Integrating operational and tactical decision-making in spare part inventory management

Daan Peters

UNIVERSITY OF TWENTE.

Fokker SERVICES GROUP

Gordian Logistic Experts

Introduction

Tactical level

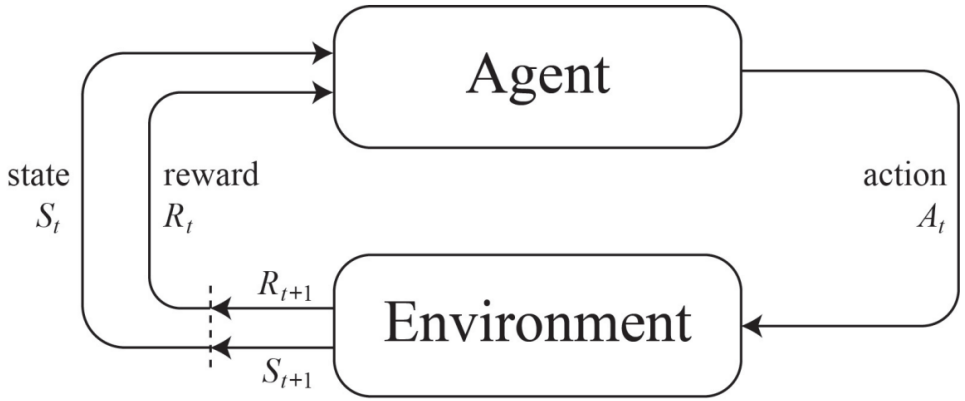
Inventory parameters
E.g. base stock levels, reorder quantities

Operational level

Interventions
E.g. expediting, lateral transshipments, cannibalization

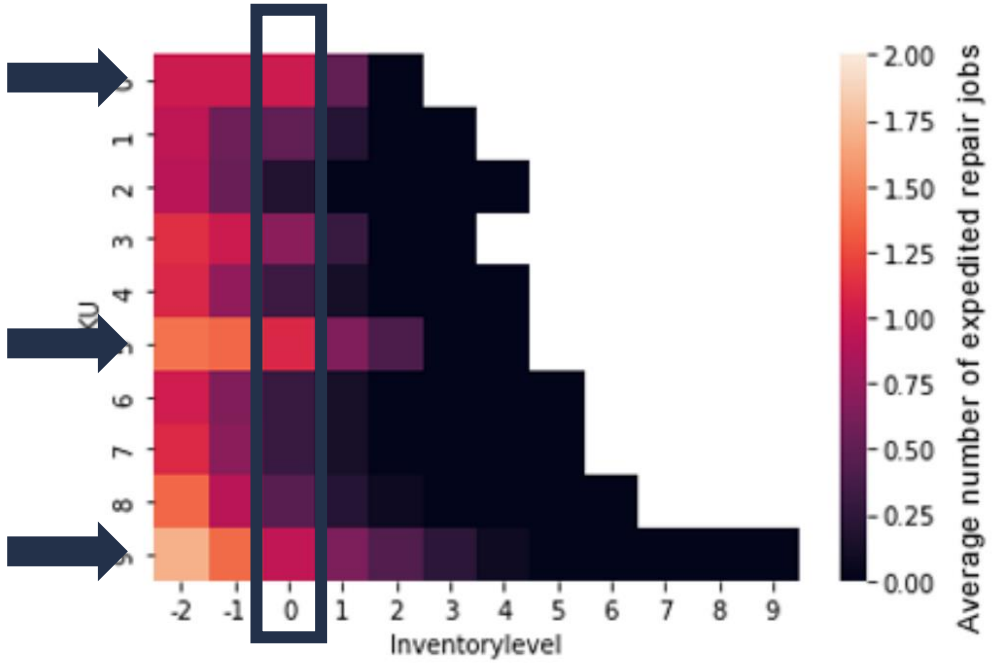
Methodology

- Deep Reinforcement Learning
- Agent chooses the **action** that, given its current **state**, maximizes the **reward**
- Neural Network



Operational model

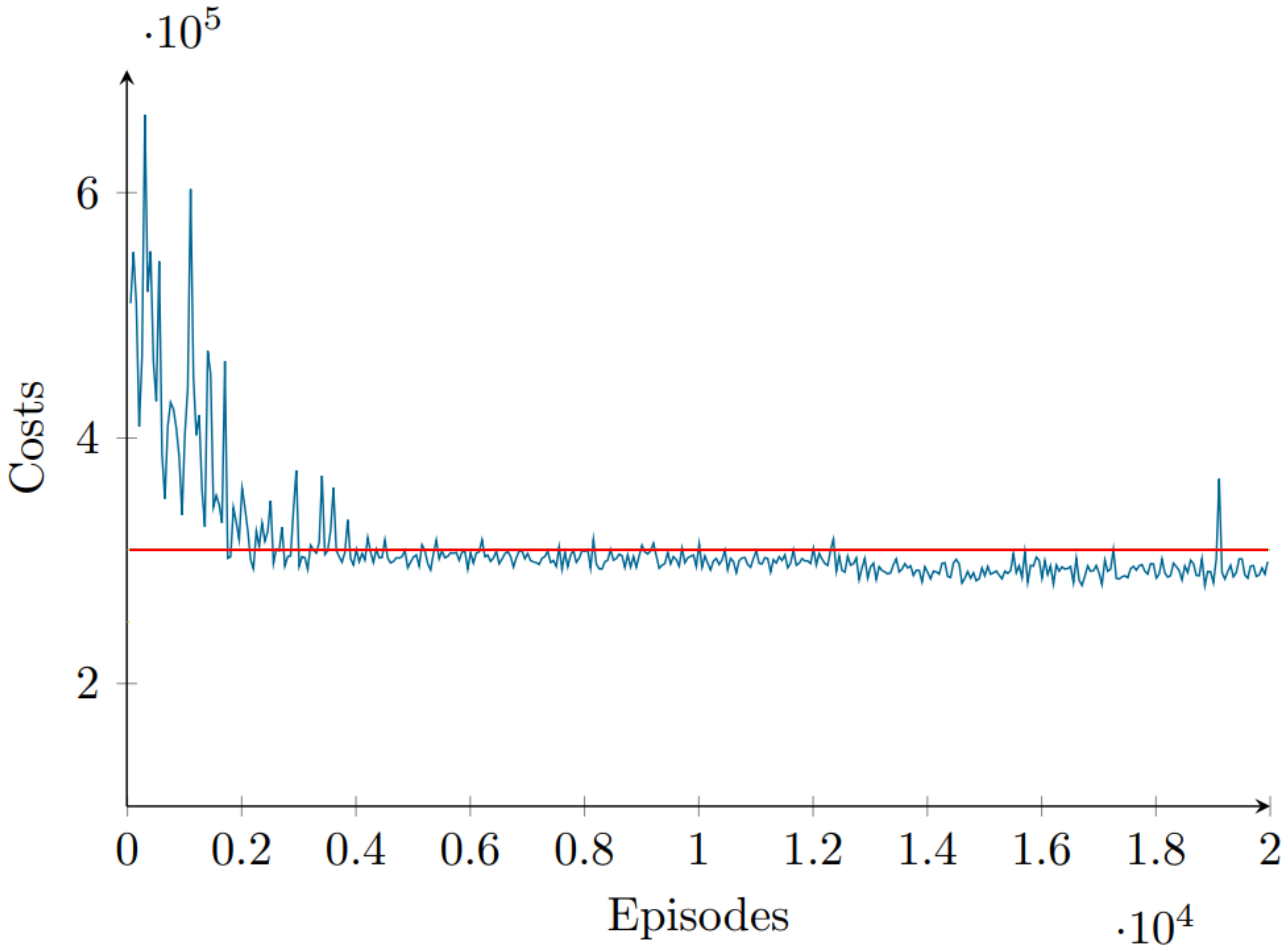
- Optimize interventions: expediting repair jobs
- Balancing expediting & backorder costs
- Scalable model



Model behaviour: Lighter colors =more expediting

Integrated model

- Cost function:
  - Backorder costs
  - Intervention costs
  - Holding costs
  - Penalty for fill rate target
- Total cost reduction of 1.1 to 3.5%



Conclusion

- Synchronization between operational and tactical planning
  - Lower total costs
  - Improved service level
  - Less interventions required
  - Lower inventory investment costs

Thank you for your attention

UNIVERSITY OF TWENTE.

Fokker SERVICES GROUP

Gordian Logistic Experts