

Challenge #3
Underground Loader
Optimisation

Unearthed Hackthon
Melbourne, 2017

Team
LoaderMaster



Meet the Loader – Masters Data Hackers from Swinburne University of Technology

- Humphrey Obie – Computer Science
- Ngoc Tran – Computer Science
- Shuo Li – Physics
- Kai Zhu – Image Processing
- Jiaxi He – Image Processing



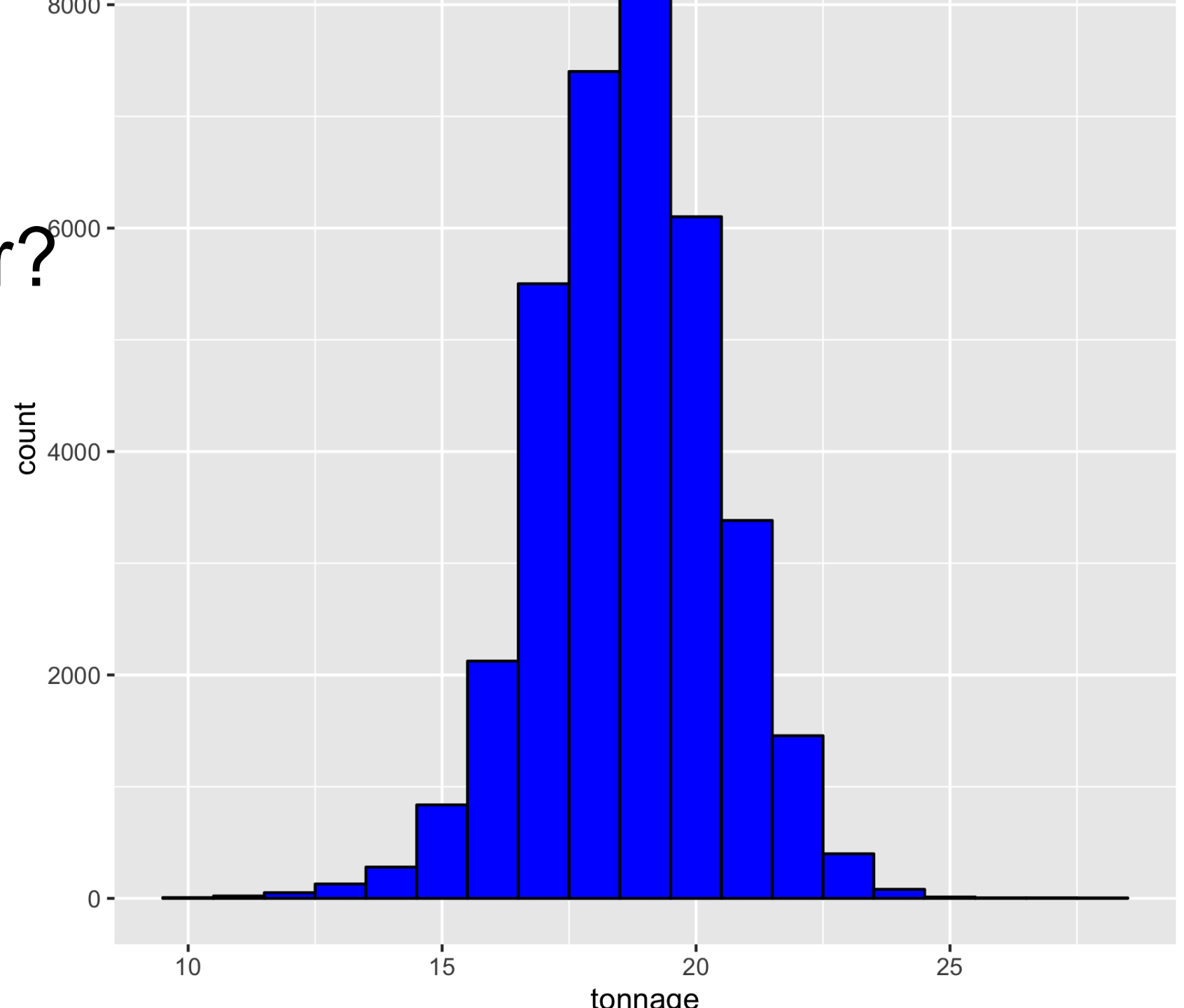
Challenge #3

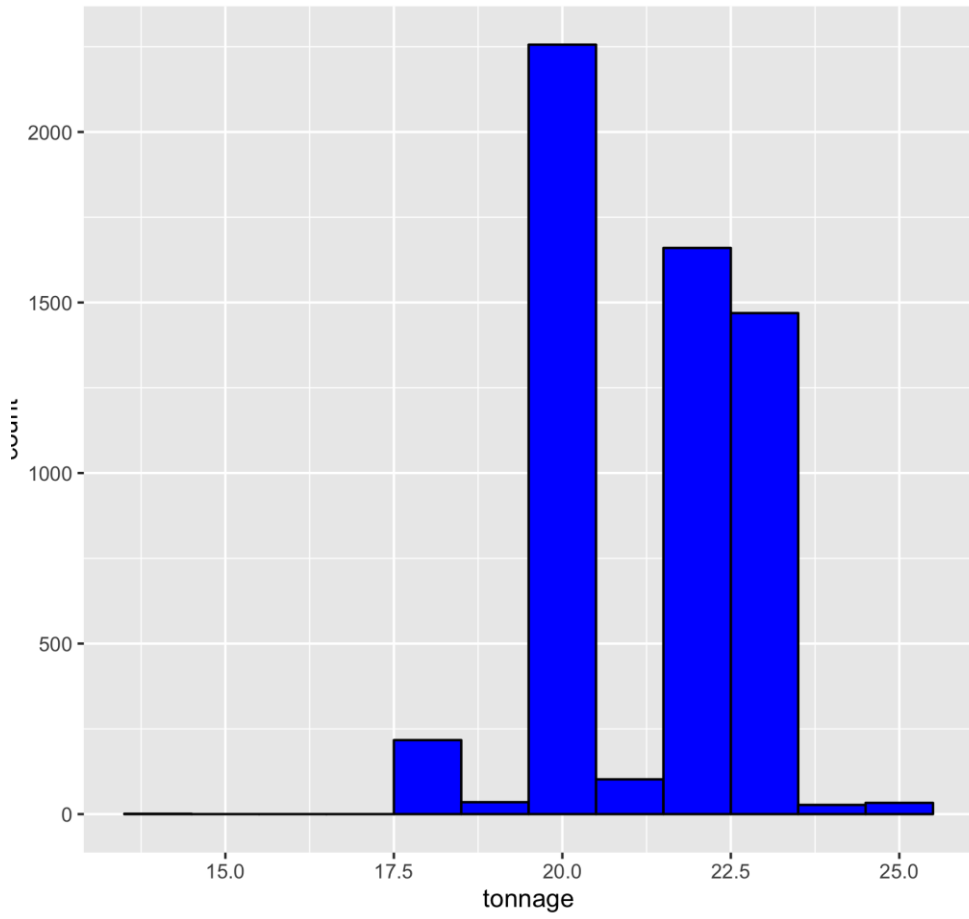
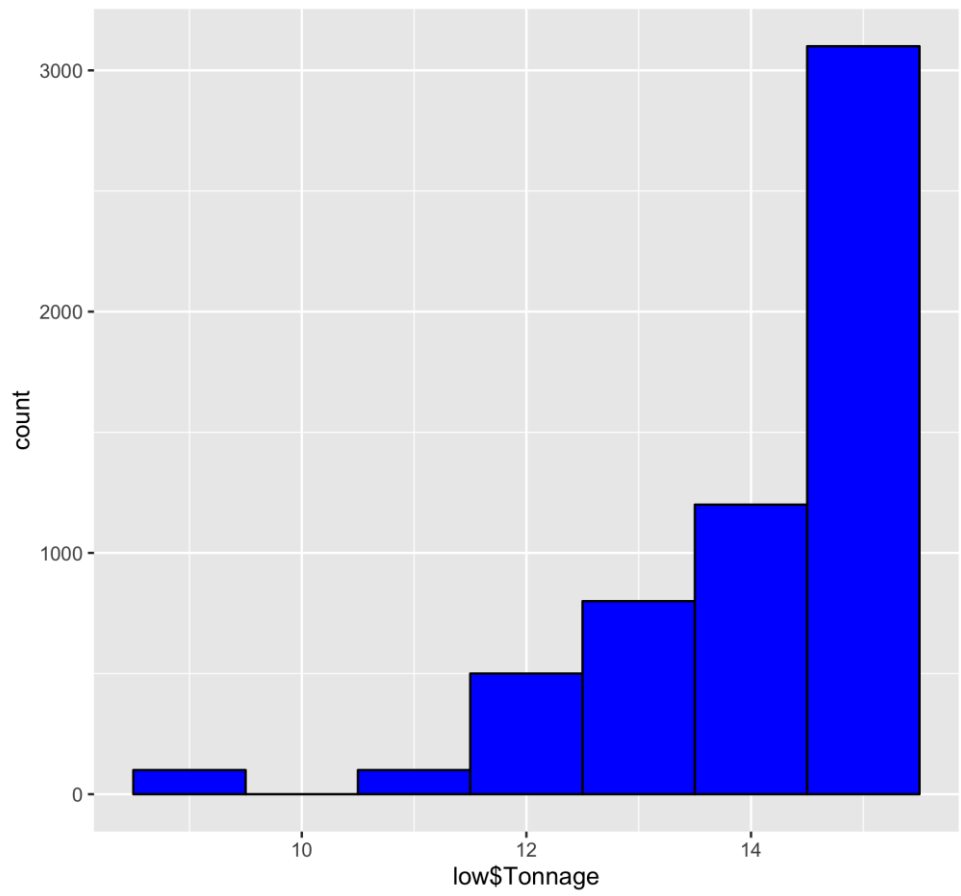
Underground Loader Optimisation

- What is the most efficient way to run these machines?
- How could operator performance be improved?
- Make productive autonomous loaders?



What is a good bogger?

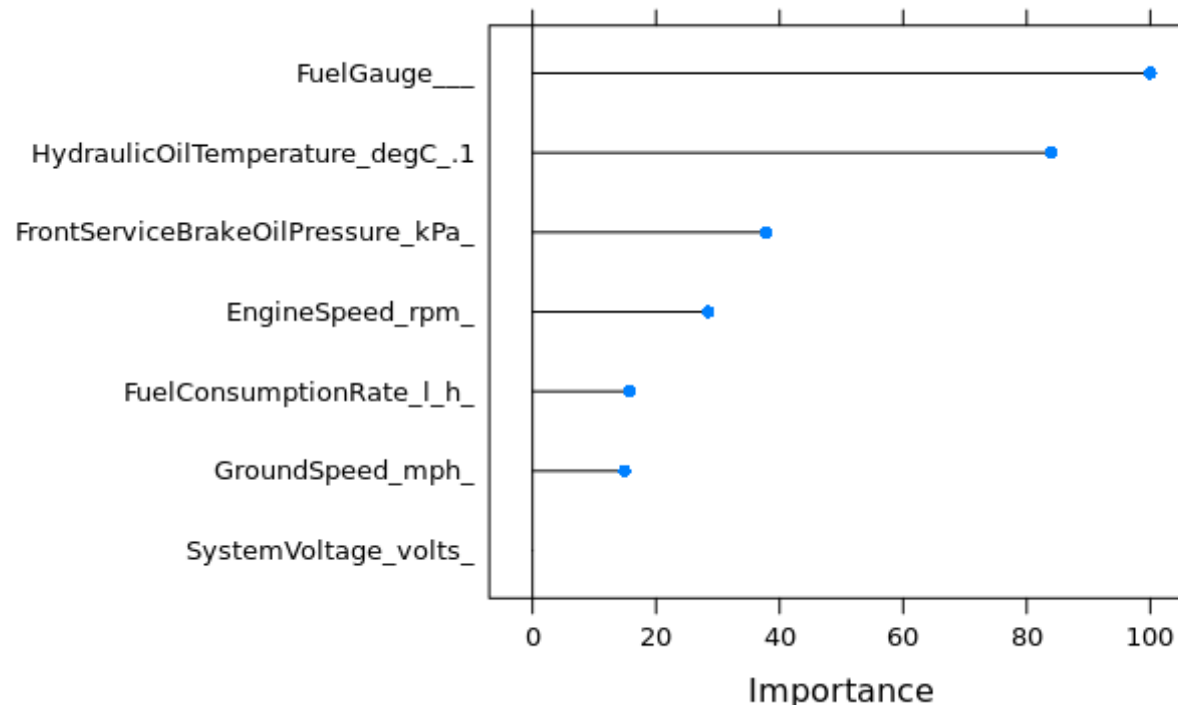




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4. Build Machine Learning Platform

- Using RandomForest, we have:
 - Identify 6 critical factors that possibly affect **tonnage**
 - Build the model that can predict how many tonnage a loader can do in a run with **86% accuracy**.



DEFAULT DATA SOURCE

[nchk17](#)

WORKER NODE SIZES

D4 v2 (4 nodes, 32 cores)

HEAD NODE SIZE

D12 v2 (2 nodes, 8 cores)

ZOOKEEPER NODE SIZES

A2 (3 nodes, 6 cores)



Results

- Given the conditions of the loader, we can tell how much tonnage to expect in real-time.
- Predict when the loaders need to be maintained
 - Reduced waiting time.
 - Maximize tonnage output.

Real Time
Tonnage

8

Predicted
Tonnage

15

Take more this time

Real Time
Tonnage

15

Predicted
Tonnage

8

Let engine cool down



Business Potential

- Improve
 - Predict the max capability of the loader.
Take actions to carry more tonnage
before delivery
- Potential
 - Potential to bring another 4-5%
tonnage/day/loader
 - More profit
 - Potential to develop more efficient
operation pattern for autonomous loaders



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Thank you

- Organizers
- Mentors
- Sponsors
- Participants

