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Please fill in your manuscript title.	Democratising Domain Data and Knowledge into Actionable Insight through Artificial Intelligence and Machine Learning

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Given Name	Surname	Company
Jackie	Koh	Petroliam Nasional Berhad (PETRONAS)

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Abstract

Objectives/Scope:

Liberating and democratising data and knowledge of an oil and gas company is pivotal in the race of digitalisation. The scope of this paper is to embark the use of AI and ML to unlock and transform big data and knowledge into actionable insights. This paper also explores the use of domain knowledge combined with digital competency in order to magnify the benefits on tapping on big data and expanding knowledge.

Methods, Procedures, Process:

The first stage is to liberate silo and federated data and knowledge sources. This is important to locate and connect to these data sources that are coming from the operating plants, platform, and internal knowledge databases. The second stage is to build a domain-led knowledge graph that will empower the AI model build to recognise relationships and connections, synonyms, and name entity recognition. The last stage is to democratise and provide insight to the users and provide prescriptive actions based on historical events. All these 3 stages, users are empowered to search, act and feedback accordingly.

Results, Observations, Conclusions:

The first and third stage allowed the users to be connected to data and various sources within the company environment. It is much easier and convenient now to find data and assisted in resolution of similar issues using historical data. Tapping in silo and fragmented data sources, in a single platform, has enabled quicker search of relevant and useful data for issue's resolution that is similar in nature.

The second stage aims to amplify the value by incorporating a domain-led knowledge graph that helps to refine or expand the search based on domain personalisation. With accurate and relevant search results, users are empowered to get reliable information and knowledge through one single source of truth. The knowledge graphs are built to connect nodes based on similarity and able to relate each node to tackle issues either adjacent with the same location, or similar but on other location. This has help quick and accurate actionable insight driven by AI model. The model also able to recognize synonyms and name entities that are standardised by Petronas or in oil and gas domain such as equipment tags, ISO standards, etc as trained by SMEs.

The initial deployment has contributed increase up to 25% of users work efficiency measured in manhours in searching for information. The pilot domain has reported a value creation of around MYR 2 mil for efficiency improvement.

Novel/Additive Information:

Knowledge is expanding by nature. We notice that by building the knowledge graph to feed to the AI model, it can be comparable to as an expert helping us to solve issues via artificial cognitive. If we able to connect the dots within the domain in oil and gas in the world, we can build a bigger connection via knowledge graph that can help with the current challenges and pace of digitalisation.