# Speeding Up Neural Network Robustness Verification via Algorithm Configuration and an Optimised Mixed Integer Linear Programming Solver Portfolio

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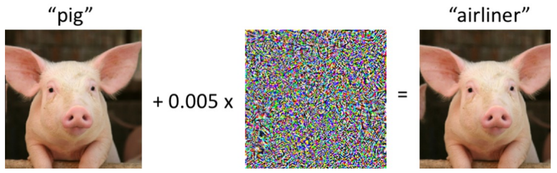
## Background

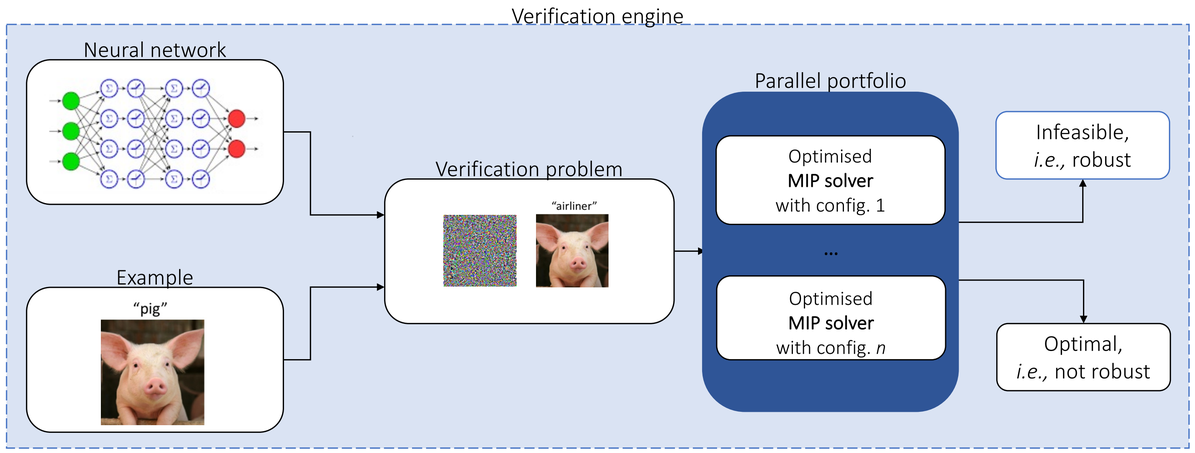
- Neural networks are vulnerable to adversarial examples




- Several neural network verification methods are based on mixed integer linear programming (MIP)
- Problem: High computational costs and many timeouts

## Method

- Parallel portfolio of optimised solver configurations
- 1 CPU core per configuration




## Conclusions

- Improved performance of state-of-the-art MIP-based verification engine **MIPVerify**:
  - Up to 4.7-fold reduction in CPU time
  - Up to 1.4 times fewer timeouts
- Improved performance of state-of-the-art MIP-based verification engine **Venus**:
  - Up to 10.3-fold reduction in CPU time
  - Up to 6.3 times fewer timeouts

## Results