High Impact Design Structure of Underground Electrical Distribution Line Status Monitoring And Bombs Detecting Robot For Military Application

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Abstract- *A robot is usually an electro-mechanical machine that is guided by computer and electronic programming. Design structure of our ROBOT which can be controlling using an APP for android mobile. We are developing the remote buttons in the android app by which we can control the robot motion with them. And in which we use Bluetooth communication to interface controller and android. Controller can be interfaced to the Bluetooth module though UART protocol. According to commands received from android the robot motion can be controlled.*

Our developing android robot is used to monitor and alert the underground electrical line fault status. An antenna can be fixed in robot head which is used to sense the electromagnetic field from distribution line. The robot will activate the buzzer when the EMF is absent. A smart phone Android operated robot. Now here is a simple to control your robot using Bluetooth module HC-05 and 89S52 microcontroller with your android Smartphone device. The controlling devices of the whole system are a microcontroller. Bluetooth module, geared DC motors are interfaced to the microcontroller. The data receive by the Bluetooth module from android smart phone is fed as input to the controller. The controller acts accordingly on the DC motor of the robot. The robot in the project can be made to move in all the four directions using the android phone. The project also works for military safety application as this robotic structure also helps to monitor areas under attack and detect underground bombs using metal detectors and also uses PIR to monitor the human movement in the military areas.

Keywords- Android ,Nuvoton(W78E052D), UART , EMF , Robot , Bomb , PIR Sensor.

I. INTRODUCTION

A.BLUETOOTH (HC-05):

The electricity power for home, laboratory, office, factory and building is very important to human life and all the equipments. We are developing multi-application robotic design for electromagnetic field detection based distribution line fault finding, bomb and human motion detection for military application. The robot can get detection signals if the distribution line cut or any fault condition.

The number of organization, who needs to control the fault around with the help of some artificial means, whether through an illness or an accident, is continually increasing. These means have to be increasingly sophisticated, taking advantage of technological evolution, in order to increase the quality of life for these people and facilitate their integration into the working world. In this way a contribution may be made to facilitating movement and to making this increasingly simple and vigorous, so that it becomes similar to that of people who do not suffer deficiencies. We designed successfully robotic EMF detector for finding the faulty area of electricity transmission line. The motion of the robot is controlled by android smart phone APP.

This project will provide a new way to control the movement of robot such as turn direction to left, right, forward, reverse direction and stop. The overall robotic operation uses geared DC motor and motor driver module combines with microcontroller system for instance controlling board. Bluetooth communication protocol is used to communicate sensory and command information between the android device and the control box .There are 5 options for basic motions of a robot to be applied by the user. The five conditions of the wheelchair can be described as the following:

a. Moving forward
b. Moving backward
c. Turning to the right
d. Turning to the left
e. Stop

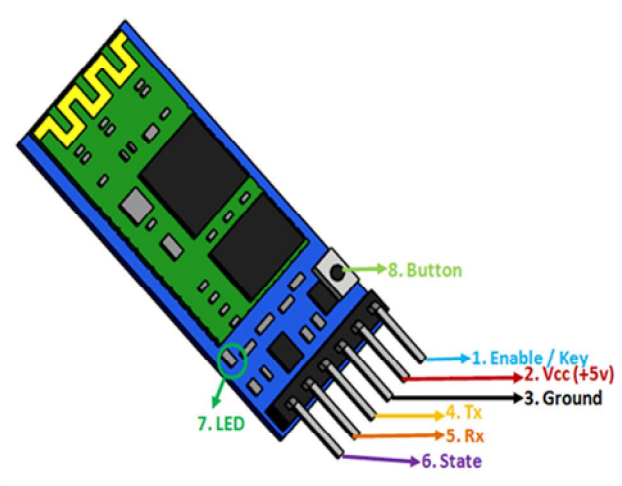

Fig: Pin diagram of HC-05 BT module

B.NUVOTON MICROCONTROLLER (W78E052DDG):

The NUVOTON W78E052DDG is a low-power, high-performance CMOS 8-bit microcontroller with 4K bytes of In-System Programmable Flash memory.

The on-chip Flash allows the program memory to be reprogrammed in-system or by a conventional nonvolatile memory programmer. By combining a versatile 8-bit CPU with In-System Programmable Flash on a monolithic chip, the atmel NUVOTON W78E052DDG is a powerful microcontroller which provides a highly-flexible and cost-effective solution to many embedded control applications.

C.PIR SENSOR:

PIR sensors allow you to sense motion, almost always used to detect whether a human has moved in or out of the sensors range. They are small, inexpensive, low-power, easy to use and don't wear out. For that reason they are commonly found in appliances and gadgets used in homes or businesses. They are often referred to as PIR, "Passive Infrared", "Pyroelectric", or "IR motion" sensors.Everything emits some low level radiation, and the hotter something is, the more radiation is emitted. The sensor in motion detector is actually split in two halves. The reason for that is that we are looking to detect motion (change) not average IR levels. The two halves are wired up so that they cancel each other out. If one half sees more or less IR radiation than the other, the output will swing high or low. Along with the pyroelectic sensor is a bunch of supporting circuitry, resistors and capacitors. It seems that most small hobbyist sensors use the BISS0001 ("Micro Power PIR Motion Detector IC"), undoubtedly a very inexpensive chip. This chip takes the output of the sensor and does some minor processing on it to emit a digital output pulse from the analog sensor.

D.HALL EFFECT SENSOR:

A **Hall Effect sensor** is a transducer that varies its output voltage in response to a magnetic field. Hall Effect sensors are used for proximity switching, positioning, speed detection, and current sensing applications. In its simplest form, the sensor operates as an analog transducer, directly returning a voltage. With a known magnetic field, its distance from the Hall plate can be determined. Using groups of sensors, the relative position of the magnet can be deduced.

Frequently, a Hall sensor is combined with circuitry that allows the device to act in a digital (on/off) mode, and may be called a switch in this configuration. Commonly seen in industrial applications such as the pictured pneumatic cylinder, they are also used in consumer equipment; for example some computer printers use them to detect missing paper and open covers. When high reliability is required, they are used in keyboards. Hall sensors are commonly used to time the speed of wheels and shafts, such as for internal combustion engineignitiontiming, tachometers and anti-lock braking systems. They are used in brushless DC electric motors to detect the position of the permanent magnet. In the pictured wheel with two equally spaced magnets, the voltage from the sensor will peak twice for each revolution. This arrangement is commonly used to regulate the speed of disk drives.

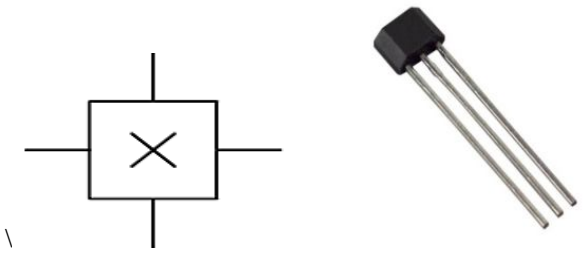

Fig: 4.9 symbols and schematic

II. LITERATURE SURVEY

1.Ghasem Abbasnejad, *Member, IEEE,* Jonathan Eden , *Member, IEEE,* and Darwin Lau , *Member, IEEE* Generalized Ray-Based Lattice Generation and Graph Representation of Wrench-Closure Workspace for Arbitrary Cable-Driven Robots IEEE TRANSACTIONS ON ROBOTICS 10.1109/TRO.2018.2871395

This system presents a new generalized ray-based approach to the generation and representation of the wrench-

closure workspace (WCW) for cable-driven robots (CDRs). Existing WCW studies have yet to address two significant problems, first is the lack of a generalized approach to generate the WCW with continuity information for all degrees-of-freedom (DoFs) and arbitrary CDRs, and second is a workspace representation for higher DoF robots. The proposed work addresses these issues using a generalized ray-based lattice WCW generation approach that can be applied in all DoFs. Furthermore, a new graph workspace representation is introduced with a range of advantages in the way CDR workspace can be visualized and studied. Such a representation is powerful since it: can be used for any other type of workspace beyond the WCW; can be visualized in two-dimensions regardless of the number of DoFs of the system; allows metric information to be included; and opens up the use of well-established graph theory techniques to study the workspace. Through three different CDR examples, a 3-DoF planar cable-driven parallel robot (CDPR), a 4-DoF multilink robot, and a 6-DoF CDPR, the characteristics and advantages of the proposed method are highlighted.

2.Federico Renda ; Frédéric Boyer ; Jorge Dias ; Lakmal Seneviratne Discrete Cosserat Approach for Multisection Soft Manipulator Dynamics IEEE Transactions on Robotics 19 October 2018

Nowadays, the most adopted model for the design and control of soft robots is the piecewise constant curvature model, with its consolidated benefits and drawbacks. In this work, an alternative model for multisection soft manipulator dynamics is presented based on a discrete Cosserat approach, in which the continuous Cosserat model is discretized by assuming a piecewise constant strain along the soft arm. As a consequence, the soft manipulator state is described by a finite set of constant strains. This approach has several advantages with respect to the existing models. First, it takes into account shear and torsional deformations, which are both essential to cope with out-of-plane external loads.

Furthermore, it inherits desirable geometrical and mechanical properties of the continuous Cosserat model, such as intrinsic parameterization and greater generality. Finally, this approach allows to extend to soft manipulators, the recursive composite-rigid-body and articulated-body algorithms, whose performances are compared through a cantilever beam simulation. The soundness of the model is demonstrated through extensive simulation and experimental results.

3.David Come ; Julien Brunel ; David DooseImproving Code Quality in ROS Packages Using a Temporal Extension of First-Order Logic 2018 Second IEEE International Conference on Robotic Computing (IRC)31 Jan.-2 Feb. 2018

Robots are given more and more challenging tasks in domains such as transport and delivery, farming or health. Software is key components for robots, and ROS is a popular open-source middleware for writing robotics applications. Code quality matters a lot because a poorly written software is much more likely to contain bugs and will be harder to maintain over time. Within a code base, finding faulty patterns takes a lot of time and money.

We propose a framework to search automatically user-provided faulty code patterns. This framework is based on FO^{++}, a temporal extension of first-order logic, and Pangolin, a verification engine for C++ programs. We formalized with FO^{++} five faulty patterns related to ROS and embedded systems. We analyzed with Pangolin 25 ROS packages looking for occurrences of these patterns and found a total of 218 defects. To prevent the faulty patterns from arising in new ROS packages, we propose a design pattern, and we show how Pangolin can be used to enforce it.

III. EXISTING SYSTEM

In this era, surveillance is the one of the most sought after technology especially in military, which could provide better protection and save innocent lives. In this paper, a surveillance robot is proposed which can monitor areas under attack and provide live video stream of the area using any android phone, irrespective of the distance of the controller from the robot.

The robot, based on Arduino Uno, combines all the different functionalities of the board and can be controlled by an android Application Program Interface (API) which works on internet and hence is not limited to a small operating range. In case of failed internet, there are multiple backup NRF handlers, which uses an Arduino Nano board which operates within a radius of 500 metres from the robot. All the secondary handlers accesses the robot on priority basis and the one with the highest most priority is set as the default, i.e. custom-built MANT app, takes over with the help of a Bluetooth module, while NRF module at the secondary handler takes over in case of a failed network.

Drawbacks of Existing System: The System design only provides the surveillance robot model which can only monitor the human movement in the military areas.

IV. PROPOSED SYSTEM

The proposed system is a simple to control your robot using Bluetooth module HC-05 and NUVOTON W78E052DDG microcontroller with your android Smartphone device. The controlling devices of the whole system are a microcontroller. Bluetooth module, geared DC motors are interfaced to the microcontroller. The data receive by the Bluetooth module from android smart phone is fed as input to the controller. The controller acts accordingly on the DC motor of the robot. The robot in the project can be made to move in all the four directions using the android phone. The project also works for military safety application as this robotic structure also helps to monitor areas under attack and detect underground bombs using metal detectors and also uses PIR to monitor the human movement in the military areas and also detect underground transmission line fault.

V. BLOCK DIAGRAM:

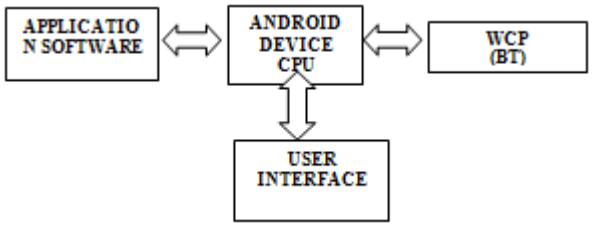

Fig: functional block diagram of android app mobile

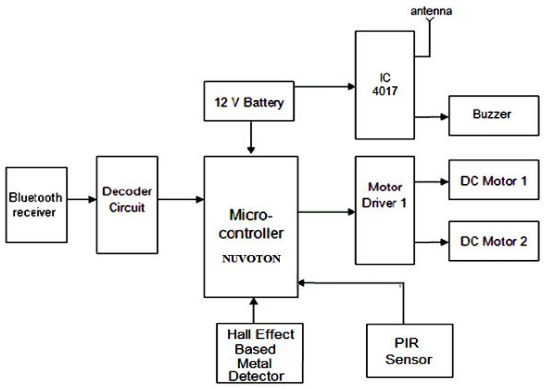

Fig: block diagram of the system

VI. CONCLUSION

This type of robot gives more useful for intimating the fault identification whenever we affect the underground distribution line or human motion and bomb detection for military application. Our project also based on wireless channel. It gives wide coverage area to intimate the power discontinuity. In semiconductor technologies, the microcontroller is the dynamic system and we can implant easily. We are using simple embedded 'C' program coding to control the all process. KEIL compiler used to convert the source program into object program.

Robots are becoming increasingly useful on the battlefield because they can be armed and sent into dangerous areas to perform critical missions. Controlling robots using traditional methods may not be possible during covert or hazardous missions. In our project successfully completed for finding and alerting the transmission line failure as well as military applications and it controlled very easily through android smart phone.

REFERENCE

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