



IJRASET

International Journal For Research in
Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 11 **Issue:** III **Month of publication:** March 2023

DOI: <https://doi.org/10.22214/ijraset.2023.49642>

www.ijraset.com

Call:  08813907089

E-mail ID: ijraset@gmail.com

Transmission Line Physical Inspection Robot Using Electrical Switch Gears and Embedded Logic

Kirti Dhenge¹, Kunal Urade², Saurabh Panchal³, Sharwari Taiwade⁴, Pankaj Kumar⁵
^{1, 2, 3, 4, 5}Department of Electrical Engineering, K.D.K. College of Engineering, Nagpur, India

Abstract: The real time methodology for inspection of Transmission line by using wireless robot is proposed in this project. As the technique is very much efficient for the inspection of transmission line. It is very risky to work with transmission line in normal as well as in Hazardous environment over the distance but by using the robot, inspection can be done properly and overcome it. The robot works on overhead transmission line which is composed of wheels and arms. An embedded computer based programming is chosen as for the control system. Wireless camera is installed to obtain the video and the communication is achieved. As we compare with the oldest technology to search problems in transmission line and how can it be made easy with a robot. This project detects the inspection of transmission line using switchgear and embedded logic with the help of a robot.

Keywords: Mobile robot, inspection, visual inspection, service robot.

I. INTRODUCTION

A physical inspection robot is a machine to perform inspection in a hazardous environment. In this case, it includes electrical switchgear which are used to control and protect the robot. The robot can be controlled remotely either manually or automatically and can be programmed to follow a specific inspection. It operates safely as it increases the reliability of the power grid and minimizes cost and time.

The procedure used for inspection and verification of wires or cables of energy transmission lines is subject to the experience of one technician who, through binoculars, covers the lines of transmission in a helicopter and is able to visualize points where damage seems to exist. After this previous identification, technical teams are sent to verify, with greater detail, if the imperfection configures a situation of maintenance; the maintenance is carried out in a de-energized line.

This paper describes the project of a mobile robot able to carry out visual inspection of transmission lines, reporting to the operator possible imperfections. This work is presented divided into mechanical system, mechanism for transposition of towers, base-robot operations communication architecture, development of the control system and development of the visual inspection system.

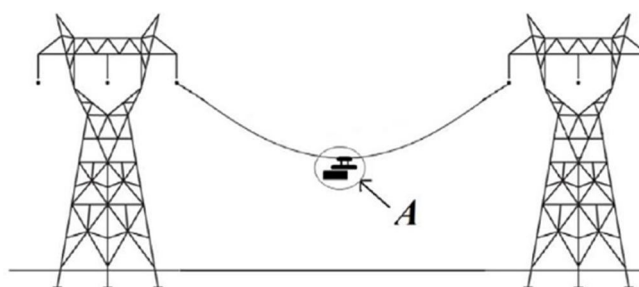


Fig.1 Schematic Diagram

II. LITERATURE SURVEY

Before this technology, people used to walk on cables. It is a high-risk job, performed by people moving to the cables. This is a very costly method and also risky. Companies deploy teams called "line-men" who are each paid about ₹ 25,000 monthly plus a dearness [1] allowance of ₹ 7,500, totalling about ₹ 1 lakh expensive per month. Using helicopters for fault detection and maintenance is also too costly & risky.

Thermal binoculars and special attire are used that can cost between Rs 22-25 lakh a piece. [2] 3. On hilly regions it is very difficult to go there for maintenance so Robot is easier to use on that line. It is also work on the night time because of using thermal infra-red cameras.[3]

We also get exact location of fault for repairing. Faults in the transmission line may prove extremely hazardous. This may lead to the total breakdown of the power system leading to instability. [4]

So the preventive maintenance of transmission line is of extreme importance. In order to serve this purpose a periodic and regular inspection of transmission line is very necessary. [5] 6. A real time methodology for inspection of transmission line by using wireless robot is proposed in this project. The inspection Robot with wheel driven can crawl along the overhead transmission wires. [6]

III. BLOCK DIAGRAM

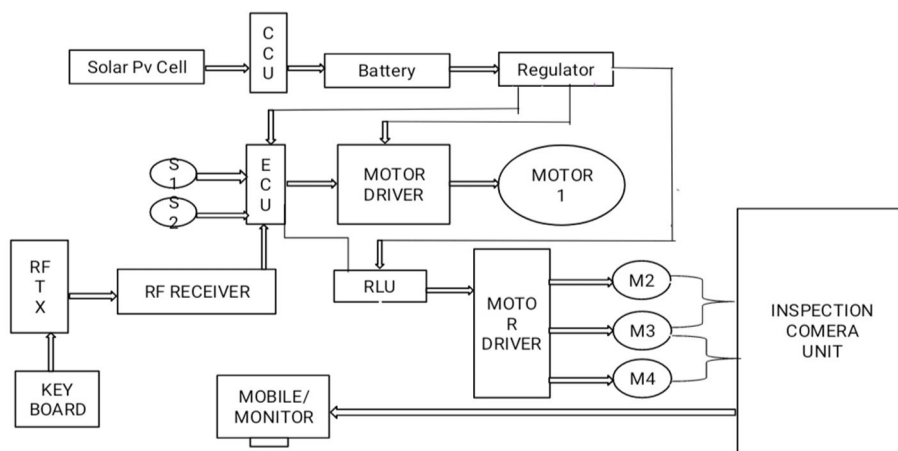


Fig.2 Block Diagram of System

IV. WORKING

Solar panel : it will converts solar energy to electrical energy Means solar panel generates DC.

CCU: charge control unit will provides a specific path to control/charge system and It also provides standard voltage levels to battery.

Battery: it is storage device.

Regulator: regulator section consists 2 no. of integrated circuit's one is 7805 and second one is 7812 The IC carry's 7805 for 5v and other IC carry's 7812 is for 12v dc supply and Both will provides constant outputs. In this section Arduino plays main role ECU will take inputs from sensors and provides desired outputs to final control elements as per program. The L293D is a 16-pin Motor Driver IC which can control a set of two DC motors simultaneously in any direction.

V. COMPONENTS

- 1) Relay
- 2) Mtor Driver IC L293D
- 3) Contactor
- 4) Sensor
- 5) Arduino
- 6) Microcontroller
- 7) Solar Panel
- 8) Embedded C language
- 9) Voltage Regulator IC 7805/7812
- 10) DC Motor
- 11) Battery
- 12) Camera
- 13) Monitor/ Mobile

VI. CONCLUSION

The problem of risk to work with transmission line in normal as well as hazardous environment over hundreds of kilometres is overcome by this robot. The regular and periodic inspection of transmission line will now become possible using this robot. So the preventive maintenance of transmission line can be done as and when required and further hazards to the power system can be avoided.

VII. RESULT

- 1) To increase the efficiency, accuracy and safety infection process.
- 2) It reduces the human effort and risk of injury or accident.
- 3) It collect accurate data and recognise exact point of damage.

REFERENCES

- [1] Campos, M. F. M.; Pereira, G. A. S.; Vale, S. R. C.; Bracarense, A.Q; Oliveira, M. P. and Pinheiro, G. A., 2002. "A mobile manipulator for installation and removal of aircraft warning spheres on aerial power transmission lines". In Proceedings of the IEEE Conference on Robotics and Automation, IEEE Conference on Robotics and Automation, Washington, DC, 2002, 3559-3564.
- [2] Davison, A. J., Kita, N. 2002. "Active Visual Localization For Multiple Inspection Robots". Advanced Robotics. Dixon, W. E.; Dawson, D. M.; Zergeroglu, E.; Behal, A., 2001. "Adaptive Tracking Control of a Wheeled Mobile
- [3] Robot Via An Uncalibrated Camera System & quot;, IEEE Gundimeda, D. P.; Veluvali, S.K. 1991. "An Automated Vision Based Approach For High-Voltage Insulator Testing". Electric Power Systems Research.
- [4] Jones, D.I.; Earp, G.K., 2001 "Camera sightline pointing requirements for aerial inspection of overhead power lines"
- [5] Electric Power Systems Research 57, pp. 73-82. Nakashima, M.; Yano, K.; Maruyama, Y.; Yakabe, H., 1995 "A hot line work robot system "Phase II" and its humanrobot interface "MOS" ". Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems, vol.2, pp. 116-123.0
- [6] Peungsungwal, S.; Pungsiri, B.; Chammongthai, K.; Okuda, M., 2001. "Autonomous robot for a power transmission line inspection". Proceedings of the IEEE International Symposium on Circuits and Systems, vol. 3, pp. 121- 124.



10.22214/IJRASET



45.98



IMPACT FACTOR:
7.129



IMPACT FACTOR:
7.429



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089  (24*7 Support on Whatsapp)