WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

Android Bluetooth Smartphone Controlled Robot with Pick and Place Arm

Miss. Bhavana B [a], Miss. Asfa shariya [b], Mr. Hasan [c], Mr. Mohd Akifuddin [d], Mr. Mohd Arbaz [e]

[a] *Professor, Guru Nanak Dev Engineering College, Bidar-585403, Karnataka, INDIA*
[b,c,d,e] *UG Student, Guru Nanak Dev Engineering College, Bidar-585403, Karnataka, INDIA*

A B S T R A C T

This article presents the design and implementation of an optimized Bluetooth-controlled robotic arm that can wirelessly select and place objects. Taking advantage of advances in high-speed technology and computer processing capabilities, the proposed system provides promising results for complex robot control systems. The system includes a Bluetooth modem for seamless wireless communication, a robotic arm with precision material handling mechanisms, DC motors for motion control, and a program that commands the microcontroller. Using Bluetooth technology, the system provides an easy and reliable wireless connection without the need for physical proximity. This feature allows remote operation of the robotic arm from a mobile device, making it simple and easy.

Keywords: Bluetooth-controlled robot arm, Wireless communication, Picking and placing, Android smartphone.

1. INTRODUCTION

This project is designed to create a robot arm that can work remotely over Bluetooth using an android phone and can select and place many objects. The emergence of new high-tech technologies and increased computing capabilities offer real opportunities for new robot control and new ways of using control methods. This technological advancement and the need for high-performance robots have created faster, more accurate and smarter robots that use new robot controllers, new drivers and advanced management systems. This project describes a new industrial robot control solution. The proposed robot arm control system can be used in different complex robotic applications. Bluetooth is a specification for radio frequency (RF) based short range communications that promises to change the face of computing and wireless communications. It is designed as an affordable wireless networking system for all classes of portable devices such as laptops, PDAs (Personal Digital Assistants) and mobile phones. It will also enable wireless connectivity for desktop computers by enabling wireless connectivity between monitors, printers, keyboards and CPUs. The modules included in the project; It is a Bluetooth modem that provides wireless communication, a robot arm that can pick up and place objects, a DC motor connected to the robot arm to move the robot, and a microcontroller that controls the robot. Select and place the handle of the object. The controller of the whole system is microcontroller, Bluetooth modem; The DC motor of the robot arm is connected with a motor driver. Each time the appropriate keys are pressed in the Android app, the data associated with the keys will be sent via Bluetooth. This information will be received by the robot arm's Bluetooth modem, which will feed this information to the controller. The microcontroller controls the data with an embedded program and performs the necessary operations on the robot arm. The microcontroller is programmed using the C programming language.

2. EMBEDDED SYSTEMS

An embedded system is a computer system designed to perform one or more specific tasks, often with time constraints. It is usually embedded as part of a complete device that includes hardware and mechanical components. In contrast, general-purpose computers such as personal computers (PCs) are designed to be flexible to meet a variety of consumer needs. Embedded systems control many of today's devices. The embedded system is controlled by one or more processing units, usually microcontrollers or digital signal processors (DSPs). But the main features are devoted to special tasks that require very powerful processors. For example, air traffic control systems can be considered technical equipment, although it includes hosts and regional and national coordination of airports and radar stations. (Each radar may contain one or more of its own embedded systems.) Because embedded systems are dedicated to specific tasks, designers can optimize them to reduce product size and costs and increase reliability and performance. Some combinations are mass produced and benefit from economies of scale. Physical embedded systems include from portable devices such as digital clocks and MP3 players to large fixed devices such as lighting, factory controllers or systems controlling nuclear power plants. Complexity ranges from as low as a microcontroller chip to very high with many units, peripherals, and networks in a large case or enclosure. In general, "embedded system" is not a strict definition because most systems have some element of scalability or programmability. Desktop computers, for example, share some common features with systems such as the processors and microprocessors that power them, but they allow different applications to be loaded and installed. In addition, even systems without programmability functionality often need to support software updates. From "general purpose" to "fixed", large applications will have components of

most elements, even if the entire system is "designed as one or a few special functions," hence the term "Embedded". 6) , flash memory (7) Embedded system programming is different from normal PC programming. Embedded system programming is in many ways similar to PC programming 15 years ago. System hardware is often chosen to keep things as cheap as possible. An extra dollar spent on streamlining a room can cost millions. Hiring an extra programmer for an extra month is comparatively cheap. This means programmers have to contend with slow and forgetful processors while still meeting the performance demands that most PC applications don't have. Below is a list of embedded domain-specific issues.

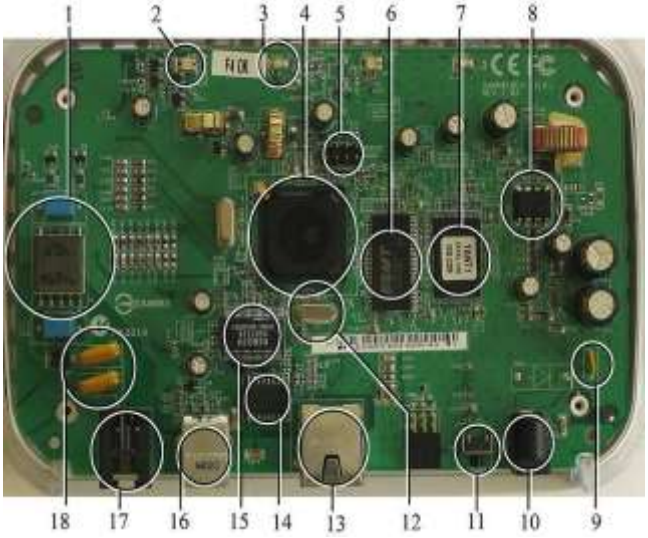

Fig. 1: A modern example of embedded system

2.1 Tools

Embedded development is only a small part of overall programming. Also, there are many graphics programs that differ from the PC world where 1 guide sets the rules and there are only 3 or 4 main guides. This means that the equipment is more expensive. It also means they are unique and cheaper. In a large embedded project you will sometimes almost always find some compiler errors. Debugging tools are another issue. Since you cannot always use the target program on the computer, you cannot run a debugger on it. This complicates the treatment. Special devices such as JTAG ports can partially solve this problem. However, permanent damage can occur if you stop at a breaking point while the system is controlling world equipment such as the engine. As a result, embedded systems builders quickly become adept at using IO channels and error message-style debugging.

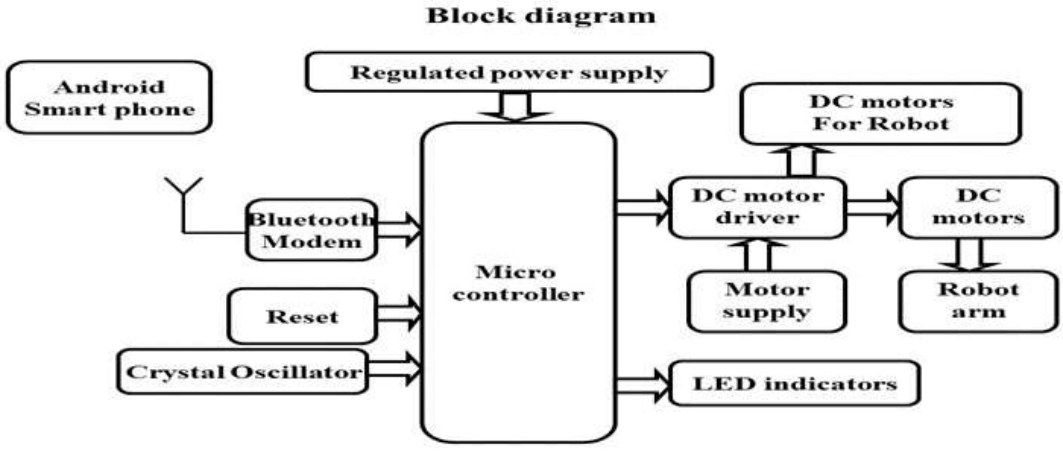

Fig. 4: Regulated Power Supply.

2.2 Resources

Embedded development is only a small part of overall programming. Also, there are many graphics programs that differ from the PC world where 1 guide sets the rules and there are only 3 or 4 main guides. This means that the equipment is more expensive. It also means they are unique and cheaper. In a large embedded project you will sometimes almost always find some compiler errors. Debugging tools are another issue. Since you cannot always use the target program on the computer, you cannot run a debugger on it. This complicates the treatment. Special devices such as JTAG ports can partially

solve this problem. However, permanent damage can occur if you stop at a breaking point while the system is controlling world equipment such as the engine. As a result, embedded systems builders quickly become adept at using IO channels and error message-style debugging.

2.3 Micro Controller

The environment we find ourselves in today in the field of microcontrollers started with the development of integrated circuits. This development made it possible to fit hundreds of thousands of transistors on a single chip. This is a prerequisite for the creation of microprocessors and the first Bluetooth,

memory, input and output lines, timers, etc. created by adding external devices. The increase in volume led to the formation of composites. These integrated systems include processors and peripherals. This is how the first chips with small chips, or what are known as microcontrollers, came about, as shown in Figure 3.

Fig. 3: Microcontrollers.

***2.4* Regulated Power Supply**

Electrical energy is a source of electricity. A device or system that supplies electricity or other power to the output or load bank is called a power supply unit or PSU. The term is often used for electronic products, less often for mechanical products, and rarely for others. The desired form and voltage usually associated with the conversion of AC line voltage to the well-controlled low direct current used by electrical appliances.

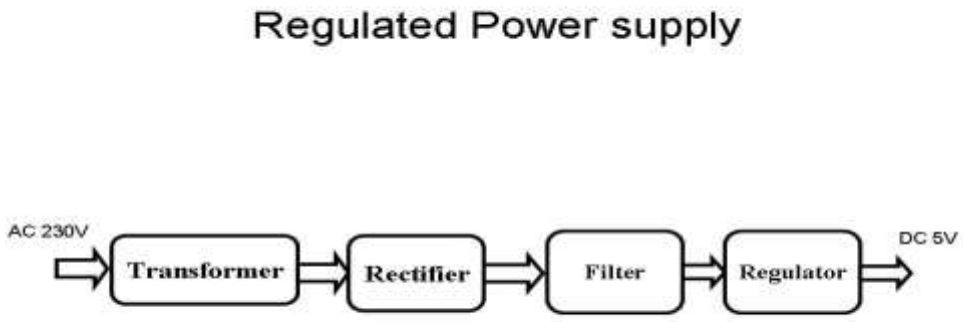

Fig. 4: Regulated Power Supply

3. BLUETOOTH MODULE

"Bluetooth," a short-range radio link technology designed to "connect" a variety of devices, including cell phones, PCs, and PDAs, and the smart decisions Motorola had to make to incorporate this new technology into its products. The aim is to provide advanced technology to the head of Motorola's communications business and to make employees efficient and tech savvy to directly integrate Bluetooth only into Motorola products. The first part of this article provides a detailed overview of Bluetooth technology and its Special Interest Groups (SIG), a group of companies dedicated to reducing Unknown emissions and thus enabling fast transmission of Bluetooth devices. It also discusses the advantages of Bluetooth over other wireless connections and highlights some of the threats that can affect Bluetooth transmission. The remainder of this article outlines the Bluetooth market potential (in both consumer and business applications) and reviews existing Bluetooth products from Motorola (batteries for cell phones and PCMCIA cards for computers, all equipped with a Bluetooth chip).Finally, the document provides guidance for Motorola's Bluetooth application development strategy for applications defined in the SIG specification, and considers applications that use existing assets and are critical to Bluetooth adoption, regardless of previous experience.

3.1 Serial Port Application Current status:

Motorola is not currently developing an application that allows a Bluetooth keyboard, mouse, or other device to be wirelessly connected to a computer.

Implications for Motorola's current business model/assets: These products are low-tech and low-margin. Motorola does not own the intellectual property or assets necessary to develop, market or distribute such products. Competitive environment: Motorola will face tough competition from established companies such as Microsoft and Logitech.

Proposition: Motorola will have to restructure factories that produce high-quality products to produce low-quality products. Motorola needs to cover the costs associated with moving up the learning curve in order to reach the same prices as its competitors. Also, it's almost always a good idea to avoid confrontation with Microsoft. Therefore, Motorola should not devote resources to developing serial port applications.

***3.2 Headset Current status*:**

Motorola is currently developing an application that will allow a mobile phone to use Bluetooth to connect to a wireless headset. Implications for Motorola's current business model/value-added products: These products are critical to competition in the cellular space. For all intents and purposes, a headset is a type of radio and Motorola offers development and distribution for such products.

Competitive Environment: Motorola will compete with traditional manufacturers such as Ericsson and Nokia because each manufacturer will want to provide a wireless headset to support their phone number.

Recommendation: Motorola should provide the necessary resources to get a good headset to market quickly. The app will also allow mobile users to experience the benefits of Bluetooth with clear results in familiar, easy-to-use products.

3.4 Dial-up Modem Network/Fax Current Status:

Motorola has not developed a standalone wireless modem/fax application that uses Bluetooth. Implications for Motorola's current business model/value added: Motorola has experience and added value in wireless technology and cable modem manufacturing. The playing field: With current performance levels in the 14.4 Kbps range, there is a small market for wireless modems with cables connecting computers (mostly) to modem-capable cells. Demand is expected to increase as wireless data grows in wireless modem devices and cellular infrastructure. Recommendation: Motorola should not invest in developing a standalone wireless modem device. They should focus more on the development of a mobile phone-based wireless modem with a Bluetooth interface. Motorola should increase its development expenditure as necessary (anticipated 1H 2002) to ensure that the mobile phone/modem is compatible with high-speed cellular data.

3.5. LAN Access Current Status:

Motorola is not currently working on a Bluetooth access point connection to the corporate intranet. Implications for Motorola's current business model/assets: While LAN access is similar to wireless modem functionality, there are some additional challenges with LAN access. Significant software development resources are needed, and Motorola has only just begun to invest in and grow software development resources. Also, Motorola has limited competition for connectivity products. Competitive environment: Competing standards such as Hyper LAN and IEEE802.11 already exist for WLAN access. This product/model allows data to be transferred at a faster and more efficient rate than Bluetooth. Recommendation: Motorola should not invest in the development of Bluetooth devices for this market due to lack of resources and experience.

3.6 DC Motor:

DC motor uses electricity to generate electric current, usually through the interaction of magnets and current-carrying objects. The reverse process of generating electricity from electricity is done by a generator, generator or generator. Many types of electric motors can work as generators and vice versa. The input of a DC motor is current/voltage and its output is torque (speed). The fixed part is also known as the stator. The figure shows a picture of a typical DC motor, the picture a picture of a DC armature, and the picture a picture of a typical stator. As can be seen from the picture, the armature is made of coils wound around a metal core with an extension shaft rotating on bearings. You should see that the end of each coil of the armature terminates at one end of the armature. The termination point is called the commutator and this is where the brushes make electrical contact to carry the current from the machine standstill to the rotation of the machine.

Fig. 5: DC Motor.

Operation: DC motors are used in many ways in modern industry, just like the simple DC motors described earlier in this section. Figures 12 to 14 show the circuit diagram of a simple DC motor. Note that the DC voltage is applied directly to the winding and the brush. Both the armature and the magnetic field are shown as coils. When voltage is applied to the motor, current starts flowing from the negative terminal of the field coil to the positive terminal. This causes a strong magnetic field in the field winding. Current also begins to flow from the brushes to the commutator section and then through the armature coils. The current continues from the coil back to the brush connected to the other end of the coil and back to DC power. The current flowing in the armature coils creates a strong magnetic field in the armature. The magnetic field in the armature and the field coil causes the armature to start rotating. This is caused by a magnetic field and a magnetic field. When the armature starts to rotate, the commutator section will start to move into the brushes. A commutator section becomes positive when it moves into a brush connected to positive voltage and negative when it moves into a brush connected to negative voltage. In this way, the commutator section continuously changes the polarity from positive to negative. Since the commutator part is connected to the end of the armature winding wire, it causes the magnetic field in the armature to change polarity from north to south. The commutator section and the brushes are arranged so that the pole change of the armature coincides with the armature field and the position of the field winding field. The change is the time for the armature to become non-magnetic with the field. Instead, the magnetic fields seem to build on each other and provide additional energy to keep the body spinning. When the motor is de-energized, the field in the armature and field windings will weaken rapidly and the speed of the armature shaft will begin to drop to zero. If voltage is supplied to the motor, the magnet will become stronger and the armature will start to rotate.

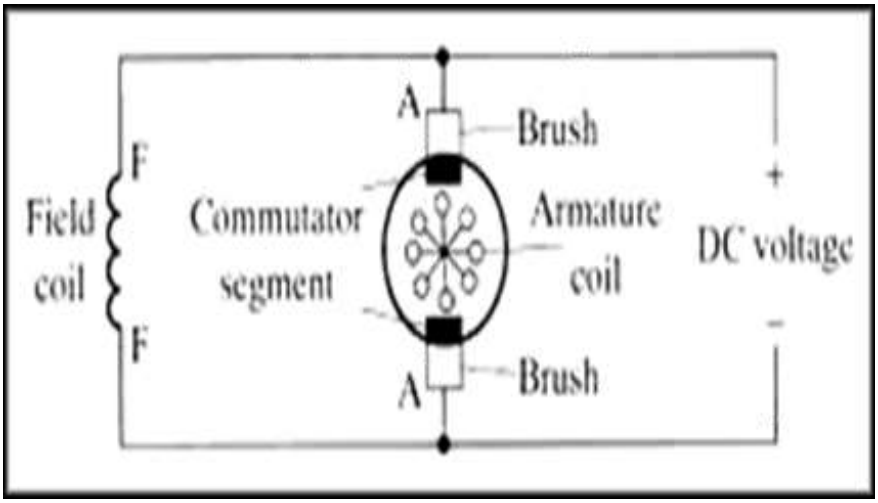

Fig. 6: Simple electrical diagram of DC motor.

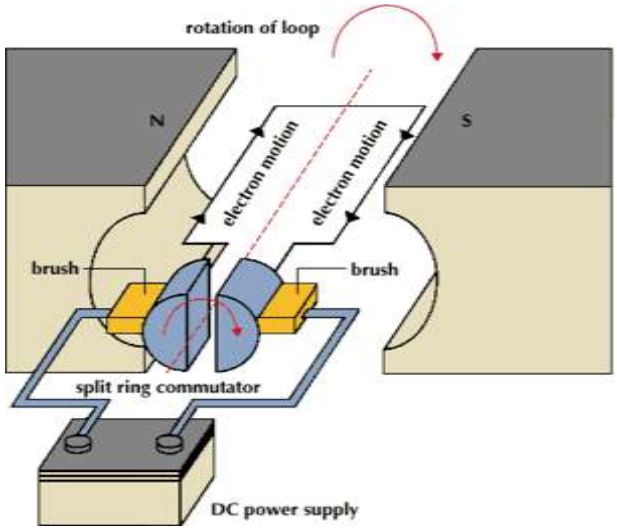

Fig. 7: Operation of a DC Motor.

Application of DC motors:

- Electric train: A type of DC motor called DC series motor is used in electric trains. DC series motors are capable of providing more power when the load is heavy. Therefore, the more people on the train, the stronger the train.
- Elevators: The best reversible motors are DC motors. They are used in elevators. Compound DC motors are used for this application.

- PC fans, CD ROM drives and hard drives: all require very small and very precise motors.AC motors never consider any demand in these areas.
- Starting a motor in a car: A car battery provides DC power, so DC motors are best for this. Also, you cannot start the motor with a small AC motor,
- University Electrical Laboratory.

4. RESULTS

The **"Logistics Robot"** project is designed for robots to work with Android phones. Control of the robot is done wirelessly on an Android smartphone using the Bluetooth feature. The robot has a robotic arm to pick up and place items.

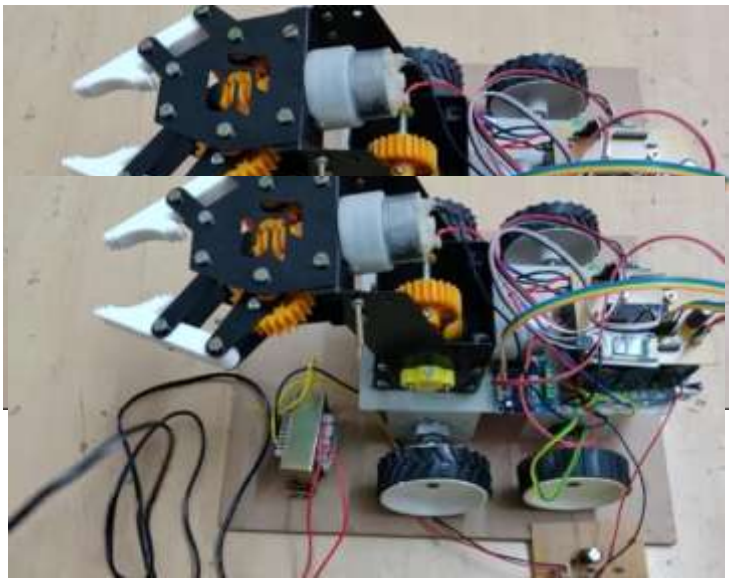

Fig. 8: Results

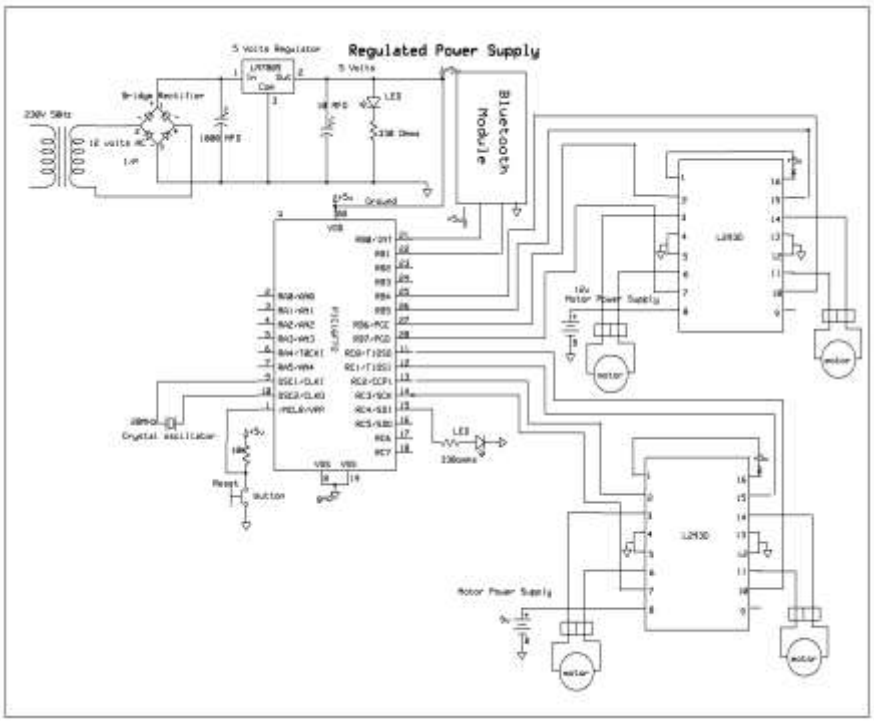

Fig. 9: Schematic diagram of Logistic Robot

5. CONCLUSION & FUTURE SCOPE

It improves the integration of all hardware devices. The existence of each module has been considered and carefully placed, thus leading to efficient operation of the unit. Secondly, with the development of technology, the use of advanced ICs, the project was successfully completed. Therefore, the project was successfully designed and tested. Our project "Pick and Place Robot Working with Bluetooth" aims to control the speed and direction of the robot with universal Bluetooth Each Bluetooth key has a unique ASCII value. Each function is assigned a unique key. The ASCII values of the keys are entered into the microcontroller via the serial port, and the microcontroller is connected to the DC motor through the driver (L293D), which controls the speed and direction of the contact iron.

6. REFERENCES

[1]R. C. Luo , K. L. Su,.A multi agent multi sensor based real-time sensory control system for intelligent security robot. IEEE International Conference on Robotics and Automation, vol. 2, 2003, pp.2394 .2399.

[2]Tan, Ming Chun (2005). Autonomous Robot Navigation using Radio Frequency. Bachelor Project. Thesis. Universiti Teknologi Malaysia, Skudai.

[3]Jennifer Bray, Charles F. Sturman (2002). “Bluetooth: connect withuot cables”, Upper Saddle river, New Jersey: Prentice-Hall PTR

[4]Robotentry,http://education.yahoo.com/reference/dictionary/entry/robot accessed on 7th April 2012 at 2.00p.m.

[5]D.L. Pieper. The kinematics of manipulators under computer control. PhD Thesis, Stanford University, Department of Mechanical Engineering, 1968.

[6]L.Feng, J.Borenstein, D. Wehe, A Completely Wireless Development System for Mobile Robots. ISRAM conferecence, Montpellier, France, May 27- 30, 1996, pp.571-576

[7]NeerparajRai,palzorgyatsobhutia,uditpradhan(2014.)“Remote learning: android operated educational robot armwith 6 dof” ,Universal journal of control and automation2(4),1-7.

8] Babul Salam Kader Ibrahim (2012) “Robotic ARM controlling used internet” International Symposium on Robotics and Intelligent Sensors (IRIS),364-370.

[9] Ritika Pahuja1, Narender Kumar(2012), “Android MobilePhone Controlled Bluetooth Robot Using 8051 Microcontroller” International Journal of ScientificEngineering and Research (IJSER),324-329.

[10] Van Delden, S.; Whigham, A.(2012) "A bluetooth-basedarchitecture for android communication with an articulated robot," Collaboration Technologies andSystems (CTS), 2012 International Conference on Robotics,8(8),104-108, 21