Bluetooth Technology Based Wireless War Field Robot with Night Vision Camera

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Abstract: Robots are playing a vital role in today's industrial automation and monitoring system. As technology developed these robots have increased their applications and functionality. Working robots will cooperate to the people makes the work more Effortless and uncomplicated. The main objective behind developing this robot is for the surveillance of human activities in the war field or border regions in order to reduce infiltrations from the enemy side. The robot consists of night vision wireless camera which can transmit videos of the war field in order to prevent any damage and loss to human life. Military people have a huge risk on their lives while entering an unknown territory. The robot will serve as an appropriate machine for the defense sector to reduce the loss of human life and will also prevent illegal activities. It will help all the military people and armed forces to know the condition of the territory before entering it.

Keywords: Arduino Controller, Bluetooth Device, DC Motor, Wireless Night Vision Camera, Laser Gun, Proximity Sensor.

I.Introduction

In today's age robotic has the fundamental key for new invention. The development of human-machine communications on an everyday basis has made the people to utilize the technology. Instead of giving rational methodology physical methods have been welcomed by everyone. Coding to some 100's of pages requires more instance, capital and power so to overcome that gesture recognition is enhanced. Using gesture recognition coding can be easily made by everyone. For gesture recognition many active devices such as a ―trackball, remote, joystick. Some of the devices are used for giving motion recognizer but gesture recognition has the foremost utility. So gesture recognizer like accelerometers with 3- axes is extensively used. Gesture can be captured by wearing gloves or having wrist band attached with the MEMS whereas using vision system and data glove is very expensive hence not utilized. To have a balance of precision data collection, ―Micro Inertial Measurement Unit‖ is developed for recognizing the gestures in 3 dimensional axis x, y, z.

Robotics is the branch of mechanical engineering, electrical engineering and computer science that deals with the design, construction, operation and application of robotics, as well as computer systems for their control, sensory feedback and information processing. The aim of developing a high-tech technology serves the purpose of achieving high speed technology, advanced capacity to control the robots and to device new methods of control theory. The realization of above standards some technical improvement along with the need of high performance robot is required to create a faster, reliable, accurate and more intelligent robot which can be devised by advanced control algorithm, robot control devices and new drivers.

II.Robot Design Principle

A robot is a virtual or mechanical artificial agent in practice, it is usually an electro-mechanical machine which is guided by computer or electronic programming, and is thus able to do tasks on its own. Another common characteristic is that by its appearance movements, a robot often conveys a sense that it has intent or agency of its own. The Robotic Industries Association defines robot as follows: "A robot is a reprogrammable, multifunctional manipulator designed to move material, parts, tools or specialized devices through variable programmed motions for the performance of a variety of tasks." The main aim of this project is to control the robot with wireless technology. For this purpose we designed two separate boards .One is transmitter and another is receiver which is placed on the robot. Here we are using RF technology (wireless communication). In the transmitter, if we press the buttons according to that some predefined data will be transferred through RF communication and the receiver will receive the data. According to the command, the robot will do the specific task i.e. Forward, Backward, Left and Right. And through the wireless camera, the receiver receives that information. After receiving the command robot will stop. After that the robot will move in the same direction in which previously the robot is moving. For this purpose we designed programs in embedded C .In order to fulfill this application there are few steps that has been performed i.e. 1) Designing the power supply for the entire circuitry. 2) Selection of microcontroller that suits our application. 3) Selection of Robot. 4) Selection of DRIVER IC. 5) Selection of wireless camera.

III.Proposed Work

Security is primary concern for every country. This Project describes a design of effective automated system for Detecting, Tracking by Wireless Operated Robotic Gun.

Projects main idea is to develop a robot which will provide security for war field & military purpose. In practical scenario there are many situations where human beings cannot deal with such problems like bomb detections etc. in this cases there is a need to

use robot. It's very safe and less risk. This project works on a concept where robot is controlled using radio frequency which will work on gesture application. Our project is based on wireless operation with night vision camera. In this, camera is connected to tank which will track the locations of the surrounding area. Information captured by camera can be seen in TV and robot is captured remotely.

At the transmitting end using push buttons, commands are sent to the receiver to control the movement of the robot either to move forward, backward and left or right etc. At the receiving end two motors are interfaced to the microcontroller where they are used for the movement of the vehicle. Further the project can be enhanced using DTMF technology. Using this technology we can control the robotic vehicle by using cell phone. This technology has an advantage over long communication range as compared to RF technology.

The entire control of the robot is done remotely. It consists of a transmitter section which transmits the required information to the receiver section. The Robot is simply covered by pressing few buttons at the transmitter side. Now that we had a brief idea about war field robot, let us have a brief recall about practical robots in defence. One of the basic features of robots used in military operations is that they are not completely automatic. They are actually controlled remotely by human beings. The robots or unmanned machines as they are termed, can be any moving object or a flying aero plane fitted with all necessary equipment's like sensors, LIDARS (Laser based Communication RADARS), cameras etc. Their operations can be from disposing bombs, to surveying enemy territory.

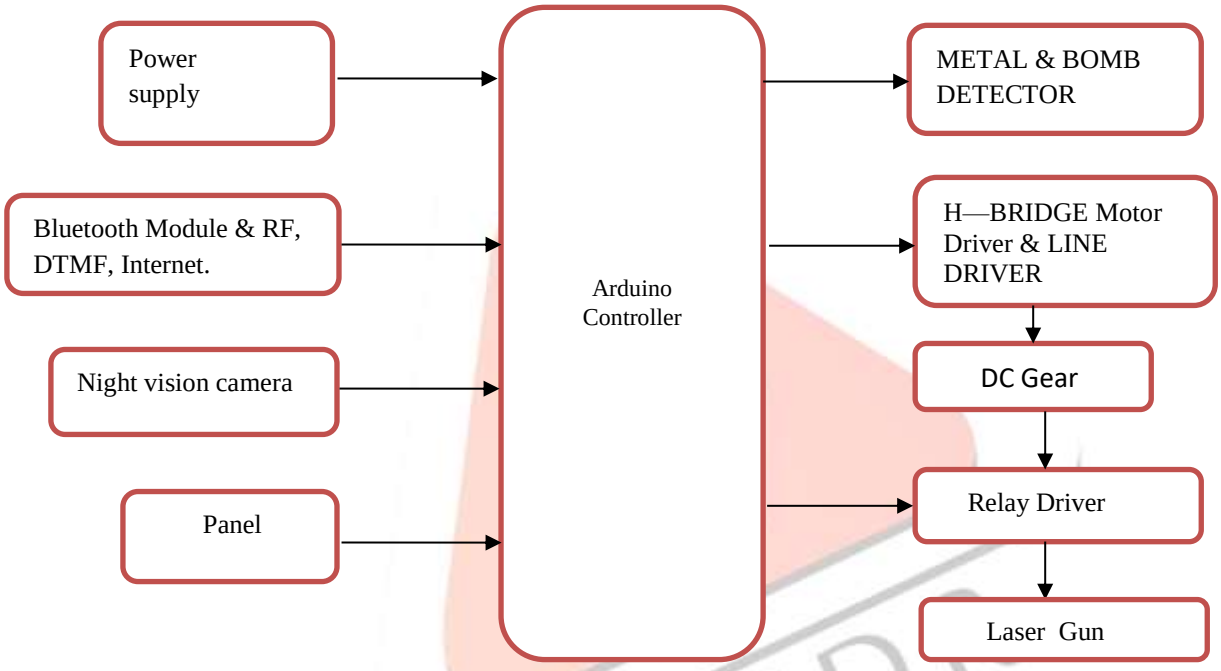

Figure 1: Block Diagram of proposed work design

Flashing an LED

Light emitting diodes (LED's) are handy for checking out what the Arduino can do. For this task, you need an LED, a 330 ohm resistor, and some short pieces of 22 or 24 g wire. The figure to the right is a sketch of an LED and its symbol used in electronic schematics Using 22 g solid wire, connect the 5V power pin on the Arduino to the bottom red power bus on the breadboard and the Gnd pin on the Arduino to the bottom blue power buss on the breadboard.

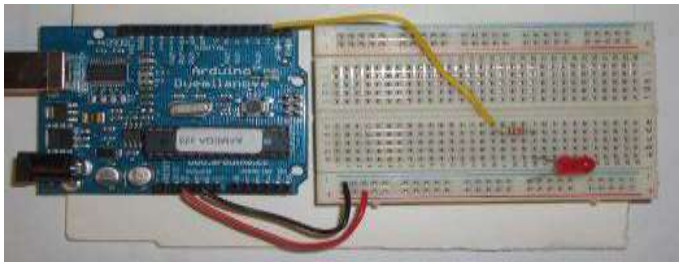

Figure2: Set up of Flashing an LED

Connect the notched or flat side of the LED to the Gnd bus and the other side to a free hole in main area of the breadboard Place the resistor so that one end is in the same column as the LED and the other end is in a free column. From that column, connect a wire to digital pin 2 on the Arduino board.

Reading a switch: The LED exercise shows how the Arduino can control the outside world. Many applications require reading the state of sensors, including switches. The figure to the right shows a picture of a pushbutton switch and its schematic symbol. Note that the symbol represents a switch whose contacts are normally open, but then are shorted when the button is pushed.

Power Supply: The power supply is designed to convert high voltage AC mains electricity to a suitable low voltage supply for electronic circuits and other devices. A power supply can by broken down into a series of blocks, each of which performs a particular function. A d.c power supply which maintains the output voltage constant irrespective of a.c mains fluctuations or load variations is known as "Regulated D.C Power Supply".

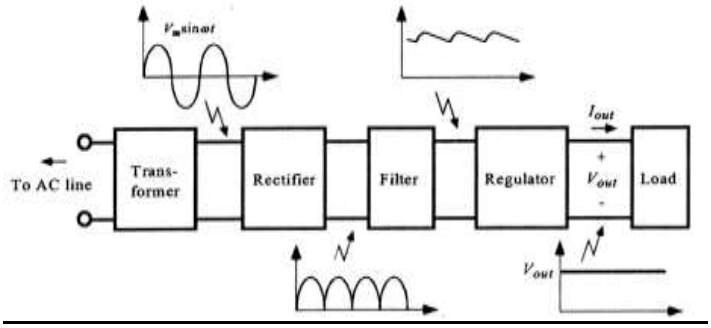

Figure 3: Circuit diagram of power supply

Bluetooth: Bluetooth is an open wireless technology standard for exchanging data over short distances from fixed and mobile devices, creating personal area networks with high levels of security. It can connect several devices, overcoming problems of synchronization. Bluetooth technology is designed for and optimized for use in mobile devices. Mobile computers, cellular handsets, network access points, printers, PDA's, desktops, keyboards, joysticks and virtually any other device can have short range Bluetooth radios operating in the free 2.4GHz Industrial-Scientific-Medical (ISM) band integrated into them (single chip).

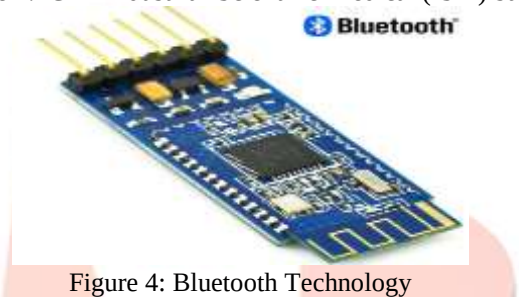

Figure 4: Bluetooth Technology

Metal detector- Inductive proximity sensors:

Inductive Proximity Sensors detect the presence of metal objects which come within range of their oscillating field and provide target detection to "zero speed". Internally, an oscillator creates a high frequency electromagnetic field (RF) which is radiated from the coil and out from the sensor face. When a metal object enters this field, eddy currents are induced into the object. As the metal moves closer to the sensor, these eddy currents increase and result in an absorption of energy from the coil which dampens the oscillator amplitude until it finally stops.

Figure 5: Proximity Sensor

Gear Motor:

Gear motors are complete motive force systems consisting of an electric motor and a reduction gear train integrated into one easy-to-mount and -configure package. This greatly reduces the complexity and cost of designing and constructing power tools, machines and appliances calling for high torque at relatively low shaft speed or RPM. Gear motors allow the use of economical low-horsepower motors to provide great motive force at low speed such as in lifts, winches, medical tables, jacks and robotics. They can be large enough to lift a building or small enough to drive a tiny clock.

Figure 6: DC Gear Motor

Laser Gun:

Light amplification by stimulated emission of radiation (LASER or laser) is a mechanism for emitting electromagnetic radiation, typically light or visible light, via the process of stimulated emission. The emitted laser light is (usually) a spatially

coherent, narrow low-divergence beam, that can be manipulated with lenses. In laser technology, "coherent light" denotes a light source that produces (emits) light of in-step waves of identical frequency and phase. [1] The laser's beam of coherent light differentiates it from light sources that emit incoherent light beams, of random phase varying with time and position; whereas the laser light is a narrow-wavelength electromagnetic spectrum monochromatic light; yet, there are lasers that emit a broad spectrum light, or simultaneously, at different wavelengths.

Figure 7: Laser Gun

IV.Conclusion

The main motive of the "Bluetooth Technology based wireless war field Robot with night vision camera" is Military people have a huge risk on their lives while entering an unknown territory. The robot will serve as an appropriate machine for the defense sector to reduce the loss of human life and will also prevent illegal activities. It will help all the military people and armed forces to know the condition of the territory before entering it.

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