

Predictive maintenance in mining

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This paper describes how latest advents in AI, namely AI on EDGE, can be combined with a Low powered IoT Asset tracking system to effectively locate and predict industrial equipment failure with reasonable accuracy. These recent technological trends have therefore made it possible to look at mining equipment maintenance in a novel way.

The paper looks at the practicality of implementing a smart sensing location-aware solution over an entire mine perimeter. All the technology platforms mentioned are mature and well used throughout the industrial world. The paper seeks to take advantage of these technologies in the context of mining and deliver tangible benefit from doing so.

We first investigate the applicability of traditional sensor information to mining. A cocktail of environmental, i.e Temperature, humidity, air pressure as well as physical data i.e. 9-axis motion sensors (3-axis linear accelerations, 3-axis gyroscopes, 3-axis magnetometers) is studied and a resulting sensor model put together. This model is referred to as “Mining Sensor Model” (MSN) in the rest of this abstract.

We then articulate how Neural Network technology can be used in association with the MSN to predict traditional faults affecting mining equipment’s over time. This phase entails analysis of existing and new set of sensor data to eventually train the models - there will probably be more than one MSN as each equipment may require some level of customisation.

Finally, we show how to map out a Low-Power Wide-Area Network (LPWAN) asset tracking system over the entire mine area in order to monitor equipment’s in real time. We have intentionally fallen short of exploring the implication of such a system into the higher level decision support system currently used by mining management.

About the Author

Bachelor Science (Informatics section), Montpellier (FR) – Class 1978
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