An IoT Based Safe Assembly Point Alert System

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Abstract. A large population depends on many industries for its livelihood like electrical, embedded, software product sectors. An IoT environment includes feedback phones that use smart devices, such as MCU (microcontroller unit), sensors and different sensors, collect, distribute, and act on messages they collect from their environment. IoT systems share the sensory data they receive when data has been either sent to the cloud for global applications or analysis by linking to an IoT gateway or other edge device. For the electrical maintenance occur in the industries will need a specific alert signal. The loss of manufacturing workers/workers may be controlled by a specific, minor accident. Therefore, it is essential to provide an emergency device able to detect the non-safety state of coal and produce an alarm to reduce the possibility of risks in the system. We are proposing an IoT-based alert system via mobile phones, as smartphones’ general usage is very common in the industries rather than using a walkie-talkie.

Keywords: IoT, GPS, sound sensor, fire sensor.

1. Introduction
Good and reliable development is a real key company. Lifecycle management technology, in particular, can help streamline and increase output. [2] This report proposes a detailed warning control system, especially for concrete smelting plants for throughput control. [1] There are difficulties in tracking schedules for concrete batching plants and managing their shifts. Exchange of information amongst industry entities is essential for seamless activities, new venture generation and professional relationship development [3]. Previously, Internet technology advancement has created a robust forum for the growth of inter-and intra-business e-services. [8] Human resources are significantly reduced with the ever-growing technology, but even now, certain industries could not ignore the value of the workforce [5].
For some businesses that allow us to extract biological riches; a real enormous task is needed. Coal mines are one such large-scale sector. [4] Coal plants are the sites where coal mining occurs. This mined coal is then shipped to numerous other plants, used by oxidation or for other secondary purposes to generate heat and electricity. [6]. Later the information or alert system is carried out using zig-bee technology; this will act node network interconnection and give a certain distance to get a signal from the user [9].

To use this, it should give a constant 3.3V supply, and it is not reliable that the cost of the product is high compared to any other devices [10]. The Zigbee interface is often used to communicate around the subway station and access point [11] until the sensor values are interpreted as a four-bit data by the microcontroller provided to the Zigbee transmitter. Similarly, the Zigbee receiver at the base station gets the stream of data that behaves similarly to the four-bit data equivalent to the signals [13].

Through the IoT, the mining hazard assessment and warning mitigation will ultimately popular the number of incidents and failures, avoiding losing staff and properties. Hence the health notice of IoT-based mining is of great importance [14]. However, tunnel industrial IoT needs a large number of resource-constrained sensors and sensing systems to be installed. The mobile signals they transmit are lost regarding data conflicts, node energy usage and energy saving reduction [15].

2. Proposed System
In this proposed work, we are giving an alert signal to the working staff working at any longer distance. For instance, if any person is working underground or high altitude cannot hear any alert sounds produced by the industries. [16] By using an Arduino MCU (Microcontroller unit) and a fire alarm sensor, sound sensor. The sound sensor's use is to get a fire alarm signal from the plant, using this can send a signal to Arduino MCU, which will send the authorized persons who are all working under critical circumstances. [7] Moreover, a GPS will point to the nearest safe assembly point. This system will be useful for working employees who are all working very long inside the operating plant. [12] Moreover, it became very easy for counting the number of employees who are the safe point. They can be safe alert for all staff and look upon the major faults of the plant. Figure 1 represents the proposed system.

![System Architecture of Proposed Systems](image)

3. Results and Discussions
It consists of fire and sound sensor with a GPS module to easily view the nearby assembly points' location. Through GPS we can able get latitude and longitude of the place. This will easily note in the IoT app. Moreover, the employees working from any of the places can get an accurate message using IoT. So, they can safeguard life without any disturbances. Figure 2 displays the overall processing output of the proposed framework.
Figure 2. A prototype model of proposed work

Figure 3: GPS location

Figure 3 shows the place's GPS location so that the person can accumulate to the respective places without any injuries.

4. Conclusion

An identification plan was presented in this paper and alert system to the persons who are all working under a long coverage area. The development can easily identify the environment and take proper care of travel, including interface requirements, sensing technologies, and self-regulation. The tests depict that this control device will accomplish safety barrier evasion, and concisely and expeditiously detect data in companies. While some main innovations still require further research, the robot has a high practical benefit and large opportunities for use.

References

[1]. Chung, Jason CS, Dickson KW Chiu, and Eleanna Kafeza. "A method of warning management for the concrete batching plant." 2007 IEEE Conference on Emerging Technologies and Factory Automation (EFTA 2007). IEEE, 2007.

[2]. Kushwaha, N., and M. Kiim. "Smart Home Health Care Warning System based on Microsoft Agent." 7th International Workshop on Enterprise Networking and Computing in Medical Healthcare Industry, 2005. HEALTHCOM 2005. IEEE, 2005.

[3]. Pudke, Ashwini J., Sanket N. Bhagat, and S. L. Naalballwaar. "Coal mine control and warning system based on LabVIEW with data acquisition." 2017 International Conference on Intelligent Computing and Control Systems (ICICS). IEEE, 2017.

[4]. Tan, Aiping, et al. "A Green Internet of Things Multi-Channel Transmission Scheme for Underground Mining Safety Alert." IEEE Access (2019).

[5]. Wang, Jian, and Pheeng Whaang. "Coal mine gas monitoring system based on a wireless sensor network." 2012 International Conference on Industrial Control and Electronics Engineering. IEEE, 2012.

[6]. Zhigang, Niu, and Fu Zhichao. "Research on detection system for coal mine detection robot based on the technology of information fusion." (2009): 151-151.
[7] Praba, B. "An effective Fire Supervision Control and Alerting System Internet of Things (IoT)." 2019 Third International conference on I-SMAC (IoT in Social, Mobile, Analytics and Cloud)(I-SMAC). IEEE, 2019.

[8] Prasath, R. and Kumanan, T., 2019. Optimal histogram for underwater image enhancement was enabled by Distance-Oriented Cuckoo Search: a novel quality metric analysis. The Imaging Science Journal, 67(2), pp.76-89.

[9] Pravallika, A., 2017. Monitoring sensor objects using mobile relay by path planning framework. International Journal of MC Square Scientific Research, 9(1), pp.288-294.

[10] Datta, Nirit, Ashutosh Malik, Mukund Aggarwal, and AnirudhJhunjhuwaala. "Real-time laptop monitoring and warning system via GPS, GSM, motion sensor and online hosting for anti-theft activities." In 2019 4th International Conference on IoT: Smart Innovation and Usages (IoT-SIU), pp. 1-6. IEEE, 2019.

[11] Salman, Hasan, MdSezadur Rahman, Md Abu Yousuf Tarek, and Jun Wang. "Formulation and application of autonomous IoT and ARM-based GPS managed system surveillance systems." In 2019 4th International Conference on Control and Robotics Engineering (ICCRE), pp. 93-98. IEEE, 2019.

[12] Munsadwala, Yashvin, Pankti Joshi, Pranav Patel, and Keyur Rana. "Identification and visualization of hazardous gases using IoT." In 2019 4th International Conference on Internet of Things: Smart Innovation and Usages (IoT-SIU), pp. 1-6. IEEE, 2019.

[13] Nair, Manish B., SamineniRohith Kumar, Naval A. Kishore, Nihal Mohan, and J. Anudev. "Instantaneous feedback pedometer with an emergency GPS tracker." In 2018 2nd International Conference on I-SMAC (IoT in Social, Mobile, Analytics and Cloud), 2018 2nd International Conference on, pp. 122-126. IEEE, 2018.

[14] Mangla, Neha, G. Sivananda, and AishwaryaKashyap. "A predicated vehicle tracking device for GPS-GSM tracked in a Google Maps-based mobile app." In 2017 International Conference on Energy, Communication, Data Analytics and Soft Computing (ICECDS), pp. 2916-2919. IEEE, 2017.

[15] Andreica, Gheorghe Romeo, LiviuiuBozzgae, DanieluZinca, and VirgileDobrota. "In a GPS-based surveillance programme for intelligent transportation networks, Denial of Service and Man-in-the-Middle Attacks against IoT devices." In 2020 19th RoEduNet Conference: Networking in Education and Research (RoEduNet), pp. 1-4. IEEE, 2020.