SMART SOLUTION FOR RAILWAYS

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LITERATURE SURVEY :

Juyeop Kim Published on "IEEE Internet of Things Journal 2018 ". Wide-ranging developments in the realms of sensors, radio access, networks, and hardware/software platforms have been made possible by the Internet of Things' (IoT) rapidly expanding demand. Despite recent improvements, a major barrier to realistic service applications is still the IoT devices' low coverage and battery life for persistent connectivity. In this study, we present a low-cost IoT solution for smart railway infrastructure that consists of a device platform, gateway, IoT network, and platform server. Then, we assess and show the applicability through a thorough case study involving IoT-based maintenance, putting a proof of concept into practise, and carrying out experimental work. It is simple to understand the condition information dispersed over a large railway region thanks to the IoT technology used for the smart railway application. It is simple to understand the condition information dispersed over a large railway region thanks to the IoT technology used for the smart railway application. By executing a thorough field test with system level implementations, we propose the network architecture of an IoT solution and assess the effectiveness of the various radio access technologies for providing IoT data in terms of power consumption and coverage. We determine the advantages that the IoT can offer based on the observation of use cases in interdisciplinary methods.

Payal Srivastava Published on "9th International Conference on Cloud Computing, Data Science & Engineering 2019".It is insufficient to detect metal on railroad tracks alone to detect train motion. Any metal object, including trains and coins, can be detected by the sensors built into the railroad tracks. Thus, adding a new parameter—weight on the railroad track—is required to make the operation more failsafe. In order to detect train movement using the Internet of Things (IoT) principle, this study offers a method that combines weight and metal sensors on railway lines.

Bo Ai Published on "Proceedings of IEEE 2020". Due to the rapid development of railways, particularly high-speed railways, railway communications have received considerable interest from both academia and industries (HSRs). The rail transportation sector needs to develop cutting-edge communication network architectures and critical technologies that guarantee high-quality transmissions for both passengers and railway operations and control systems in order to be in line with the goal of future smart rail communications. With high mobility, security, comfort, comfort with the environment, openness, predictability, and dependability. The design issues with high reliability and high throughput for HSR communications could be resolved with the use of fifth-generation (5G) technology, which are considered to be a potential option. We suggest a network slicing design for a 5G-based HSR system based on our in-depth examination of smart rail traffic services and communication situations. Using an analysis based on ray tracing We make significant inferences on acceptable operating frequency bands for HSRs based on radio wave propagation characteristics and channel models for millimetre wave (mmWave) bands in railway scenarios. mymargin We have specifically highlighted important 5G-based core technologies for HSRs, including as spatial modulation, quick channel estimation, cell-free massive MIMO, mmWave, effective beamforming, wireless backhaul, ultrareliable low latency communications, and improved handover methods. We have created a comprehensive framework of 5G technologies for smart trains based on these technologies and identified interesting new research prospects.

Ohyun Jo Published on "IEEE Internet of things journal 2018". Wide-ranging developments in the realms of sensors, radio access, networks, and hardware/software platforms have been made possible by the Internet of Things' (IoT) rapidly expanding demand. Despite recent improvements, a major barrier to realistic service applications is still the IoT devices' low coverage and battery life for persistent connectivity. In this study, we present a low-cost IoT solution for smart railway infrastructure that consists of a device platform, gateway, IoT network, and platform server. Then, we assess and show the applicability through a thorough case study involving IoT-based maintenance, putting a proof of concept into practise, and carrying out experimental work. It is simple to understand the condition information dispersed over a large railway region thanks to the IoT technology used for the smart railway application. By executing a thorough field test with system level implementations, we propose the network architecture of an IoT solution and assess the effectiveness of the various radio access technologies for providing IoT data in terms of power consumption and coverage. We determine the advantages that the IoT can offer based on the observation of use cases in interdisciplinary methods.

Ankur Kumar Gupta Published on "International Conference on Smart Electric Drives and Power System (ICSEDPS) 2018". The necessity for some technological advancement at a reasonable cost is becoming more pressing given the current state of chaos in the Indian railways and the debate surrounding the use—or rather, the poor use—of technology in the railways. The locally created, cutting-edge, and easily accessible technology is one easy fix for this "Anti-collision Technology However, the disadvantage of it technique is the high installation costs. The creation of an overcomes this issue "Trains have a "Wind Train" system. The primary goal of this project is to create a windmill that can be put on a train and provide power to the coaches' lights and fans.

T.Sangeethavani Published on "International Conference on Circuit ,Power and Computing Technologies (ICCPCT) 2017". The most popular mode of transportation is the railroad. The major reasons why most people prefer this mode of transportation are its affordability and comfort. Our system offers a complete solution to expand this comfort zone and decrease the amount of accidents. There are several railroad accidents today. The majority of these mishaps happen at level crossings with railroad gates. There are now a lot of initiatives to reduce the frequency of accidents and the staffing at railway gates. The majority of the designs used sensors as a significant component to identify the approaching train, but this system is ineffective and requires ongoing maintenance. To find the sensor issue, monitoring is also necessary. This document detects and tracks the train's arrival using GPS rather than sensors. Our smartphone application includes a GPS-based method of train tracking. The engine driver can operate the railway gate with this app.

Avijit Das published on "TENCON 2017 - 2017 IEEE Region 10 Conference ".In order to avoid risks like crashes and derailments, this study proposes a method for an intelligent and automatic management of a railway transportation system. The system was created with Bangladesh in mind, but it may also be simply applied to any other railway infrastructure. The system includes automatic signalling and gate control at level crossings using light emitting diodes (LEDs) and servo motors, active train detection using global positioning satellite system (GNSS) coordinates, obstacle detection at level crossings using long-range infrared, automatic and manual communication between trains and level crossings using GSM technology, and development of a web-based central control system. and to interact with the nation's emergency services as well as the whole railway industry. Three distinct sub-systems—the central control system, the level crossing system, and the train system—are integrated into and interact with one another in our design. By implementing such a system, Bangladesh Railway would not only offer a high degree of rail transit safety, but will also get closer to realising the government of Bangladesh's long-awaited vision of a "Digital Bangladesh".

Y.Wang Published on "4th IET International Conference on Railway Condition Monitoring 2008". Train speed and density have been steadily rising over the past 20 years due to the increased demand for railroad services. As a result, stricter safety standards are required for the infrastructure, signalling, and control of railroads. Alongside that development, wireless communication methods have evolved significantly in recent years. In particular, as sophisticated, low-cost wireless communication technologies like WiFi, Bluetooth, and ZigBee mature, it is now conceivable to create a wireless system to check on the infrastructure or signalling of a railway. The regular operation of railroad systems will be aided by an efficient, low-cost monitoring system. This essay provides a description of how one such monitoring system was created. An array of monitor units and a remote controller make up the entire system. Receiving the remote control transfers control instructions, monitoring control information, and data from the monitor units to the monitor units. The article will demonstrate how wireless technology could be used to create such a straightforward setup for railway surveillance.

Shaofu Lin Published on " Journal of Physics Conference Series 2019". In order to support railroad innovation and development and boost their core competitiveness, railroads must further their informatization and intelligent construction. It is urgent to make plans for the development of smart railways to provide guiding suggestions for the development of railway informationization. At the moment, China has extensive research in smart cities, smart transportation, and other fields, but the research on smart railways is still in its infancy. This paper tries to provide a precise definition of smart railway from the perspective of the development of smart cities, based on research findings of smart cities and smart transportation in related fields at home and abroad, combined with the application trends of internet technology and big data technology in railway informatization. It also suggests the overarching framework of the smart railway's top-level design, and application of the smart railway in conjunction with the requirements for development of the Jing-Zhang high-speed railway.

Bo Ai Published on "5G Key Technologies for Smart Railways 2022". Due to the rapid development of railways, particularly high-speed railways, railway communications have received considerable interest from both academia and industries (HSRs).The rail transportation sector needs to develop cutting-edge communication network architectures and critical technologies that guarantee high-quality transmissions for both passengers and railway operations and control systems in order to be in line with the goal of future smart rail communications. With high mobility, security, comfort, comfort with the environment, openness, predictability, and dependability. The design issues with high reliability and high throughput for HSR communications could be resolved with the use of fifth-generation (5G) technology, which are considered to be a potential option. We suggest a network slicing design for a 5G-based HSR system based on our in-depth examination of smart rail traffic services and communication situations. Using an analysis based on ray tracing we make significant inferences on acceptable operating frequency bands for HSRs based on radio wave propagation characteristics and channel models for millimetre wave (mmWave) bands in railway scenarios. We have specifically pinpointed important 5G-based key technologies for HSRs, including spatial modulation, quick channel estimation, cell-free massive multiple-input multiple-output (MIMO), mmWave, effective beamforming, wireless backhaul, ultra-reliable low latency communications, and improved handover strategies. We have created a comprehensive framework of 5G technologies for smart trains based on these technologies and identified interesting new research prospects.