Medical Support System In-Train With IoT

Mrs.Maheswari.D[1], Belgin[2], Bharanidharan[3], Haripriya[4], Indumathi[5]
[1, 2, 3, 4, 5] Dept of Electronics and Communication
[1, 2, 3, 4, 5] Agni College Of Technology, Chennai

Abstract- *This study describes a track monitoring system based on the Internet of Things (IOT) for improving the comfort of rail track traffic. Rail tracks are typically examined only at midnight and only once a month or less frequently. Unfortunately, any incident that is not discovered within the time limit can result in a train disaster and other safety hazards. As a result, an in-service vehicle has been introduced to improve train safety. Track abnormalities are found in this work utilizing bogie and car body acceleration measurements, which are then optimized using the particle swarm optimization algorithm (PSO). The suggested method is compared to a standard track geometry measurement system. IOT can be used to send monitoring and control information*

Keywords- IOT, EMERGENCY

I. INTRODUCTION

Damages to the rail surface have become increasingly common as the train's speed and load have been increased, reducing the rail's service life. Furthermore, rolling contact fatigue is caused by high shear forces between train wheels and the rail surface (RCF) Manuscript was received on July 29, 2019, edited on September 7, 2020, and
November 19, 2020, and accepted on January 15, 2021. This research was funded in part by the National Nature Science Foundation of China under Grants 61771191 and 61971182, in part by the Hunan Provincial Natural Science Foundation of China under Grants 2020JJ4213 and 2020JJ5497, and in part by the Changsha City Grant KQ2004007 from the Science and Technology Department; and Grant 2020JJ4213 and 2020JJ5497 from the Hunan Provincial Natural Science Foundation of China

SCOPE OF THE PROJECT

The project's goal is to detect railway emergency health conditions and transmit an alarm to medical aid.

EXISTING SYSTEM

We can monitor and control the passengers' safety status in the proposed system, which incorporates medical emergencies and requires minimal human work.

EXISTING SYSTEM DISADVANTAGES

Sensors may be used to operate the system automatically, and communication is simple.

PROPOSED SYSTEM

We can monitor and control the passengers' safety status in the proposed system, which implements medical emergencies with minimal human effort.

PROPOSED SYSTEM ADVANTAGES

Sensors can be used to control the system automatically. It's simple to communicate, and you'll be notified automatically.

II. HARDWARE DESCRIPTION

1.ARDUINO MEGA

Arduino is an open-source electronics platform that uses minimal hardware and software to make it simple to use. Arduino boards may transform inputs to outputs, such as light from a sensor, a finger on a button, or a tweet.Activating a motor, turning on an LED, and publishing something on the internet are all examples of this. You can Send a series of instructions to your board to tell it what to do. On the board, there is a microcontroller.The MEGA 2560 is designed for more challenging projects. This group consists of 54 people. It has 16 analog inputs, digital I/O pins, and more areas for your sketch.3D printers and robotics projects should use this board. This provides you with This project has plenty of room and possibilities. A microcontroller, the Arduino Mega 2560 is.

The ATmega2560 is used in this microcontroller board. In connection, a power jack a reset button, and an ICSP header

It includes everything you'll need to get started with the microcontroller, including a USB cable to connect it to a computer and an AC-to-DC adapter or battery to power it. The majority of shields designed for the Uno and previous Duemilanove or Diecimila The Arduino software can be used to program the Mega 2560 board. (IDE).On the Mega

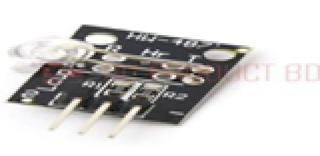
2560, the ATmega2560 is pre-programmed with a boot loader that allows you to update the firmware without the need of a computer a hardware programmer that is external It uses the original STK500 to communicate. protocol. The Mega 2560 contains a resetting poly fuse that safeguards your computer's components.

USB ports are protected against shorts and overcurrent. Even though the majority of PCs are equipped with their own internal protection is provided by the fuse. The power source is automatically selected. An AC-to-DC adapter (wall-wart) or a battery can provide external (non-USB) power. A 2.1mm center-positive plug can be plugged into the board's connector to connect the adapter. a jack for power Battery leads can be placed into the GND and Vin pins. the POWER connector's headers[6]

The board can be powered by a 6 to 20-volt external supply. If one is available, The 5V pin, however, may deliver less than five volts if the voltage is less than seven volts. It's possible that the board will become unstable. If you use more than 12V, the voltage will be higher. regulator may overheat, causing damage to the circuit board. 7 is the recommended range.to a voltage of 12 volts

Fig: Arduino mega 2560

2. HEART BEAT SENSOR



This project detects the pulse of the finger using a phototransistor and a powerful infrared (IR) LED, with a red

LED flashing with each pulse. The following is how a pulse monitor works: The LED is on the finger's light side, and the phototransistor is on the finger's dark side; the phototransistor is used to obtain the flux emitted when the finger's blood pressure pulses, causing the photo transistor's resistance to alter somewhat. We used a very high resistance resistor R1 for the project's schematic circuit since most of the light passing through the finger is absorbed, therefore the phototransistor must be sensitive enough. To acquire the greatest outcomes, resistance can be chosen by experimentation. The most crucial thing is to maintain the shield in place. The measured values are printed when the software is run. It might be difficult to get a true heartbeat from this. Because most of the light that passes through the finger is absorbed, the phototransistor in the KY-039 Heartbeat Detector has a very high resistance resistor R1. The most critical thing is to keep stray light from entering the phototransistor. This is especially significant for home illumination because most lights at home oscillate between 50 and 60 Hz, so a faint heartbeat will contribute a lot of noise.

3. ZIGBEE

ZigBee is a low-cost, low-power wireless sensor network technology that was designed as an open worldwide standard. The standard uses the IEEE 802.15.4 physical radio specification to operate in unlicensed bands around the world at frequencies of 2.400–2.484 GHz, 902–928 MHz, and 868.0–868.6 MHz.

The power levels for the Zigbee module (down from 5v to 3.3v).

Set the voltages on the communication lines (TX, RX, DIN, and DOUT).

The Zigbee module serves as a transmitter as well as a receiver. The Rx and Tx pins of the ZIGBEE are connected to the microcontroller's Tx and Rx pins, respectively. The data from the microcontroller is transferred serially to the Zigbee module through the UART port. The data is then transmitted to another Zigbee. The data was transferred through Zigbee from a Dout pin. The data is received by the Zigbee on the other side via the Din pin.

4. TEMPERATURE SENSOR TEMP & HUMIDITY SENSOR:

A temperature and humidity sensor complex with a calibrated digital signal output is included in the DHT11 Temperature & Humidity Sensor. It offers high dependability and outstanding long-term stability by employing an innovative digital-signal-acquisition technique as well as temperature and humidity sensing technology. This sensor links to a high-performance 8-bit microcontroller and combines a resistive-type humidity measurement component and an NTC temperature measuring component, providing great quality, fast response, anti-interference ability, and cost-effectiveness. Each DHT11 element is meticulously calibrated in a laboratory to ensure the highest level of humidity accuracy. The single-wire serial interface simplifies system integration

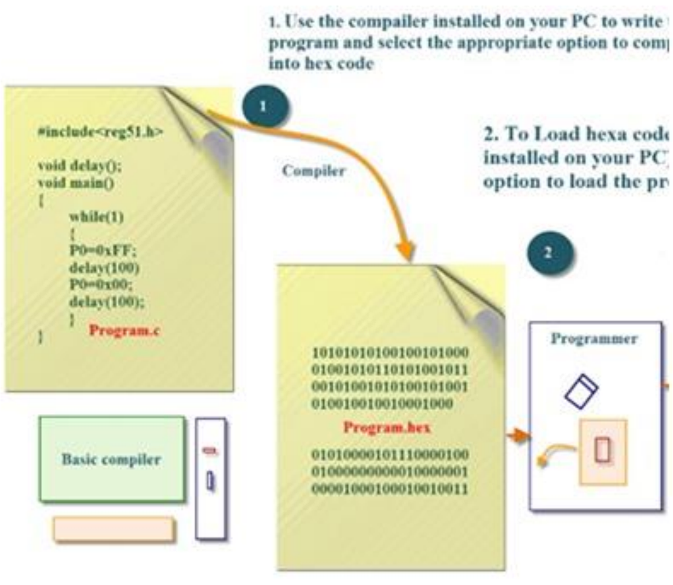
5. INTERNET OF THINGS

The internet of things (IoT) is a network of physical devices, vehicles, buildings, and other items that are equipped with electronics, software, sensors, actuators, and network connectivity to collect and share data. The Internet of Things (IoT) was defined as "the infrastructure of the information society" by the Global Standards Initiative on the Internet of Things (IoT-GSI) in 2013. The Internet of Things allows things to be sensed and controlled remotely using existing network infrastructure, allowing for more direct integration of the physical world into computer-based systems and greater efficiency, accuracy, and cost savings. When IoT is combined with sensors and actuators, it is classified as a cyber-physical system, which includes smart grids, smart homes, intelligent transportation, and more internet infrastructure. Experts predict that by 2020, the Internet of Things will include about 50 billion objects.

III. SOFTWAREREQUIREMENTS

EMBEDDED C:

Embedded C is the most extensively used programming language for constructing electronic devices in the software industry. Embedded software is coupled with each processor utilised in an electronic system.



Embedded C programming is essential for the CPU to accomplish specified tasks. We utilize a variety of technological equipment in our daily lives, such as cell phones, washing machines, digital cameras, and soon. All of these devices are controlled by a microcontroller that is programmed in embedded C.

Let's look at how embedded system programming is represented in a block diagram:

The Embedded C code in the block diagram above is used to flash the LED linked to the microcontroller's Port0.

C code is preferred over other languages in embedded system programming. Because of the following factors:

1. Simple to comprehend
2. Exceptional Reliability
3. Portability
4. Scalability

IV. FUTURE ENHANCEMENT APPLICATIONS

It is used to monitor the health emergency in the railway system.

FUTURE ENHANCEMENT

The system can be further improved by adding artificial intelligence using a web camera.

ADVANTAGES:

1. Automated driver monitoring.
2. Prevent emergency death loss in the train traveling.

V. CONCLUSION

A new visual inspection method for rail surface defects was created in this work, and the defect detection algorithm was thoroughly investigated. The introduction of a novel PEF algorithm is the paper's key contribution. APRS proposes adaptively classifying the rail surface into three types of regions based on the wheel-rail contact degree, and then adaptively setting appropriate thresholds for distinct types of regions on the rail surface based on the defect proportion information, so that the binarization conforms to the statistical characteristics of defect distribution in each type of region in the process of extracting edge features for defects by PEF. The edge growth is then employed to join the fault's fracture edges. To be more specific, to be more effective.

REFERENCES

[1] F. Sadeghi, B. Jalalahmadi, T. S. Slack, N. Raje, and N. K. Arakere, "A review of rolling contact fatigue," J. Tribol., vol. 131, pp. 041403–041417, Jul. 2009.

[2] M. C. Nakhaee et al., "The recent applications of machine learning in rail track maintenance: A survey," in Proc. Int. Conf. Rel., Saf., Secure. Railway Syst. Cham, Switzerland: Springer, 2019. [3] W. Wang et al., "Analysis and design of coil- based electromagnetic induced thermoacoustic for rail internal-flaw inspection," IEEE Trans. Intell. Transp. Syst., vol. 20, no. 7, pp. 2691–2702, Jul. 2019.

[3] R. S. Edwards, S. Dixon, and X. Jian, "Characterisation of defects in the railhead using ultrasonic surface waves," NDT E Int., vol. 39, no. 6, pp. 468–475, Sep. 2006.

[4] Y. Li, G. Y. Tian, and S. Ward, "Numerical simulation on magnetic flux leakage evaluation at high speed," NDT E Int., vol. 39, no. 5, pp. 367–373, Jul. 2006.

[5] Q. Li and S. Ren, "A visual detection system for rail surface defects," IEEE Trans. Syst., Man, Cybern. C, Appl. Rev., vol. 42, no. 6, pp. 1531–1542, Nov. 2012.

[6] Q. Li et al., "A cyber-enabled visual inspection system for rail corrugation," Future Gener. Comput. Syst., vol. 79, pp. 374–382, Feb. 2018.

[7] F. Marino, A. Distante, P. L. Mazzeo, and E. Stella, "A real-time visual inspection system for railway maintenance: Automatic hexagonal headed bolts detection," IEEE Trans. Syst., Man Cybern. C, Appl. Rev., vol. 37, no. 3, pp. 418–428, May 2007.

[8] X. Gibert, V. M. Patel, and R. Chellappa, "Deep multitask learning for railway track

.