LITERATURE SURVEY

SMART SOLUTION FOR RAILWAY

Author Name: Ishan Mishra

Year of Publishing: 2020

Description:

When it comes to travelling, in our country the cheapest and the most comfortable mode of transport is railway. A lot of people in India travel to other places using railways and some people use Indian Railways to travel even on daily basis. So, a lot of people trust railways with their life on daily basis and if the railways are not secure and prone to accident then life of many people are at risk. A lot of railway accidents occur at level crossing that is the point of intersection of road and railway track and the reason in most of the cases in human error. So to avoid the accidents caused due to human failure this model is to make level crossing unmanned and smart than can reduce the chances of accidents manifold. This model automatically closes the gates of railway crossing when the train is arriving near the crossing before a safe interval of time so that there is no chance of human error. After the train has passed the gates are again opened automatically to allow people to use the roadways again. Also our model keeps a track of the train passed from the particular crossing along with exact time of passing so that the data is maintained that too without human effort. With the help of IR sensor and using GSM, information can be sent to the authorities (loco pilot) of the train if the track has any hindrance so that accident can be avoided as far as possible.

Author Name: Yong-Kyu Kim

Year of Publishing: September 2017

Description:

The explosively growing demand of internet of things (IoT) has rendered broadscale advancements in the fields across sensors, radio access, network, and hardware/software platforms for mass market applications. In spite of the recent advancements, limited coverage and battery for persistent connections of IoT devices still remains a critical impediment to practical service applications. In this paper, we introduces a cost-effective IoT solution consisting of device platform, gateway, IoT network, and platform server for smart railway infrastructure. Then, we evaluate and demonstrate the applicability through an in-depth case study related to IoT-based maintenance by implementing a proof of concept and performing experimental works. The IoT solution applied for the smart railway application makes it easy to grasp the condition information distributed over a wide railway area. To deduce the potential and feasibility, we propose the network architecture of IoT solution and evaluate the performance of the candidate Radio Access Technologies (RATs) for delivering IoT data in the aspects of power consumption and coverage by performing an intensive field test with system level implementations. Based on the observation of use cases in interdisciplinary approaches, we figure out the benefits that the IoT can bring.

Author Name: Ohyun Jo, Yong-Kyu Kim, yuyeop Kim

Year of Publishing: September 2017

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of device platform, gateway, IoT network, and platform server for smart railway infrastructure. Then, we evaluate and demonstrate the applicability through an in-depth case study related to IoT-based maintenance by implementing a proof of concept and performing experimental works. The IoT solution applied for the smart railway application makes it easy to grasp the condition information distributed over a wide railway area. To deduce the potential and feasibility, we propose the network architecture of IoT solution and evaluate the performance of the candidate radio access technologies for delivering IoT data in the aspects of power consumption and coverage by performing an intensive field test with system level implementations. Based on the observation of use cases in interdisciplinary approaches, we figure out the benefits that the IoT can bring.

Author Name: Paula Fraga-Lamas

Year of Publishing: June 2017

Description:

Nowadays, the railway industry is in a position where it is able to exploit the opportunities created by the IoT (Industrial Internet of Things) and enabling communication technologies under the paradigm of Internet of Trains. This review details the evolution of communication technologies since the deployment of GSM-R, describing the main alternatives and how railway requirements, specifications and recommendations have evolved over time. The advantages of the latest generation of broadband communication systems (e.g., LTE, 5G, IEEE 802.11ad) and the emergence of Wireless Sensor Networks (WSNs) for the railway environment are also explained together with the strategic roadmap to ensure a smooth migration from GSM-R. Furthermore, this survey focuses on providing a holistic approach, identifying scenarios and architectures where railways could leverage better commercial IoT capabilities. After reviewing the main industrial developments, short and medium-term IoT-enabled services for

smart railways are evaluated. Then, it is analysed the latest research on predictive maintenance, smart infrastructure, advanced monitoring of assets, video surveillance systems, railway operations, Passenger and Freight Information Systems (PIS/FIS), train control systems, safety assurance, signalling systems, cyber security and energy efficiency. Overall, it can be stated that the aim of this article is to provide a detailed examination of the state-of-the-art of different technologies and services that will revolutionize the railway industry and will allow for confronting today a challenges.

Author Name: Dr. A. Benjamin Joseph, Mohan kumar aradhya M S, N phaneendra, Ranjith kumar G M

Year of Publishing: March 2018

Description:

Even with greatest of ideas to avoid railway accidents, many trains accidents still happen worldwide. This paper shares an idea on how to avoid train collision by using an automated control incorporated in the trains. In this proposed paper we have implemented ideas such as pre-crashing using RFID sensor, ultrasonic sensor in-order to choose an array of commands which would run as per the conditional algorithm created in the microcontroller. We would also have a EPM to control the speed of the motor to lessen speed. This system will be more efficient since it was fully automated and also it was cost effective

Author Name: Jun, Seunghwa; Park, Jongsur; Kim, Jeong Yoon

Year of Publishing: July 2022

Description:

The COVID-19 pandemic is changing the dynamics of international freight transport as no single event has probably done before in the recent past. The outbreak of the pandemic has adversely impacted freight transported by all other modes other than by rail. The increase in freight carried by railways is not surprising, given its distinct features, that are working to its advantage in the current situation. International railway transport uses less manpower over long distance and accordingly there are fewer health checks, unlike, for example, in road transport where checks and congestions at border crossings cause more frequent human interactions. Each freight train can carry between 40 to 70 times equivalent of lorry loads of goods in a much more safe and secure environment giving rail a distinct advantage. The opportunities for switching more cargo to rail during the COVID-19 recovery phase and making shift towards railways more enduring in national and international transport- would require enhanced competitiveness of railway transport compared to other modes. To support trade and transport connectivity globally in times of pandemic the United Nation agencies have jointly launched a project titled- Trade and transport connectivity in times of pandemics: with overarching objective of developing contactless, seamless and collaborative solutions to preserve and further enhance the trade and transport connectivity. In Asia and the Pacific, ESCAP is leading the project and has initiated series of studies aimed at supporting countries in this direction. The present study on smart railway solutions has been carried out under the project with aim to identify smart railway solutions that are proven to be successful elsewhere and are potentially replicable and scalable. Not all solutions would have equal importance or relevance for the railways of the region.

Each railway could assess its own situation and determine which smart solutions would be more beneficial and applicable for them. In this regard, the study may also be seen as an inventory of smart railway solutions that would expand the knowledge of railways of the region on the range of options available to deal with emerging challenges and opportunities in the era of pandemic. First part of the study provides context for smart railway solutions along the Trans-Asian Railway Network. It provides insight into the emerging trends in international railway transport followed by analysis of the impact of pandemic on the railway freight flows along the Trans-Asian Railway network. Identification of common priorities of the railways of region and the focus areas for specialized railway organizations follow next. The objective of this part is to underscore the importance of using the current crisis as an opportunity to further enhance the comparative advantages of railway transport through use of smart railway solutions that would enhance the competitiveness of the railways in the post pandemic environment. The second part of the study provides six modules on smart railway solutions. These modules are smart railway operations, smart railway maintenance, smart train driving, smart railway border crossing, smart railway customer orientation and smart railway investing. Each module has submodules that explain the range of smart railway solutions with details. The study is complemented by the Annexes providing information on new rail freight services in 2016-2020 and key priorities of the TARN member countries as defined in official national strategic documents as well as smart railway solutions.