

MILITARY ROBOT WITH VISION

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ABSTRACT

Autonomous contrivances such as Military Robots are being included in the Military application. There are many perilous jobs but Military is the one. Many of the tasks that soldiers do that differ from others. For example walking throughout minefields, deactivating unexploded bombs or clearing out hostile buildings. But a thoroughly autonomous robot which can perform varieties of tasks is still under development. Consequently, researchers all over the world work towards the design and development of such robots, to simplify our works in sundry fields. The initial step towards the perfect autonomy of a robot is the design and the development of obstruction avoidance and path planning.

Key Words: Bluetooth, Camera, Robots, Mine Detector, Defence surveillance.

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I. INTRODUCTION

After the many attacks of the terrorist like 26/11 attack Taj Hotel in Mumbai. All countries commenced fixating on how to manage the attacks of terrorism and how to amend the security to a nation. As a result, some nations commenced utilizing of robots in the defence field. The most difficult task for spies is tracking of enemies at far areas. It has a possibility of loss of life in the war. So our conception is to replace the human soldiers with the Military robots. Hence, today is the era of revolution in the field of robotics. As this project is wireless controlled monitoring robot with video support that plenary controlled with the wireless network this will reduce the problem of changing of human army. An object is detected by the project that is located at some distance within the range of a wireless camera. This conveyance is equipped with a metal detector can detect any land mine proceeding and a wireless camera which will transmit the live pictures and videos remotely. In survey area, the metal detector sensor of robots detects the mines. The robotic arm will utilize to pick and place the bombs and mines. It has advanced facility relish to abstract obstacles from the path. It having many sensors like fire sensor, which will detect the fire on the way and it has a pump motor which commences sprinkling water to extinguish the fire. When this intensity will fall below a certain

value, it will automatically make the IR lights on to make the camera night vision. It is additionally having some weapons which will avail it to fight in the survey area, like a cutter and the laser light. One more powerful tool is GSM module. This unit is subsidiary and subsidiary for surveillance of an area inference grounds for the enemy, spying purport where the human reach is not possible. The unit is minute handy portable and can reach places facilely.

II. PROPOSED METHODOLOGY

Our system consists of a remote MOBILE and a robot. The robot is controlled by a utilizer sitting at the remote MOBILE, over the BLUETOOTH. The robot consists of a Bluetooth an ARM 7 microcontroller to manage the robot's kineticism, and the requisite hardware (motors, chassis, power supply, etc.). The utilizer controls the robot by transmitmanage signals by the Android keenly intellectual-phone. The smartphone then forwards these signals to the ARM7 Microcontroller, which then moves the robot in the required direction. The camera on the robot is utilized to send video feedback to the remote utilizer simultaneously over the cyber world. This enables the utilizer to navigate the robot remotely. Supplemental processing can be performed on the video aliment on the remote computer. The android application consists of

kineticism buttons when IR sensor is detected the robot will stop at that place.

The metal sensor is utilized to detect the landmines. When a land mine is detected the controller will acquire the GPS coordinates the send by GSM module.

The gas sensor is utilized to detect the gasses in astrigent areas. If any gas is detected the buzzer will get triggered and GPS location will be sent. There are four motors in the robot, first two are for mobility of the robot and other two are for the robotic arm. In the case of selection of any object, we can remotely control the robotic arm.

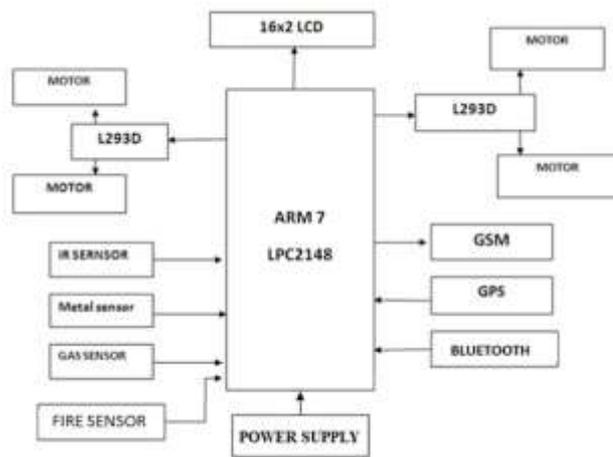


Figure1. Block Diagram of MILITARY ROBOT

III.HARDWARE DESCRIPTION

LPC2148:

16/32-bit ARM7TDMI microcontroller in a minuscule LQFP64 package. LPC2148 has 8 kB- 40kB of on-chip static RAM & 32 kB - 512 kB of on-chip flash memory.128-bit wide interface/expeditor enables high-speed 60 MHz operations. Embedded ICET and Embedded Trace interfaces offer authentic-time debugging with the on-chip Authentic Monitor software and high-speed tracing of injunctive authorization execution. Two channels 32 bit timer/external event counter. Low power real time clock with independent power and 32 kHz clock input.

ROBOTIC ARM:

A robotic arm of 3 DOF (degree of freedom) is utilized, which is rudimentary used to abstract the obstacles in the way and withal to place the bombs etc.

FIRE DETECTION:

Fire detector sensor makes the consumption of a thermistor (heat sensitive resistors), so the output is engendered when the fire is detect in the region. The Fire sensor is used as a simple and compact device for protection against fire. The module makes use of IR sensor and comparator to detect fire up to a range of 1 - 2 meters depending on fire density.

IR SENSORS:

The sensor used is the TSOP1738. It only senses the signal of frequency 38 kHz. This sensor is utilized to eschew the response of signals from other sources. The 38 kHz signal is only utilized by TSOP1738, it can be horizontally mounted. It senses the reflected IR rays from 38 kHz IR source to detect any impediment proceeding.

Gas Sensor:

They are utilized as a part of gas distinguishing hardware for carbon monoxide(CO) in family and industry or auto.

METAL DETECTOR:

These are utilizable for finding metal enclosure hidden within the object or metal substanceshidden underground. Metal detector is utilized here as a bomb detector. The inductively coupled coil is utilized to ascertain the metal present inside the ground. It absorbs the magnetic field emerges from the metal and gives the acknowledgment to the control unit. The metal detector consists of an oscillator inducing an alternating current that passes during a coil inducing an alternating magnetic field. If the current carrying metal is proximate to it, eddy currents will be induced in the metal and this engenders a magnetic field. The magnetometer is utilized to quantify the magnetic field, the transmutation in the magnetic field denotes the metal present inside the surface.

LIGHT DEPENDENT RESISTOR (LDR):

Light dependent resistor is very subsidiary specifically in light or dark sensor. Usually the resistance of LDR is very high (1000000 ohms) but when they are under light its resistance drops extensively. We are utilizing 10 X LDR sensors in this project. It principle behind its working is, when it's dark, the LDR having very high resistance. Due to high resistance, the voltage across the base of the transistor is not adequate enough to turn on the transistor so the current path from collector to emitter is blocked. When LDR is illuminated, the transistor is turned on sanctioning the current path from collector to emitter.

DC MOTOR:

DC motor is utilized for kineticism and locomotion purport of the rover. It has high revolution per minute and low torque. In general, robotics requires low revolution per minute and high torque. Hence gearbox is utilized to achieve this configuration, which reduces the rpm and increases the torque. The principle of DC motor is predicated on electromagnetism which states the magnetic field is engendered by a current carrying conductor and when it is placed in an external field, it understanding a force comparative to the current in the conductor. The haste of the motor can be controlled by transmuting the voltage applied to the armature or by transmuting the field current.

MOTOR DRIVER:

L293D is a massive integrated high voltage & high current 4 channel driver considered to accept TTL logic

levels and drive switching power transistors. L293D is a made up of a 16 lead plastic package which has 4 center pins connected jointly and utilized for heat reducing. It is designed to organize 2 DC motors. It requires separate power supply because it operates at high current and low voltage hence the operation of the whole circuit is defence from it by utilizing separate battery supply. There are 2 Input & Output pins for each motor. This contrivance is more congruous for switching application at frequencies up to 5 kHz. It has two H-bridge hence it drives two motors.

GSM:

Global System for Mobile Communications (GSM) is the most fashionable mobile phone system in the world. GSM uses Time Division Multiplexing & Frequency Division Multiplexing. FDMA divide the frequency range for GSM, which are 890-915, 935-960. Every one is divided into 200 kHz wide channels. As far as TDMA goes, each time window is 577 microseconds long, 8-time slices is a frame, lasting for a grand total of 4.615ms. Multi-frame include 51 frames, 51 multi frames combines a one Super frame & 2048 Super frames combines one Hyper frame which include 2715648 frames.

GPS:

Global Positioning System (GPS) satellites transmit signals from space that GPS receivers, utilize to provide the three-dimensional positions (latitude, longitude, and altitude). GPS receivers provide reliable situating, navigation accommodations to global users on a perpetual substratum in all climate, day & night, wherever on or close to the Earth. GPS receiver can access GPS signals from 65 channels of satellites and output position data with high precision in astronomically challenging surroundings and under low signal conditions due to its in process antenna and high-sensitivity. The GPS receiver's -160dBm tracking sensitivity sanctions perpetual position coverage in proximately all application environments. The output is serial data of 9600 baud rate.

BLUETOOTH:

HC-05 unit is too easy to utilize Bluetooth SPP (Serial Port Protocol) unit, intended for transparent wireless serial connection system.

Serial port Bluetooth unit is plenary trained Bluetooth V2.0+EDR (Enhanced Data Rate) 3Mbps Modulation with consummate 2.4GHz radio transceiver and baseband. It utilizes CSR Bluecore 04 external single chip Bluetooth system with CMOS machinery and with AFH (Adaptive Frequency Hopping Feature). It has the path as diminutive as 12.7mmx27mm.

WIRELESS CAMERA:

A camera is a contrivance that records images, either as a still photograph or as videos. This is utilized in the robot

to take the video surveillance of the area. And it is transmitted utilizing a carrier signal. On the receiving end, it is transformed to the video signal. It has a range of 70100fts with no line of visual perception.

LCD:

LCD (Liquid Crystal Display) screen is an electronic display module which is used in wide range of applications. A 16x2 LCD display is a very fundamental module and is very commonly utilized in sundry contrivances and circuits. These modules are approved over seven segments and additional multi-segment LEDs. The reasons being: LCDs are economical; facilely programmable; have no inhibition of displaying special & even custom characters (unlike in seven segments), animations and so on.

A 16x2 LCD denotes it can exhibit that each line having 16 characters and it having 2 such lines. In LCD 5x7 pixel matrix used for display LCD character. Command and Data are 2 registers in LCD.

The command register used for storing the command ordiant dictations given to the LCD. The data register stores the data to be exhibited on the LCD. The data is the ASCII value of the character to be exhibited on the LCD.

IV. SOFTWARE DESCRIPTION

μ VISION FOR LPC2148: Kiel software is utilized for the software execution of the developed system. With avail of it, we can induce embedded application for the multitude of 8051 and 251 derivatives. μ vision4 Integrated Development Environment is an IDE that makes facility, editor, and dominant debugger. It is utilized for compile the programs. In this project, coding is written of all switching unit, modules, sensors which are interfaced with the LPC2148 microcontroller. As per the embedded in the controller, the interfaced modules and sensors induce an proper output at the receiving terminal.

PROTEUS 7.0 FOR CIRCUIT SIMULATION: Proteus 7.0 is a virtual system modeling that cumulates circuit simulation, animation components, and microcontroller model to create the consummate microcontroller predicated designs. In this project, virtual simulation circuit is designed with avail of Proteus for testing.

V. RESULTS

In this project, we have work on a robotic system which is operated utilizing the Bluetooth. A software code embedded into microcontroller controls the working of sundry sensors and weapons embedded on the robot. GSM works by making a GSM phone call to the mobile phone annexed to the robot. The robotic arm is prosperously embedded on the robot for pick and place operation in the surveillance area. Fire sensor is used to senses the fire and makes a robot to stop. IR sensors

affixed find the path by detecting obstacles. Metal sensors detect bombs and mines.



Figure 2. MILITARY ROBOT WITH VISION

VI. CONCLUSION

A defence surveillance autonomous robot was designed in the project. We can program the robot such that it can detect objects and reach them on its own. Thus, we can create it completely autonomous. Also, with the occurrence of GPS navigation and mapping software, the robot has the capability of finding the best route possible to reach a certain location. Also, by making it powerful and giving it extra protection, we can create it an all-terrain robot, which would make it ideal for a surveillance robot. There is also the option of adding sound processing to the remote computer, thus giving it greater surveillance capabilities. The possibilities are endless. This robot in its present state provides a platform for further research into improving its capabilities.

Other areas of applications includes

- A. Space Exploration
- B. In hospitals to maintain Sterile Environment
- C. Industrial Automated Equipment Carriers.

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