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Multitasking Military Spying Robot

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Abstract: *The main purpose of the development of this robotis to monitor human activities in battlefields or border areas in order to reduce enemy infiltration. The robot consists of a night vision wireless camera that transmits battlefield videos to preventdamage and loss of human lives. When enters an unknown area, military personnel face great danger to their lives. This robotwill serve as a real machine for the defense industry to reduce the loss of human lives and prevent illegal activities. This will help all military and armed forces understand the situation inthe area before entering.*

Keywords: Robot, Wireless Camera, Bluetooth Module, Raspberry Pi.

I. INTRODUCTION

This article explains the benefits of using robotic methods for surveillance as well as metal and smoke detection. Roboticsbrings innovation and change to the world by introducing newtechnologies. The fundamental purpose of using the robotic approach is to determine human safety and reduce humanworkload . Surveillance is a big issue when we're going to protect anything because it's a tedious job of involving people,and because it's risky to monitor all these things, we're going to make a robot that does constant monitoring . The bot constantly monitors and sends its live streams to authorized personnel. Since the job of monitoring will be easier, and for technical reasons it will be accurate. The implementation of this project solves the problem of replacing humans with surveillance robots, so that we reduce the damage to human resources. Robots are generally small in stature, so they are large enough to enter small holes in tunnels, mines and buildings , and also capable of surviving their entire lives in harsh and harsh climates without doing harm Military robots have been designed over the past years. Most systems today use a mobile robot with a camera for surveillance.

As security needs increase, especially at home, in the workplace, at borders, and on military bases, as sensors and devices improve, there is a growing need for security systems capable of protecting people, property, borders and human-computer interactions. ., Robot servers are increasinglybeing used for surveillance in uncontrolled environments. A robot is a mechanical or virtual human agent, usually an electromechanical machine controlled by a computer program.Robots can be both autonomous and semi-autonomous. They replace humans in repetitive and dangerous tasks that humans do not want to do, or cannot do due to size constraints, or perform in extreme environments such as space or under the sea. This project describes the design and implementation of a spy robot system with a spy camera and obstacle avoidance technology. The project acts as an early warning system, using high-resolution cameras to continuously monitor harsh environments and relay the information to a connected Raspberry Pi device that controls the robot. The dangers of landmines are appalling worldwide, with 5,504,444 million landmines buried in more than 50 countries. Governments are taking steps to overcome this situation. One of the reason for the design ofthis robot is to detect hidden mines, this robot has specific sensors that can detect and locate underground mines andavoid obstacles without manual control through the wireless.

II. SYSTEM DESCRIPTION

This project is a mechatronic system consisting of an ultrasonic sensor, a metal sensor, a smoke sensor, a RaspberryPi, a PI camera, four DC motors, a DC motor driver IC, Bluetooth module, Android phone and other components. The Raspberry Pi powered by a 5V DC power supply is a Linux microcomputer based on the ARM architecture and is the main control device of this project. The wireless night vision camera embedded on the robot consists of a wireless transmitter. The camera is powered with a 12 V battery and captures these images and transmits them to the receiver unit connected to a Computer unit. The images are converted to digital signals by the transmitter unit and the

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receiver unit receives these digital signals and reconverts them to images and these images or videos are then monitored and analyzed on a PC unit. PI cameras are used to capture images continuously and use the data set to check if an unauthorized person enters the surveillance area using CNN algorithm for facial recognition. Ultrasonic sensors are used for long-range obstacle detection and avoidance. Four wheel-connected 5- volt DC motors are used to provide balance and motion, as their speed is easily controlled over a wide range and their torque-speed characteristics have always been easier to tune than any class of AC motors, Motor driver IC (L298N) for forward and reverse function with speed control of DC motor and Android smartphone with app installed which helps to control the robot in four directions to manage the direction i.e. Wirelessly connect with the robot via Bluetooth.

III. TECHNOLOGY

The technology used in this project is a camera. We can design a prototype of a simple military spy robot that can be controlled remotely and the images transmitted by the camera can be monitored and analyzed on a laptop or computer. The camera is powered by a 12V battery and captures images and sends them to a receiver connected to a laptop or handheld. The images are converted by the transmitting unit into digital signals, which are received by the receiving unit and converted back into images, which are then monitored and analyzed on a laptop or computer. Another technology used by the isthe Bluetooth module. Remotely all control of the robot are done . It consists of a transmitter section which wirelessly transmits the required information to the receiver section. It acts as an intermediary between the controller and the server. The module is based on the BC417 single-chip Bluetooth IC, which complies with the Bluetooth v2.0 standard and supportsUART and USB interfaces.

IV. ALGORITHM

4.1 CNN Algorithm

This project uses the CNN algorithm for facial recognition and image classification. In a CNN, you have multiple layers that contain various filters that are responsible for detecting specific features of the object you want to detect. Early layers attempt to focus on general functionality, while later layers attempt to detect very specific functionality. In CNNs, the values of the different filters of each convolutional layer are obtained by training on a specific training set. At the end ofthe training, you will have a unique set of filter values to detectspecific features in your dataset. Using this set of filter values, you can apply them to new images so you can predict whatthe image will contain.

4.2 Haar Cascade Algorithm

For this project, Her Cascade Algorithm was used to train the authorizer data. The Her Cascade classifier is an effective method for object detection. This approach was proposed by Paul Viola and Michael Jones in their article Rapid Object Detection using a Boosted Cascade of Simple Features. Their cascade is a machine learning based approach where many positive and negative images are used to train a classifier. positive images - These images contain the images we want the classifier to recognize.

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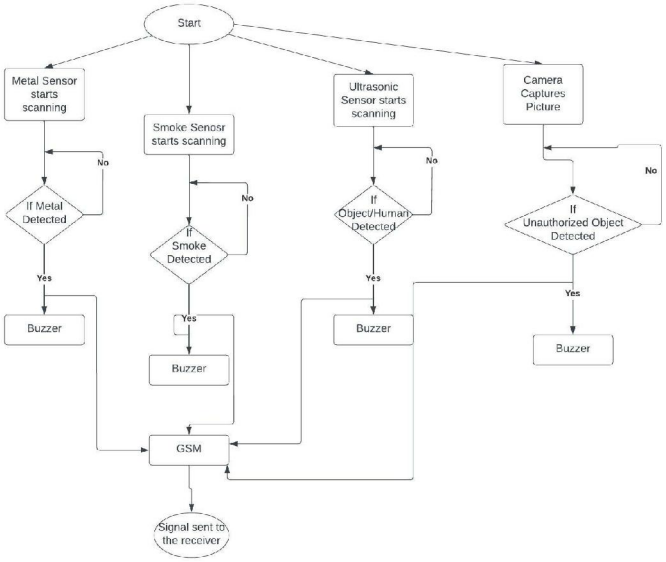
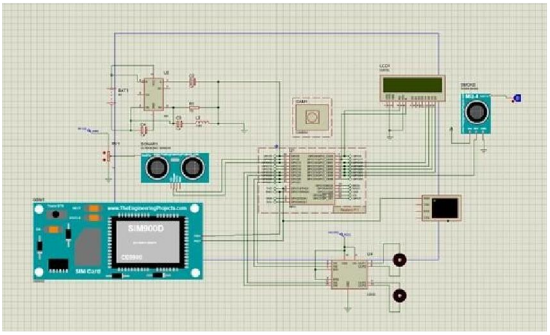
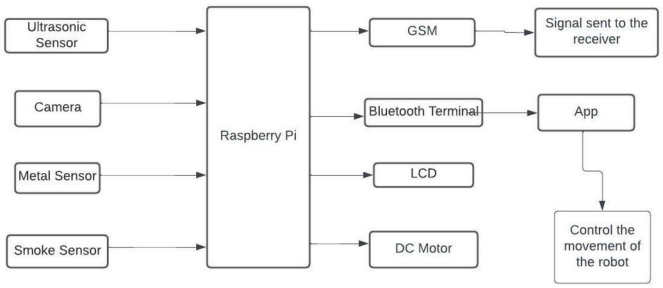
V. FLOWCHART



VI. CIRCUIT DIAGRAM



VII. BLOCK DIAGRAM



The block diagram of the project is mainly focused onthe Raspberry Pi..Many sensors such as Metal sensor, Smoke sensor, Ultrasonic sensor and Camera are connected to Rasp- berry Pi. All these components are placed on the robot and power is supplied to it through power supply unit. The Smart Phone is connected wirelessly to the Bluetooth Module using Bluetooth Technology. The robot is moved by sending an inputsignal to the Raspberry PI from the smartphone via Bluetooth module, the microprocessor scans the input according to the stored program and the output is given to the motor driverto move the DC motors either forward or reverse, right or left. The robot is moved continuously around the border and when landmines, smoke or unauthorized person are detectedmessage is sent to the receiver.

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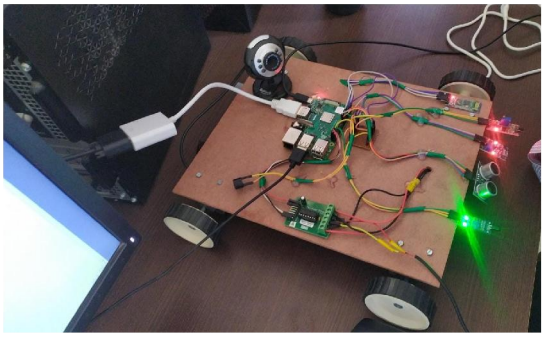
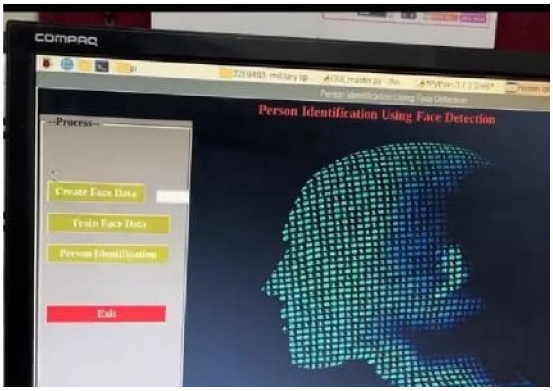
Input for GPIO	Notations given to motor	Robot Movement				
		Step	Backward	Forward	Right	Left
20	Motor1A	0	1	0	0	1
21	Motor1B	0	0	1	1	0
26	Motor2A	0	0	1	0	1
19	Motor2B	0	1	0	1	0

Table I: Robot Motion.

VIII. RESULT





IX. CONCLUSION

The smartphone is an Android system, and an effectiveremote control program can be developed. At the same time, this program communicates with the robot via a Bluetooth connection. This turns out to allow meaningful two-way communication between the Android phone and the robot. The multifunctional military service robot is designed to meet the needs of the army, police and armed forces. It has countless applications and can be used in different environments and scenarios. For example, in one place, it may be used by the armed forces for military purposes, while in another, it maybe used for espionage. It can also spread after detecting a mine

X. ADVANTAGES

1. Robots are small and hence can be used for espionage.
2. A military robot is an autonomous or remote-controlled device or robot designed for military applications.
3. Robots could reduce the number of soldiers injured or killed in combat.

XI. APPLICATIONS

1. Can be used for search as well as rescue operations.
2. During the explosion of a bomb.
3. This robot is also used to detect animals in the forest.
4. This robot can be used for border clearance. 5) Robots may be used for surveillance.

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