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Intelligent Railway Track Cleaning Robot with Waste Segregation

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Abstract

In India, railway transportation is one of the important transportation. Due to population most of the peoples use railway transportation for their daily activates. Now this type of transportation is developed day by day. The government is also taking various steps to develop this department through various technologies. Millions of peoples using this railway transport. But wastage disposal is the major problem in railway department. Now this current situation human wastage and solid wastages are disposed by human beings only. So, immediate solution is needed to remove the wastages from railway tracks. Because of that the cleaning peoples are affected various hygienic problems. To avoid this problem in this research proposed a new automatic robot is used to clean the rail way track. In this current digital world most of the machines are run in automatically. This automatic cleaning robot is constructed by using special wheels, enhanced sweeper roller etc. This proposed robot definitely provides the better solution compared with an existing system.

Keywords:*Internet of Things (IoT), Transmission Time, Ultra Sonic Sensor, Garbage, Motor Driver.*

I. INTRODUCTION

Government of India had taken the control of entire railway department from 1950. Railway transport system connects the most of important cities entire country within a single network. According to the survey more than 19, 000 trains run in this country and above 23.3 crore travelers use this railway transportation for their daily activities. Using this railway transport 2.5 million tons of various types of products also carried daily. The railway transportation system links the various parts of the country easily. Because of that various business activities are increased. But most of the technologies used in this railway transport were expired. Railway transport system also needs modern communication technologies. Sanitation is the very important issue in the railway department. The travelers throw the solid wastages to the railway track itself. Indian railway department also introduce lot of activities for cleaning activities. Solid wastages are divided into two major categories. The two categories of solid wastages are biodegradable and non-biodegradable. Based on the survey every train produces 1,100 plates, 1,750 cups and 800 various plastic items in daily basis. The human being are using toilet for expose the wastages. Release the human beings wastages from the railway track is the major problem of railway department. The human wastages are immediately disposed on the tracks only. Due to this various type of pollution problem will occur and also harmful micro organisms are spread on the tracks. These items pollute soil, water and the entire environment of the country. To dispose these all type of the wastages requires more money and human energy. Due to the crack in railway tracks a lot of accidents are happened recent days. To avoid such kind of problem this proposed system is used. This system is used to clean the railway track automatically and to detect the cracks in the track.

The second part of this proposed article describes about the existing methods used to clean the railway tracks. Section three explains about the proposed system and the process flow. The section deals with the simulation result of our proposed model. Section five concludes the result.

II LITERATURE SURVEY

Thiyagesan Jesin James et al., says that cleanliness of the railway tracks and surroundings create the social problem in our country. Now commonly the passengers are throw the solid wastes on the railway tracks. The passenger's wastages also clean by the human being only. For this problem the immediate solution is needed. The cleaning persons are affected by various health issues. To avoid this situation robots are used for this particular purpose. Here the authors constructed a new system for cleaning railway track using control technology. This robot will be move on normal place as well as railway tracks. It was be designed for cleaning railway track, it will be work in a systematic way. This robot was constructed by using four wheels with waste collecting unit, cleaning part, disposed part, control part, sensing device and power supply part. This system was exclusively developed for clean the railway tracks automatically. By using this system the railway department can able to save large amount of money and man power [2].

Nehal D. Jadhao et al., says that India can move to the moto of green and clean. Here the authors constructed a new system for cleaning a railway track automatically. The prototype is the alternative system of currently using system. This machine is entirely overcome the disadvantages of existing system. The existing cleaning process was done by manually. This is the very tedious process. Cleanliness is the major requirement of entire railway department. Using this prototype spray the water through with its hole by using water jet. Here suction part is used to collect the wastages on the railway track [3].

Novel Kumar Sahu et al., said that Indian Railway department was criticized for generating an environment pollution by disposing human waste on the railway tracks. In the train contain a small toilet that contains a hole directly faced on the floor. The human wastages are exposed directly on the railway track. To avoid this situation Indian railway introduces various activities like eco friendly bio toilets. But this toilet is very costly compared with an existing system. Automatic wastage collection and cleaning system is one of the solutions for above mentioned problem. This system was embedded with the existing toilet without any changes of its working procedure. This system also used in bus transports [4].

Balasaheb Kasure et al., says that sanitation is actually represents disposal of human beings urine and faces. This proposed model describes the sanitary condition of the railway tracks. The various fatal diseases are occurring in the human because of less sanitation. Indian railway is one of the fast growing departments. The main purpose of this article was to create awareness to the people regarding railway track sanitation and avoid various types' pollution such as land pollution, water pollution and air pollution. [5]

G.Kasthuri et al., explain about the importance of Indian railway. They said that Indian railway is one of the biggest webs in the world. This paper deals with detection of cracks in the railway tracks manually or automatic manner. To identify the creaks in the railways track is very difficult in manual way. It requires large amount money of human power. In this paper the authors was constructed a new system for detect the railway track automatically with the help of current communication technology. This system consists of micro controller, IR sensors and various hardware parts. The alert message will also send to the administrator by using GPS concept. The major part of this system is microcontroller. This system is run by using sunlight or battery. The proposed system moves on the track and the sensors are connected the in front of the system. If any crack is identified in the path, this system cannot move and find the location. This location will be submitted to the controller with the help of GPS and GSM. The SMS also sent to the admin of this system. [6].

Renupriya.G et al., says that in railway system track is the important part. Already some systems are implemented for detecting to detect railway track. Sanitization is also one of the major issue in this current situation. Human wastages are cleaned by humans only. Human beings also clean the solid wastages from the railway track. This manual cleaning leads to the severe health problem. In this article the authors proposed a trolley to detect the railway crack and clean the wastages automatically. This system consists of various hardware parts like microcontroller, Sensor and vacuum cleaner [7].

S.Jeya Anusuya, et al., says about the existing procedure used to clean the solid wastages on the railway tracks. Normally human beings are clean the railway tracks manually. Due to this cleaning person affected by various health related issues. To overcome this issue automatic cleaning system was introduced in this paper. This system is definitely helpful to the railway department. Large amount of money and human resources are needed to clean the track manually [8].

Chaitra T A et al., said that sanitation was the major issue in railway department. The human beings only clean the human wastages and other solid wastes on railway tracks. In this situation immediate solution is needed to solve this above mentioned problem. Using control technology the automatic cleaning system was developed by these authors. This system was used to detect the crack on the railway track and clean the wastages automatically by using robots. This system consists of four wheel robot, power supply, cleaning part, spray part etc. LRD sensor is used to detect the crack on the railway road [9].

III PROPOSED METHOD

In this current situation human wastages and solid wastages are disposed by the human beings only. Because of this cleaning peoples are affected by various critical heal issues. The environment also polluted of this wastages. In this proposed system is used to dispose the wastages by the intelligent robot with the help of current communication technology devices. The following fig 1 shows the architecture of our proposed model. In this proposed system consists of various parts.

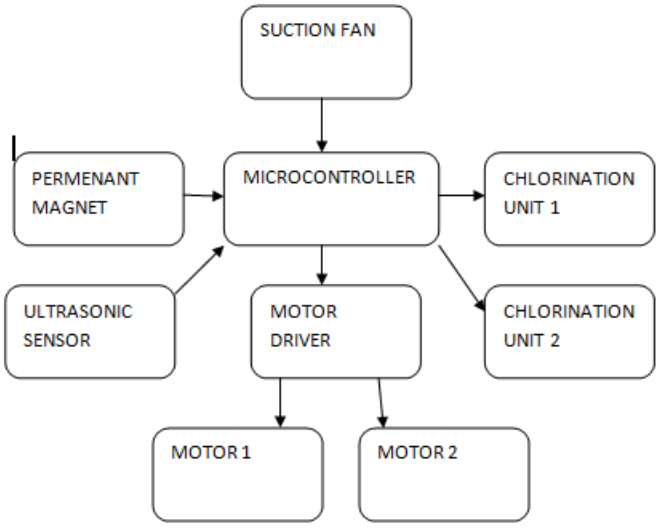

Fig 1 Overview of proposed System

The main parts of this proposed system is sweeping system for sweep the railway track, retractable wheels for move the robot, chlorination part for provide bleach in specified intervals. The sweeping part is connected in front of the robot. This sweeping part consists of vaccum fan. The wheels in the robots are used to move along with the railway track. It is manufactured by using aluminum. Chlorination part is integrated with the back portion of the robot.

This part is used to bleach the cleaned path by using chlorine. This part also contains small holes. From the holes the chlorine liquid is exposed and spray on the path. Another important part of this proposed system is alarm part. This part is developed by using ADK controller. A permanent magnet is been attached to the robot which will try to attract the iron particles in the railway track.

IV RESULTS AND DISCUSSIONS

This proposed model is used to collect the human waste and other solid wastes from the railway track automatically using current technologies. This system sprays the chlorine on the railway path after cleaning. The following fig 2 shows the prototype of our proposed system.

Fig 2 Railway track cleaning boT

This proposed device is runs on the railway track using their wheels and collect the waste by two types. We have a permanent magnet which will help in attracting iron particles. A vaccum fan is been attached to the robot which will help in sucking the paper wastes lying on the track area. An ultrasonic sensor is attached which will help in stopping the vehicle when the obstracle is sensed. We also have two chlorination tank which will pour chlorine water to clean the track. This entire process is controlled by using Arudino Controller. Mainly this controller is used to construct electronic real time projects. This board consists of hard part and a small part of software content. This board uses the simple C++ language only. This board is also connected with the various sensors.

V CONCLUSION

This proposed automatic robot is used to ensure the entire hygienic level of the railway station and railway tracking environment. Here automation means all the operations of the robot is executed automatically. This system entirely avoids the human intervention in the operations of this proposed system. This system is designed to sweep the area in between the railway tracks. This system can be attached with the railway track. Our proposed model may provide the better result compared with other systems. This system creates clean environment and reduce the human resources. The main objective of this proposed system is to provide better working environment and hygienic surroundings.

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