



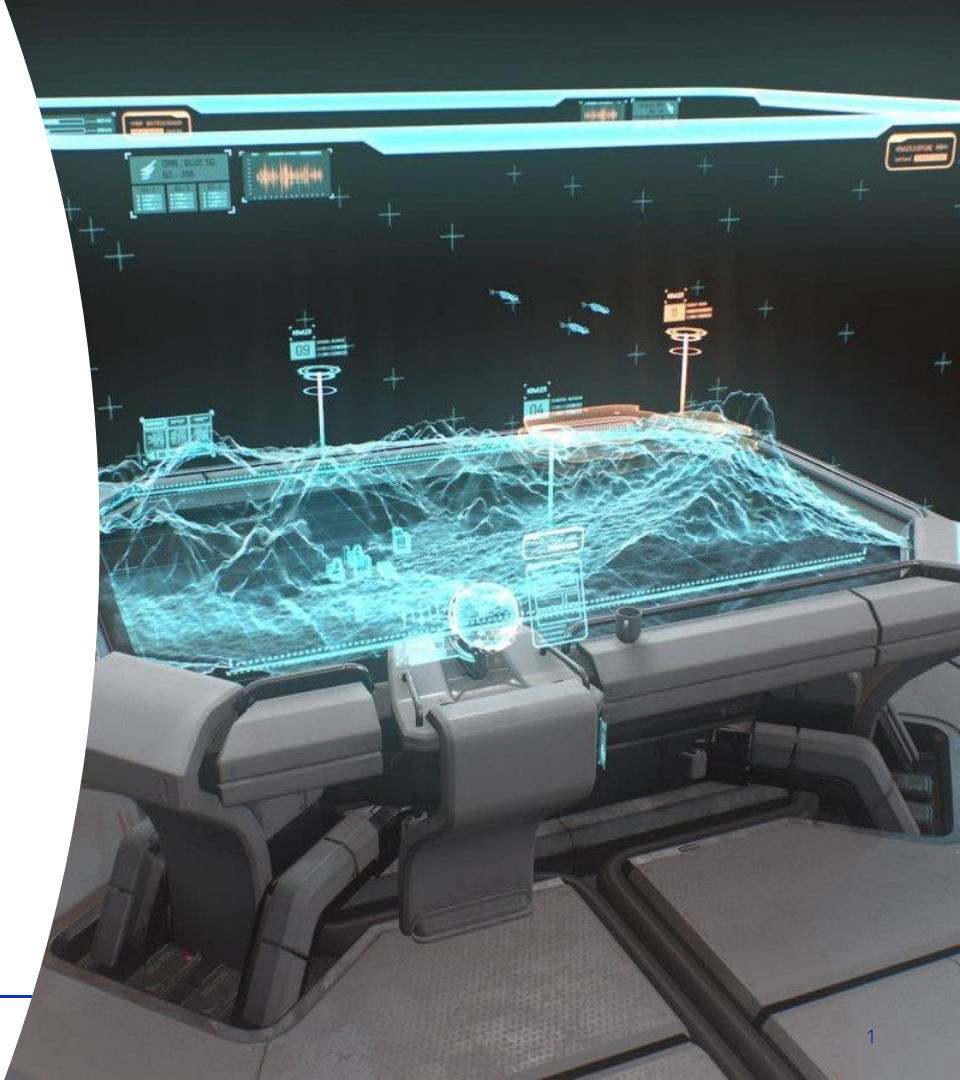
Digital Ground Control Management Plan for underground mines of Anglo American

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Agenda

1. Ground Control Management
2. The Challenge
3. The Opportunity
4. Results
5. Data Presenting Capabilities
6. Learnings
7. What's next



Ground Control Management

Ground control

Ability to Predict & influence the behaviour of rock in a mining Environment.

Having due regard for the safety of the workforce and the required serviceability & design life of the mine.



District

Portion of a mine with similar geological conditions exist.

Give a unique set of identifiable rock-related hazards and strategies to minimize the risk resulting from mining.



Plan

Scale of 1 in 2,500 plan on good quality transparent draughting material, indicating all applicable ground control districts of the mine.



The Challenge

32,000 Compliance data points recorded / month

36,000 Panel Hazard Rating (monthly planning input) data points recorded / month

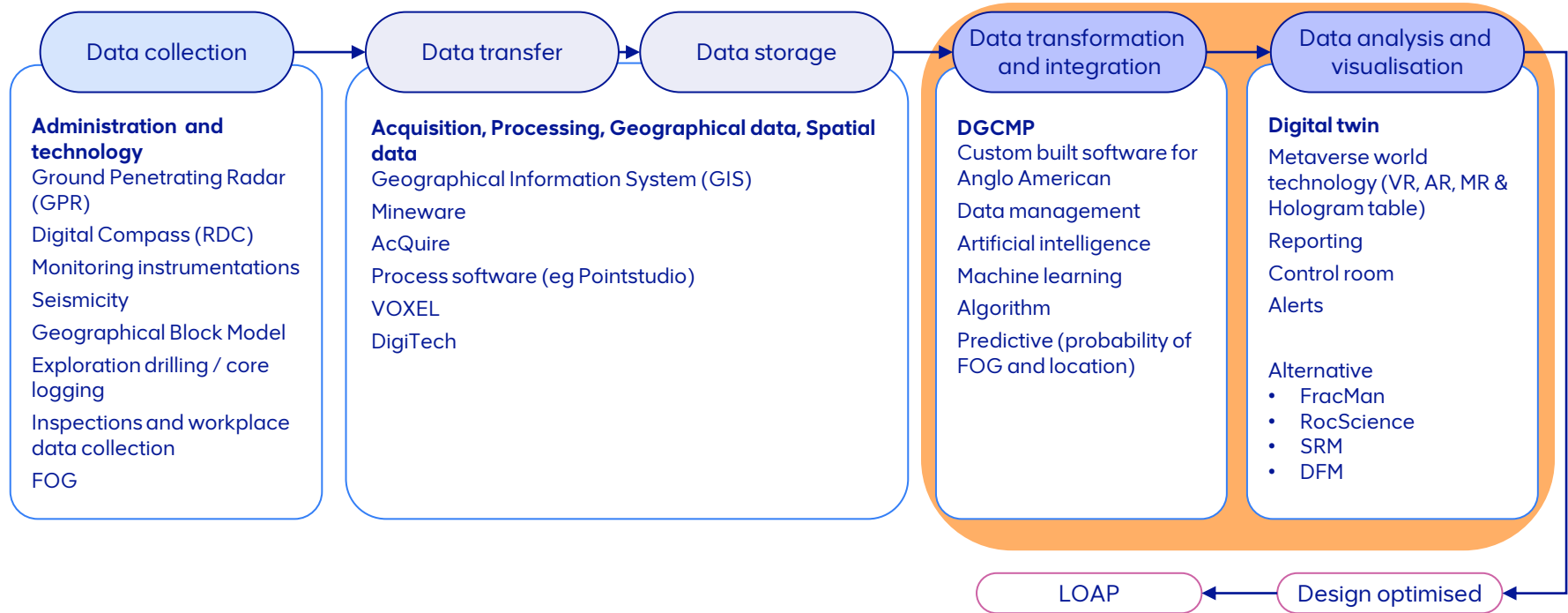
FOG data included

THE CHALLENGE

Regularly analyse multi-factor integrated data to ensure safe decision-making strategies are in place with limited time and recourses ?

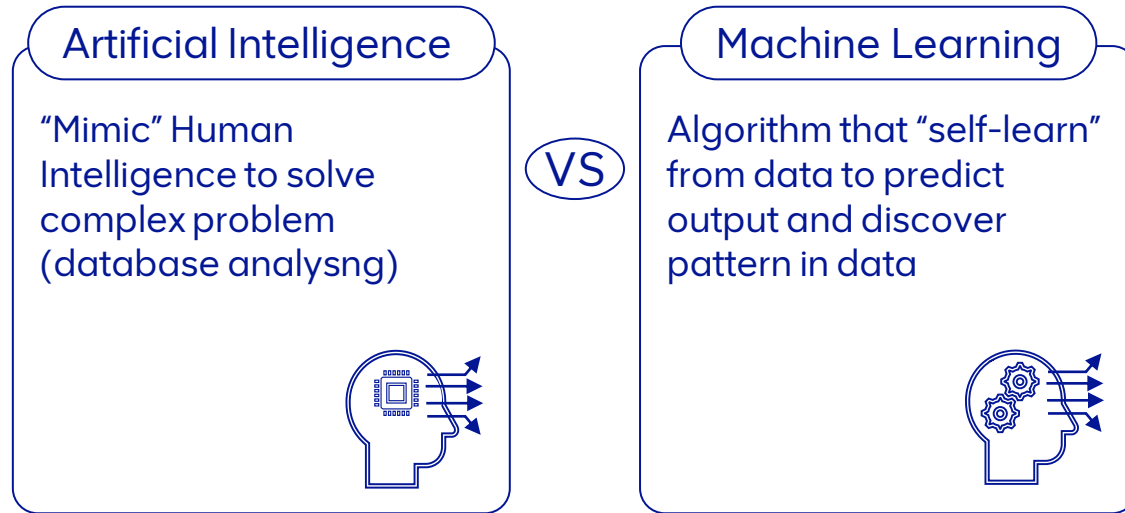
The Opportunity

Database diagram



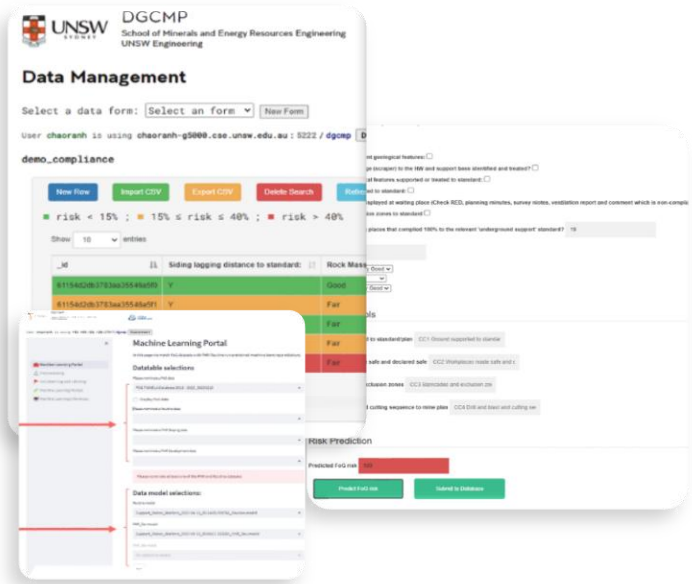
Purpose of AI and ML

Improve capability to identify areas with increased probability of an uncontrolled FOG using Artificial Intelligence and Machine Learning techniques

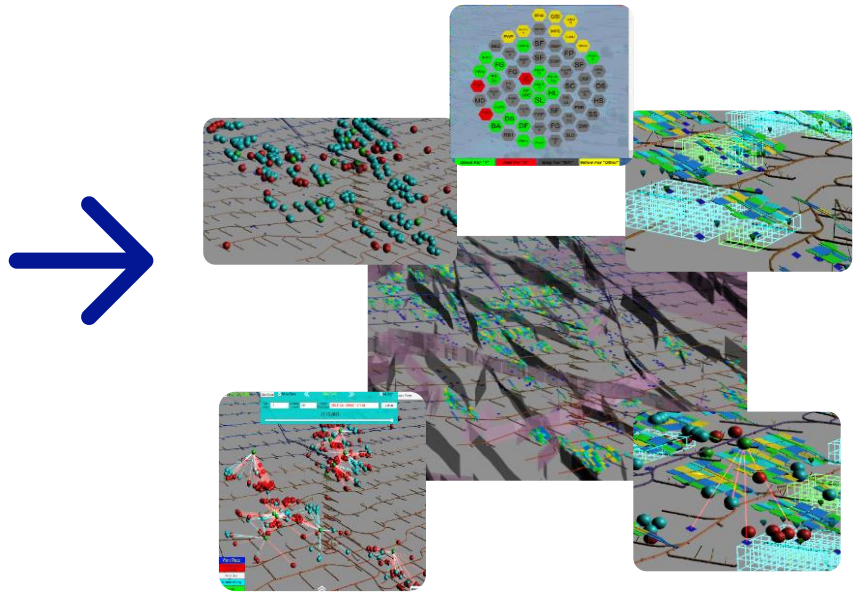


Results

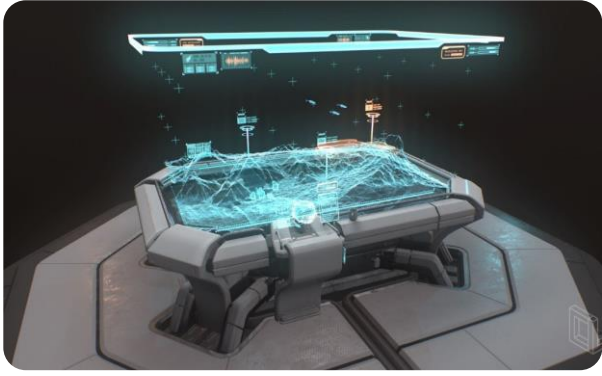
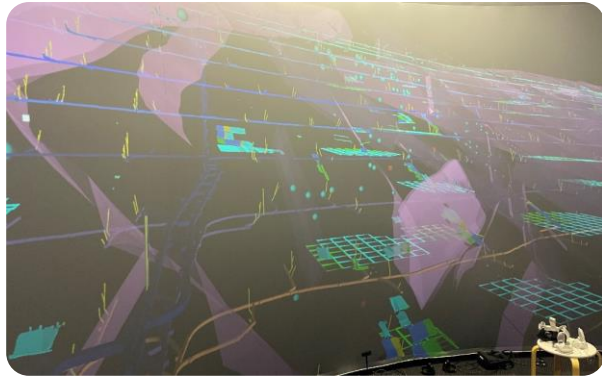
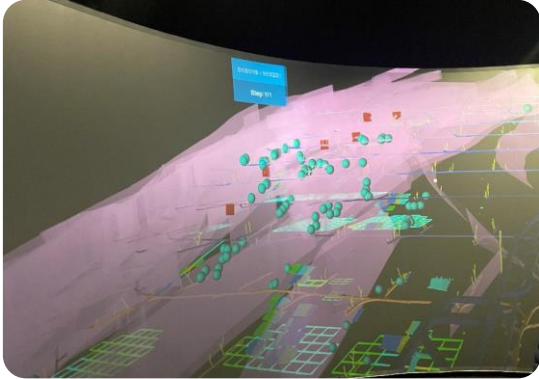
ML Data Management Dashboard



Visualisation and integration to management plan



Data Visualisation Capabilities

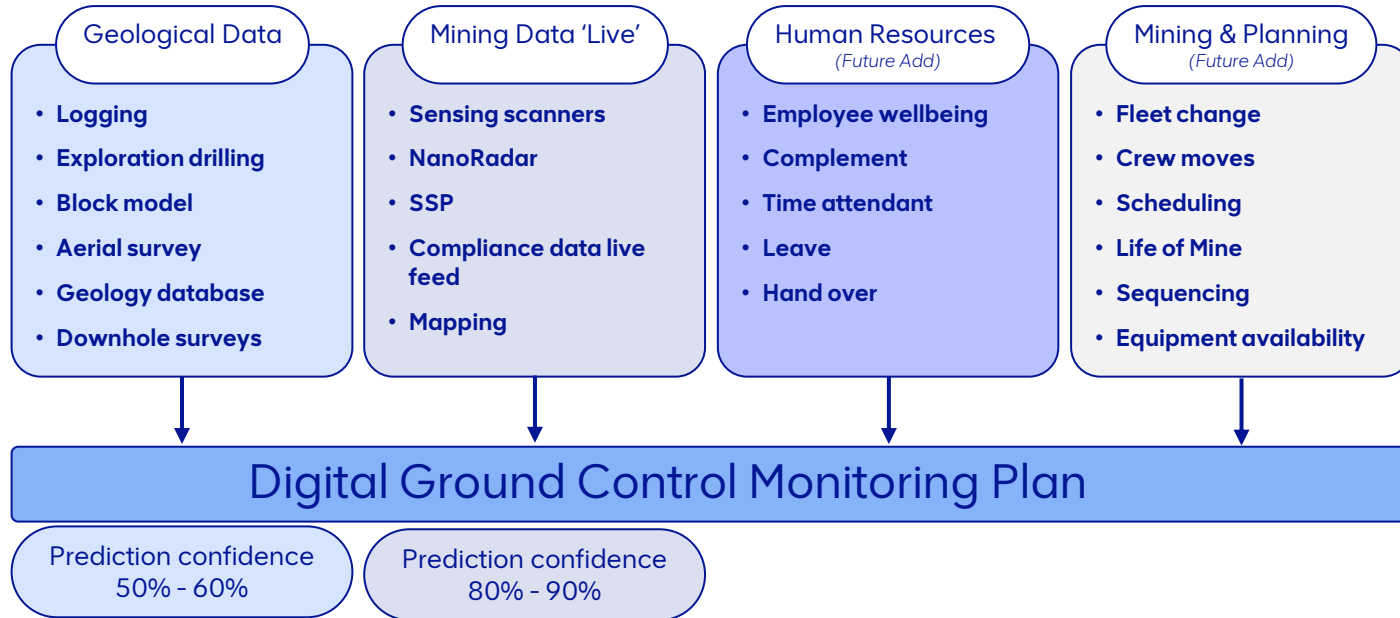


Learnings

- Excel spreadsheets are not a databases (Google agrees)
 - Setup proper database management system is crucial from the start
- Need sufficient, good quality data
- Selection of relevant analysing factors for AI and ML. **AI won't fix garbage!!**
 - eg not workplace names, dates
- Spatial location of data recording is vital for data grouping and matching
- Ensure standardisation

What's next?

Speed up the process





Thank you