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Video Surveillance with Hanging Robot for Animal Safety in Railroads

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ABSTRACT

Animal accidents in rail road have become one of the causes that may lead to their extinction. Therefore we implement our project by monitoring the presence of animals (more commonly elephants) in rail track with hanging robot in forest areas where unexpectable wildlife mortality in rail road occurs. The hanging robot in motion records the situation and displays it to the engine driver. An alarm is present to alert engine driver if any large animals are present. Image processing is done to identify the type of animal. The detailed design is modeled and fabrication is performed and a central box containing the required mechanisms to perform the locomotion. Finally the robot is cost effective compared to many other developed robots.

1. INTRODUCTION

Looking around, we find ourselves to be surrounded by various types of embedded systems. Be it a digital camera, a mobile phone, or a washing machine, all of them has some kind of processor functioning inside it. Associated with each processor is the embedded software. If hardware forms the body of an embedded system, embedded processor acts as the brain, and embedded software forms its soul. It is the embedded software, which primarily governs the functioning of embedded systems.

During infancy years of microprocessor based systems, programs were developed using assemblers and fused into the EPROMs. There used to be no mechanism to find what the program was doing. LEDs, switches, etc. were used to check correct execution of the program. Some ‘very fortunate’ developers had In-circuit Simulators (ICEs), but they were too costly and were not quite reliable as well.

Subsequent sections will discuss what Embedded C is, features of C language, similarities and difference between C and embedded C, and features of embedded C programming.

2. EXISTING SYSTEM

In existing, Wheeled or continuous track robot have been used. Those robots maintained a simple structure, to move quickly, easily controlled, spin on the spot, or turn around in small places. When more powered wheels are used the design becomes much more complex as each of the wheels has to turn with the same speed when the robot has to move forwards [1-10].

Robot needs to pass small or large obstacles. For a wheel to get over a vertical obstacle, it has to be at least twice as tall as the vertical obstacle [11-27]. Due to more friction and a complex mechanical system, the robot with continuous tracks has lower speed compared with robots on wheels [28-38]. The continuous tracks are difficult to repair or replace than wheels.

3. PROPOSED SYSTEM

The climbing robot should be sucked to the surface on which it is climbing safely and overcome its gravity. That is the difference between a climbing robot and an ordinary walking robot on the ground. The robot should have a function to move in both the up-down direction as well as the right-left direction to get to every point on the glass. Once the task signals are sent by the user, the robot should keep itself attached to and move on the surface while accomplishing the tasks of may be cleaning, surveillance, sensing. If any sensor value going to abnormal, buzzer will ON. Camera is used to capture current situation in surrounding areas.

3.1. BLOCK DIAGRAM

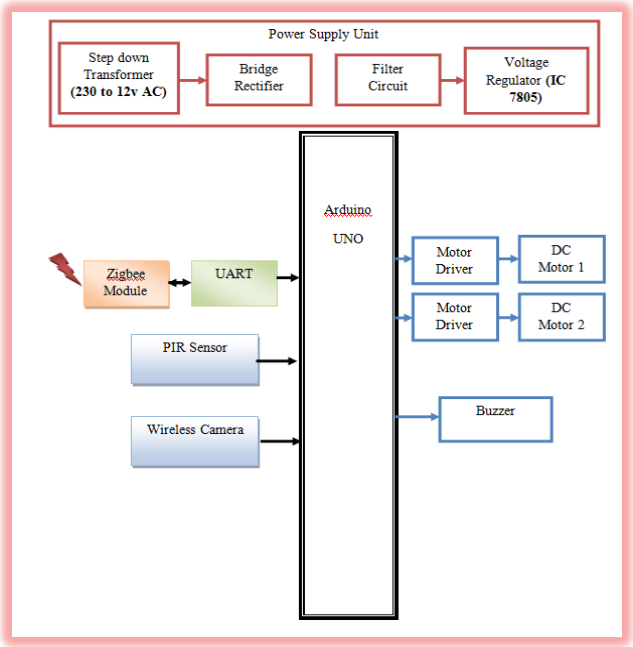

Fig: Block diagram description

4. HARDWARE REQUIREMENTS

It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. The Uno differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip.

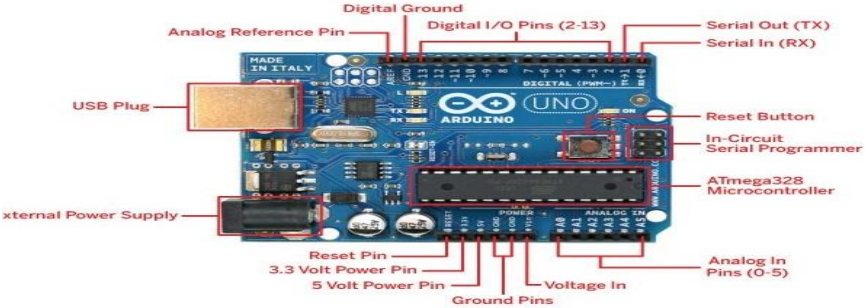

Fig 1: Arduino Board

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Instead, it features the Atmega8U2 programmed as a USB-to-serial converter. "Uno" means one in Italian and is named to mark the upcoming release of Arduino 1.0. The Uno and version 1.0 will be the reference versions of Arduino, moving forward. The Uno is the latest in a series of USB Arduino boards, and the reference model for the Arduino platform; for a comparison with previous versions.

The most important advantage with Arduino is the programs can be directly loaded to the device without requiring any hardware programmer to burn the program. This is done because of the presence of the 0.5KB of Boot loader which allows the program to be burned into the circuit. All we have to do is to download the Arduino software and writing the code.

4.1. ZIGBEE

ZigBee is based on the Institute of Electrical and Electronics Engineers Standards Association's 802.15 specification. It operates on the IEEE 802.15.4 physical radio specification and in unlicensed frequency bands, including 2.4 GHz, 900 MHz and 868 MHz The specifications are maintained and updated by the ZigBee Alliance.

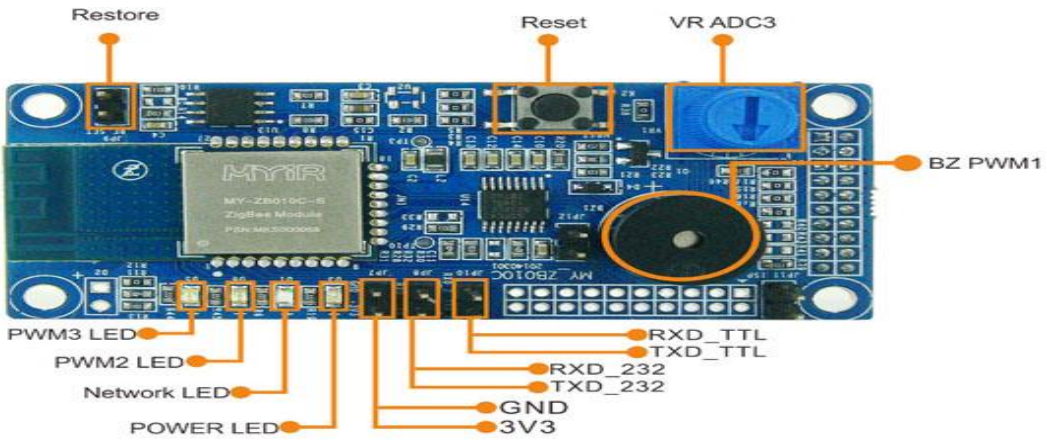

Fig 2: Zigbee

4.2. UART

The Universal Asynchronous Receiver/Transmitter (UART) controller is the key component of the serial communications subsystem of a computer. UART is also a common integrated feature in most microcontrollers. The UART takes bytes of data and transmits the individual bits in a sequential fashion. At the destination, a second UART re-assembles the bits into complete bytes. A UART (Universal Asynchronous Receiver/Transmitter) is the microchip with programming that controls a computer's interface to its attached serial devices.

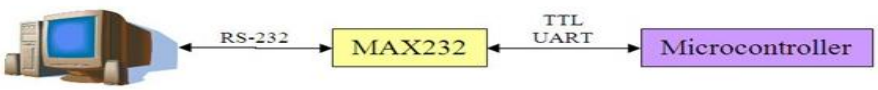

Fig 3: UART

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5. SOFTWARE REQUIREMENTS

5.1. ARDUINO SOFTWARE (IDE)

The Arduino Integrated Development Environment or Arduino Software (IDE) and embedded C. contains a text editor for writing code, a message area, a text console, a toolbar with buttons for common functions and a series of menus. It connects to the Arduino and Genuino hardware to upload programs and communicate with them.

5.2. TOOLS

1. Auto Format -This formats your code nicely: i.e. indents it so that opening and closing curly braces line up, and that the statements inside curly braces are indented more.
2. Archive Sketch -Archives a copy of the current sketch in .zip format. The archive is placed in the same directory as the sketch.
3. Fix Encoding & Reload - Fixes possible discrepancies between the editor char map encoding and other operating systems char maps.
4. Serial Monitor- Opens the serial monitor window and initiates the exchange of data with any connected board on the currently selected Port.

6. CONCLUSION

In this proposed system, we have made a project to prevent the animal accidents in rail roads. Animals being victims in railway tracks have become a common one nowadays. If this continues it may even cause their groups to extinct. Hence our project implies one of the ways to prevent the unexpected accidents in tracks.

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