

REFERENCES	RESEARCH PAPER	AUTHORS	FINDINGS
1	Development of Surveillance Robot to Monitor the Work Performance in Hazardous Area	S.Sirasaganagandla , M. Pachipulusu and R. Jayaraman	<p>The paper focuses on the idea of providing surveillance using a robot with the techniques of IOT. Surveillance is a major issue in public restricted areas. The robot is hired here to monitor throughout the day. This robotic vehicle has the ability to substitute humans in hazardous areas to provide surveillance. The robot is operated manually by connecting it to Wi-Fi and consists of sensors for identifying any obstacles and identifying humans and giving live streaming to the respective admin. This is operated over Wi-fi using blynk app software. Arduino IDE is used in programming the robot. ICs like L293D (motor driver) and sensors like PIR, ultrasonic helps in movement of the mechanical body and detection of obstacles respectively. A camera is equipped for capturing the image of the person identified. A face recognition algorithm can help in spotting the intruder. The gas sensor provided can sense the presence of toxic chemicals in its surroundings. Thus the robot continuously provides data in remote locations in addition to the advantages of reduced human loss and detection of threats.</p>
2	Real-Time Design of HMI for Hazardous Gas Control and Monitoring System in Pakistani Mines, Natural Gas Areas and Fertilizer Plants	M. U. Khan, A. Shaheen, M. Zeeshan, Asad-ur-Rehman, M. Adnan and M. T. Rehman	<p>Gas leakage is a serious issue in commercial areas (fertilizer plants/mines) and domestic buildings and a major cause of concern in bistros, populated neighborhoods, and automobiles that operate upon compressed natural gas (CNG). Because of the increased gas leaks, residential safety has been a serious concern in recent years. Hazardous gasses such as propane and methane are flammable, and if contained in close proximity might trigger explosions Installing gas monitoring systems in sensitive areas is one of the preventative techniques for eliminating fatalities caused by gas leakage.</p>

			<p>The technique presented in this paper includes the identification and reporting of dangerous gases in a region by designing a Gas control and monitoring system (GCMS) that can automatically detect, alert and control hazardous gas leakage. It is quite easy to handle as users will only have to press buttons at the designed HMI (Human machine interface)</p>
3	Digital Twin for Monitoring Containerized Hazmat Cargo in Port Areas	L. Oliveira, M. Castro, R. Ramos, J. Santos, J. Silva and L. Dias	<p>The complexity of the number of stakeholders, information systems used, and port operations evoke new challenges to port security when it comes to the total knowledge and control of the overall operations of transport and parking of containerized freight, namely hazmat ones. The rising interest and the port authorities' awareness of the relevance of security concerns involved in this complex ecosystem has led to the search for new technological solutions that allow, in an integrated manner, the smart and automatic control of operations of transport and hazardous freight parking in all the areas of its jurisdiction, without third-party dependencies. Despite its importance and criticality, port authorities tend to have limited real-time knowledge of the location of hazmat containers, whether moving within the port (entering and leaving), or in its parking, having a direct impact on the port security. This article presents a Digital Twin platform for 3D and real-time georeferenced visualization of container parks and the location of hazardous containerized freight. This tool combines different modules that further allow to visualize information associated to a container, its movement, as well as its surrounding area, including a realistic and dynamic 3D representation of what is the area encircling the port</p>

4	To design and develop LoRa-based system for remote safety monitoring	S. Ingle, S. Salankar and S. Prasad	<p>Hazardous area, such as coal mines, are below the earth's surface. Below a certain level there are dangerous and flammable gases. Unavailability of any mobile Network makes such an area black spot for communication. In this paper, describe the using of LoRa that provide an wireless network upto certain range in this range using another LoRa that receive and again retransmit the same data resulting in doubling the range of communication. Adding Lora repeaters multiplies the range of communication. In such a way, routing sensor data till the area where GPRS Packets are available and then upload the data to the cloud. This can turn any black spot for communication reach to cloud storage.</p>
5	Optimization of RSSI based indoor localization and tracking to monitor workers in a hazardous working zone using Machine Learning techniques	P. Aravinda, S. Sooriyaarachchi, C. Gamage and N. Kottege	<p>This paper proposes a method for RSSI based indoor localization and tracking in cluttered environments using Deep Neural Networks. We implemented a real-time system to localize people using wearable active RF tags and RF receivers fixed in an industrial environment with high RF noise. The proposed solution is advantageous in analysing RSSI data in cluttered-indoor environments with the presence of human body attenuation, signal distortion, and environmental noise. Simulations and experiments on a hardware testbed demonstrated that receiver arrangement, number of receivers and amount of line of sight signals captured by receivers are important parameters for improving localization and tracking accuracy. The effect of RF signal attenuation through the person who carries the tag was combined with two neural network models trained with RSSI data pertaining to two walking directions. This method was successful in predicting the walking direction of the person</p>