

CASE STUDY

Predicting mill surging events using state of the art machine learning and artificial intelligence

GEAR

Type
Asset Surge Prediction

Module
Machine Learning

The Customer

Our client is one of the world's largest gold mining companies with operations globally and in Australia. Their portfolio of predominantly low cost, long life mines represents more than 25 years of production.

The Problem

A ball mill is used to grind, blend and even mix stockpiled ore into smaller pieces of a uniform size. In the case of a surge event, a large amount of unprocessed ore and water are suddenly ejected from the mill resulting in a temporary decrease in throughput and mine productivity. The objective was to identify key drivers and/or warning indicators of surging events and be able to predict them ahead of time to facilitate early intervention and minimise disruptions to productivity.

The Solution

Following extensive exploratory data analysis and processing, machine learning algorithms were applied to the data to forecast surges across a number of different time horizons, resulting in :

- Predictive models that could identify surges from 2 minutes to 15 minutes into the future with a high degree of accuracy
- The ability to identify surges far enough into the future to allow for corrective action
- Identifying the contributing factors of the surges
- The ability to make corrective action and surge prevention easier

The Challenges

The ball mill forms part of a highly complex circuit of crushing equipment

A number of contributing factors were identified by onsite engineers, however the complexity lay in finding the exact combination of these factors causing each surge

To pinpoint the contributing factors of a surge, historical data was cleansed/analysed to identify previous surge occurrences and their lead-up periods

The Value

GEAR was able to improve asset productivity by being able to predict and avoid future surges. The results identified a variable importance scale to identify key contributing factors which would enable early intervention.



94%

Surge prediction accuracy at T-5 min.



82%

Surge prediction accuracy at T-30 min.



10 weeks

Rapid project delivery timeframe

