

Multi-Purpose Robot

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Abstract- Today computing is no longer restricted to laboratory experiments they have found their technique into our homes and being a physical entity itself. Several vogue ideas area unit explored and area unit conferred during a shot to maximise the user awareness of the robot's interaction with the atmosphere. Throughout this method the advanced observance of the home is finished. Typically often handling by the bluetooth controller package Apps which we have a tendency to area unit exploitation bluetooth module for the purposed of the interfacing of humanoid Mobile and system. Throughout this method uses device that's used to sight gas escape. we have a tendency to area unit ready to sight crook or unwanted one World Health Organization is enter in home once owner is not gift reception. at intervals the sense it's going to helps to watch the house and capture the image of unwanted activities happened in home once owner is not gift reception. The advantage of this system is that we have a tendency to area unit ready to monitor, pick-n-place object and in addition alert owner once gas escape detected via Sms.

In this system 2 fully completely different microcontroller area units used i.e. AVR microcontroller and 8051 microcontroller. the foremost purpose of AVR microcontroller is to interface with the device that the system can monitor gas escape, motion and if it's happened the system automatically send massage to owner vary therewith fault occur in home. The 8051 microcontroller is used for movement of system. this system is basically doing all operations of maid like improvement or the dirt improvement home furthermore as develop the material that gift at here and there and place it on the proper place, furthermore as a result of it keeps eyes on the house as at intervals the safety mode, like gas is detected or there is any crook at intervals the house.

this technique will look after the Bluetooth that functions at intervals the humanoid mobile, there is application accessible at intervals the mobile |which is ready to speak with system so can operate the operate user desires like forward, reverse, left, right, cleaning, grip, leave and stop.

Index Terms- PIR (PyroelectricInfra-Red Sensor), GSM equipment (Global System for Mobile Communications modem), Apps (Application), liquid show (Liquid crystal display), GSM (Global System for Mobile Communications), GPS (Global Position system), D.C motor (Direct current motor).

1. INTRODUCTION

1.1. History of robotics:

The word “Robot” is one in each of these volatile terms that have defied distinctive definition. One reason for typically often that its use changes all the time. Initially, a golem was a humanoid or human-like being. The word “Robot” was derived from the Czech import slave labor and was coined by Kapec in his play, Rossum’s Universal Robots in 1921. These robots were chemical science – what we’d presently call androids. This was followed presently once by type of films that has robots like Fritz Langes 1922

Metropolis that excited the imagination of every the overall public and additionally the science and engineering communities. Fantasy books like Asimov’s I Robot”, from where we've got an inclination to get the term AI, were together normal at now.



Fig. 1. Cleaning robot

Today, AI is also a chop-chop growing field, as technological advances continue; researching, designing, and building new robots serve various wise functions, whether or not or not domestically, commercially, or militarily. AI is also a key technology at intervals this time. many robots do jobs that unit unsafe to fogeys like termination bombs, mines and exploring shipwrecks. Robotics' is that the branch of technology, engineering science and study that deals with the look, construction, operation, and application of robots, nevertheless as laptop computer systems for his or her management, sensory feedback, and information method. AI is also made public as a result of the science or study of the technology primarily associated with the look, fabrication, theory, and application of robots. Whereas various fields contribute the arithmetic, the techniques, and additionally the weather, AI creates the magic outcome.

2. SYSTEM DESCRIPTION

2.1. Existing system

Literature survey is that the most significant step in package and hardware development tool. Before developing the tool it's necessary to see the time issue, economy. Once these items ar glad, then next step is to see that software and language are often used for developing the tool. Once the programmers begin building the tool the programmers want ton of external support. These supports are often obtained from senior programmers, from book or from websites. Before building the system the on top of thought are taken under consideration for developing the planned system.

Nirmal T M -“Multipurpose golem for Patients and Military Applications”, International Journal of physical science Communication and engineering (IJECCCT).

Farshid Amirabdollahian, Rieks op den Akker, Sandra Bedaf, Richard Bormann, Heather dealer, Vanessa Medgar Wiley Evers, Gert Gregorian calendar month Gelderblom, geographic area

Gutierrez Ruiz -“ Accompany: Acceptable AI Companions for Ageing Years -Multidimensional Aspects of Human-System Interactions”, Paladyn journal of activity AI, Virsita,2013. This project responds to some unnoted aspects of technology style, divided into multiple areas like empathetic and social human-robot interaction, golem learning and memory image, and observation persons' activities at Home. To bring these aspects along, a fanatical task is known to confirm technological integration of those multiple approaches on associate degree existing robotic platform, Care-O-Bot@3 within the context of a smart-home setting utilising a mess of detector arrays.

V. Prasanna balaji & Goutham, “A useful golem for military”, International journal on theoretical & applied **analysis** in mechanical engineering(IJTARME), 2013.The main purpose of this **golem** is **observation** . If any entrant is detected then combat .it is additionally utilized in bomb detection & parcel mounting. This project relies on face recognition technique.

Mr. M. Arun Kumar Mrs. M. Sharmila – “Wireless Multi Axis golem for Multi-Purpose Operations”, International Journal of Engineering Trends and Technology (IJETT), 2013. K. Kannan, Dr. J. Selvakumar, “Aurduino primarily based voice controller robot”, International analysis journal of engineering (IJTARME), 2015.The main purpose of this golem is load and unleash. This project relies on speech recognition technique. V. Nagamani, Shanti Swaroop Kampa, CH. Shreedhar, Siddarth. G, “Voice Activated Programmable Multi-Purpose Robot”, International journal of advanced analysis in laptop engineering & Technology (IJTARCET), 2013. This project relies on twin tone multi frequency technique.

2.2. System model and working

During our literature survey we have a tendency to encounter several journal papers during which AI operated with the assistance of remote controls. During this manuscript automaton through wireless communication system mistreatment Bluetooth controller Apps. It's a wireless controlled automaton here we have a tendency to area unit utilize the idea of GSM communication and this automaton is controlled by mistreatment mobile phones. One is operator mobile and bluetooth device is stacked on the automaton. The management of automaton Involves 3 Distinct Phases: Perception, process and

Action. Generally, the Preceptors area unit Sensors Mounted on the automaton, process is finished by the On-board Microcontroller or Processor, and also the Task is Performed mistreatment Motors. During this Project the automaton is connected to GSM mobile that is task is monitor the house in ideal mode.

With the assistance of Commands we will Move Our automaton in Desired Direction as Per Our needs. therefore we've got discerned concerning the bluetooth controller apps that is put in in automaton mobile initial connect bluetooth device that is place or mounted on automaton may be in company in system for dominant the movement of this automaton. once the command is received by the automaton it follows the command and perform task as per demand. once the user pushes movable keyboard buttons command is transmitted that is receiving by bluetooth module place on automaton. The device technologies are utilized in the fields like mill automation, area exploration, in places wherever human access is troublesome or risky. Because the movable permits U.S.A. to attach with the skin devices via mobile communication network despite time and area, the movable could be a appropriate device to manage domestic systems. The projected technique uses the bluetooth controller apps to send command once a keyboard button of the movable is ironed by the user i.e. stop, left, right, forward, reverse, leave, clean, stop, secure .

In the advanced market these robots area unit additional enforced mistreatment the new technologies like GSM, GPS and alphanumeric display displays. Mistreatment these GSM technologies will operate the automaton from the way distances and that we can establish the situation mistreatment GPS. Mistreatment Camera at the automaton and show display at the user section we will operate the device accurately and it provides live section. Gear wheels will give the correct movement all told areas. In our project we have a tendency to area unit mistreatment the popular 8051 microcontroller. The microcontroller is employed to manage the motors. It gets the signals from the PIR detectors and it drives the motors in step with the sensor inputs. In ideal mode live person will be detected by the blood heat radiation. The PIR detector are going to be designed like that it'll activate once it'll notice that a lot of temperature.

3. PRPOSED WORK MULTI-PURPOSE ROBOT SYSTEM

3.1. Detailed description of proposed work

Figure2 presents the diagram of the Multi-purpose golem victimization PIR. the most hardware parts square measure 8051 microcontroller, GSM modem, Bluetooth (HC-05), PIR sensor, LCD, ROBO motor, itinerant (android), LPG device (MQ6), camera and power provide. The most scope of project is to send commands from one mobile phone via bluetooth controller apps to be received by another bluetooth device that is mounted on the golem. The controller conjointly connected to the GSM module that sends data to owner if any motion is detected within the absence of owner GSM module sends message on needed mobile phone to alert owner. Conjointly connected camera will send the specified data within the kind of video that is definitely displayed on television.

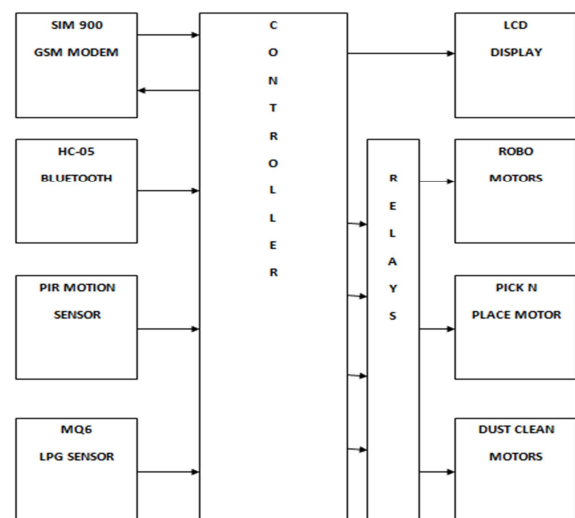


Fig. 2. Multi-Purpose robot

Here the golem is controlled through bluetooth technology and golem is autonomous supported moving wheels. Here the golem is provided with PIR device, GPS and cameras so as to send needed data to owner. On GSM controlled golem we've mounted a 12V battery because the power provide for the circuit and therefore the motors.

Now, your golem is prepared to control wirelessly victimization GSM facility once you connect bluetooth

controller apps with bluetooth module that is place on golem. By pressing the command keypads in your mobile phone, you may be able to move the golem in numerous directions. The 8051 microcontroller acts as process unit. The controller is principally interfaced to driver circuits to drive the motors connected to the golem. The controller conjointly connected to the GSM module, that sends data to owner personnel regarding the damaging state of affairs like gas outpouring reception and any motion is detected throughout ideal mode. Conjointly connected camera will send the specified data within the kind of video.

3.1.1 Power Supply

A tool or system that provides electricity to Associate in Nursing output load or cluster of masses is named as power provide unit. In our projected system +5V DC provide is needed for 8051 microcontroller Associate in Nursing +9V DC provide is needed for camera and as an input to 7805 regulator to induce +5V DC provide.

3.1.2 Mobile unit

This unit will receive the commands from the mobile if we have to operate this robot.

3.1.3 Microcontroller

The brain of the circuit is that the microcontroller. AT89C51 is associate 8-bit microcontroller and belongs to Atmel's 8051 family. ATMEL 89C51 has 4KB of Flash programmable and effaceable scan solely memory (PEROM) and 128 bytes of RAM. It may be erased and program to a most of one thousand times. In forty pin AT89C51, there square measure four ports selected as P1, P2, P3 and P0. of these ports square measure 8-bit bi-directional ports, i.e., they'll be used as each input and output ports. Except P0 that desires external pull-ups, remainder of the ports have internal pull-ups. once 1s square measure written to those port pins, they're force high by the inner pull-ups and might be used as inputs. These ports also are bit available then their bits may also be accessed severally.

3.1.4 PIR Sensor

Here we have a tendency to be exploitation PIR detector for notice human. The project is principally utilized in the PIR detector for motion detection. The infrared sensors are accustomed sense the live persons. All the higher than systems are controlled by the microcontroller. 2 DC motors are accustomed drive the mechanism.

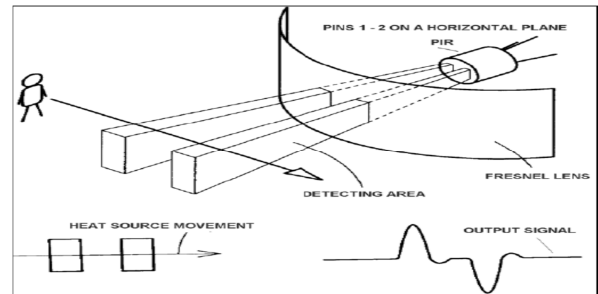


Fig. 3. PIR operating and signal

A body passing before of the component can activate initial one and so alternative as shown in figure three whereas other supply can have an effect on each component at the same time and be off. The PIR detector internally is split into 2 halves, one 0.5 is positive and also the different is taken into account as negative. Thus, one 0.5 generates one signal by police work the motion of a hot body and spouse generates another signal. The distinction between these 2 signals is generated as signal. Primarily, this detector consists of Fresnel lens that is divided to notice the actinic ray made by the motion of hot body over a large vary or specific space. If once the detector gets warm up, then the output remains low till it detects motion. If once it detects the motion, then the output goes high for a few of seconds and so returns to a standard state or low. This detector needs subsiding time, that is characteristically within the vary of ten to sixty seconds.

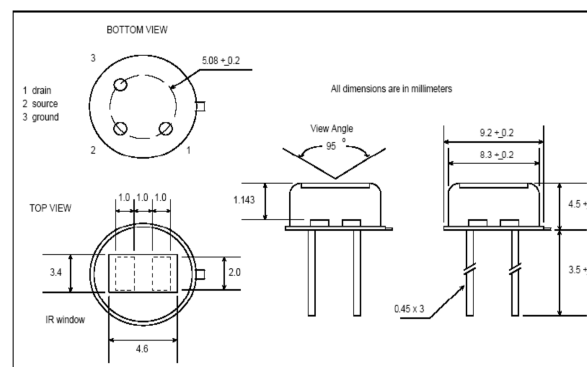


Fig. 4. Specification and dimension

The radiation supply ought to pass during a horizontal direction therefore the components are consecutive exposed to the IR supply. The detector conjointly includes an inherent infrared filter window. The detection vary while not a lens is concerning 3 feet

however are often extended to up to ninety feet or additional by inserting Associate in Nursing infrared Fresnel lens before of the detector. Associate in nursing infrared Fresnel lens with a focal distance of zero.65 in. is usually recommended for longest vary.

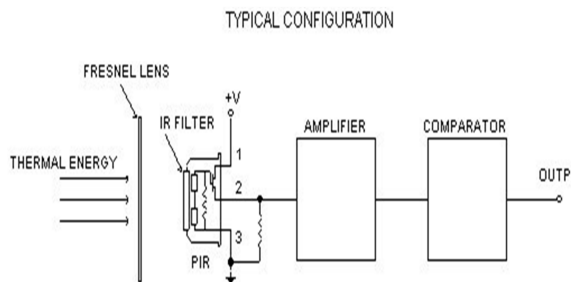


Fig. 5. Typical configuration

Fig-5 shows the pin configuration of the PIR detector. PIR detector consists of 3 pins, ground, signal, and power at the aspect or bottom. Generally, the PIR detector power is up to 5V, but, the massive size PIR modules operate a relay rather than direct output. This robots job is to notice the live person and indicates the signal to the helpers.

It's terribly straightforward and simple to interface the detector with a microcontroller. The output of the PIR is (usually digital output) either low or high. This mechanism is extremely useful in police work live persons underneath the buried and pillars etc., whenever there's any earthquake occurred and building collapse. At the time of those effects folks could fell down and buried underneath the bridges and underneath the pillars etc., in some cases we have a tendency to can't get into that cut contacts and that we can't facilitate them. In such cases to avoid wasting them straightaway we have a tendency to use this mechanism

3.1.5 GSM

GSM stands for world System for Mobile Communications. GSM Controlled Wireless golem is wireless golem that capable of receiving decision and performs the required actions. During this project GSM is that the necessary half to send alert once absence of owner reception. Operators will simply obtaining message once motion is detected in absence of him/her.

3.1.6 DC motor

Output of controller is given to the dc motor driver. During this project we have a tendency to are victimization dc motor for the movement of automaton. Following controls are often disbursed victimization the dc motor by constellation. During this automotive we have a tendency to use 2 12V dc motors

for his or her motion. These motors are fastened with back wheels every with one. Front wheel is unengaged to rotate. A motor is employed for driving the automaton i.e., whenever the signals are given by the user the automaton moves forward, backward, right, left ,pick up with the assistance of the motor.

3.1.7 Camera

Here the automaton is provided with PIR detector. Main operate of camera is to watch home and if motion is detected within the absence of owner then send needed info within the variety of message send to mobile no that is enclose program.

3.1.8 LPG gas sensor

This is a simple-to-use liquefied fossil fuel gas (LPG) device, appropriate for sensing LPG (composed of largely fuel and butane) concentrations within the air. The MQ-6 will observe gas concentrations anyplace from two hundred to 10000ppm.

This device encompasses a high sensitivity and quick time interval. The sensor's output is associate analog resistance. The drive circuit is extremely simple; all you wish to try and do is power the heater coil with 5V, add a load resistance, associated connect the output to an ADC.

This device comes in a very package kind of like our MQ-3 alcohol device, and might be used with the break board.

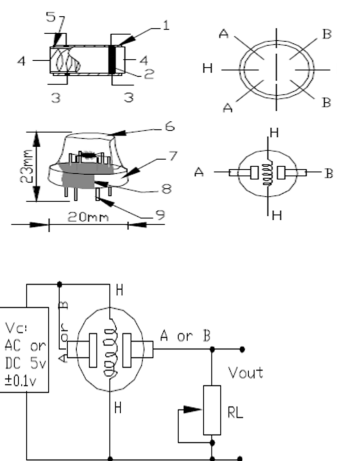


Fig. 6. Typical Structure and configuration of MQ-6

Structure and configuration of MQ-6 gas device is shown as Fig.6 (Configuration A or B), device composed by small AL₂O₃ ceramic tube, Tin oxide

(SnO₂) sensitive layer, activity conductor and heater square measure mounted into a crust created by plastic and stainless-steel web. The heater provides necessary work conditions for work of sensitive elements. The engulfed MQ-6 has half-dozen pin, four of them square measure accustomed fetch signals, and different a pair of square measure used for providing heating current.

3.1.9 Robo motor

There are unit three varieties of d.c motors area unit accustomed perform three wholly completely different task specifically as moving mechanism (D.C 10 revolutions per minute motor), cleanup floor and pick-n-place object. For these purpose wholly completely different revolutions per minute motors area unit used like thirty revolutions per minute, 10 revolutions per minute and cardinal revolutions per minute. 10 revolutions per minute motor is used to perform task. Thirty revolutions per minute motor is used to perform task. Cardinal revolutions per minute motor are used to perform task. Motor details area unit discussing bellow.

30 revolutions per minute side Shaft 37mm Diameter Compact DC Gear Motor is suitable for little robots/ automation systems. it's sturdy construction with gear box designed to handle stall force created by the motor. Drive shaft is supported from either aspect with metal bushes. Motor runs smoothly from 4V to 12V and offers thirty revolutions per minute at 12V. Motor has 6mm diameter, 22mm length drive shaft with D kind for superb coupling. This motor area unit bit howling whereas running. For long life, this motor is not prompt for application requiring dynamic force of quite 3 kg-cm.



Fig. 7. 12v D.C motor (30 rpm)

10RPM 12V DC geared motors is used for wheels of mechanism. Really easy to use and out there in commonplace size. Nut and threads on shaft simply connect and internal rib shaft for simply connecting it to wheel.

Johnson geared DC motor may well be a really high force motor that need to be accustomed build large robots or robotised platform. Gear box is constructed to handle the stall force made by the motor. Shaft includes a metal bushing for wear reissuance.



Fig. 8. 12v D.C motor (1000 rpm)

3.2. Overview of the technology used

Proteus ISIS is that the best simulation computer code within the world for numerous styles with natural philosophy & microcontroller. It's in the main standard thanks to handiness of virtually all microcontrollers in it. Thus it's a handy tool to check programs and embedded styles for natural philosophy amateur & knowledgeable. You'll be able to simulate your programming of microcontroller in Proteus eight Simulation computer code. When simulating your circuit mistreatment Proteus computer code you'll be able to directly create PCB style with it thus it might be a dead one package for college students and hobbyists.

3.2.1 Algorithm

- Start
- Initialize serial communication
- Check interface if serial port=Get f then Move Robo forward.
- Check interface if serial port=Get r then Move Robo reverse.
- Check interface if serial port=Get L then Robo Left.
- Check interface if serial port=Get R then Robo Right.
- Check interface if serial port=Get s then Robo Stop.
- Check interface if serial port=Get c then Robo cleanup mode on.
- Check interface if serial port=Get C then Camera mode on.

3.2.2 Performance Analysis

Firstly system is connected with golem phone via bluetooth .The golem phone is connected to the system with the assistance of bluetooth controller apps. With the assistance of this app we tend to directly access system and system. These systems essentially monitor the house absence of owner reception. If any unwanted activity is happened or any unwanted person is detected in home then it sends seasoner to the quantity that is put in program i.e. on homeowners phone with the assistance of sim 900 GSM module the below the seasoner that is showed on system display is shown in fig. 9.



Fig. 9. Massage displayed on system

The mechanism will do these basic tasks

- Move forward
- Move back
- Turn right
- Turn left
- Stop (stops doing the present job)
- Grip
- Secure
- Clean
- Leave

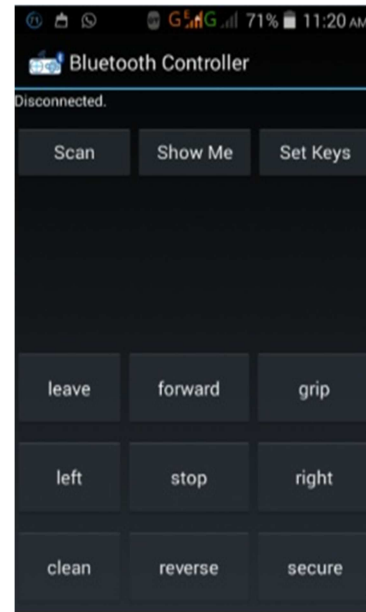


Fig. 10. Screen wanting bluetooth controller apps

The screen shot of bluetooth controller apps shown in figure eleven. Once we press any key on golem phone it's send to the system with the assistance of this apps and also the system can receive command with the assistance of bluetooth module place on system. Once clean secret is press the comb can rotate and clean the ground.

4. HARDWARE IMPLEMENTATION:

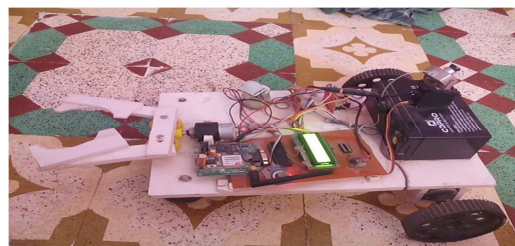


Fig. 11. Multi-Purpose Robot

5. CONCLUSIONS

The main aim of this paper is to explaining the observance methodology accustomed operate the golem, with the assistance of robot phone we will monitor, clean and decide and place object. The circuit was assembled on the PCB. Check once switched on system the message showed on alphanumeric display or not. When change on system check camera is turned 360° or not. If the system is correctly operating then within the absence of owner it'll properly work. The ability offer the PIR module was checked for detection of human. The GPS receiver details were checked. Finally microcontroller takes a call and provides command to motor driver so as to drive the motor in several directions.

In the future scope operating range area is increase as per the requirement of user. Efficiency improves with less time to access system. And two more features added in system for better utilization of system i.e. momentum with linear and circular .with the help of this added feature the house monitoring is improved efficiently.

Acknowledgments

I would like to specific my deep sense of appreciation & profound feeling to Principal of SPW COE Aurangabad, Prof. A. B. Diggikar my guide and Head of Department and P. R. Thorat principal of physics & Telecommunication of SPW COE Aurangabad for uplifting & in flinching steering throughout the course of investigation. This work is Associate in Nursing outcome of their constant encouragement, nice interest parental care & support while not that the work wouldn't have taken place.

REFERENCES

- [1] Nirmal T. M.(2014) :Multipurpose Robot for Patients and Military Applications.
- [2] V. Nagamani; Shanti Swaroop Kampa; CH. Shreedhar; Siddarth. G(2013): Voice Activated Programmable Multi-Purpose Robot.
- [3] Farshid Amirabdollahian; Rieks op den Akker, Sandra Bedaf, Richard Bormann; Heather Draper, Vanessa Evers; Gert Jan Gelderblom; Carolina Gutierrez Ruiz(2013) : Accompany Acceptable robotics Companions for Ageing Years -Multidimensional Aspects of Human-System Interactions.
- [4] Mr.M.Arun Kumar; Mrs.M.Sharmila(2013) :Wireless Multi Axis ROBOT for Multi-Purpose Operations
- [5] Farshid Amirabdollahian; Rieks op den Akker, Sandra Bedaf(2013): Assistive technology design and development for acceptable robotics companions for ageing years
- [6] V.Prasanna balaji ;Goutham(2013): A multipurpose robot for military .
- [7] K. Kannan; Dr. J. Selvakumar(2015): Aurduino based voice controller robot.