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# WIRELESS TRAIN PANTOGRAPH FOR FUTURE TECHNOLOGY WITH AUTOMATION

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**ABSTRACT-**
Many anticipate that integrating wireless power transfer (WPT) technologies into the existing railway systems wi ll improve them as the technology becomes more widely used, particularly in public transport.The design method ology of a WPT system for railway application is presented in this study.The benefits and effectiveness of a pote ntial train system are examined after first analysing the fundamental concepts of magnetic fields and a WPT circ uit.After that, in order to develop a wireless train system, it looks at other important aspects including performan ce requirements and EMC criteria.

## I. INTRODUCTION

Pollution from burning fossil fuels and depletion of natural resources have been major global problems since the I ndustrial Revolution.One initiative to lessen the detrimental effects of global warming on the environment is the sh ift towards electric automobiles.The creation of a practical and efficient electric car is a longstanding goal for scie ntists.

Safety is major barrier preventing them from realising their ambition, and it is in fact essential to the development of an environmentally friendly car.One viable approach to lowering the amount of oil energy consumed is the app lication of wireless power transfer (WPT) technologies to public transportation.

Despite the fact that the idea was first presented in the 1970s, it is indisputable that the Recently, Korea Advanced Institute of Science and Technology (KAIST) showed the possibility to put the WPT vehicle on the market in the transportation industry by introducing an On-Line Electric Vehicle (OLEV) . By installing the power lines underneath the ground and pickup modules on the bus, OLEV resolved the critical problems of conventional electric cars, such as the bulky size and weight, low power capacity, high expense, long recharging time, and short life expectancy of batteries. The railway systems, which are spotlighted as future green transportation systems, can be the application of the wireless power transfer technology. The railway systems inherently have advantages in higher efficiency due to smaller air gap for wireless power transfer system, and almost no lateral displacement as well as increased attractiveness, and reduced management costs. In this paper, we introduce the concept of wireless power transfer technology applications to railway system and suggest design methodology for high-power wireless

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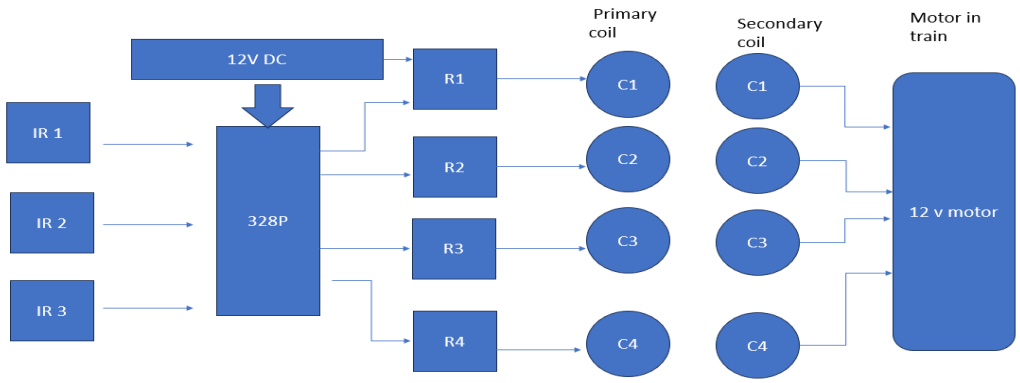
power transfer systems with high efficiency. Also, the concerns on the leaking electromagnetic fields and its effects on human bodies are discussed.

## II. METHODOLOGY

The first thing to consider while building a train system is the performance requirements.It is crucial that trains h andle high power requirements while maintaining safety because they operate at far higher voltage and power ou tput levels than buses.
Since they directly impact the system's magnetic flux densities' intensities, frequency and voltage in the WPT s ystem are crucial to its operation and should be given careful thought.
Due to its critical importance, the EMF criteria for WPT railway systems are covered in detail in the next subsect ion. Power supply and outputs from a few high-speed trains are used as examples in this section.

## III. BLOCK DIAGRAM




Diag.1- Block Diagram for the contactless train

A. Hardware Implementation

**1) MICRO-CONTROLLER :** The heart of the whole project is the Micro-controller unit. For this project the ESP32 Micro-controller was used. It is a low power general purpose micro-controller with good processing speed, small physical dimension, that is durable and cheap.it having in built wifi and Bluetooth.
In above diagram as we see that the all the components is communicate with the esp32 microcontroller it is the heart of our system and hence the all the devices input and output is attached with the controller . We use ir sensor for detecting any faults in railway track the overall system communicate with the controller which sense the input coming from the sensor and send this output to the relay . *coils uses for power supply which passes.*

***2) LCD DISPLAY*:** this is 16*2 display which shows the process output like ,humidity in air ,temperature and other parameter like water pump is ON or OFF.

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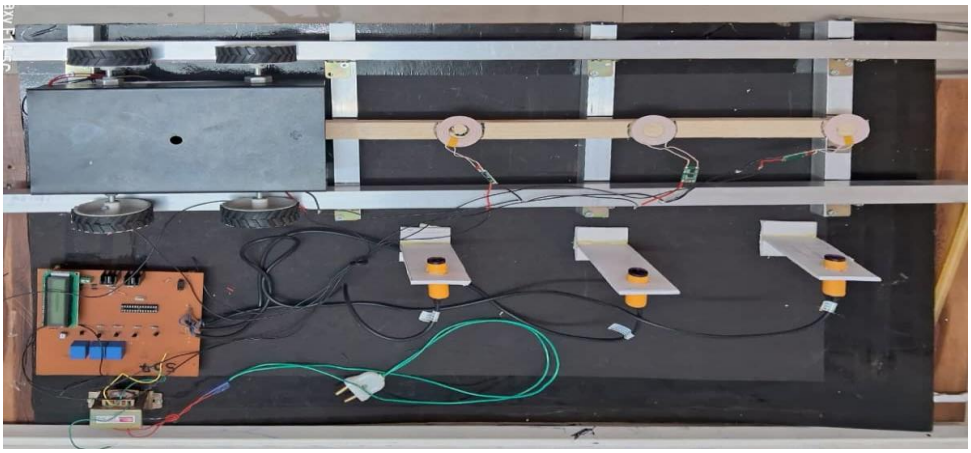
**3) IR SENSOR :** We use ir sensor for detecting any faults in railway track.

**4) THE POWER SUPPLY UNIT:** Now days, almost all electronic equipment includes a circuit that converts ac supply into dc supply. The part of equipment that converts ac into dc is called DC power supply. In general at the input of the power supply there is a power transformer. It is followed by a rectifier (a diode circuit) 1a smoothing filter and then by a voltage regulator circuit.Here In our system we were design a 5v and 12v power supply for our electronic device .

**5) 5v RELAY:** It is using for the switching purpose to turn on the water pump.

**6) COILS** : Uses for power supply which passes.

## IV. RESULT



## V. CONCLUSIONS

In this work, the WPT system is formed of threephase long stator winding and generator winding as transmission coils and receiving coils, respectively, by connecting highfrequency input power supply and tuning capacitor, without altering the mechanical structure of highspeed maglev train.The operating frequency and input current value of the system are determined the full speed range, which meets the power supply demand within the entire vehicle, by computing the selfinductance, mutual inductance, and coupling coefficient of the system and co mparing the output power and efficiency of WPT system under different frequencies and currents.

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