ANDROID CONTROLLED LANDMINE DETECTION ROBOT

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ABSTRACT

The main objective behind this paper is to develop a robot to perform the act of surveillance human activities using wireless night vision camera along with metal detection and Robots can be manually controlled using IOT android application. The robot consists of night vision wireless camera which can transmit videos of the human. In this project, one can control the robot with the help of mobile. This robot will collect data from remote place and able to send those data to a remote IoT cloud database. We can control the movement of the robot by sending instructions via IOT app from our android phone. a multipurpose Robotic vehicle moves Forward, Left, Right, Backward and Stop directions at which can be constrained by Arduino. When any metal/Landmine detected automatically sends data to IOT server with buzzer alert. In proposed system we are going to designed a low-cost Microcontroller Based Android controlled Robot. The robot will move forward, backward, left and right direction by following the instructions given from the mobile. This system can be helpful for various purposes. Our project aims to provide a robotic vehicle equipped with a wireless camera having night vision capability for remote monitoring/spying purposes. The night vision camera allows for transmitting real time night vision video even in dark environments. Whatever is recorded by the camera can be viewed in PC for reference.

1. INTRODUCTION

Our project aims to provide a robotic vehicle equipped with a wireless camera having night vision capability for remote monitoring/spying purposes. The night vision camera allows for transmitting real time night vision video even in dark environments. Whatever is recorded by the camera can be viewed in PC for reference. This system is to be useful in war, terrorism and sensitive areas. It can also be used to operate in jungles and other environments humans cannot possibly enter during the night. The vehicle can be controlled remotely by an android device for easy operation. It uses android application commands to move in front, back and left right directions. The vehicle consists of receivers interfaced to an 8051 microcontroller. On receiving command from the receiver. The 8051 microcontroller now operates the movement motor through a driver IC. The robotic vehicle can be easily operated from any android device. It provides a good user interface for handling the vehicle. The android device can operate the vehicle at a good IOT communication range. The IOT receiver at the vehicle is used to transmit control movement data from app to vehicle. The night vision camera mounted on robot allows for efficient spying even in darkest areas using infrared lighting. Cloud robotics is an emerging field that

is centered on the benefits of converged infrastructure and shared services of a cloud computing environment. In this paper, a system is designed with an autonomous robot to sense environmental data such as temperature, humidity, and air quality, along with GPS coordinates and store them on the cloud. The mobile robot is controlled using an Arduino microcontroller and communicates with the cloud via a Raspberry Pi. A private cloud is set up using Open Stack that provides Infrastructure as a Service. The collected data are stored in a cloud server which could be viewed through a web browser and can be used to create awareness about the environmental changes of the location under study. A proof- of-concept prototype has been developed to illustrate the effectiveness of the proposed system. Cloud robotics is an emerging field that merges the concepts of cloud technologies and service robots. It is a disruptive technology based on the advantages of rapid fall in costs of servers, data centers, and broadband access, inexpensive cloud storage, and distributed computing. Internet is used to complement the capabilities of the robots by relieving them from on -board computation-intensive tasks and enable them to provide effective services on demand. Robotics is a technology that deals with the design, construction, operation, and application of robots, as well as computer systems for their control, sensory feedback, and information processing. The human operator may manipulate the robot from a distance by sending commands and receiving information via communication network. Robotic systems have brought significant economic and social impacts to human lives over the past few decades. Recently, robotic systems are utilized as data-gathering tools by scientists for a greater understanding of environmental processes. Robots are also being designed to explore deep oceans, to track harmful algal blooms, monitor climatic condition ns, and to study about remote volcanoes. Cloud is a service provider that provides services such as infrastructure, software or resources. Infrastructure as a Service (IaaS) models an organization that outsources the resources required for its operations, including storage and networking components. While the cloud computing paradigm was originally developed in the cyber world and applied software as a service (SaaS), in the last few years it has been extended to the cyber-physical world, including vehicles like cars and people with smart phones, and robots like ground vehicles and unmanned aerial vehicles. Recently, researchers have started to merge cloud computing concepts with mobile robotics, e.g... This approach has been particularly useful in the context of computation intensive applications like image processing and cognition needed by mobile robots as these tasks take up space, power, and incur high costs. The cost and complexity of performing the basic functionalities such as sensing, actuation, and control in a single robot increases exponentially. Therefore, the cloud robot system efficiently provides different types of support. An interesting related technological development is the emergence of Robots as a Service (RAAS), analogous to system oriented architecture. In spite of the significant potential of cloud robot systems, much of the research in literature has focused mainly on cloud-based operation of robot manipulators or arms. For example, Kehoe, et al have applied the cloud computing concept to a manipulator mounted on a mobile robot system. Their technique performs object recognition, pose estimation and grasping of common household objects with the aid of Google Goggles Image Recognition System and stores the results on a cloud server. Kamei, et al have proposed the use of cloud networked robots for providing multi-location daily activity using on-board manipulators to support elderly and disabled people. Use of vision-based servo control of manipulators with distributed computing has been proposed in. More recently, robotics

researchers have turned to the applications of cloud computing in individual and wirelessly networked mobile robot systems. Real-time path planning for mobile robots using computation-intensive evolutionary algorithms on the cloud has been studied in. Use of cloud based multi-core graphic processing units for analysis of 3D perceptual changes in robot texture images for purposes of navigation has been made in. A number of mobile robotic systems have been developed in recent years for monitoring climate variables both terrestrial and underwater, harmful algal blooms and volcanoes. Mobile robots with on-board environmental sensors offer several advantages - low cost, ease of automation, wide operational range, and flexibility - in the monitoring of wide geographical areas. Indoor and outdoor environmental monitoring using mobile robots has been considered by several researchers, e.g. Small mobile robots called Boebots have been built to capture image that will be processed by a cloud setup using Microsoft windows Azure a standalone low cost device for transmitting data with touch screen display had been built using Raspberry Pi and IOT. A robot to recognize voice had been developed using Google voice API and Raspberry Pi. Raihan et. al. had developed an economical automated toll system that work by processing images using Raspberry Pi. The system was developed as an alternative to the more costly system using RFID. In this paper, a robot is designed to move autonomously in the open space and to monitor the environmental conditions. The sensor data collected by the robot are stored in a cloud server that could be also be displayed in a webpage as well. Since very large amounts of spatio-temporal environmental data are collected in the process, a cloud server is used for economical storage, analysis, and retrieval of the data. The cloud environment is set up using Open Stack in Ubuntu Linux. The Raspberry Pi microcontroller is used in the robot for communicating with the cloud server, while an Arduino microcontroller is used for control of the robot project is to deal with the security issues such as combating of the terrorist’s activities by tracking their locations and launch pads and reducing soldier's efforts and involvement in the mission. This can be achieved by the RF BASED spy robot which consists of a night vision wireless camera. The robot consists of night vision camera which is wireless and it can record real time videos and footages even in dark and these footages are displayed on our mobile screen which is connected through Wi-Fi via MI-app spy. This robot is capable carrying all kinds of military operations under all conditions without much involvement of the soldiers, thus saving the loss of lives and neutralizing any terrorists' activities. This can be also useful in gathering information about the arms and ammunitions of the rivals, destroying them from a sufficient safe distance. This device can easily be connected to the rocket launcher and tanks, acting as a guide machine. Not only in defense sector but also in disaster management can be fruitful in managing the situations like flood, earthquakes etc. This can be easily operated either through IOT or Wi-Fi. But in our project we are more concerned and focused on Wi-Fi, since it has better com munication parameters and range.

2. LITERATURE SURVEY

After going through various articles and research papers we concluded that some of the papers were beneficial for designing our project and make it a successful one. In Military 2020 Spying Robot by Sarmad Hameed, Muhammad Hamza Khan, Naqi Jafri, the massive tasks is dangerous in war field. In

border region it gets difficult for the humans working in the battle field to protect them from harm. Both protecting they and keeping keen observation on enemy becomes a little bit difficult task so in that situation robot is better option. Consequently robot replaces the trooper. In Spying Robot with Night Vision Camera by Aaruni Jha, Apoorva Singh, and Ravinder Turna -The robot sends the flag to the RF collector mounted on the robot through RF transmitter at the base station. Due to this robot records real time footages and videos and can deliver those at our phone screen even in dark also as LED lights are used which even the enemy in the at border region or in suspected area can't even recognize that something is getting recorded. And the work done by PriyankaYadav, Swati Gawhale-She concluded that during the period of battle against enemy this robot can be used to collect all the necessary data that may weaken the opponent's plan if in case plotting something dangerous to attack them. In this way the military men would get prepared themselves for anything that the opponent is plotting against them and retort to their action in a better way that the enemy could not even think of at correct time. Robot navigation problems can be generally classified as global or local, depending upon the environment surrounding the robot. In global navigation, the environment surrounding the robot is known and a path which avoids the obstacles is selected. In one example of the global navigation techniques, graphical maps which contain information about the obstacles are used to determine a desirable path. In local navigation, the environment surrounding the robot is unknown, or only partially known, and sensors have to be used to detect the obstacles and a collision avoidance system must be incorporated into the robot to avoid the obstacles. The artificial potential field approach is one of the well-known techniques which have been developed for this purpose. Krogh, for example, used a generalized potential field approach to obstacle avoidance. Kilm and Khosla used instead harmonic potential functions for obstacle avoidance. On the other hand, Krogh and Fang used the dynamic generation of sub goals using local feedback information. [5] During the past few years, potential field methods (PFM) for obstacle avoidance have gained increased popularity among researchers in the field of robots and mobile robots. The idea of imaginary forces acting on a robot has been suggested by Andrews and Hogan and Khatib. In these approaches' obstacles exert repulsive forces onto the robot, while the target applies an attractive force to the robot. The sum of all forces, the resultant force R, determines the subsequent direction and speed of travel. One of the reasons for the popularity of this method is its simplicity and elegance. [6] This paper introduces histogram in-motion mapping (HIMM), a new method for real-time map building with a mobile robot in motion. HIMM represents data in a two-dimensional array, called a histogram grid, that is updated through rapid in motion sampling of onboard range sensors. Rapid in-motion sampling results in a map representation that is well-suited to modeling inaccurate and noisy range-sensor data, such as that produced by ultrasonic sensors, and requires minimal computational overhead. Fast map-building allows the robot to immediately use the mapped information in real-time obstacle-avoidance algorithms. The benefits of this integrated approach are twofold: (1) quick, accurate mapping; and (2) safe navigation of the robot toward a given target.

[7] Real-time obstacle avoidance is one of the key issues to successful application of mobile robot systems. All mobile robots feature some kind of collision avoidance, ranging from primitive algorithms that detect an obstacle and stop the robot short of it in order to avoid a collision, through sophisticate algorithms, that enable the robot to detour obstacle. The later algorithms are much more complex, since

they involve not only the detection of an obstacle, but also some kind of quantitative measurements concerning the obstacle's dimensions. In our system the ultrasonic sensors are continuously sampled while the robot is moving. If an obstacle produces an echo, the corresponding cell contents are incremented. A solid, motionless obstacle eventually causes a high count in the corresponding cells. Misreading, on the other hand, occur randomly, and do not cause high count in any particular cell. These methods yield a more reliable obstacle representation in spite of the ultrasonic sensor's inaccuracies. [8]. Many definitions of the Internet of Things exist, but at the most fundamental level it can be described as a network of devices interacting with each other via machine to machine (M2M) communications, enabling collection and exchange of data [9], [10], [11]. This technology enables automation within a large range of industries, as well as allowing for the collection of big data. Hailed as the driver of the Fourth Industrial Revolution [12], Internet of Things technology has already found commercial use in areas such as smart parking [14], precision agriculture and water usage management. Extensive research has also been conducted into the use of IoT for developing intelligent systems in areas including traffic congestion minimization structural health monitoring crash-avoiding cars, and smart grids. While the aforementioned fields appear vastly different to healthcare, the research conducted within them verifies the plausibility of an IoT-based healthcare system. Existing systems in other fields have proven that remote monitoring of objects, with data collection and reporting are achievable. This can therefore be expanded and adapted for monitoring the health of people and reporting it to relevant parties such as caretakers, doctors, emergency services, and healthcare centers. In today's rapid growing generation, the development in the field of new techniques has brought a vast and massive change in the field of mechanics, automation and advancement in all the sectors of our day to day life either related to family or social welfare. In all aspects we are experiencing now-a-day some or the other way kind of changes. All over the world showoffs due to sharply –witted mobiles have brought a drastic revolution in one's living standard and various other aspects of life. One such example is based on android applications which provides us complete open environment to do anything we are pleased with, related to any field we are that we are interested in guiding us in our daily life. The primary objective behind creation of this robot keeping a alert watch especially in war field when something fishy is caught at border side due to some suspected act of enemy or any if any unnatural things is felt to happen. This is done so, in order to avoid loss of human life as the military personnel have great danger of losing their life if they are found to spying any suspected area. So, to avoid it this robot will be useful to use in such cases. This robot vehicle will serve as an suitable material not only in aspect of providing border security but moreover can be utilized for different characteristic adversity and this machine for the defense segment will reduce loss of human life too. It may guide all the military personnel and make them prepared for any misfortune if going to occur within their shelter region. Different Finder can be utilized that can be embedded on mechanical vehicle like metallic finder sensor is utilized to distinguish metallic objects. Fire finder is utilized to distinguish correct heading of fire source. This robot is valuable at places where one cannot reach like mystery spots or little areas. The foremost centre of this sort of model is to supply one extraordinary security degree. The great advancement that we come across in in designing this robot is the use of Wi-Fi. We can use here IOT module also instead of Wi-Fi but IOT have a short range of connection to make the robot work more efficiently as compared to Wi-Fi based system. Wi-Fi

technique is useful in case if we are very far from the gadget also but our connection and Wi-Fi network is good then it works more significantly. The Node MCU ESP8266 used here acts as a link between the camera and the motor driver module fixed on the robot. It consists of motor driver module acts as a controller to control the motion of the robot for working of the wheels of the robot fixed in it. The motor module used is named as L293D and a connector is provided between Node MCU module and motor driver module. That connector will be utilized for supplying external power supply. Four wheels are which operates on DC Motor is used for the motion of the robot. The camera used here can rotate whole 360 degree to record each and everything at every side wherever we wish to figure out the situation at the place where it is used for spying purpose.

3. EXISTING SYSTEM

In the present existing system there is manual things of operations going due to that no faster the applications and cost effective. To make automation we re introducing the robot. This proposed robot will be controlled via manually with metal detection. We can control the movement of the robot by sending instructions via IOT app from our android phone. a multipurpose Robotic vehicle moves Forward,Left,Right,Backward and Stop directions with night vision spy camera. The existing system has used the 8051 micro controller and Arduino board in order to design the robot. Here we use 8052 series micro controller (AT89C52).

4. PROPOSED SYSTEM

Our project aims to provide a robotic vehicle equipped with a wireless ESP camera having night vision capability for remote monitoring/spying purposes. The night vision camera allows for transmitting real time night vision video even in dark environments. Whatever is recorded by the camera can be viewed in PC for reference.

The block diagram of IoT based firefighting robot is shown by fig.1, which consists of plurality of sensors, Arduino Uno, dc motor and IOT module. Power offer could be a regard to supply of electricity. A device which provides electricity or different kinds of power to drive an output load or various number of installed components. The supply is mostly ordinarily injected to voltage consuming component, less typically to mechanical parts, and barely other parts.

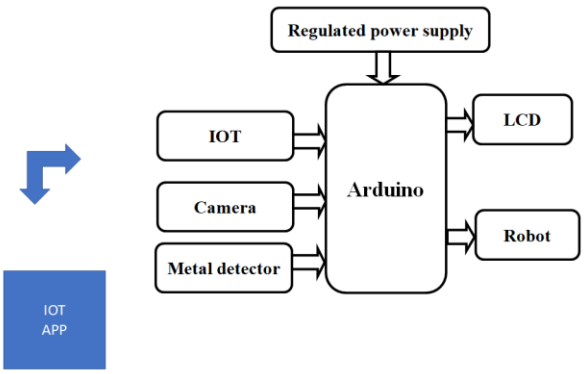
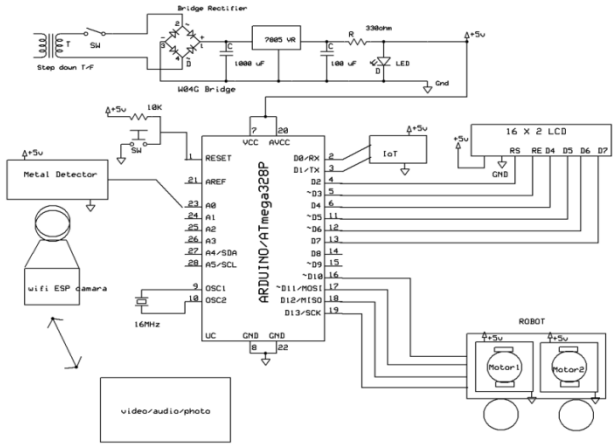


Fig.1. Proposed block diagram

WORKING MODEL:

In this device a 12V DC power is offer to all electronics related component. For this purpose, there is a requirement to step down electrical device, rectifier, transformer, and filter circuit for smoothing generated 12V DC power. When any metal detected automatically sends data to email of the image with ESP Camera along buzzer alert. The Attention commands are transferred to the electronic devices. In reverse, the electronic device transfers the stored messages from the wireless module. The micro controller checks the IOT command and after validating the command it performs further certain task on the robot or device. The micro controller used here in this project is ATMEGA 328 incorporated in an



Arduino UNO board.

Fig.2. Proposed Circuit diagram

PIN DESCRIPTION

- The ongoing revolution of Internet, together With the growing robotics in many activities of everyday life. In this method we use embedded C language for coding and debugging in Arduino by using ISP programmer. Arduino-IDE tool. And for controlling we use L293D driver IC. Finding this robot is a reprogrammable, multifunctional manipulator designed to move or pick and place the materials, Parts and tools. These robots are not only used for lifting purpose but also for polishing, sealing, Machine handling and minor surgeries also. The automatic mode robot is programmed within the embedded C Programming and it makes the robot to act as human beings. This version of robot is mainly defined by the factor named Artificial Intelligence. The fig block diagram gives an idea of how the robot works. It shows how the system circuit works and how the current flow goes through it. The wireless communication used is IOT which helps in transferring the data and messages.

5. RESULTS

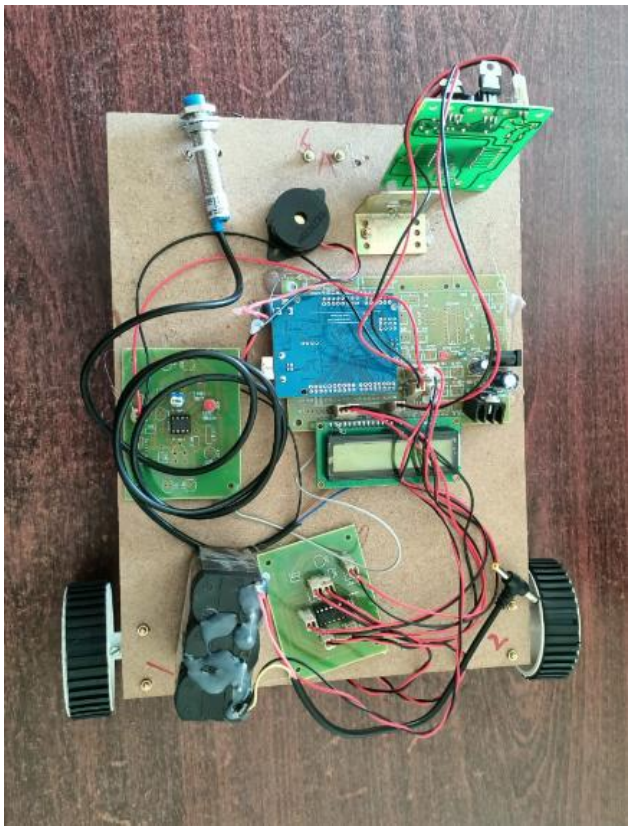


Fig.3. Proposed Output model

When the power is on the LED on the Arduino gets on and blink red colour. And the LCD gets on and displays the title of the project which is Landmine detection Robot. And LED on IOT module also blinks which is used to pass the data to the server.

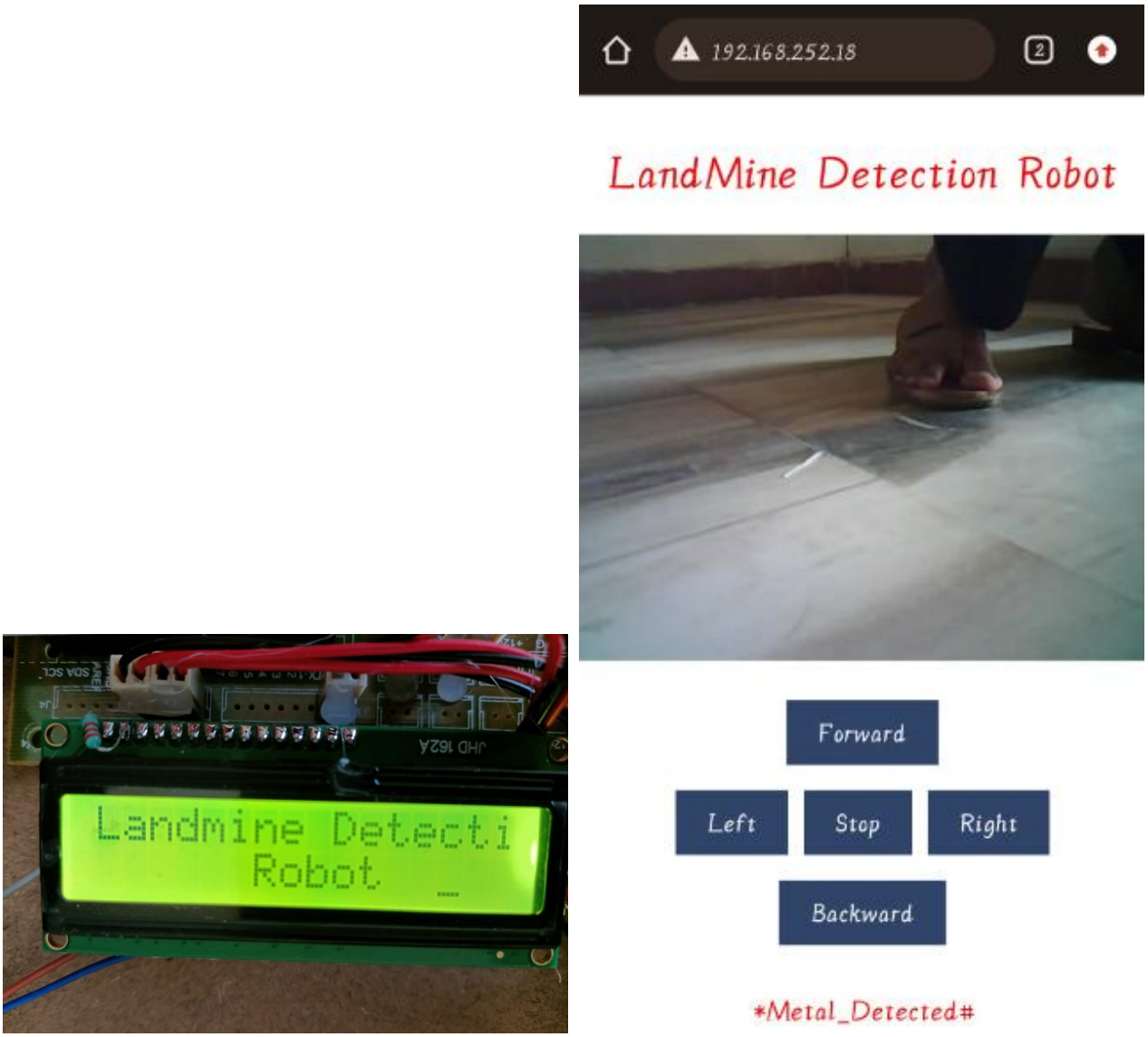


Fig.4. LCD Output Level Indication

We can control the robot using webserver Left, right, forward and backward and stop using android application.

Table.1 Results comparison Table

Parameter	Existing Model	Proposed Model
Microcontroller	8051	Arduino
Speed	Low	High
Complexity	High	Low
Efficiency	LOW	HIGH

6. CONCLUSION

We are going to designed a low-cost Microcontroller Based Android controlled Robot. The robot will move forward, backward, left and right direction by following the instructions given from the mobile with video surveillance system using night vision camera. This robot is controlled by IOT module with left, right, forward and backwards positions through android phone. When any metal detected automatically sends data to email of the image with ESP Camera along buzzer alert. This system can be helpful for various purposes. In this paper, we have proposed a design of a smart cloud robot to monitor the environmental condition of a remote place. A prototype has been developed and tested in our campus to illustrate the effectiveness of the proposed.

Future scope

In future studies this system integrates with GPS get the exact location of fire and gas detection detected. Module it utilizes an interface GPS sensor to transmit area of the leakage over to the IOT login system, here we use IOT to check, get and show the gas leakage caution and location over IOT.

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