WORKSHOP 2021

Doctoral Program in Industrial and Systems Engineering (DPISE/PDEIS)

ALGORITMI Research Centre

School of Engineering - University of Minho

The use of artificial neural networks to improve cost predictability in industrial megaprojects in the mining sector

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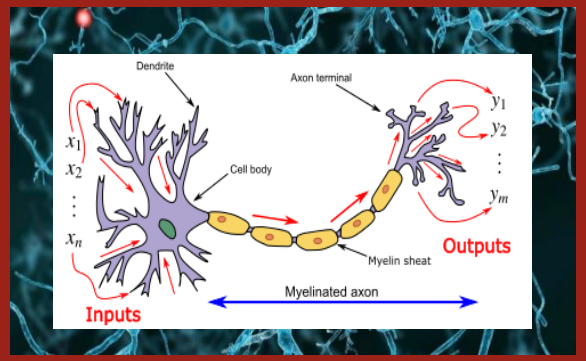
Objective

Investigate the application of machine learning techniques, like **Artificial Neural Networks (ANN)**, in forecasting cost deviations/contingencies in mining megaprojects. The focus is in improving their degree of predictability in the development stage, prior to implementation approval.



Mining megaprojects, VUCA-like environment, deviating projects objectives

Complexity is known as one of the main drivers for cost overrun

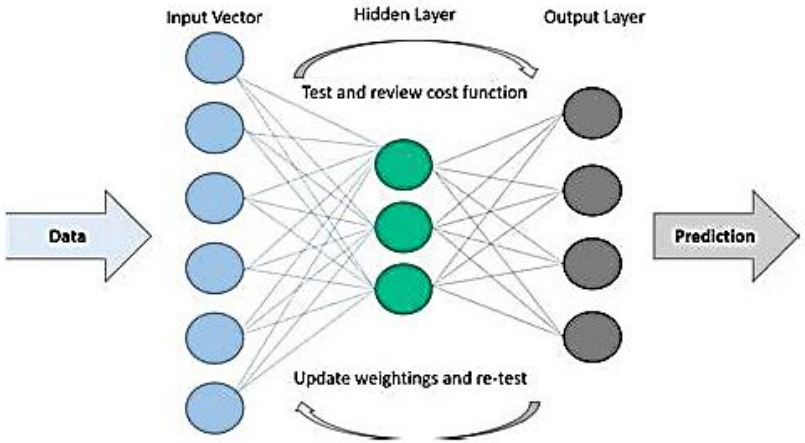
Cost - Contingency model based on a hybrid approach, comprising quantitative and categorical input variables

- **Inherent physical and operational characteristics**
- **Complexity**

ANN modeling runs in 'R' software platform

- **Input data gathered from around 40 projects includes:**
  - **Estimated costs**
  - **Contingencies estimates based on risk assessments with Monte Carlo simulations**
  - **Risk analysis and project maturity assessment reports (source for ambiguity, complexity, uncertainty, and volatility aspects)**
  - **Actual final costs and contingencies**

ANN model representation



ANN model output: Cost + Contingency Prediction