

Surveillance and Defense Bot

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Abstract: *This robotic vehicle has the ability to substitute the soldier at the border area to provide surveillance. The robotic vehicle works as manually controlled vehicle using internet communication medium. This robot used to detect presence of enemy capture it in camera and give the live streaming to the authorized person Surveillance is major role while we working on border area for this there is robot for surveillance purpose. This paper presents a smart surveillance robot for military application by using an Atmega328 microcontroller for security purposes. On field Atmega 328p microcontroller sends a wireless command which is received by Authorized person on web Page and accordingly robot moves. We have seen increased levels of investment in autonomous vehicles for surveillance and security used. On the domestic side, the robots are only used to detect human movement in the region and store it in the database to record, but on the side of the defense, the robots are used to detect the movement and directly send to the control room and capturing the person on the field. We propose a cost effective four wheels surveillance robot of an Arduino microcontroller. This system is very useful for monitoring in areas where there is no Internet connection and also the collapse of the communication system during a disaster.*

Keywords: Atmega 328p, Smart Surveillance Robot for Military, Internet, etc.

I. INTRODUCTION

The advent of new high-speed technology and the growing computer Capacity provided realistic opportunity for new robot controls and realization of new methods of control theory. This technical improvement together with the need for high performance robots created faster, more accurate and more intelligent robots using new robots control devices, new drivers and advanced control algorithms. This project describes a new economical solution of robot control systems. In general; the robots are controlled through wired network. The programming of the robot takes time if there is any change in the project the reprogramming has to be done. Thus, they are not user friendly and worked along with the user preferences. To make a robot user-friendly and to get the multimedia tone in the control of the robot, they are designed to make user commanded work.

The modern technology has to be implemented to do this. Surveillance means the process of monitoring a situation, region or person. This usually occurs in a scenario where military border surveillance and enemy territory is essential to the security of a country. Human Monitoring is achieved by deploying close to sensitive areas of staff to constantly monitor the changes. But humans have limitations and deployment in places that are not always possible. There are also additional risks losing the staff in case of being caught by the enemy. With advances in technology over the years, it is possible to monitor remote areas of importance by using robots instead of humans. Besides the obvious advantage of not having to risk any personnel, land and air robots can also look for details that are not visible to humans. By providing the high-resolution cameras and various sensors, it is possible to obtain distance information to specific area.

II. LITERATURE SURVEY

Wireless Controlled Spy Robot by Kalyanee N. Kapadnis, Sahil Mandial¹, Gaganjot Kaur in this framework the microcontroller is the heart. It is controlled from outside gadget i.e., Android telephone which speaks with

microcontroller through Bluetooth individual system. An Android application is utilized to control it. Here DC equip motor is utilized to move the framework forward and backward and furthermore towards move any heading. One servo engine is utilized for moving the camera. Here, an Android advanced mobile phone goes about as a remote controller gadget for controlling the development of the robot. An Android application is utilized for this reason. The application bolsters just the 2.2 or more forms of Android Working Frameworks.

The Bluetooth module goes about as an interface among Cell phone and Authority microcontroller. HC-05 Bluetooth module is utilized for this framework. In this frameworks ace is the cell phone and slave is the Bluetooth module. Bluetooth module gets the directions given by the cell phone to the microcontroller. The microcontroller goes about as the cerebrum of the robot. The robot's development is chosen by the microcontroller. In this framework contains microcontroller named Arduino Uno.

David Kohanbash "A Safety Architecture for Autonomous Agricultural Vehicles" IEEE, 2014 We have built a four wheeled robot with an Arduino microcontroller, specifically the Arduino Mega 2650. We have written Arduino and Android libraries to allow an Android device to control the robot through a USB connection. The robot is designed to track objects by spinning left and right to keep the object in sight and driving forward and backward to maintain a constant distance between the robot and the object. Images are acquired through the camera of an Android device which is attached to the robot. The camera is attached to servos on the robot which allow the camera to pan and tilt. Several image processing techniques are used to detect the location of the object being tracked in the images. Two different kernel-based trackers are implemented as Android applications. One of them uses a color-based tracking method and the other uses a template-based tracking method. Both applications use Android's Open CV library to help with the image processing.

The experimental results of the robot using both methods show robust tracking of a variety of objects undergoing significant appearance changes, with a low computational complexity. Arduino Controlled War Field Spy Robot using Night Vision Wireless Camera and Android Application Jignesh Patoliya¹, Haard Mehta², Hitesh Patel. The advent of technology has brought a revolutionary change in the field of robotics and automation which ranges in all the sectors from household domestic works to the defense sector. Today in the global market, smart phones also have brought a revolution in changing people's lifestyle and providing numerous applications on different operating systems. Android operating system is one of these systems build on open source which has made a huge impact providing many applications for robotics to help people in their day-to-day life. The main technology used here for serial communication with the robot is the Bluetooth technology. Bluetooth technology can be used to share data between two devices considering the range between two devices.

The Bluetooth module HC-05 will be connected with the robot and the commands to the robot will be given through the android application. The war field robot consists of Arduino uno board as a controller board. It has L293D motor driver IC's along with a HC-05 Bluetooth module. Two DC motors are also used for the motion of the robot. The night vision wireless camera is attached with the robot in order to monitor the situation and the camera can be rotated 360 degrees via the android application through motor. The Sydney siege is considered one of the historic moments in the field of automation and robotics where a robot with a laser beam light and Bomb disposal Kit inbuilt was sent inside a dark room before the military commanders in order to reduce the risk of losing human life. It was so far considered as the best police operation carried out by New South Wales police department with the use of latest technology resulting is less loss of human life.

Wireless Controlled Surveillance Robot A mobile robot is a machine that is basically place or mounted on a movable platform and can be with the help of certain instructions. In today TM's world a lot of fields use mobile robots. Many of the complex robots that we now see have originated from the simpler mobile robots. This technology has increased many new applications in the industry. The combination of mobile devices and robots are leading to new ideas in lots of fields. The mobile devices are now being used in many of the industrial applications this is mainly because of the reason that they are portable and have a longer battery life as compared to a laptop. Also, they have a data plan through a cell phone carrier which is convenient as we can interact with the mobile robot once the connection is established. Mobile Robots:

The mobile robots can be classified into different types. The track robot is the robot that uses tracks to move around. However, such robots are costly to build. Also, they are not as flexible as the wheeled robots. The wheeled robots are the robots which use wheels for moving. Such robots can move only on smooth flat surfaces. The third type is the legged robots which are based on human form. They have legs which helps them to move around. These robots are very difficult to design.

Smart Phone Controlled Robot Using ATMEGA328 Micro-controller

Robots have been with us for less than 50 years but the idea of inanimate creations represents a sincere bid whose success is much older. But real robots did not come into existence until 1950s and 60s. With the growing invention of transistors and integrated circuits, computer industry added brains to the brawn of already existing machines. In 1959, researchers illustrated the possibility of robotic manufacturing when they unveiled a computer-controlled milling machine. Bluetooth technology was created by telecom vendor Ericsson in 1994. A Bluetooth device is able to communicate with up to seven Bluetooth modules at same time through one link whose normal working area is within eight meters.

The basic function of Bluetooth serial module is replacing the serial port line by connecting one to Bluetooth master device and the other connecting to slave device. Today, robots are enjoying resurgence. As computer processors are getting faster and inexpensive, robots can afford to get smarter. While, researchers are working on ways to help robots move more efficiently. Since most robots in use today are designed for specific tasks, our goal is to someday make universal robots that are flexible enough to do just about anything a human does and more. Android is a software stack for mobile devices that includes an operating system and key applications. Android applications provide access to a wide range of useful libraries and tools that can be used to build rich applications. Android also includes a full set of tools that provides developers with high productivity and deep insight into their applications.

III. IMPLEMENTATION

Robotic technology has increased appreciably in past couple of years. Such innovations were only a dream for some people a couple of years back. But in this rapid moving world, now there is a need of robot such as “A Human Following Robot” that can interact and co-exist with them. The development of robot technology had increased significantly due to industrial, medical and military applications. In various fields with harsh environment such as underground mining, war-zones, medical, construction, space exploration etc. the work done by one is extremely dangerous. Life of individuals assisting are also put at risks.

Tasks performed by humans have its own limitations in many ways. In order to perceive beyond the human limitation in vision, speed, consistency, flexibility, quality etc we should make use of robots. A key requirement for these robots is the ability to detect humans and to interact with the minimum non-technical way. The main objective of this dissertation is to make a robot that can help humans with various tasks. In this paper, we present a prototype of a human following robot that uses Arduino Uno and different sensors for detection and following an object.

1) Components Used

1. Atmega 328p micro-controller
2. HC -05 Bluetooth module
3. 12V 30rpm DC motor
4. Pulley wheels.
5. Analog Camera Secure 360 Wireless Rotating Camera

Atmega 328p



FIGURE 2: ATMEGA 328P CHIP

The Arduino uno is one kind of microcontroller board based on ATmega328, and Uno is an Italian term which means one. Arduino Uno is named for marking the upcoming release of microcontroller board namely Arduino Uno Board 1.0. This board includes digital I/O pins-14, a power jack, analog i/ps-6, ceramic resonator A16 MHz, a USB connection, an RST button, and an ICSP header. All these can support the microcontroller for further operation by connecting this board to the computer. The power supply of this board can be done with the help of an AC to DC adapter, a USB cable, otherwise a battery. This article discusses what is an Arduino Uno microcontroller, pin configuration, Arduino Uno specifications or features, and applications.

Motor Driver (L298D)

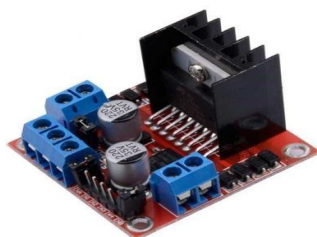
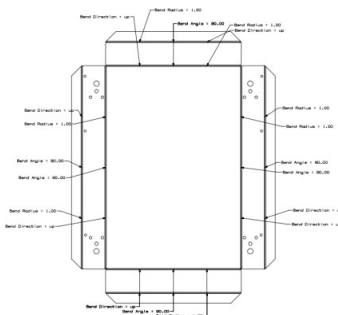
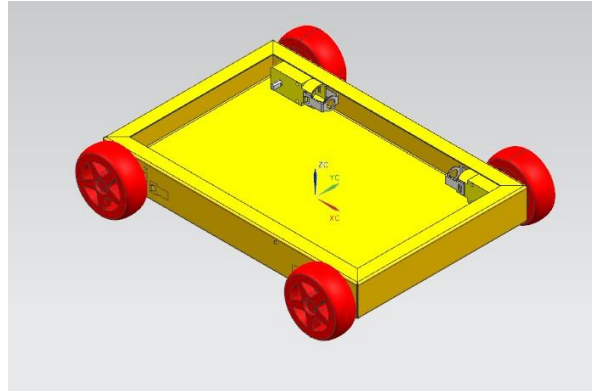


FIGURE 3: MOTOR DRIVER

The tiny chip on the board takes those tiny signals (or commands) from your microcontroller and boosts it until it is large enough to drive a motor. The board around makes sure connections between your controller and motor is hassle free. The chip on the board is an L293D H-Bridge driver which is capable of driving two DC motors and delivers output current up to 1A on each channel. Another pair of pins control speed of motors by conventional PWM method. Motor driver can either be powered by the microcontroller power pins or through an external power supply. Onboard regulator makes sure 5V is supplied to chip for logical operation and higher voltage (external supply) to motors.

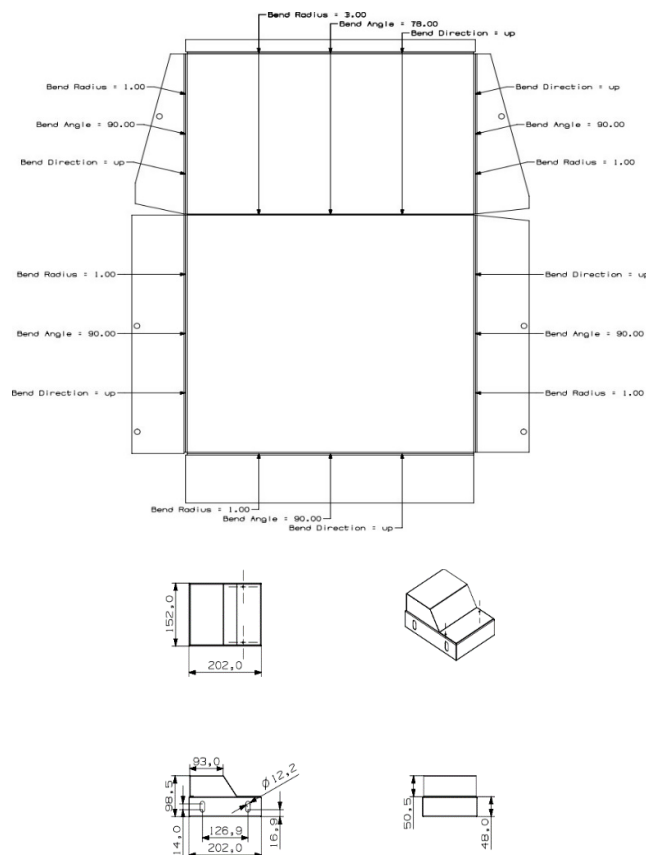
Body Design:

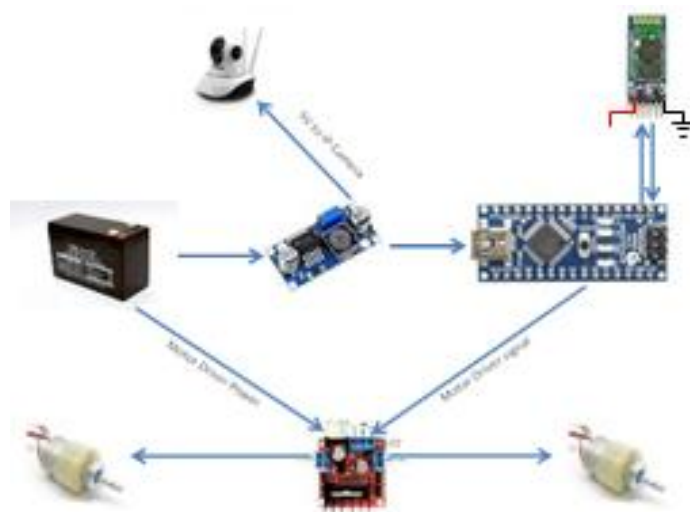




For the above design we have used M.S steel for designing the body Because it is inexpensive, strong, and durable. For bending we have taken 1mm to take the desired shape for the body of the robot. The bend angle for the body is 90 degrees. For body the upper part is bend toward the upper direction so c shaped design can be seen from side. Similarly bend all the sides of the sheet towards upper side so the box type structure is formed with upper side open. From the above calculations we can see the total length of the robot.

Frame Design:





Circuit Diagram

IV. CONCLUSION AND DISCUSSION

Different experiments were conducted and the performance of the robot was tested. Test was performed on app for moving the robot back and forth. It was noted that the robot works for 30 min. Then we performed the test to check whether the robot maintains a specific range with the object. Then we checked the serial communication between Arduino, motor driver and various motor. On the basis of results obtained from these tests and experiments we made the necessary changes in the processing and control algorithm.

After the completion we observed that the results produced were very satisfying the robot was perfectly working in day and night also capture the video, sound, and photos. This project uses Arduino, motors, sensors, Bluetooth-module to achieve the goal. This project helped to do research of the technology, automation, understood how to communicate with electronics, mechanical systems, and their integration with programming.

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