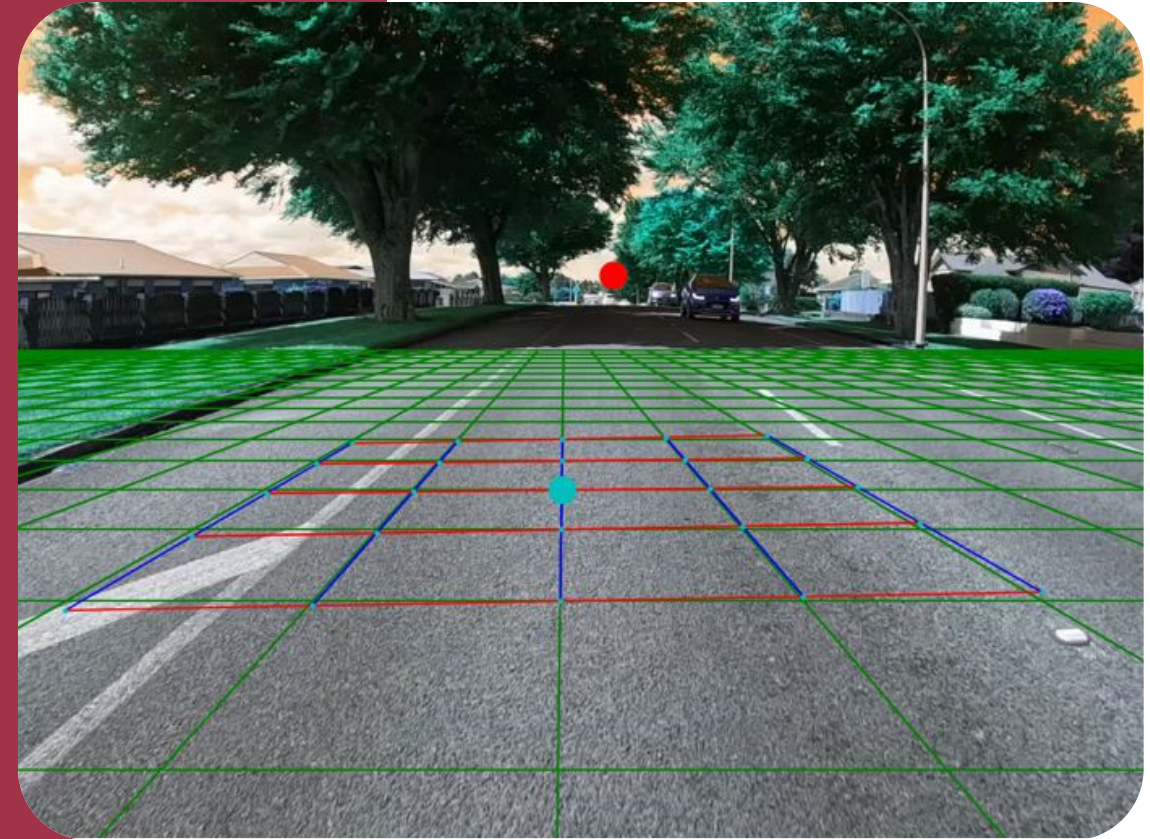


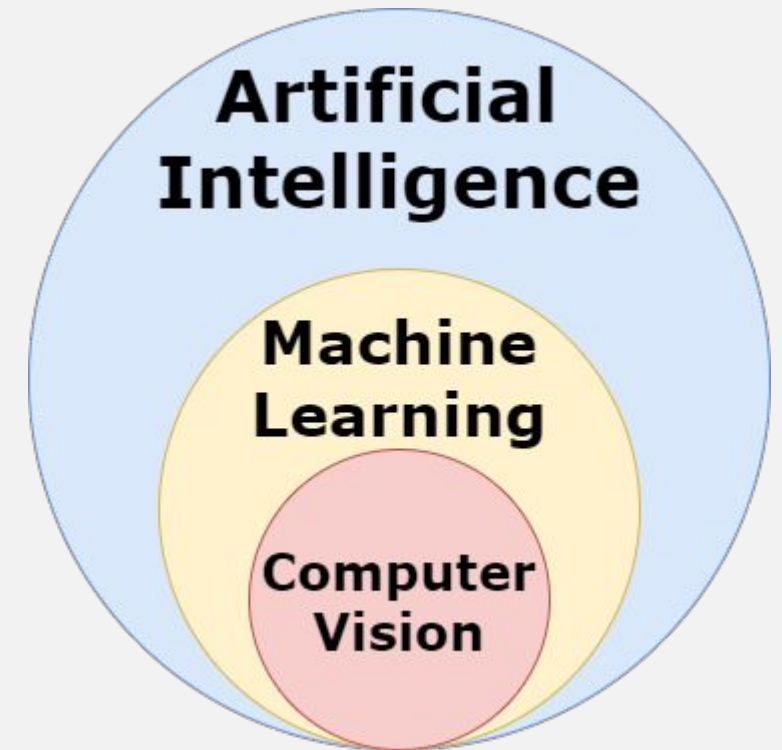
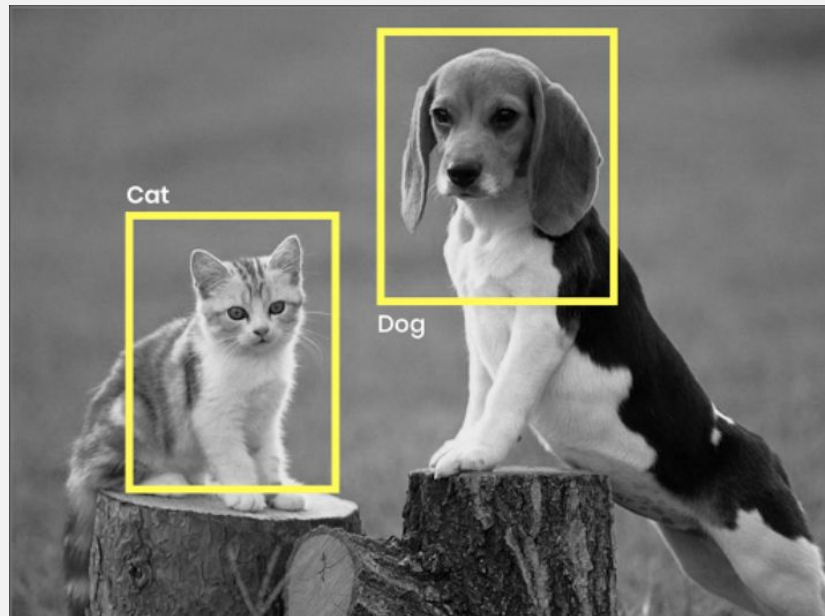
Modelling through the lens of AI

Dr Phillipa O'Shea, Eric Yu



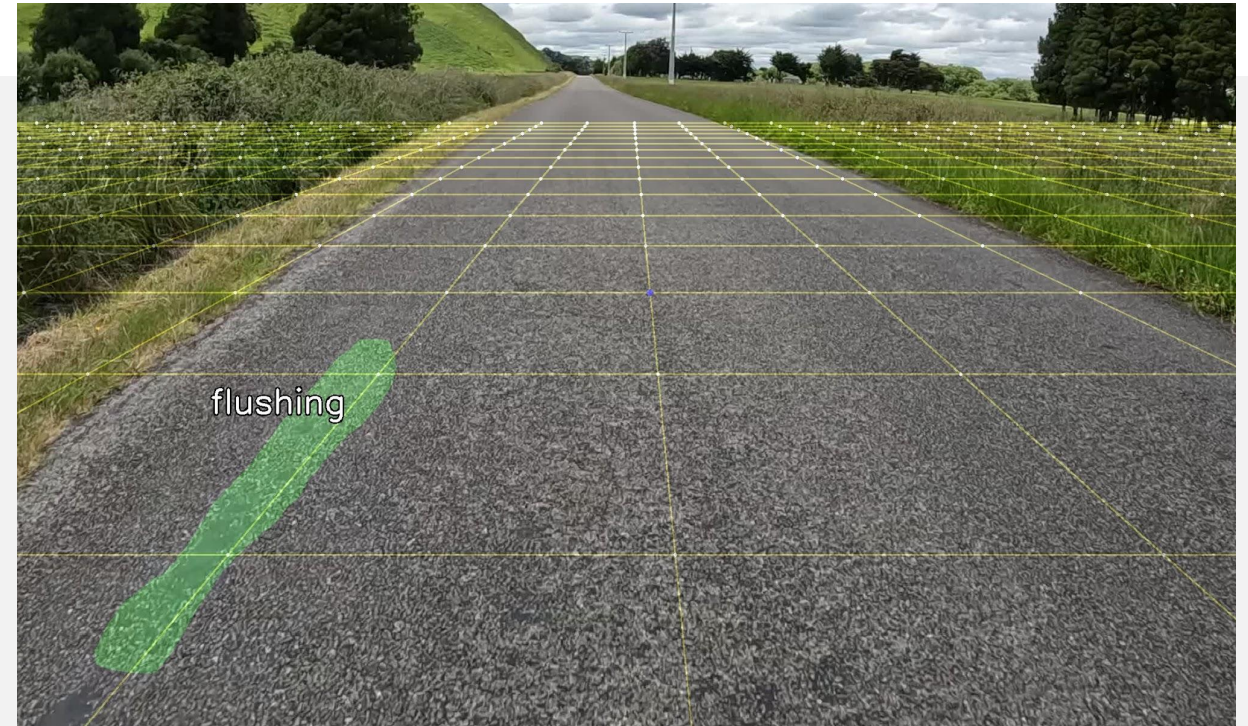
What is AI Fault Detection?

- Pattern recognition model
- Need to be taught (aka Train)



Why use AI / Machine Learning?

- More detail
- Efficiency
- Repeatable
- Inspector Safety
- Video collection use for virtual driveovers



A. Image classification



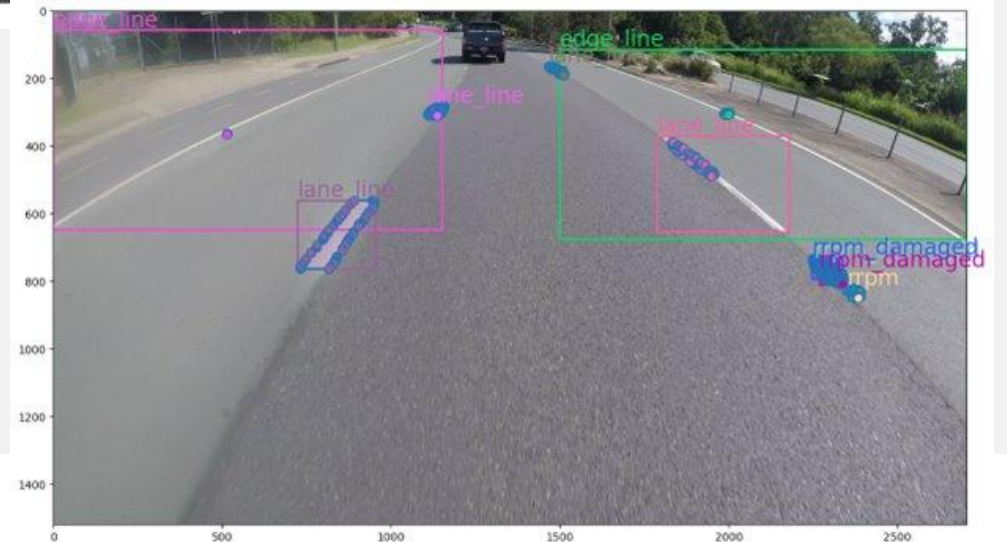
B. Object Detection



C. Instance Segmentation

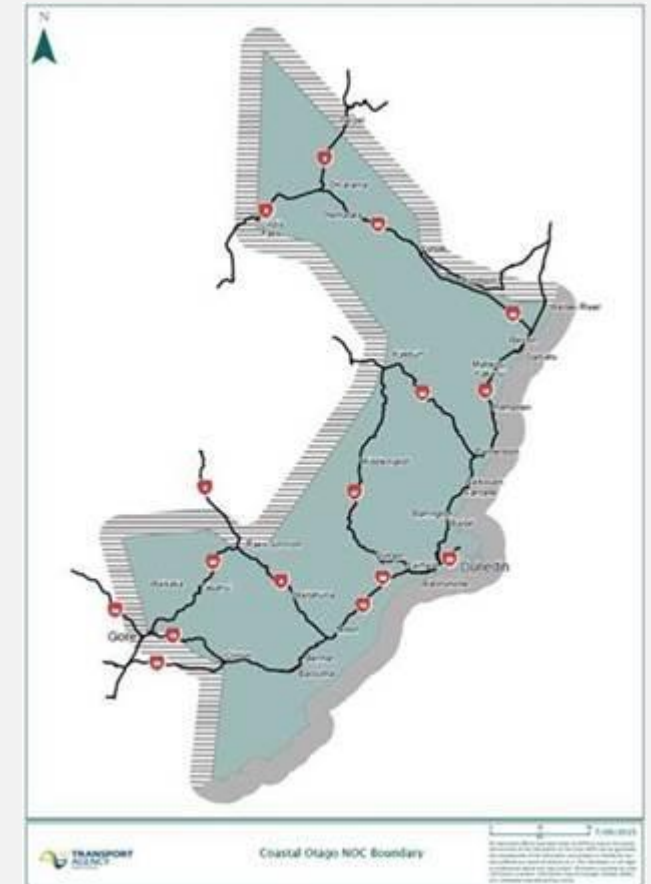
Our journey

- 4 contracts
- 3 AI systems
- 3 sets of problem



Journey 1 – Coastal Otago NOC

- First application
- Coastal Otago network is used to train an AI model
- A lot of flushing faults



Journey 2 – Porirua CC

- 2nd Application of the model
- Coastal Otago network is used to train the model (!)
- A lot of flushing faults



Coastal Otago SH



Porirua Streets

Definitely looks the same, RIGHT?

Journey 3 – New Plymouth DC

- Another Fault Detection model
- Outputs have been validated
- Predictive model output using AI fault data is comparable to NPDC's own excellent All Faults data

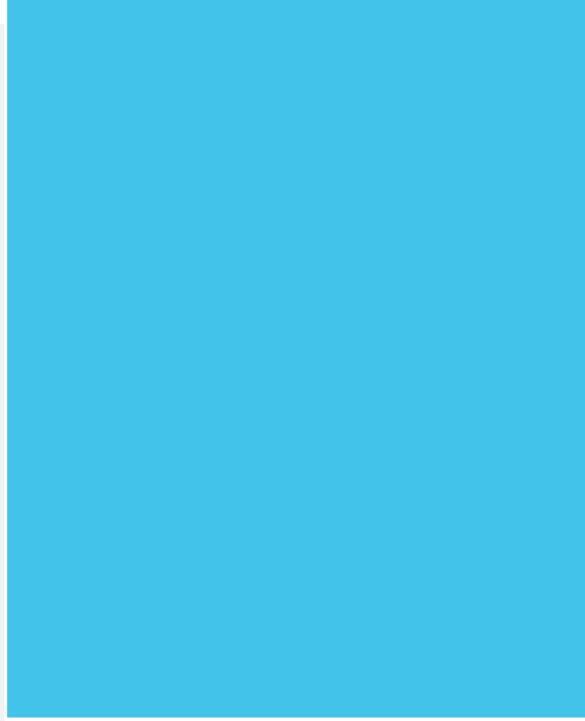






Journey 4 – Taranaki NOC

- 3rd Fault Detection model
- Still in pilot stage
- Early results are promising
- **FLUSHING!!!**

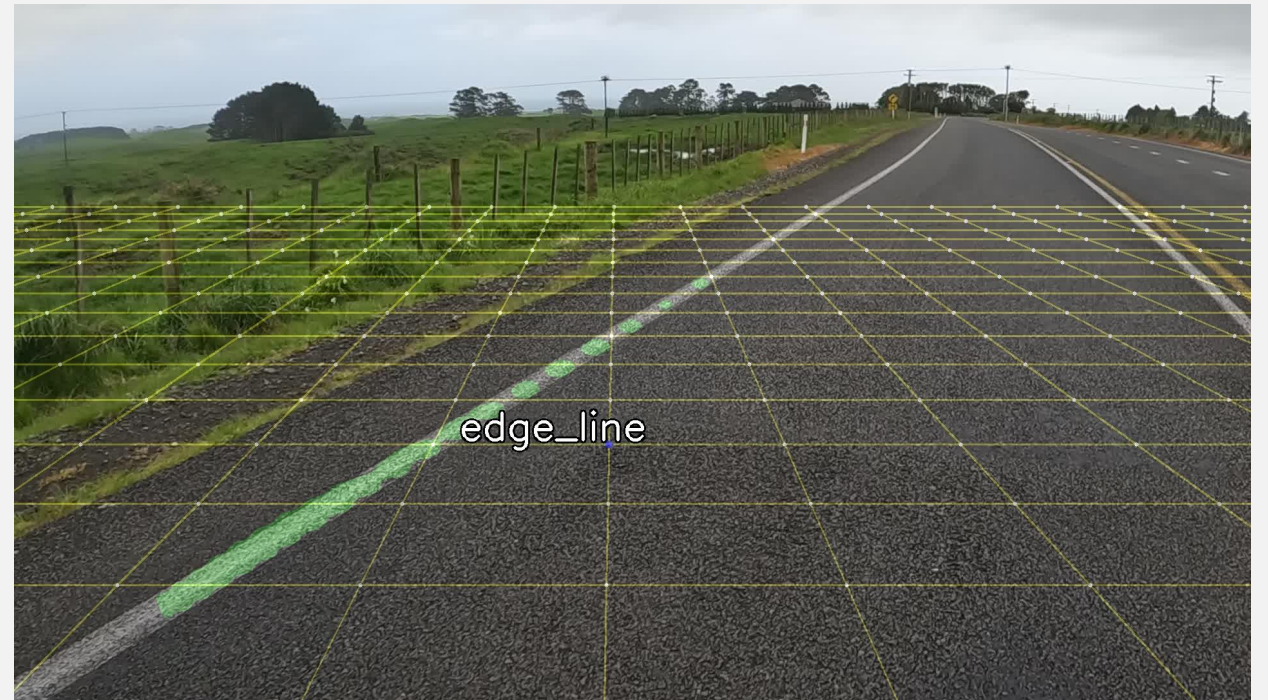


Lessons Learnt – Flushing

| | | | |
|---|--|---|---|
|  |  |  |  |
| Human | Flushing | Not Flushing |  |
| AI | Flushing | Flushing | FLU\$HING!!! |

Lessons Learnt – Camera Setup

- Good calibration is key
- Garbage in garbage out



Lessons Learnt – Urban / Rural

- Different driving behaviour, e.g. turn around, reversing – not going to happen on SH
- Vastly different shoulder / kerb / berm



- AI more granular fault detection – less defect area – affects deterioration model
- Currently AI faults do not accurately reflect maintenance risk
- Site selection between methods was similar
- AI is repeatable, All faults relies on well trained inspectors
- The AI model output is comparable to a contract with good All Faults data
- AI can identify missing assets

- AI models work
- Dependent on correct camera setup
- Dependent on training data
- AI models are equal to good practice all faults models
- Validation is key – network knowledge is fundamental
- More improvements to be made