SAFETY ACCIDENTS IN RAILWAY STATIONS

USING ML AND IOT

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Abstract : Railway Track Tracer System for creature detection is a system for detecting cracks on the railway tracks. This system will help to avoid many accidents that occur on rails. This system frequently monitors the railway tracks using a camera, so that the presence of cracks can be easily identified and then necessary actions can be taken to prevent accidents. Internet of Things is the most studied field and its applications are endless. Internet of Things (IOT) is implemented to give an up-to-date update on the railway management. In this mode IR sensor is used for checking the availability of the platform. This system is used update the platform availability to the upcoming train to avoid the prevent accidents. To detect fire and automatic engine detachment. To update the platform availability. There has been an upsurge in railway accidents, which are mostly caused by track quandaries. That might be a misalignment, an obstacle, a crack in one of the track's sides, or some other fault with the track. So, keeping track of all these difficulties is a time-consuming chore for a person. So, we engendered an IoT-predicated Railway Inspection System that includes a sensor-equipped robot car that can identify quandaries on the track which have potential for causing railway accidents, and the sensors utilized to detect this were tilt, ultrasonic, infrared, water, and fire sensors and the movement is controlled using the Relay. In this project we have built the train track security and Monitoring application. In which we monitoring the rails i.e. tracks of trains with an automated robot which we are passing through this track which will detects and inspects the track status like curve and damages etc. and we are controlling this bot remotely so we are getting all these data via an android app this way are monitoring the track in real time with the track fault detection. So with this data we can prevent the remedies like accidents and train sleeping due to those faulty tracks.

I. INTRODUCTION

While going through the day to day papers numerous mishaps in railroad railings are found. Railroad-related mishaps are more perilous than other transportation mishaps as far as seriousness and demise rate and so on. Accordingly, more endeavors are essential for further developing security. Horrendous powers of a train are typically no counterpart for some other kind of vehicle. Train mishaps cause a significant fiasco, as they make extreme harm life and property. Rail route security is a significant part of rail activity everywhere. Here the point is to help the railroad organizations worried to fortify their wellbeing society and foster the observing instruments expected by current security the board. The principal issue handled is breaks in the rail line track. Every year, mishaps at level intersections not just objective fatalities or serious wounds to a huge number of street clients and rail line travelers, yet in addition force a weighty monetary weight as far as disturbances of rail line and street administrations and harms to rail line and street vehicles and property. An extremely large number of these crashes are brought about by the carelessness, ineptitude or insufficiency of street vehicle drivers. This is the subsequent issue handled here. Since it is the railroad which should bear the obligation regarding guaranteeing that it is shielded from the offenses by street clients (in spite of the way that in numerous nations the law gives it need of section over street clients), it is the rail line which likewise needs to bear the majority of the monetary weight of giving this assurance. So a strategy to forestall this sort of mishaps is likewise carried out. In India, the greater part of the business transport is being done by the railroad organization and subsequently, any issues in the equivalent has the ability to actuate significant harm to the economy-despite the cultural effect of death toll or appendage. Fire causes more harm in less measure of time. The products and compartments consumed in the fire can't be recuperated. It likewise makes serious harm lives. A strategy to distinguish the fire and promptly control it is executed.

II. BACKGROUND STUDY(LITERATURE)

Indian rail lines are one of most active organization on the planet covering track organization of 1,27,000 sq.km. Just about 2/third of the populace utilize the rail route network in India. Practically 60% of the mishaps are happening at railroad track crossing and because of break in rail route tracks bringing about loss of valuable life and loss of economy. In current situation this issue has monstrous potential in having an optimal answer for this issue. Remedying the issues in existing frameworks that rail routes generally face is required. In existing framework, the manual studying and upkeep of tracks is finished by individual and in different breaks. Fundamentally, in the two strategies, studying and location of breaks is been done however the impediment is of support

individuals expected for the two techniques to screen the break in the track. Additionally, this technique is restricted for specific courses and not all courses and divisions of rail lines can be covered. Further, once in a while exactness is blamed. Likewise, swirl current technique ultrasonic break identifier is additionally utilized in certain cases. We have gathered the thoughts in planning railroad break identification framework utilizing. Arduino Microcontroller and sensors to recognize the breaks and area of breaks been given by GPS module and caution through messages through GSM module. We are committed in building such framework which will give an ideal answer for the break identification issue and arrive at in accomplishing higher exactness and accuracy than existing frameworks. Likewise, our task points in giving wellbeing affirmation to rail lines, while the current frameworks slack it totally.

III. RESEARCH METHODOLOGY

System Design and Planning: Define the overall system architecture and identify the key components such as Arduino boards, sensors, actuators, and communication modules. Establish the system requirements, including safety features, emergency response protocols, and communication interfaces.

Sensor Deployment and Calibration: Install IR sensors along the railway tracks for crack detection and platform for object or human detection on the tracks. Calibrate sensors to ensure accurate readings and responses.

Fire Detection System Integration: Integrate fire sensors within train compartments and the railway environment. Develop algorithms to interpret availability monitoring. Deploy ultrasonic sensors for object or human detection on the tracks. Calibrate sensors to ensure accurate readings and responses.

Fire Detection System Integration: Integrate fire sensors within train compartments and the railway environment. Develop algorithms to interpret sensor data and trigger emergency responses in the event of a fire.

DC Motor Control for Train Movement: Implement DC motors to control the movement of trains. Develop algorithms for precise acceleration, deceleration, and speed control.

Relay and Water Pump Integration: Integrate relays to automate the detachment of train compartments in case of a fire. Connect water pumps to the system to activate automatically during fire incidents.

NodeMCU for Real-time Communication: Incorporate NodeMCU for real-time communication between different system components. Develop protocols for message intimation, ensuring timely communication during emergencies.

Zigbee Communication Setup: Set up Zigbee communication for seamless connectivity between stationary and moving units. Develop communication protocols to exchange real-time data and updates.

Emergency Response Algorithms: Develop algorithms to initiate emergency responses based on sensor data, including fire suppression, train compartment detachment, and communication protocols.

Platform Availability Monitoring System: Deploy additional IR sensors for continuous monitoring of platform occupancy and availability. Integrate platform availability data into the overall system for efficient train scheduling.
Platform availability: The principle involved in checking platform availability is when the crack is detected the light does not get reflected to IR sensor and the train stops. Here two IR sensors are placed on all platform and a message "PLATFORM 1 AVAIALBLE" OR "PLATFORM 2 AVAILABLE" OR "ALL PLATFORM AVAILABLE" OR "PLATFORM NOT AVAILABLE" is displayed on the LCD.

Fire detection: A fire sensor is set in every compartment. At the point when the fire is detected, the sensor will caution the regulator and hand-off will be set high and sprinkler will be enacted. Pause and Confine () capability is called which will stop the development of the train by getting the qualities free from engine 1 and engine 2. Another engine (Engine 3) is utilized to disengage the compartment to keep fire from spreading. The message "FIRE" and "HELP" will be shown on the LCD. Signal is utilized to alarm the travelers about the fire.

Crack Detection We used yolo algorithm with convolution neural network for detection of crack. The set of classes were learned using CNN. The input image which we capture through camera is passed to convolution layer in the convolutional neural network model. The images were pooled in the pooling layer. The pooling layer combines the images in the convolution layer by reducing the dimensions and pass in to the fully connected layer. The message "CRACK DETECTED" will be displayed on the LCD.

Station Module:
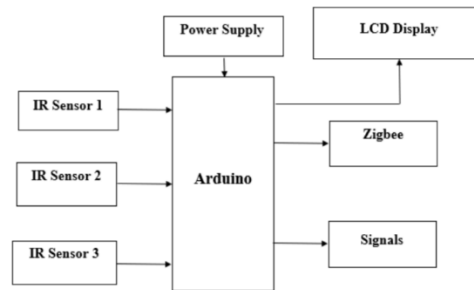
Train Module:
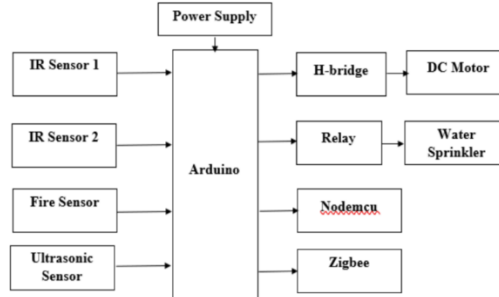
IV. CONCLUSION

System will help to reduce accidents caused due to railway cracks, fire and accidents happening while arriving train to the platform. An automatic method is used to inspect in railway track for crack detection which helps in maintenance and monitoring the condition of railway tracks without any errors. Automatic opening and closing of gate will reduce the rate of accidents and there is no need for an operator. System uses a fire sensor to detect the fire. Quick actions are taken to avoid spreading of fire to other compartments and alert the passengers.

V. ACKNOWLEDGMENT

VI. REFERENCE

1.Fei Yan, Tao Tang, Junqiao Ma "An Accident Casual Model for Railway Based on Operational Scenario Cognition Conflict", 2018 International Conference on Intelligent Rail Transportation (ICIRT) 2.Xiaohong Wang;Jingyang Wang;Jiao Han, "Knowledge Graph Construction for Railway Electrical Ac cident Analysis" 2019 International Conference on Machine Learning, Big Data and Business Intelligence (MLBDBI) 3.YaoXing Zhang;Wenju Li;Huiling Chen;Maoxian He, "CRTSII Track Slab Crack Detection Based on Improved YOLOv3 Algorithm" 2020 5th International Conference on Mechanical, Control and Computer Engineering (ICMCCE) 4.R. Thendral, A. Ranjeeth, "Computer Vision System for Railway Track Crack Detection using Deep Learning Neural Network", 2021 3rd International Conference on Signal Processing and Communication (ICPSC)