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SMART GRID ROBOT FOR HIGH VOLTAGE TRANSMISSION LINES

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Abstract —The power lines are prone to problems with the unconditional whether in different locations. Workers have to check manually that, if there are any faults occurred in the power transmission lines and this makes their life risky .Effective maintenance is required to increase its reliability .This paper concentrates on the detecting and locating faults in power lines and also to provide uninterrupted power supply to consumers. It identifies the illegal usage of power .This robot based equipment makes the task easier, efficient and safe.

Keywords—robot, faults, detection, theft, sensors.

1. INTRODUCTION

Electricity has become must in this present generation. In our country consumption of electricity is increasing at faster rate. Electrical power system is divided into generation, transmission and distribution. Losses in distribution system is very high due to fault and theft.

The uninterrupted power supply is not available because of the problems associated with the high voltage transmission line. This can be solved by regular inspection and maintenance of power lines. Survey tells us that only around 70% of the total power generated in the power plants reach the end user. Supply to the power lines should be off during manual corrections, this causes extensive power loss which, in the long run, will affect the economic and electrical stand of our land. Hence, we decided to design a robot that will travel along the high voltage transmission lines where normal manual inspection cannot be done frequently. The device keeps track of environmental conditions such as temperature and transmission line parameters such as current .By this robots ,periodical check-ups be avoided and any damage of power transmission lines can be detected.

1.1 Problem Statement

- Conventional methods needs manual inspections which are dangerous because of high voltage in the transmission lines.
- Any Fault in the transmission lines can be detected only after any voltage drops or any power cut occurs in the supply.

1.2 Objectives

- The aim of the project is to design a robot which will detect the faults occurring in transmission lines by measuring electrical quantities such as voltage, current and temperature.
- To provide uninterrupted electrical power supply to the customers.
- To Identify the illegal usage of power.

2. THE TECHNICAL ROUTE OF THE STUDY.

A. Materials Required

- Temperature Sensor
- Ultrasonic Sensor
- Color Sensor Current Sensor
- Arduino Microcontroller
- Node MCU
- 5V Buzzer
- 12V, 1.3.Ah Battery
- DC Motors and driver circuits

2.1 METHODOLOGY

The robot main body consists of base chassis. This consists a pair of dc motors which are used for driving wheel mechanism , where it helps in movement of robot based on its input. Robot required the control activity to attain the specified task to provide better performance and decision making process. It consists of different types of sensors like current sensors, temperature sensors, color sensors etc. as shown in fig(1) are used in it for finding the faults.GPS is used for tracking the location . NodeMcu is used for wireless transmission and to intimate the concerned authority to rectify the problem before it becomes an issue .The robot can be controlled by mobile application in this precised work.

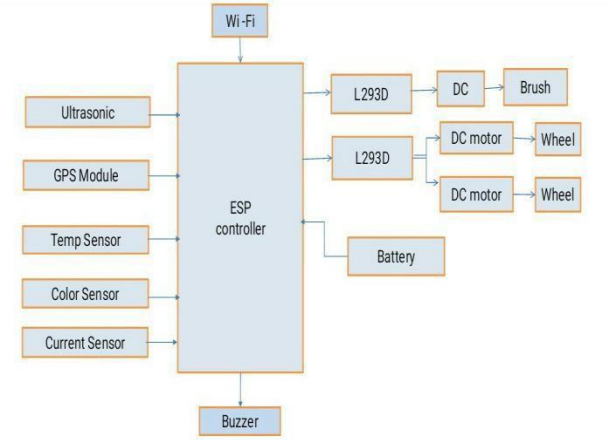

Fig -1: Block diagram

2.2 FUTURE SCOPE

Electricity has become inevitable in current generation. This has been achieved by innovations in the fields of transmission systems and power grid. Even though there are lots of advances in this area, uninterrupted power supply is not achievable due to the problems associated with transmission lines. These problems can be resolved by appropriate inspection and maintenance of electrical lines. The complete automation of robot will be by taking up by the self decisions while travelling on high voltage lines. The performance analysis of robot will be better in real time inspection through the integration of cameras, thermal sensors etc.., The accident of robot can be avoided by modifying the self lifting mechanism through the help of propeller. This project can also be modified for single lines than the parallel transmission lines.

3. CONCLUSIONS

This project aims at reducing the complexity underlying in inspection of the overhead high voltage transmission lines by inspecting the main parameters of the parallel transmission lines by balancing the forward and reverse moving robot. The electrical distribution system has microcontroller and GPS based protection system which is a reliable technique for both monitoring and controlling actions .This concept mainly analysis the faults and helps to minimize the fault and provide uninterrupted power .This robot eliminates the requirement of human power and it provides accuracy as well as efficiency .

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