Bomb Detection Robotics using Embedded Controller
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Abstract:
Now-a-days, Automated systems have less manual operations, flexibility, reliability and accurate. Detect the bomb by sending the robot to the respective place. A person can operate the system from personal computer through wireless RF control. Aims at designing and executing the bomb, fire and obstacle detection. The IR sensor is a pair sensors has a receiver and a transmitter sensor. In the present scenario of war situations, unmanned systems plays very important role to minimize human losses. This robot is fitted with motors. A micro controller is used to control all operations. According to the motor operations the robot will operate as specified in program. Whenever any fire is detected, the Buzzer will ON.
Keywords — Bomb Detection, IR sensor, Robotics, Web server.

I. Introduction:
A simulation game is composed of three main elements: scenery, one or more characters and some rules. The characters can be real or fictional. A micro controller is an integrated circuit composed of a CPU, various peripheral devices, and typically memory, all in niches. Using one chip that contains all the necessary functions in place of a microprocessor and multiple peripheral chips has reduced the size and the power consumption of control oriented applications. For avoiding this types of problem in the nuclear power plant. The additional features of this project are that the robot is controlled by web server. A microcontroller not only accepts the data as inputs but also manipulates it, interfaces the data with various devices, controls the data and thus finally gives the result. A remotely controlled robot is able to enhance the safety of the artificers and, at the same time, to execute successfully the task. Since water cannons and micro charges, typical equipment of robots that operate outdoor, cannot be used inside an airplane, any other technique that allows to identify potential explosive devices is extremely valuable: cameras, X rays, etc. The robots existing on the market can be classified depending on “what” they are able to handle (mass and size of the object) and “where” they should operate (indoor, outdoor, structured environment). The mass and the size of the object are crucial for the correct design of the arm and of the grasping device.

II. ARCHITECTURE AT ROBOTIC SIDE
The proposed design is illustrated in this section. It also gives the complete details about the interfaced devices to implement this project. It consists of analog to digital converters, multiplexers, potentiometers, metal detector and cell phone jammer. Position and orientation of hand is obtained by two main parts; data glove and sensor arm cover. Data glove consists of 5 potentiometer as shown in Figure3. Bend of the five fingers can be measured by potentiometer.
Bomb detector is just act as metal detector which detected any metal in the required areas. Because the bombs made with metals. The bomb detector is attached in the topside with an antenna. Robot movements are controlled remotely.

III. Basic System Model:
Radio frequency (RF) is a rate of oscillation in the range of about 3 kHz to 300 GHz, which corresponds to the frequency of radio waves, and the alternating currents which carry radio signals. RF usually refers to electrical rather than
Mechanical oscillations; however, mechanical RF systems do exist. RF is the wireless transmission of data by digital radio signals at a particular frequency.

**IV. Multiplexer:**

The device contains an 8-channel single-ended analog signal multiplexer. A particular input channel is selected by using the address decoder. The address is latched into the decoder on the low-to-high transition of the address latch enable signal.

**V. Digital potentiometers Design:**

A digital potentiometer is built either from a resistor ladder integrated circuit or a digital-to-analog converter although a resistor ladder construction is the more common. Every step on the resistor ladder has its own switch which can connect this step to the output terminal of the potentiometer. The selected step on the ladder determines the resistance ratio of the digital potentiometer. The number of steps is normally indicated with a bit value e.g. 8 bits equals 256 steps; 8 bits is the most common, but resolutions between 5 and 10 bits (32 to 1024 steps) are available.

**VI. Limitations:**

While quite similar to normal potentiometers, digital potentiometers are constrained by current limit in the range of tens of mill amperes. Also, most digital potentiometers limit the input voltage range to the digital supply range (0–5 VDC), so additional circuitry is required to replace conventional potentiometer. Further, instead of the seemingly continuous control that can be obtained from a multiturn resistive potentiometer, digital potentiometers have discrete steps in resistance. Another constraint is that special logic is often required to check for zero crossing of an analog AC signal to allow the resistance value to be changed without causing an audible click in the output for audio amplifiers.

**VII. User Interface:**

The user can interact with the simulation through the mouse and the keyboard. The former controls the camera, while the latter commands the robot and some parameters of the simulation. A keyboard handler class of OSG manages the keyboard. At each time step, the keyboard handler class checks for a key press.

**VIII. DC Motor:**

DC motors are configured in many types and sizes, including brushless, servo, and gear motor types. A motor consists of a rotor and a permanent magnetic field stator. The magnetic field is maintained using either permanent magnets or electromagnetic windings. DC motors are most commonly used in variable speed and torque.

Every DC motor has six basic parts -- axle, rotor (a.k.a., armature), stator, commutator, field magnet(s), and brushes. In most common DC motors (and all that Beammers will see), the external magnetic field is produced by high-strength permanent magnets. The stator is the stationary part of the motor -- this includes the motor casing, as well as two or more permanent magnet pole pieces.

**IX. Metal Detector:**

If the sensor comes near a piece of metal this is indicated by a changing tone in earphones, or a
needle moving on an indicator. Usually the device gives some indication of distance; the closer the metal is, the higher the tone in the earphone or the higher the needle goes. The simplest form of a metal detector consists of an oscillator producing an alternating current that passes through a coil producing an alternating magnetic field. If a piece of electrically conductive metal is close to the coil, eddy currents will be induced in the metal, and this produces a magnetic field of its own. If another coil is used to measure the magnetic field (acting as a magnetometer), the change in the magnetic field due to the metallic object can be detected.

X. RF Transmitter:
Transmission through RF is better than IR (infrared) because of many reasons. Firstly, signals through RF can travel through larger distances making it suitable for long range applications. Also, while IR mostly operates in line-of-sight mode, RF signals can travel even when there is an obstruction between transmitter & receiver. Next, RF transmission is more strong and reliable than IR transmission. RF communication uses a specific frequency unlike IR signals which are affected by other IR emitting sources.

XI. RF Receiver:
The data is received by the RF receiver from the antenna pin and this data is available on the data pins. Two data pins are provided in the receiver module. Thus, this data can be used for further applications.

XII. Automatic Mode
As per figure 15 shows the Robot controls in web server and this automatic mode is satisfy to working the robot movement. In automatic mode the robot is moved without any restriction if any obstacle comes in front of this robot, it turns right side direction automatically[5,6]. In this mode there is no movement in robotic arm. It is designed only for safety of robot to save it from damage [11, 12]. In this mode there is no connection between server and client. Figure 16 shows the robotic movement in automatic mode.

XIII. Conclusion
The project “Bomb Detection Robotics using Embedded Controller” has been successfully designed and tested. It has been developed by integrating features of all the hardware components used. Presence of every module has been reasoned out and placed carefully thus contributing to the best working of the unit. Secondly, using highly advanced IC’s and with the help of growing technology the project has been successfully implemented. Finally we conclude that EMBEDDED SYSTEM is an emerging field and there is a huge scope for research and development.
XIV. Reference


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