Predicting Near Misses with Low Signal Hse Data

Morgan Eldred[1], Jimmy Thatcher[1], Abdul Rehman[1], and Carsten Sonne-Schmidt[1]

[1]Digital Energy, Dubai, United Arab Emirates

Abstract

Objectives/Scope: Health, Safety and Environment (HSE) operations can be greatly enhanced by reducing the uncertainty inherent in quantifying and modelling human activity. One way to do this is using supervised machine learning to predict when and where an adverse event (such as a near-miss or lost time incident) is likely to occur. This allows an organization to target their interventions more effeSilurian Tannezuftan adverse event, potentially saving lives and minimizing Non Productive Time (NPT). Interventions can be triggered automatically through mobile devices in various forms such as safety coaches, surveillance, or dedicated awareness bulletins. This approach can be used as a leading indicator to complement the existing lagging indicators to prioritise HSE day to day and longer term strategy. Methods, Procedures, Process: A comprehensive system was architectured for easily collecting and structuring data associated with work orders, audits, observations and near misses. Machine learning applied on the data then provides predictions of adverse events. The model is unique by combining quantifiable data with a novel feature using text processing, thereby providing a specialized algorithms to predict where, when, which discipline and under what life saving rule a future adverse event is likely to occur. The new approachusing natural language processing on text data inherent in HSE and operations coupled with machine learning and frequency, transform models to successfully predict the probability for a near miss or incident to occur over a given time-period for a given location and discipline. Results, Observations, Conclusions: This approach was trialed with a large operator against a workforce of over 50,000 with models further trained on smaller operations and found it to be very effective and accurate in predicting adverse events, within the time period, location and discipline. The average accuracy (how often the model is correct in predicting both if an adverse event will happen or not) of the model across 18 tests was found to be around 70%. Novel/Additive Information: A new, comprehensive approach to the collection of HSE data and development of industry specific machine learning models to predict adverse events is put forward. In addition, the machine learning model and technique represents a novel use case in terms of both method and application to the oil and gas industry as well as heavy industry in general.