Biolcheva., Int J Earth Environ Sci 2021, 6: 189
https://doi.org/10.15344/2456-351X/2021/189

International Journal of
Earth & Environmental Sciences

Original Article Open Access

Business Readiness for Implementation of AI Prevention of Potential Risks in Natural Gas Transmission and Storage

Petya Biolcheva

Department of Industrial Business, University of National and World Economy, Bulgaria

Abstract

Despite the high pace at which AI navigates in various areas of the business, there are still aspects to provoke restraints and limitations. Such restrains could be regarded to the concerns in experts that they would be literally substituted by the machines. In the same time, the dynamycal of the surrounding environment apply the necessity of accelerated optimisations of processes and namely by the abilities offered by of the AI.

This article aims to identify how AI can improve risk management processes which are the pros and cons and how it relates to experts in the field. In order to determine the possibilities to integrate AI by the risk prevention during working with natural gas, the following are analyzed here: the importance and place of natural gas in the economy; the main risks by the transmission and storage of natural gas; the place of AI in risk prevention. An empirical study is conducted in this material, which reveals the opinion of experts in the field and their attitudes regarding AI. All this is aimed at achieving the goal of reducing the risk and negative consequences of its manifestation in the transmission and storage of natural gas.

Publication History:

Received: October 22, 2021
Accepted: December 04, 2021
Published: December 06, 2021

Keywords:

Natural Gas, Risk Prevention, Gas Explosions, Artificial Intelligence, Applied to AI

Introduction

To understand the essence of the topic, it is first necessary to determine the importance of natural gas for the economy. In September 2020, the European Commission has set itself the ambitious goal of reducing greenhouse gas emissions by at least 55% by 2030 compared to levels from 1990. This will allow Europe's economy to evolve to "climate-neutral" [1]. It is a known fact that from the spread fuels in use, the natural gas is among the most environmental friendly. This is one of the reasons why it remains a preferred energy source and the forecasts are its consumption to increase [2]. Statistics from the last 20 years shows a steady increase in interest of natural gas worldwide [3]. According to Rios-Mercado and Sanchez [4], natural gas is a future energy source. They define a number of advantages in support of its consumption. These include low greenhouse gas emissions and relatively low capital costs. As an energy source, it is used both by end users and in industry, including the energetics. For 2020 natural gas consumption is widely spread in almost all parts of the world [5].

In order to ensure the consumption of gas, a complex infrastructure related to its transportation is needed - millions of kilometers of gas pipelines, accompanying infrastructure for regulating the amount of gas, load, temperature, etc., as well as gas storage facilities for its storage and compensation of the different gas consumption at the expense of the seasonal needs of the population. These facilities are functioning under coercive requirements, and their violation is associated with provoking many risk situations. This paper discusses the main risks that are realized through the processing of gas transmission and storage. Although there is active work on risk reduction, worldwide, negative events are encountered every year in resulting in the loss of human life and to damages to nature due to explosions of gas pipelines or gas storage facilities. Here, are presented facts in favor of increased prevention proposed by the application of artificial intelligence in the overall process of managing these risks.

Main Risks in the Transmission and Storage of Natural Gas

Along with the positive aspects of the use of natural gas, there are also threats related to potential risks, mainly related to accidents and damage during its transmission and storage. They can be provoked by:

1. Natural disasters - landslides and floods; geological changes of the aquifers; seismic activity [6], etc.;
2. Infrastructure problems - accidents in storage facilities, pipelines, dewatering facilities, etc. Here the variety of potential risks is wide: Corrosion of the gas transmission routes, damaged insulation, non-functioning electrochemical protection, not in time established factory defects, the quality of the pipe does not meet the established norms and standards; appearance of pores during welding of the pipe; improper laying (there is a stone in the trench that causes torsion, not a consistent fraction of inert material when burying the pipe); changes in gas storage capacity; change in the flow rates of injection and gas extraction , etc.;
3. External interference and malicious actions - here the risk may be caused by accidental and or intentional actions by staff and or third parties.

The realization of the potential risks associated with the transmission and storage of natural gas may lead to adverse consequences such as:

1. Gas loss from a leak in the gas pipeline;
2. Risk of human casualties [6], destruction of flora and fauna in the event of a potential explosion;
3. Thermal radiation and thermal effects; explosions, including large ones, in which the fire cannot be extinguished for a long time; fires in the area of the explosion;
4. Economic damage caused by infrastructure rehabilitation;
5. Deprivation of the population of access to natural gas and electricity;
6. Breach of contractual relations and losses from penalties, etc.

***Corresponding Author:** Dr. Petya Biolcheva, Department of Industrial Business, University of National and World Economy, Sofia 1000, Students Town, Bulgaria, Tel: +359 887695738; E-mail: p.biolcheva@unwe.bg

Citation: Biolcheva P (2021) Business Readiness for Implementation of AI Prevention of Potential Risks in Natural Gas Transmission and Storage. Int J Earth Environ Sci 6: 189 doi: https://doi.org/10.15344/2456-351X/2021/189

To reduce the risk, efforts are made to implement various software solutions. EWS (Early Warning Systems) is often applied, which allows monitoring of the environment and creation of preconditions for quick reaction asides of the employees in charge. EWS is built on the basis of sensors and technological infrastructure on the basis of which forecasts for upcoming risk events are made [7]. Another active risk assessment solution is PIPESAFE [6]. This solution makes it possible to take into account the characteristics of the main risks threatening gas transmission and to provide predictive solutions. In addition, investments are made in raising the qualification of the staff, as well as in integrating business processes. In recent years, there has been increasing talk of using artificial intelligence (AI). Such a method can be applied in the monitoring of the studied object. For example, a system based on the Internet of Things (IoTRMS) and AI, developed by Tsang and team [8]. They offer such a risk monitoring system used to control product quality and safety in use. The method involves the integration of a sensor network with a cloud based database along with logical algorithms for collecting, filtering and analyzing risk data.

A number of risk management methods are applicable to the transmission and storage of natural gas. Some of them are applied in their pure form, others are modified depending on the specific features and specifics of the activity. Among the commonly used methods is the analysis of the root causes. It focuses on Han and his team [9]. They aim to identify potential gas accidents and eliminate them, through preventive measures and improving safety at the industrial level. Another method that is widely used in the hazard identification process is HAZID. It uses historical data on gas transmission and storage accidents. The advantages of HAZID are related to the calculation of probabilistic estimates focused on the consequences and their scale [9]. Sosa and Alvarez-Ramirez [10] use correlation dependencies and algorithms to reduce the risk in gas pipelines. The advantages of their approach are that various indicators can be taken into account, including technical and geopolitical. Another traditional method of risk control is the error tree. In the gas industry, it is applied, through its modifications related to fuzzy set theory, to treat the probabilities of major events as ambiguous and inaccurate values [9]. Next, the use of qualitative risk analysis can be mentioned as part of the traditional risk management process. Here he focuses on: estimating probabilities; analysis of the consequences of the external and internal environment of the gas pipelines, which require technical assessment to describe the accidents; risk assessment calculated on the basis of a mathematical function of the probability of an accident and the consequences of that accident [11]. Various integrated risk quantification methods for natural gas pipeline networks are also available in research and practice, which analyze various environmental factors as well as the internal and external consequences of accidents [9]. In summary, it can be stated that all the methods used increase the opportunities for risk prevention, providing a basis for expert analysis and forecasts. Their main disadvantage is that they are largely subjective. It is due to the opinion of the experts who conduct them and to historical data. When making their assessments, future trends are often not taken into account, as well as the high changes and dynamics of the environment. According to the author of this paper, these inaccuracies can be overcome by introducing artificial intelligence into the overall risk management process.

Place of Artificial Intelligence in the Process of Risk Management in the Transmission and Storage of Natural Gas

Artificial intelligence is becoming one of the most advanced technologies used in various sectors [12], including energetics. It allows large amounts of data to be processed and complex problems related to planning, operation and diagnostics in the energy sector to be solved [13].

AI is dependent on data and algorithms related to the availability of initial data, ongoing strategy for data collection, arranging the collected data, determining useful data characteristics, transforming data in response to the requirements of a particular model, selecting appropriate algorithms, evaluation of many algorithms for determining the accuracy, comparison with other algorithms and determining the speed of the model [14] and so on.

AI is already used in various natural gas activities. Some of the main doers are aimed at:

1. identification and prioritization of infrastructure problems related to obsolete equipment and potential risks in its operation. The benefits of AI are recognized here with a significant improvement in safety, reliability, sustainability, accessibility and environmental protection; optimizing capital and operating costs, improving decision-making for deferred maintenance; better management in the supply system; supplementing and improving the existing methods for collecting data on leaks in the gas pipeline, etc. [15].

Risk management stage	Contribution of AI
Risk identification when working with natural gas	• Cleaner risk identification and obtaining results in real time. It is implemented on the basis of the information received from the monitoring network in the gas infrastructure and refers to location and technical data. • Data obtained from various early warning systems for natural disasters, such as GIS (geographic information system) [13]. • Scanning and filtering relevant external information of third parties and linking it to existing assets.
Risk analysis and assessment	• Increasing the transparency in the correlation of the risks and the total risk exposure; • Risk assessment with a wider data set; • Real-time visibility of changing total gas transmission and storage exposure. • Constant validation of the model by collecting new data and detecting anomalies in data points and correlations.
Impact on risk	• Faster response time to risk reduction measures; • Better conditions for risk transfer, thanks to the large amount of available data and the machine learning algorithm.
Risk monitoring and control	• Improves risk protection; • Avoid accidents and better protect assets; • Faster response time to relevant risk events; • Greater resilience.

Table 1: The place of AI in the stages of project risk management.
Source: Cotelle, Ph., Dias, T., Florian, J., Gunes, O., ets. 2019, Artificial Intelligence Applied to Risk Management, FERMA Perspectives 03, p.15-20.

2. reduction of damages related to affecting the gas transmission network during repair works on other utility facilities in the vicinity. By transmitting information in real time, AI detects the movement of construction equipment and alerts stakeholders to the potential risk [15].
3. Forecasting gas consumption. Different algorithms are used, based on a combination of neural networks (NN) and genetic algorithms (GA) with basic data related to temperature, historical records, forecasts, etc. [16,17].

Despite these areas and the emergence of new ones, no significant results have yet been achieved in the use of AI. This is a reason to raise the awareness of energy operators working with natural gas and to seek support.

Although in the monitoring and control of the transmission and storage of natural gas, powerful systems and software solutions with proven efficiency are in duty, AI can contribute to their improvement by making them smarter and more sensitive to changes [18].

As a result, its effects can be seen in the whole risk management process. In a systematic way, according to the individual phases of the risk management process, the effects of AI are summarized in [19] (Table 1).

In general, it can be said that the main contributions of AI in the process of risk prevention are the following:

1. Greater clarity in the forecast of the potential magnitude of the risk manifestation. The application of AI is aimed at reducing the negative risk consequences by applying forecasting. This makes it possible to trace a number of interrelated characteristics, the combinatorics of which would give accurate results in modeling the negative effects of potential risk events. For example: a potential risk of explosion in the gas transmission network within a certain section would have a different negative effect, depending on the type of gas pipeline, its location, ie. Whether located in or outside a settlement, this would lead to different cost and recovery times for infrastructure and damage, risks to third parties, reactions from stakeholders affected, and a number of other accompanying negative effects. The combinatorics of the various risk indicators and the possibility of applying specific algorithms would show the "picture" in the greatest accuracy;
2. Reducing the risk of the human factor - increasing the opportunities for better monitoring by reducing the routine activities performed by the dispatchers in the monitoring centers. This will also reduce costs, automate and streamline of repetitive tasks [21]. It is not to ignore the reduced risk from human error. AI increases impartiality and gives greater resilience in processes, reducing the human factor;
3. Easy identification of vulnerabilities where the level of potential risk increases, based on the data received from the technical infrastructure. This increases the success of risk identification. The collection of database from the monitoring network of the gas transmission and storage infrastructure, as well as the analysis of historical data in real time allows to establish early indicators of forthcoming risks, which should be referred to the responsible experts.
4. AI increases the success of preventive measures. It offers various alternatives for responding to specific risks. By considering an alternative, all related effects can be visualized. This allows for a more complete picture and selection of appropriate solutions to reduce the specific potential risk.

Along with the positive effects of the introduction of AI, there are other factors that provoke the creation of negative sentiments among experts in the gas industry. They are mainly related to:

1. Fear among experts that technology will take precedence over their competence and they will be replaced. This begs the question: is it possible that the monitoring centers managing the risk in the processes of transmission and storage of natural gas will be left without physical dispatchers? If their presence is maintained and the main activities are performed on the basis of AI, what will be their responsibilities, whether they will not lose their motivation and developed ability to respond properly in risky situations. If they have the opportunity to intervene in decision-making despite the AI, then what is it for?
2. Vulnerability of the system due to increased opportunities for malicious individuals to carry out attacks on the energy system, especially cyber attacks, even in combination with physical damage and social engineering. The risk of accidental interruption also increases. Hackers are becoming increasingly capable of detecting vulnerabilities in the energy system [22].
3. Easier possibility for potential manipulations of industrial control systems can not only lead to interruption of gas supply, but also to physical damage to equipment and industrial accidents, including explosions and fires. The number of AI-connected network devices in the power system is expected to increase with the proliferation of the "industrial Internet of Things", activated by the introduction of 5G wireless communication networks [22].
4. In order for AI algorithms to be successful, they need a large amount of training data. Some gaps in model validation can lead to misinterpretation of the data, which adds irrelevant or incorrect conclusions [23].
5. High costs for system implementation and maintenance. For its operation, AI needs powerful machines, software and hardware, which are updated periodically to meet the requirements [24].
6. Lack of emotional intelligence and inherent in human teams. This means that the AI performs only the tasks assigned to it for which they are designed or programmed. For anything outside this range, they index with inappropriate results that lead to increased risk [24].

Research Methodology

This section reveals the methodology for the prevention of the risk of explosions during the transmission and storage of natural gas through the use of AI. It is based on a combination of processes involving expertise, those that take place in a complex between expertise and AI and are entirely subordinate to AI. Here the restriction is placed that the methodology is related to the concept of its implementation and not to the specific mechanisms of AI for the implementation of the processes.

The start of the methodology begins with defining the scope of the gas transmission network with all its features and scale. It is required here to identify and describe the activities related to the transmission and storage of gas - the basic requirements for them, as well as all the

parameters that affect them. Typical potential risks in this direction can be sought in the state of the infrastructure and the possibilities for its compromising, including the state of sensors and control sensors; deviations in gas pressure; changes in gas supply, etc.

Here is the first place in the proposed methodology, where the application of AI is introduced. It is aimed at analyzing the parameters that can provoke potential risks. AI analysis is conducted in several areas: 1) historical analysis of data from past periods. AI seeks a link between historically occurring explosions and changes in specific activities related to its transport and storage. 2) Analysis of a database of key indicators (economic; geopolitical; cultural; availability of resources and changes in its price and volumes; condition of the gas transmission infrastructure; response time of crisis teams, etc.) the difference with the previous analysis is only in the form of a database. Here the necessary database is purchased from the market of information products. Such databases are available for various macro indicators and other indicators that are relevant to the gas industry. 3) Semantic analysis of AI, able to supplement the identified risks outside the available databases. His main contributions are related to conducting analyzes of unstructured databases and information on the Internet. After the AI analysis, an expert analysis can be conducted, which has rather control functions and goals and taking into account the views of the experts on the individual activities and parameters [25].

The result of the analysis is systematized in a list of potential risks leading to increased threats associated with gas explosions. The advantage of AI is that it maintains this list in dynamics, as updates are in real time.

In the next step of the methodology, a “Probability Matrix” is prepared defining the level of each specific risk. Again, with the help of neural networks, a causal relationship between individual risks is established. This is necessary to withstand the chain effect of risk and greater accuracy of its assessment and prioritization of risk. All the obtained results are the basis for conducting AI simulation, using the Monte Carlo method, on the basis of which the numerical values of each individual risk are derived.

The obtained risk analysis is the basis for making specific decisions for prevention. AI activates its deep learning algorithms and shows the appropriate strategies that would give positive results. It offers combinations of solutions from which experts in the gas industry should choose the best according to them.

In this way, AI significantly supports the process of gas explosion risk prevention - identifies, systematizes, analyzes data, eliminates repetitive activities, facilitates time-consuming computational activities, and the choice of solutions is left in the hands of the human factor [25].

An empirical study was conducted to establish the attitudes of businesses and their readiness to use artificial intelligence in the process of explosion risk prevention in the transmission and storage of natural gas. Respondents are experts with experience in monitoring the transmission and storage of natural gas. The survey was organized through an online survey guaranteeing the anonymity of the answers, free expression of personal opinion, ethics and certainty in the results obtained. For easier systematization of the survey, the questions are closed, allowing the choice of answer/s by the respondents. The survey was conducted in the first quarter of 2021 within Bulgaria.

Results of the Empirical Study

The analysis of the results of the survey begins with the establishment of the place of AI in risk management and in particular in the prevention of explosion risk carried out in monitoring rooms. Respondents show a positive attitude. 26% of them are convinced of its positive effect, stating their firm position "FOR" its introduction. Another 40.7% also have a positive attitude, finding it appropriate to introduce it. There are still experts who, in one way or another, feel controversial about the topic and whether they need AI, given that they rely on their expertise and a well-functioning monitoring and control software system. This group includes 22.2%. It is normal to have opponents of the idea of introducing AI, but they are only 11.1%. The study does not show the existence of a definite refusal to enter artificial intelligence in the process of risk prevention. This is proof that the introduction of AI needs to happen in stages, in order to overcome the reservations of experts in the field.

According to 55% of the respondents, the biggest contribution of AI in their activity is related to the ability to analyze large databases. According to a small percentage (about 20%), the application of AI is mainly in the choice of reaction solutions. This is due to the general opinion of the experts that "when it comes to choosing key decisions, expert assessment is most important." The monitoring phase has also been identified as a possible alternative in which to use the opportunities offered by modern AI technologies.

Another important issue addressed in the survey is related to the feeling of threat from the respondents and in particular the possibility to be displaced. The question of whether AI can replace peer review is the subject of much controversy, both in the scientific community and in practice. This is the reason why it should be asked to the respondents in the present study. The results show that more than half (55.7%) do not feel threatened by AI, and according to them, the risk prevention process can be supported by the opportunities provided by artificial intelligence, but the main decisions will continue to be made by experts in the field. . According to about 30% of respondents, artificial intelligence still cannot be compared to the full emotional intelligence and human intelligence of experts. Another 15% are also not worried because they find the use of artificial intelligence primarily in routine activities. The survey shows another group of respondents (14.8%) who are aware of the accuracy of artificial intelligence and the fact that it is based on data and algorithms. In other words, its capabilities far exceed the capabilities of the best experts in the field. Another area where tension is felt is that AI will enable people without experience to manage risky processes.

Awareness-raising is important, but the benefits and contributions that artificial intelligence can contribute to practice are a priority. Various benefits are systematized here, from which the practice can benefit by introducing AI. They do not exhaust all the benefits, but aim to establish the respondents' attitude towards the contributions. The benefits are systematized in Figure 1, showing the assessment of the respondents to each of them (the assessment was performed on an ascending scale from 1 to 5).

All these issues lead to the conclusion that AI should be introduced step by step in the prevention of the risk of explosions during the transmission and storage of natural gas. Part of the routine actions with a lower degree of seriousness should be performed on the basis of artificial intelligence, and in case of more serious risks the leading role should remain in the hands of experienced experts. This will improve

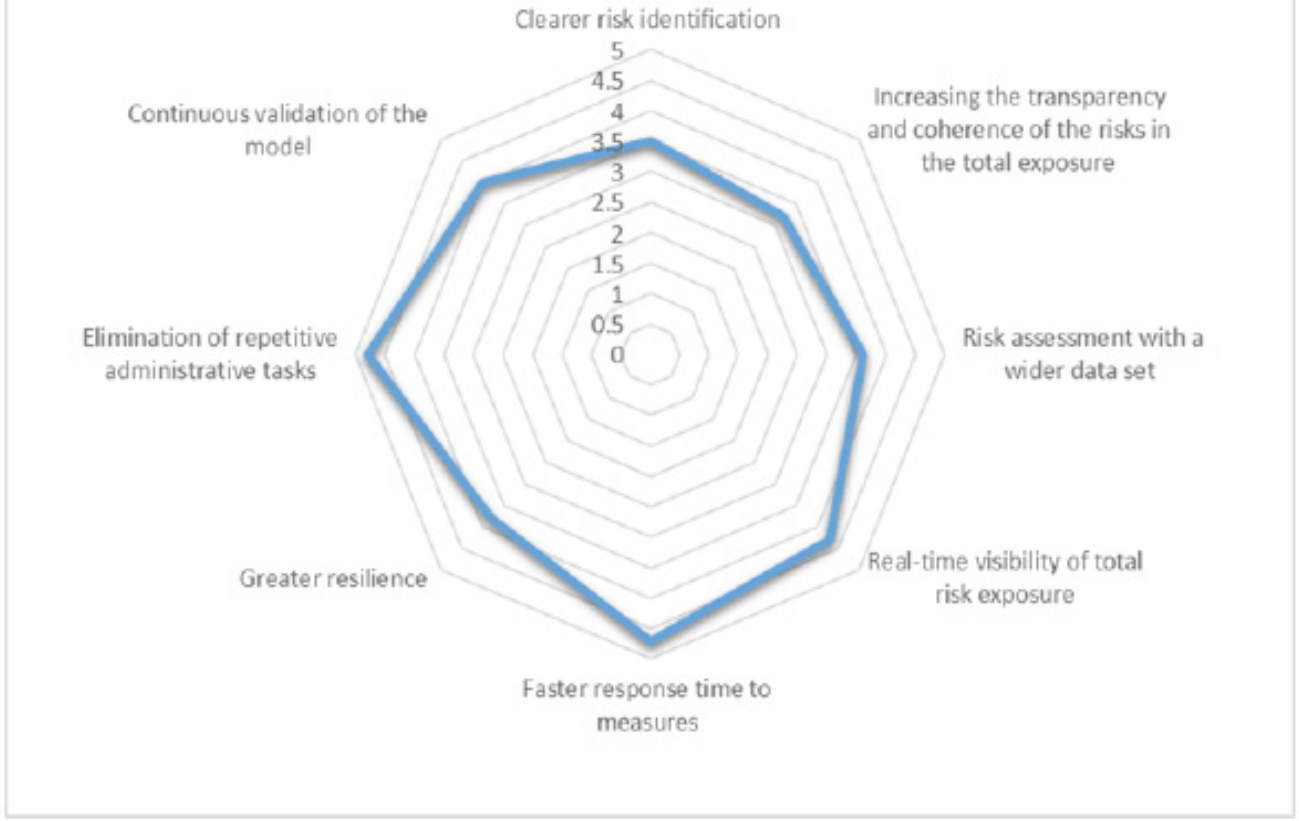

Figure 1: Advantages of AI for the process of gas explosion risk prevention (rated on a scale of 1 to 5 with increasing gradation)

the prevention process by accessing better quality data; improved database; opportunity for better analysis of certain indicators.

Conclusion

The importance of natural gas for the world economy will be a priority in the coming years. At the same time, working with it hides a number of risks, mainly related to the safety of its transportation and storage. All experts in the field are actively working to increase the turnaround activities related to reducing threats. This paper provides a methodological scheme on the basis of which the risk of gas explosions can be reduced. Knowing and controlling risk factors is important. Their origin is sought in the state of the gas infrastructure and the possibilities for early identification of an increased level of threat; changes in gas supply, pressure, etc. The ability to identify potential threats at the earliest stages significantly contributes to the implementation of timely prevention. A solution in this direction was proposed here, namely risk reduction through the introduction of artificial intelligence. It will allow experts to make rational decisions based on analyzes and conclusions from large structured and unstructured databases. It will optimize the process by showing the situation in real time, reduce the time for conducting computational procedures for the analysis of the situation, will allow experts to minimize routine activities and have the opportunity to focus on development priorities. The results of the study show that experts in the field will be significantly supported and will have much more complete and timely information. The long-term prospects are linked to a more rational and safer operation of the gas infrastructure in the transmission and storage of natural gas, and this will lead to a number of competitive advantages.

Competing Interests

The author declare that there is no competing interests regarding the publication of this article.

Funding

This research is funded by the Bulgarian National Science Fund, Contract КП-06-М35/1 от 29.09.2020, Project "Risk Integration in Organizational Business Process Management".

References

1. 2030 climate & energy framework. European Commission.
2. Climate & energy framework (2021) European Commission.
3. International Energy Statistics database.
4. Rios-Mercado RZ, Sanchez CB (2015) Optimization Problems in Natural Gas Transportation Systems: A State-of-the-Art Review. Applied Energy 147: 536-555.
5. Global Energy Statistical Yearbook 2021 (2021) Enterdata.

6. Acton MR, Baldwin PJ, Baldwin TR (1998) The Development of The Pipesafe Risk Assessment Package for Gas Transmission Pipelines. International Pipeline Conference.
7. Horita FEA, Albuquerque JP, Marchezini V (2018) Understanding the decision-making process in disaster risk monitoring and early-warning: A case study within a control room in Brazil. International Journal of Disaster Risk Reduction 28: 22-31.
8. Tsang YP, Choy KL, Wu CH, Ho GTS, Lam CHY, et al. (2018) Internet of Things (IoT)-based risk monitoring system for managing cold supply chain risks. Industrial Management & Data Systems© Emerald Publishing Limited.
9. Han Z, Weng W (2010) An integrated quantitative risk analysis method for natural gas pipeline network. Journal of Loss Prevention in the Process Industries 23: 428-436.
10. Sosa E, Alvarez-Ramirez J (2009) Time-correlations in the dynamics of hazardous material pipelines incidents. J Hazard Mater 165: 1204-1209.
11. Bianchini A, Donini F, Guzzini A, Pellegrini M, Saccani C, et al. (2015) Natural Gas pipelines distribution: analysis of risk, design and maintenance to improve the safety performance. 20th Summer School "Francesco Turco" At: Naples (Italy) Volume: Issue Industrial Systems Engineering.
12. Ilan Y (2021) Improving Global Healthcare and Reducing Costs Using Second-Generation Artificial Intelligence-Based Digital Pills: A Market Disruptor. Int J Environ Res Public Health 18: 811.
13. Yousuf H, Zainal AY, Alshurideh M, Salloum SA (2021) Artificial Intelligence Models in Power System Analysis. Artificial Intelligence for Sustainable Development: Theory, Practice and Future Applications.
14. Addo A (2019) Artificial Intelligence for Risk Management. Business Expert Press.
15. Artificial Intelligence for Natural Gas Utilities: A Primer (2020) Department of Energy-National Association of Regulatory Utility Commissioners Natural Gas Partnership.
16. Salehi M, Nikkhah A, Boostani R (2015) Predicting National Gas Consumption in Iran using a Hierarchical Combination of Neural Networks and Genetic Algorithms. Energy.
17. Anagnostis A, Papageorgiou E, Bochtis D (2020) Application of Artificial Neural Networks for Natural Gas Consumption Forecasting. Sustainability 12: 6409.
18. Mata J, Miguel I, Durán RJ, Merayo N, Singh SK, et al. (2018) Artificial intelligence (AI) methods in optical networks: A comprehensive survey. Optical Switching and Networking 28: 43-57.
19. Cotelle P, Dias T, Florian J, Gunes O (2019) Artificial Intelligence Applied to Risk Management. FERMA Perspectives 3: 15-20.
20. Maliene V, Grigonis V, Palevicius V, Griffiths S (2011) Geographic information system: Old principles with new capabilities. Urban Design International 16: 1-6.
21. 11 Impacts of Artificial Intelligence on Project Management. Project Practicai.
22. Erbach G, O'Shea J (2019) Cybersecurity of critical energy infrastructure. European parliament.
23. Noguerol TM, Godino FP, Valdivia MT, Menias CO, Luna A, et al. (2019) Strengths, Weaknesses, Opportunities, and Threats Analysis of Artificial Intelligence and Machine Learning Applications in Radiology. Journal of the American College of Radiology 16: 1239-1247.
24. Kumar S (2019) Advantages and Disadvantages of Artificial Intelligence.
25. Biolcheva P (2021) The place of artificial intelligence in the risk management process. SHS Web Conf, EDP Sciences.