

**CRACK DETECTION IN RAILWAY TRACK USING IOT****Dr. Dayadi Lakshmaiah<sup>1</sup>, P. Srinivasa chary<sup>2</sup>, K.Poojasri<sup>3</sup>, M.Gowthami<sup>4</sup>, M.Lokesh<sup>5</sup>**<sup>1</sup>Professor ,Department of ECE, Sri Indu Institute of Engineering &Technology ,Hyderabad.<sup>2</sup>Assistant Professor ,Department of H&S, Sri Indu Institute of Engineering &Technology ,Hyderabad.<sup>3-5</sup>Student ,Department of ECE, Sri Indu Institute of Engineering & Technology , Hyderabad .

*Abstract: We use solar energy in many ways. All day, we use sunlight to see what we're doing and where we're going. Solar energy[3] is free and clean. There is enough for everyone, and we will never run out of it. Solar energy is renewable. The sun will keep making energy for millions of years. Why don't we use the sun for all our energy needs? We don't know how to yet. The hard part is capturing the sunlight. It shines all over the earth and only a little bit reaches any one place. On a cloudy day, most of the light never reaches the ground at all. The Transportation of train always depends on railway tracks (rails) only. If there is a crack in these rails, it creates a major problem. Most of the accidents in the train are caused due to cracks in the railway tracks, which cannot be easily identified. Also it takes more time to rectify this problem. In order to avoid this problem, we are using the crack detector[1-2] robot, which detects the crack in the rails and gives an alarm. This project is designed with ATmega8 / 168 / 328 MCU.*

**I.INTRODUCTION:**

Faults of railway tracks not only cause deterioration in ride quality but also generate noise and have the potential to cause serious accidents. The track faults have conventionally been measured using exclusive track.

However, this method is costly and is therefore not widely employed on local. It also has a problem in that very frequent inspections cannot be made if schedules are overcrowded, even on priority lines. If faults can be detected by attaching simple sensors such as IR[4-5] to commercial vehicles, more efficient maintenance of tracks would be possible. Such vehicles are called "probe-vehicles". The Transportation of train always depends on railway tracks (rails) only.

If there is a crack in these rails, it creates a major problem. Most of the accidents in the train are caused due to cracks in the railway tracks[1-3], which cannot be easily identified. Also it takes more time to rectify this problem. In order to avoid this problem, we are using the crack detector robot, which detects the crack in the rails and gives an alarm.

**II.EXISTING SYSTEM:**

The finding of cracks in railway tracks takes time consumption due to manual checking. It reduces the accuracy too. This method of design is having limited intelligence.

**III.PROPOSED SYSTEM:**

This system involves the design of crack finding robot for finding cracks in railway tracks. This system uses controller for interfacing the robotic vehicle and crack detection sensor[4]. The sensing device senses the voltage variations from the crack sensor and then it gives the signal to the microcontroller. The microcontroller checks the voltage variations between measured value and threshold value and controls the robot according to it. The robotic model is interfaced with the microcontroller with the help of SPDT relays and driver IC. If any crack occurs in the rail, the robot will be stopped and then an alarm will be raised. This project uses regulated 5V, 750mA power supply. 7805 three terminal voltage regulator is used for voltage regulation. Bridge type full wave rectifier is used to rectify the ac output of secondary of 230/18V step down transformer. The crack of a railway track can be detected easily.

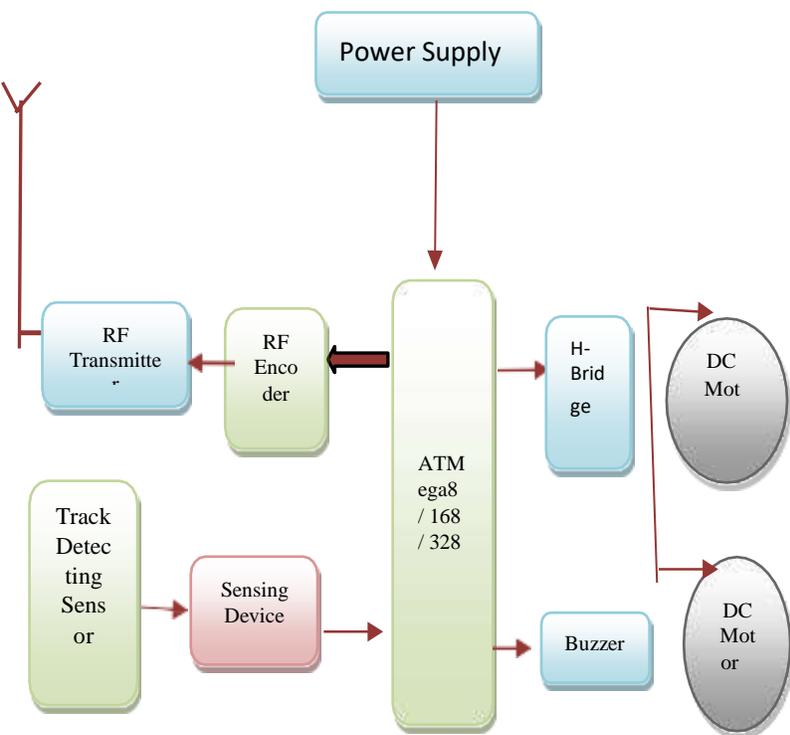


Figure: Block diagram

#### IV. WORKING PROCEDURE:

An embedded system is a system which is going to do a predefined specified task. The embedded system is even defined as a combination of both software and hardware. A general-purpose definition of embedded systems is that they are devices used to control, monitor or assist the operation of equipment, machinery or plant. "Embedded" reflects the fact that they are an integral part of the system. At the other extreme, a general-purpose computer may be used to control the operation of a large complex processing plant, and its presence will be obvious. All embedded systems are including computers or microprocessors. Some of these computers are however very simple systems as compared with a personal computer. The very simplest embedded systems are capable of performing only a single function or set of functions to meet a single predetermined purpose. In more complex systems, an application program that enables the embedded system to be used for a particular purpose in a

specific application determines the functioning of the embedded system. The ability to have programs means that the same embedded system can be used for a variety of different purposes. In some cases, a microprocessor may be designed in such a way that application software for a particular purpose can be added to the basic software in a second process, after which it is not possible to make further changes. The applications software on such processors is sometimes referred to as firmware. The simplest devices consist of a single microprocessor (often called a "chip"), which may itself be packaged with other chips in a hybrid system or Application Specific Integrated Circuit (ASIC). Its input comes from a detector or sensor [4-5] and its output goes to a switch or activator which (for example) may start or stop the operation of a machine or, by operating a valve, may control the flow of fuel to an engine. As the embedded system is the combination of both software and hardware. Lead-acid batteries are the most common in PV systems because their initial cost is lower and because they are readily available nearly everywhere in the world. There are many different sizes and designs of lead-acid batteries, but the most important designation is that they are deep cycle batteries. Lead-acid batteries are available in both wet-cell (requires maintenance) and sealed no-maintenance versions. AGM and Gel-cell deep-cycle batteries are also popular because they are maintenance free and they last a lot longer. Lead acid batteries are reliable and cost effective with an exceptionally long life. The Lead acid batteries have high reliability because of their ability to withstand overcharge, over discharge, vibration and shock. The use of special sealing techniques ensures that our batteries are leak proof and non-spillable. Other critical features include the ability to withstand relatively deeper discharge, faster recovery and more chances of survival if subjected to overcharge. The batteries have exceptional charge acceptance, large electrolyte volume and low discharge, which make them ideal as zero-batteries. Lead acid batteries are manufactured/ tested using CAD (Computer Aided Design). These batteries are used in Inverter & UPS Systems and have the proven

ability to perform under extreme conditions. The batteries have electrolyte volume, use PE Separators and are sealed in sturdy containers, which give them excellent protection against leakage and corrosion. In the world today, everything would be incredibly different if it were not for wireless communication devices. The fact that we can communicate with people in other parts of our own country and the world is amazing and has led to lots of changes in human history. There are various kinds of wireless communication tools and here we will look at a few different kinds as well as the benefits of having them. Sometimes wireless communication does not happen across thousands of miles but only across a few feet. For instance, if you have a television with a remote control, there is communication happening between the two. The remote control tells the television what to do and this information is transferred without the use of any wires. You could also use walkie talkies for this purpose. These are little devices that work like telephones except with different methods and will allow two people or a group of people to talk to each other from a small distance away, such as at a festival or celebration.

One of the most widely acknowledged benefits of long distance wireless communication is that people can perform their jobs at a distance. If they are trying to contact their boss or write a report, they can do so from almost any part of the globe without having to be physically present. This reduces travel costs and the impact of travel on the environment.

Another benefit of long distance wireless communication [3] is that families can stay in touch with each other even if one of them is far away. It used to be that if someone was on a business trip, they would have to write a letter to communicate with their loved ones. Now they can communicate through video and show their family exactly where they are so that the family can connect about these experiences and maintain closer relationships with each other. The types and forms of wireless communication are changing at a rapid pace to include ever more increasing advances in

technology. The benefits of these devices are many and range from benefits that relate to our jobs to those that relate to our loving connection to our families. This describes the installation of the Arduino IDE Development software and drivers for the Windows Operating System. The images and description is based on installation under Windows XP, but the process should be similar for Vista and Windows 7. Typical actuators used for contact switches include spring loaded force cap actuators that reciprocate within a sleeve disposed within the canister. The actuator is typically coupled to the movement of the cap assembly, such that the actuator translates in a direction that is parallel with the cap. A push button switch for a data input unit for a mobile communication device such as a cellular phone, a key board for a personal computer or the like is generally constructed by mounting a cover member directly on a circuit board.

## V. CONCLUSION

This project is cost effective. Monitoring and maintenance by human is very difficult and takes more time. It saves the time and the money for identification of crack. It makes possible to save precious lives of passengers and loss of economy.

## VI. FUTURE SCOPE

In this project we are using IR sensors [4-5] for detecting the cracks and obstacles in track [6]. In future, we will also use the CCTV systems with IP based camera for monitoring the visual videos captured from the track. It will also increase the security for the both trains and passengers.

## VII. REFERENCES

[1] A. Rizvi, P. Khan and D. Ahmad, "Crack Detection In Railway Track Using Image Processing", International Journal of Advance Research, Ideas and Innovations in Technology., vol. 3, no. 4, 2017.

[2] S. Srivastava, R. Chaurasia, S. Abbas, P. Sharma and N. Singh, "Railway Track Crack Detection

[3] K. Bhargavi and M. Janardhana Raj "Railway Track Crack Detection Using Led-Ldr Assembly, International Journal of Advanced Research in Electronics and Communication Engineering (IJARECE), vol. 3, no. 9, pp. 1230-1234, 2014.

[4] B. Siva Ram Krishna, D. Seshendia, G. Govinda Raja, T. Sudharshan and K. Srikanth, "Railway Track Fault Detection System By Using IR Sensors And Bluetooth Technology", Asian Journal of Applied Science and Technology (AJAST), vol. 1, no. 6, pp. 82-84, 2017.

[5] P. Navaraj, "Crack Detection System For Railway Track By Using Ultrasonic And Pir Sensor", vol. 1, no. 1, pp. 126-130, 2014.

[6] D. Narendhar Sigh and D. Naresh, "Railway Track Crack Detection And Data Analysis", vol. 5, no. 4, pp. 1859-1863, 2017.

[7] Available: [https://m.timesofindia.com/india/586-train-accidents-in-last-5-years-53-due-to-derailments/amp\\_articleshow/](https://m.timesofindia.com/india/586-train-accidents-in-last-5-years-53-due-to-derailments/amp_articleshow/)