

Railway Process Automation to Ensure Human Safety with the Aid of IoT and Image Processing

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Abstract : Railways provide the most convenient and economically beneficial mode of transportation, and it has been the most popular transportation method among all. According to the past analyzed data, it reveals a considerable number of accidents which occurred at railways and caused damages to not only precious lives but also to the economy of the countries. There are some major issues which need to be addressed in railways of South Asian countries since they fall under the developing category. The goal of this research is to minimize the influencing aspect of railway level crossing accidents by developing the "railway process automation system", as there are high-risk areas that are prone to accidents, and safety at these places is of utmost significance. This paper describes the implementation methodology and the success of the study. The main purpose of the system is to ensure human safety by using the Internet of Things (IoT) and image processing techniques. The system can detect the current location of the train and close the railway gate automatically. And it is possible to do the above-mentioned process through a decision-making system by using past data. The specialty is both processes working parallel. As usual, if the system fails to close the railway gate due to technical or a network failure, the proposed system can identify the current location and close the railway gate through a decision-making system, which is a revolutionary feature. The proposed system introduces further two features to reduce the causes of railway accidents. Railway track crack detection and motion detection are those features which play a significant role in reducing the risk of railway accidents. Moreover, the system is capable of detecting rule violations at a level crossing by using sensors. The proposed system is implemented through a prototype, and it is tested with real-world scenarios to gain the above 90% of accuracy.

Keywords : crack detection, decision-making, image processing, Internet of Things, motion detection, prototype, sensors

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