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Rail Robot-Unmanned Automatic Track Cleaning Robot

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ABSTRACT: Manual scavenging is done now-a - days, owing to the peculiar nature of the job, and many who are engaged for this job suffer from related health problems. The prevailing condition can be rectified to some extent by the adequate use of robotics and control technology. This device is the first of its kind proposed to be developed exclusively for the Indian Railways. Also, the railways can save a lot of money on water and labour charges. The application of this project in the current railway cleaning scenario will ensure that there will not be any nauseating scenes at railway stations across the country. We have accomplished some functionality critical in the waste clean-up in railway tracks, and have also tried to find solution for connected problems.

I.INTRODUCTION

Indian Railways is one of the largest railway networks in the world. Railways cover the entire length and breadth of the country. It has a total track length of 1, 14,500 km, with 7083 stations [1] dotted along. Indian Railways is also the largest employer in the country. It has come up as one of the nation's fast growing and profit making organizations. However, sadly enough, it has been years since the railways achieved complete sanitation. Open defecation through railways, unclean toilets, choked basins, and littered bogeys and tracks are the causes of the present poor sanitary condition of India's Railways

The toilets that are constantly in use in the train- coaches are small compartments with hole, through which human faeces is disposed off openly on tracks [1]. Disposing off the human excreta containing various harmful and deadly disease-causing microorganisms into the open tracks and thereby contaminating country-wide rivers, streams etc. Indian Railways is perhaps becoming the biggest mobile source of environmental pollution in the country. And of course, this kind of round -the-clock disposal of vast quantity of human waste in open environments to keep the trains clean is not at all healthy and advisable. The garbage from pantry cars and tray loads of hot meals on station and in train are also thrown off through the doors and windows of bogeys onto the tracks polluting the stations and places all along the train's way. The existing cleaning process of the tracks and the railway platforms is manual, which is tedious and far from the desired level of sanitation or cleanliness.

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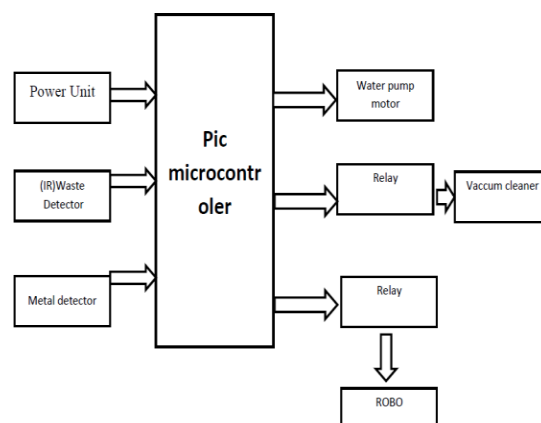
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II. LITERATURE REVIEW

Sanitation is always regarded as a key of development intervention. Sanitation generally refers to the provision of facilities for disposal of human urine and faeces. It deals with maintenance of hygienic conditions through services such as collection and disposal of solid and liquid waste. Several deadly diseases because of lack of sanitation like diarrhea, dysentery, typhoid, malaria, filariasis dengue and schistosomiasis are the outcome of improper or lack of sanitation. Indian Railways has always been a possession which has made us proud as an Indian. Railways cover length and breadth of country through its rails. It has 1,14,500 km of total track and 7083 stations. It has come up as a fast growing and profit making organization. However it has been striving since many years to achieve complete sanitation in railways. Open defecation through railways, unclean toilets, choked basins, litters in bogeys and along tracks are the causes that has compelled the environmental engineers to put a thought over sanitation in railways. This study aims to bring the topic in to focus so as to create the awareness that how important it is to maintain sanitation in railway premises and how environmental pollution can be controlled through railways. We have celebrated '2008' as International Year of Sanitation. Similarly one of the targets set for the millennium development goal (MDG) by the members of United Nations is to 'halve, by 2015, the proportion of the population without sustainable access to safe drinking water and basic sanitation'. In view of this target, we can contribute our big share by achieving complete sanitation in railways which is one of the most successful and largest organizations of India.

III. HARDWARE CONFIGURATION



proximity sensor:

A proximity sensor can detect metal targets approaching the sensor, without physical contact with the target. Proximity sensors are roughly classified into the following three types according to the operating principle: the high-frequency oscillation type using electromagnetic induction, the magnetic type using a magnet, and the capacitance type using the change of capacitance. . The sensor detects this change in the oscillation status with the amplitude detecting circuit, and outputs a detection signal.

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IR Sensors/Detector:

Infrared is an energy radiation with a frequency below our eyes sensitivity, so we cannot see it. Even that we cannot "see" sound frequencies, we know that it exists, we can listen them. Even that we cannot see or hear infrared, we can feel it at our skin temperature sensors. When you approach your hand to fire or warm element, you will "feel" the heat, but you can't see it. You can see the fire because it emits other types of radiation, visible to your eyes, but it also emits lots of infrared that you can only feel in your skin.

Robot:

Some robots use hydraulics (the kind of fluid-filled tubes used on mechanical excavators and tipper trucks) so they can lift or move heavy objects with relatively little effort. The Space Shuttle's manipulator arm is another example of a robot-like device that uses hydraulics. (It's not really a robot as such: the arm is operated by one of the pilots—it's not controlling itself.)

IV. PROPOSED SYSTEM

This proposes that the prevailing condition can be rectified to a considerable extent by the adequate use of robotics and control technology. The Northern Railway is now undertaking a massive exercise to ensure cleanliness by using track cleaning machines [3]. The team of Northern Railway Diesel Loco Shed, Shakurbasti at New Delhi, has developed the concept for the design of very large, heavy-duty equipment mounted on a Railway wagon for track cleaning. Another similar machine introduced in Network Rail (UK) is the ballast cleaner. A ballast cleaner is a machine that specializes in cleaning the railway track ballast of impurities [4]. But the main problem facing by these machines are they are massive. These machines are intended to clean only the major stations and fails outreaching of minor stations. We need huge investments to build and operate such machines considering the huge networks of Indian Railways.

This paper attempts to identify the main technical elements contributing to the design of cleaning robots. The paper is organized as follows. Section 3 describes some of the mechanical configurations and methodologies used. It also presents a list of design requirements and discusses some of the control architectures used. Section 4 discusses navigation algorithm specifically designed to provide complete coverage of areas to be cleaned by the robot, and also the observations made after completing the robot. Section 8 summarizes the paper and identifies specific research areas that have not been addressed so far.

V. CONCLUSION

The Automatic Track Cleaning Robot provides an efficient cleaning process and promises dirt free railway tracks in the stations with minimal human interaction. The proposed application of robotics can also be utilized for cleaning in emergency interventions. Intelligent Track Cleaning Robot is a revolutionary new way to clean around switching points. Intelligent Track Cleaning Robot is a time-saver and dirt-destroyer. Our proposed robotic application may serve in scenarios where manual scavenging is unhealthy. The system can be displaced and operated by external support making it user-friendly..

The robot is an efficient alternative for manual scavenging. Compared with the presently available systems, our robot saves on labour costs and time, as a single machine can do the work of multiple labourers in less time. It is eco-friendly as well. It maintains a log of cleaned and unclean area in the secondary storage. It can be made fully automatic. The main constraint in the development of a cleaning robot is the size, since without a minimal size it will not maintain its

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mobility. Intelligent TrackCleaning Robot can be worked only in a specified range along the station.

REFERENCES

- [1] Dr. Manoj Hedaoo, Dr. Suchita Hirde , Ms. Arshi Khan ,“Sanitation in indian railway premises: a great cause of concern” , International Journal of Advanced Engineering Technology, 2015
- [2] Dr Aparajita Baruah, The Prohibition of Employment as Manual Scavengers and their Rehabilitation Act, 2013: A Review, Baruah. Space and Culture, India 2014
- [3] http://www.nr.indianrailways.gov.in/view_detail.js p?lang=0&dcd=3591&id=0,4,268
- [4]<http://www.railwaystrategies.co.uk/articlepage.ph p?conten tid=2196&issueid=103>
- [5]Mr. Rajesh Pant, Mr. Mayank Uniyal, Mr. Prashant Ratodi “Manual Scavenging and Technological Solution to Eradicate It. (Turning Scavengers to Engineers)”, IOSR Journal of Mechanical and Civil.
- [6]E. Prassler, E. Stroulia, M “Office Waste Cleanup: An Application For Service Robots” StrobelResearch Institute for Applied Knowledge ProcessingP.O. Box 2060,D89010Ulm,Germany{ prassler,stroulia,mstrobel} @faw.uni-ulm.de
- [7]Tarek Mohammad ”Using Ultrasonic and Infrared Sensors for Distance Measurement” by International Science Index, Mechanical and Mechatronics Engineering Vol:3, No:3, 2009
waset.org/Publication/683