

Chapter 11


Application of Machine Learning Methods to Forecast Potential Dangers in Chemical and Gas Industries

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ABSTRACT

Employers have a responsibility to prioritize the safety of their workers and should regularly inquire about their well-being to assess their levels of stress and comfort. Through the analysis and comprehension of their workers' requirements, organizations can generate superior quality products. Utilizing predictive analytics to mitigate the frequency and severity of catastrophic events would be advantageous, since Occupational Health and Safety anticipates substantial direct expenses associated with such incidents. If technology can accurately predict the timing and location of accidents, inspection data will be very valuable in directing immediate injury prevention measures and reducing the probability of future

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incidents. This article presents machine learning techniques for assessing and evaluating risks in the chemical and gas industries using K-Nearest Neighbors (KNN), Support Vector Machine (SVM), and Naive Bayes (NB) methods. The support vector machine (SVM) approach demonstrates high performance in criteria such as accuracy, sensitivity, and specificity

1. INTRODUCTION

It is the obligation of businesses to guarantee that their workplaces offer a safe and healthy environment for their workers in order to compete for competent workforce and to maintain that labour. In the workplace, safety and protection measures are of the biggest importance since they are necessary for providing a high level of well-being not only for employers but also for workers. For this reason, they are of the utmost relevance. It is of the highest importance to ensure the safety of workers while they are on the job, and it is the duty of employers to watch out for the health and safety of their staff members. When it comes to the dangers that are involved, companies implement safety precautions; nevertheless, these sectors also need to have a system in place to monitor the continuing preventive efforts that their employees are participating in. The obligation of ensuring that its workers are never placed in danger while they are on the job falls on the shoulders of the company. Additionally, the company should frequently check in with employees to see how their levels of comfort and stress are holding up under the circumstances. Through conducting research and gaining an understanding of the attributes that are required of their workforce, the commercial sector has the opportunity to generate goods of a high quality product. There is never a guarantee that a person will be completely safeguarded against danger, regardless of the work that they undertake for a living.

It is possible to combine occupational health and safety management systems with other parts of performance management in order to accomplish the following goals: a) reduce the risks that workers and external observers face; b) increase the productivity of the corporation; and c) make it easier to develop a favourable image for the industry. Occupational health and safety regulations that are exclusive to a company may differ from one another in line with the company's own requirements and beliefs. As firms expand, there is the potential for improvements to be made to the policies, processes, and programs that pertain to occupational health and safety (OH&S).

Due to the fact that modern industrialisation has altered the processes surrounding employment as well as the nature of labour itself, people are now more susceptible to new dangers and are suffering new health problems. As a consequence of this, it is of the utmost importance for a modern company to adhere to the regulations that control the monitoring of health, safety, and the environment. Safety events are a substantial reason for worry, despite the fact that the frequency of safety incidents is far lower than that of traffic accidents. This is because the location of safety incidents is unpredictable, and the intensity of their impacts is also unpredictable. It is not possible to have “zero threats,” not to a person, not to a society, and not to the natural environment. There is no such thing on the planet. There is no such thing as any of them. Businesses are obligated to keep records of any accidents, incidents, and other mishaps that occur while personnel are doing their tasks in accordance with the Occupational Health and Safety (OH&S) regulations, which are a component of the Business Intelligence System (BIS) (Verma, S., & Chaudhari, S. (2017).

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