason behind choosing the Android mobile as a remote control is the increased usage of smart phones all over the world. The smart phones are making their significance everywhere in the world, they can be used for many purposes and now it's our turn, we are using an android smartphone as remote control for our robot.An android application would be installed in a mobile phone, which will have all the necessary control buttons for the robot movement and pic and place functionality. The mechanical arrangement of the robotic wheels consists of DC motors, which will be operated in required directions through a motor driver circuit connected from the microcontroller.In the robotic system, we used LPC2148 microcontroller because of it is having less power consumption, and having many anonymous features on chip such as ADC, Flash memory, DAC, SSP, etc. The microcontroller acts as a heart of the robot, all the controlling and processing of tasks can be done by the microcontroller. The tasks like getting the input from android phone, analyzing the commands and give the instructions about the robot movement according the received command from the android phone. The communication technology used between the robot and the android phone is Bluetooth, which is tends to be use in the our system because its presence in any mobile almost as well in any Smartphone. A Bluetooth module is to be connected to the robotic system. While comparing with the other wireless technologies like Wi-Fi or ZigBee, they may not be present in every Smartphone and they will be so expensive compared to the Bluetooth. Moreover the Bluetooth works based on unlicensed spectrum of frequencies

around 2.4GHz and is very useful in case of short distance communication.

In Bluetooth communication, there is an advantage of connecting the multiple slave (maximum upto 7) with a single slave. The operating range of a Bluetooth device will vary based on the antenna configuration, battery cinditions, signal propagation conditions, data sampling variation. In most of the Bluetooth devices, the communication range will be reduced due to signal attenuationdue to walls and other obstacles.

II. LITERATURE REVIEW

The research on robotics technology has done for implementing this system. The study goes on mechanical working principle of DC motors referred from K. S. Fu & R.C. Gonzalez & C.S.G. Lee, Robotics: Control, Sensing, Vision, and Intelligence (CAD/CAM, robotics, and computer vision). The study of working with DC motors includes the selection of a motor based on our requirement about the speed of the robot movement and weight to be carried and also power consumption. In our robotic system, the motors used are having high torque and low speed because of it needs to carry some more weight of moving arms with it.The study is next focused on the wireless communication technologies for remote control for the moving robot. The wireless communication technologies include GSM, GPRS, ZigBee, Bluetooth and Wi-Fi, etc. We went for a background research every technology and its limitations. Based on the communication range, complexity of data exchange, we are considering the Bluetooth as a remote control communication technology. Moreover, there we are implementing an Android appa for controlling the robot, so, we need a simpler

communication technology which must be available in mobile phone also.The next study is goes on the different sensors

networks. The robot is developing intended to be used in industrial applications, so that there might be a chance of occurring fire accidents sometimes, so by adding a fire detection sensor, we can also provide the rescue from fire accidents. The study of working with fire detection sensors went based on the requirement of intensity of the fire sensor to detect a flame from required distance.

III. SYSTEM ARCHITECTURE

The system architecture consists of the main parts included in our robotic system. The below given diagram shows the block diagram of the moving robot. The microcontroller in the system used is LPC2148 which is a 32 bit microcontroller having ARM 7 core in it. The LPC2148 is having total two IO ports and each having 32 pins. Among the 64 pins, 48 pins are usable as general purpose input/output operations. The microcontroller will do all thecontrolling operations of the robotic system such as wheels control, moving arms moving instructions, etc.The DC motors are connected with moving arms for open close of the arms and also moving up and down the arms. The DC motors require the voltage as same as other IO devices, but they need more current than other devices. So the current drawn from the Microcontroller port pin will not be sufficient for running the DC motor. Here we need to amplify the current from the microcontroller output. For that, we are using a driver IC L293D. It will drive the output current of the microcontroller to the required current level for the motor.Here is a fire detection sensor to identify incase of fire accidents occurred in the industrial areas.

Fig 2: Fire Sensor

The fire sensor works based on detecting the light intensity of the flame. The sensitivity can be varied manually.The Moving kit consists of the robotic arms to hold an object and also consists of DC motors for arms movement. The kit will have two motors. One is for controlling the arm movement up and down. Another motor is for tighten and loosen the picked object. Again these two motors have to drive their current input from the L293D. The moving kit will have a jaw teeth modeled arms to hold the object strongly. While moving the robot, we can simultaneously perform the moving functionality if needed.

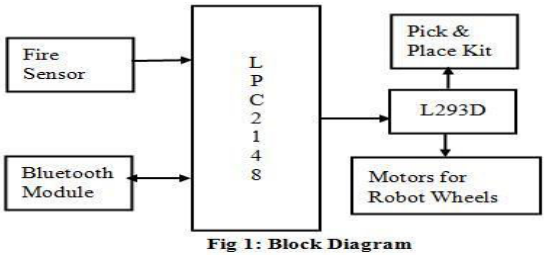

Fig 1: Block Diagram

Fig 3: Moving Kit

The Bluetooth module is the experimental form of the industrial Bluetooth standards. The module operates with 5v power supply. It is simple to use. The communication protocol for accessing data from Bluetooth module is RS 232. Initially it transmits the address of the device, then we will connect with our smart phone.

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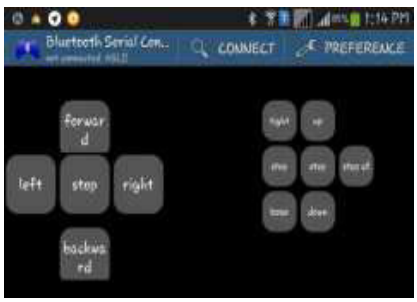
Fig 4: Bluetooth Module

IV. WORKING DESCRIPTION

The Moving robot working starts from getting the instruction from the android app installed in a smart phone. The android app consists of dedicated buttons to move the robot according to our requirement. As well, there will be buttons to control the moving functionality of arms. The below figure shows the android app how it look like.

Fig 6: Android App

Fig 5: Displaying The Robo In Stop Condition



The Bluetooth module is interfaced with microcontroller and connected to smart phone via Bluetooth. While pressing the corresponding button in the application, the app will send an ASCII command to the Bluetooth module, the controller will compare the received characters
and perform the corresponding functions on the robotic wheels and moving arms. For example, if the user pressed a forward button in the application, it will send an ascii character to the Bluetooth module, the microcontroller compares the received character in programming, if it is matched then it will give the corresponding logic voltage levels to the port pins.While robot moving or doing the moving functionality, if any fire is detected by the fire detection sensor, immediately it will rings a buzzer, the robot will stop moving further and the microcontroller will send the information to the user who operates the android phone.

V. RESULTS

The following pictures shows the experimental results of the Moving robot. The above experimental results shows the various conditions of the moving robot while it is getting commands from the android phone

VI. CONCLUSION

The moving robot with android application control will be a smart robotic implementation in the field of robotics. It will be very useful in industrial purposes. The android application interface added a smart finish to the moving robot. This robot is also an economic one where the featured phones in people hands are replacing by smart phones every where this days.

REFERENCES

[1] K. Yu and I. Oppermann, "UWB Positioning for WirelessEmbedded Networks," Proc. IEEE Radio and Wireless Conf.,pp. 459-462, Sept. 2004.

[2] N. Schmitz, J. Koch, M. Proetzsch, and K. Berns, "Fault-Tolerant3D Localization for Outdoor Vehicles," Proc. IEEE/RSJ Int'l Conf.Intelligent Robots and Systems, pp. 941-946, Oct. 2006.Brubaker MA, Geiger A and Urtasun R (2013) Lost! Leveragingthe crowd for probabilistic visual self-localization. In: *Conferenceon computer vision and pattern recognition (CVPR).*

[3] Geiger A, Lauer M and Urtasun R (2011a) A generative modelfor 3D urban scene understanding from movable platforms.In: *Conference on computer vision and pattern recognition(CVPR).*

[4] Geiger A, Wojek C and Urtasun R (2011b) Joint 3D estimation ofobjects and scene layout. In: *Conference on neural informationprocessing systems (NIPS).*

[5] Domonkos, M.T, S Heidger, D Brown, J.V Parker, C.W Gregg, K Slenes, W Hackenberger, Seongtae Kwon, E Loree,and T Tran. "Submicrosecond Pulsed Power Capacitors Based on Novel Ceramic Technologies." *PlasmaScience, IEEE Transactions on*, (2010): 2686-2693.

[6] Ho, J, T.R Jow, and S Boggs. "Historical Introduction to Capacitor Technology." *Electrical Insulation Magazin. IEEE*,26 (2010): 20-25.

[7] Kishi, Hiroshi, Youichi Mizuno, and HirokazuChazono. "Base-Metal Electrode-Multilayer Ceramic Capacitors: Past,Present and Future Perspectives." *The Japan Society of Applied Physics.* Vol. 42 (2003) pp. 1–15 .Part 1, No.1, January 2003.

[8] Pan, Ming-Jen, and C.A Randall. "A Brief Introduction to Ceramic Capacitors." *Electrical Insulation Magazine, IEEE*,26 (2010): 44-50.

[9] Raboch, Jiri, and Karel Hoffmann. "Parametric Equivalent Circuit of Single Layer Capacitor Mounted in MicrostripLine."*Proceedings of the 14th Conference on Microwave Techniques*. PAGE:1-3. 2008.

[10] Rogov I. I. , P. M. Pletnev and V. I. Rogov. "A method for rejecting unreliable ceramic capacitor blanks."