Lora Based Controlled Surveillance Spy Robot

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Abstract - Robotics has been the idea of superior production for extra than 1/2 a century. As robots and their sidebars grow to be greater state-of-the-art, reliable, and miniaturized, these structures are an increasing number of getting used for army and criminal purposes. robots play a essential position in military affairs, from surveillance to capability explosives. With appropriate sensors to carry out on unique missions, mobile robots are operated remotely to come across popularity. With the development of generation inclusive of LoRa era goals to trade information wirelessly with radio waves that incorporate functions that make it less difficult, detectable and managed. The project offers a cutting-edge way of looking at far flung and border regions the usage of a robotic multi-motive robot primarily based on Lora's technology utilized in protection and military operations.

Key Words: Surveillance, Robot, Embedded C, Fritzing.

1.INTRODUCTION

LoRa is found to be the best IoT solution because it operates in an unlicensed Industrial Scientific and Medical (ISM) band (sub-gigahertz) and provides long-distance connectivity to low-power devices. Distribution of the distribution spectrum is an old form of voice change developed in 1940 that was once used for military communications. Monitor real-time data collection and timely data transmission to operator data. The employment of Defense applications plays an important role in keeping an eye on its citizens and LoRa modulation is an improved version of the traditional method as it is based on the chirp spread spectrum, which allows the use of low-end oscillators for storage, and makes synchronization faster and more reliable. In addition, LoRa technology provides more than a 150 dB connector budget, which provides good coverage. The idea of chirp to spread a spectrum modem converts one information into another bit series and spreads it across the spectrum. It thus makes it more powerful for channel sound because all the allocated bandwidth is used to broadcast the signal. LoRa aims to eliminate duplicates, reduce device costs, increase battery life on devices, improve network capacity, and support a larger number of devices. It transmits information about 10 to 15 km in rural areas and 30km in water. The disadvantage of this remote connection is the low data rate, which usually ranges from a few hundred to a few thousand bits per second (0.3 to 37.5 kbps) due to which helps us to achieve longer battery life due to lower power consumption. In fact, the whole electronic system is powered by batteries. Even a large number of items are connected with technologies such as GSM, ZigBee, Wi-Fi, and Bluetooth with high power consumption. Considering the energy needs and the issue of battery life, it is worthwhile to use LoRa technology to use an IoT robot based cognitive.

2. LITERATURE SURVEY

M.Karthikeya (2017), the author has proposed the defense surroundings kinds of army robots for attack operations and surveillance, the robots are been controlled by way of using fashionable brief distance RF waves which limits the capability, lessen the reliability and operation functionalities of the robots in terms of lengthy-distance faraway controlling. to triumph over this trouble, the author proposed a self-neural schema-primarily based framework used for independent control and selection making and a reporting gadget, embedded within the robot automobile. There undertaking consist of a Multi–angled rotatable digital camera for accelerated view of army base or other places. Ultrasonic sensor is used for direction control and object detection for motor control. [1]

k. Damodhar (2016), the writer has proposed surveillance robot gadget used for the real time surveillance in interfere region. This system turned into designed for video tracking, capturing the photographs and storing video frames in reminiscence cards for further veriwi-fication. This system is controlled by means of a cellular GUI primarily based utility linked over c084d04ddacadd4b971ae3d98fecfb2a wi-fi medium to the surveillance robotic. [2]

Saurabh Nalawade (2019), the author has proposed a robot unit the use of Zigbee generation to manipulate that unit. The digital camera unit is used for surveillance in a place which transmits stay feed to transportable television. With the assist of technology like Zigbee it's miles viable to managed long range-based totally robots inside 100m from remote places. [3]

Thair Ali Salh (2013), makes a speciality of layout and implementation of cell robotic with 3 subsystems: The obstacle avoidance, face reputation and detection leakage of combustible gases. inside the wirelessrst subsystem, an implementation of wi-fisynthetic neural network on subject programmable analog array has been used to manipulate the movement of the robot. A combination of principle thing analysis and linear discriminate evaluation characteristic extraction algorithms with aid vector system classiwi-fier is used inside the 2d schema. The 1/3 subsystem makes use of

MQ4 sensor with addition circuit to locate the leakage of flamable gases.[4]

Amit Maurya (2018), proposes a robotic for human rescue operation the use of cognitive systems in an environment that is improper for any human intervention. The robot can operate manually with human enter and is also capable of self sufwiwireless operation by being guided the use of sensors. In manual mode, human input is supplied wirelessly and its operation is located by using the feedback from a established camera. The robotic is established with IR and PIR sensors to help it navigate even as running autonomously. The robotic will resource in rescue operations by using allowing a minimal threat to human life. [5]

3. PROPOSED METHDOLOGY

1. The system uses ESP32 and NodeMCU ESP12E as a robot microcontroller and on the side of the system control respectively.
2. Various sensors such as Metector Detector Sensor, PIR Sensor (Human Detection) & Gas Sensor (Hazardous Gas Detection) are used.
3. The L293D Motor Driver is used to drive engines connected to a robot.
4. LoRa SX1278 modules are used for communication between the robot and the controller.
5. Data from the sensors connected to the robot is collected and transmitted by LoRa via the robot to the LoRa controller.
6. The toy stick is used as a controller to control the movement of the robot.
7. Robot navigation is done via Wi-Fi.
8. The 2C LCD is used to display the current state of the sensors sent by the robot to the controller.

4. BLOCK DIAGRAM

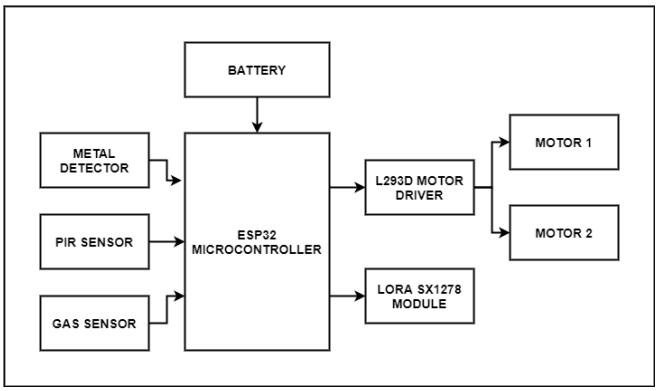

Fig -1: Block Diagram of Robot

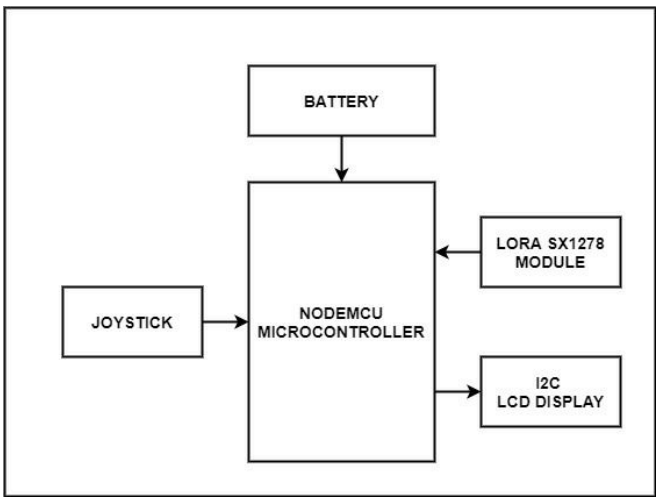

Fig -2: Block Diagram of Remote-control

5. EXPLANTION

The project being developed is split into two parts the transmitter and the receiver section. The transmitter section is the controller that is equipped with a joystick for movement control of the robot in a 2D Plane. The joystick works in both X and Y direction and positive and negative magnitudes. It consists of two potentiometers and hence we obtain x and y values which can be mapped to movement of robot. The controller also comprises of I2C LCD for displaying values from the Robot. The LoRa module here acts as an communication interface between the robot and the controller. The controller is powered by a 9V battery supply which is then converted to 5V with the help of 7805 voltage regulator. The receiver section or the robot is equipped with a L293D motor driver which has two DC geared motor connected to it for movement of the robot. The robot has a PIR sensor for sensing human presence along with a metal detector and hazardous smoke detector mechanism. The values of this sensors is collected by the microcontroller and is then passed to the LoRa module for sending it to the controller. Here a 12V rechargeable battery is used to power the system while it is converted to 5V using a 7805 based voltage regulator and then applied to the microcontroller.

6. CIRCUIT DIAGRAM

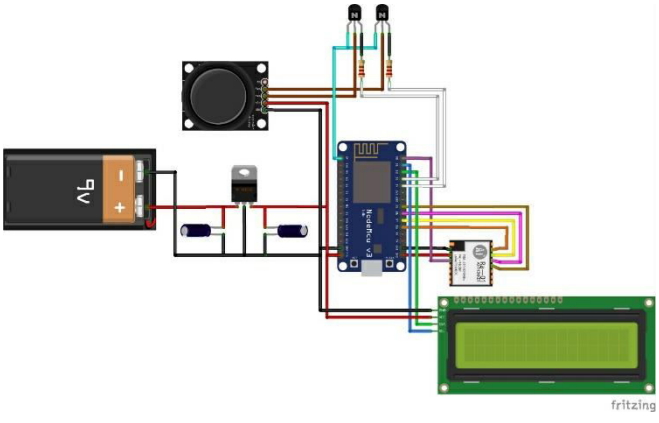

Fig -3: Descriptive Diagram of Remote Control

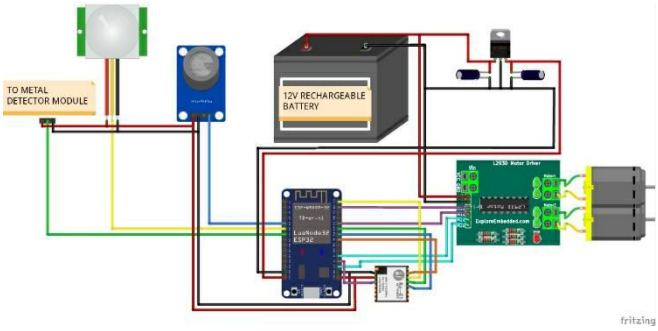

Fig -4: Descriptive Diagram of Robot

REFERENCES

1. M.Karthikeya and Mr. G. Sreeram “Intelligent Exploration and Surveillance Robot In Defence Environment” International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering. Vol. 3 pp120-123.
2. K. Damodhar, B. Vanathi and K. Shanmugam “A Surveillance Robot for Real Time Monitoring and Capturing Controlled Using Android Mobile” Middle-East Journal of Scientific Research 24, pp 155-166
3. Saurabh Nalawade “Robots for Surveillance in Military Applications” International Journal of Electronics and Communication Engineering and Technology. Vol.7 Issue 5, Pp.23939-23944.
4. Thair Ali Salh; Mustafa Zuhaer Nayef "Intelligent surveillance robot" 2013 International Conference on Electrical Communication, Computer, Power, and Control Engineering (ICECCPCE)
5. Amit Maurya; Mayuri Sonkusare; Akshata Raut; Dhanashree Tamhane; Deepali Palase "Surveillance Robot with Human Detection" 2018 Second International Conference on Inventive Communication and Computational Technologies (ICICCT)