KU LEUVEN

The ORDinL warehousing use case

Vincent Derkinderen

Pieter Smet

DTAI CODeS

06/06/2019

Outline

1. ORDinL
2. Warehousing use case
3. Available data
4. Our approach

ORDinL

Operational Research and Data Science in Logistics

Goal

Develop a methodology and frameworks to solve optimization problems in a data driven way (in a logistics setting).

ORDinL

Operational Research and Data Science in Logistics

Interested in

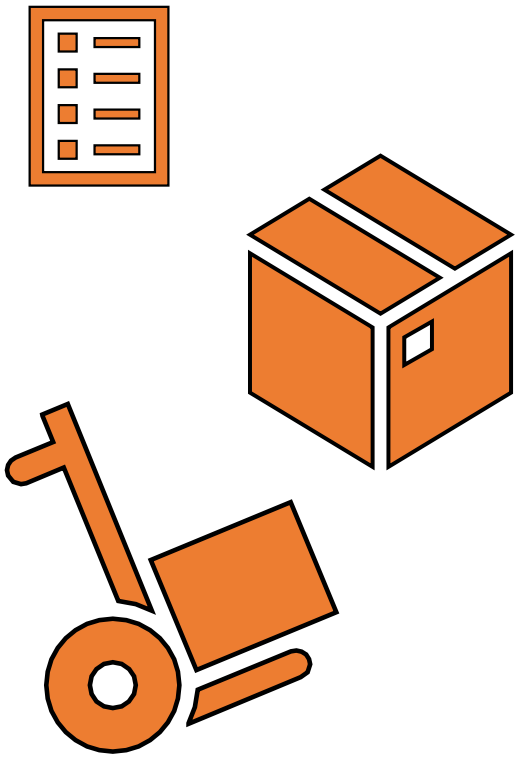
Optimisation

- Meta-heuristics
- Algorithm construction
- Optimisation under uncertainty
- Pattern Mining
- …

Model construction

- Model Learning
- Parameter Learning
- Preference Learning
- …

Warehousing Context

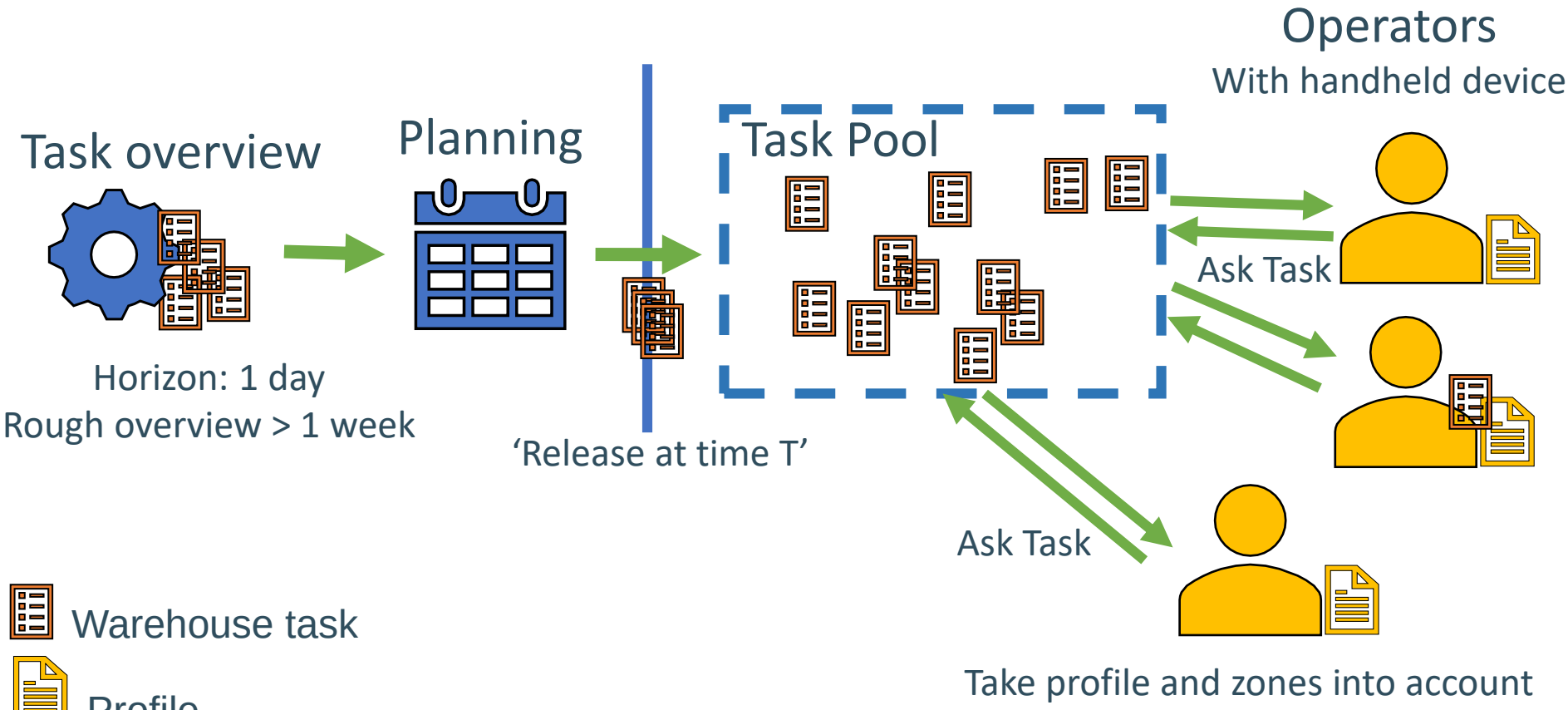


Task: move item X in quantity Y from A to B

- Types (e.g. pick, put, ship, move, inventory,…)
- Deadline
- Precondition (tasks to be completed first)
- Expected, min & max duration (manual)

Divide warehouse in zones.
Assign tasks based on proximity and profiles.

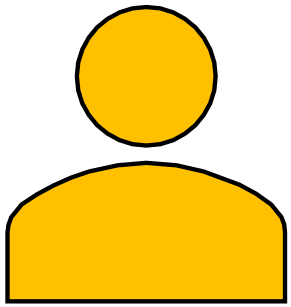
Current design



Warehousing Context

Profiles:

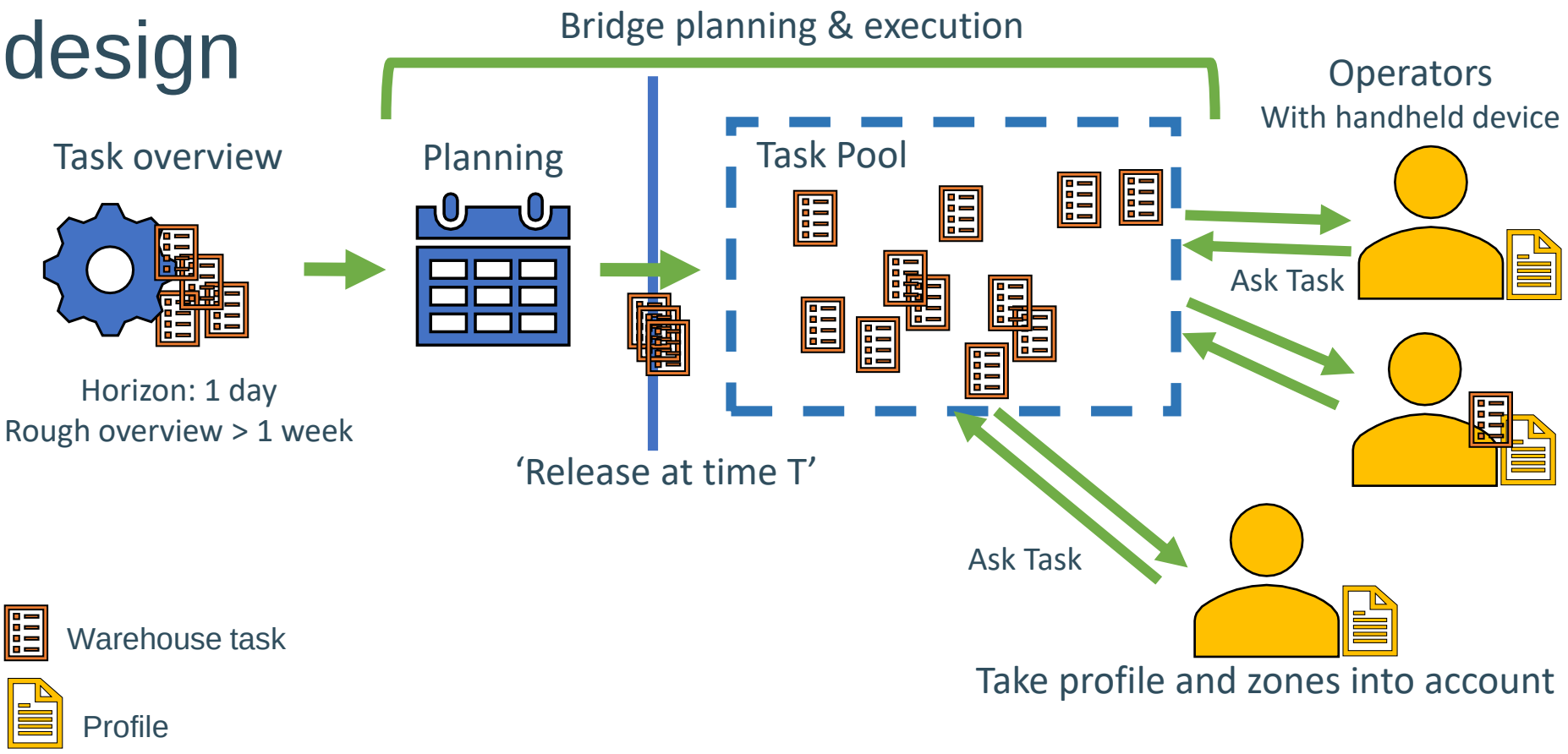
- Ordering of task types
- Assigned to operators
- Used in task assignment process



Example Profile
PUT, zone 1
PICK, zone 1
zone 2

Only assign tasks of type PICK when no type PUT is available (in zone 1).

Current design



Available data

Task execution details (~840 000, 2010-2019)

- Planned on
- Released on
- Started on
- Finished on
- Source location
- Target location
- WorkzoneID
- EmployeeID
- Type (Bulk or pallet)
- Category (e.g. PICK, PUT, MOVE,…)
- Priority
- ItemID
- Quantity
- OrderID

Profile assignments & details

…

Company's interest

- Automating the profile assignments minimizing end time

My focus for now
Includes dealing with uncertainty

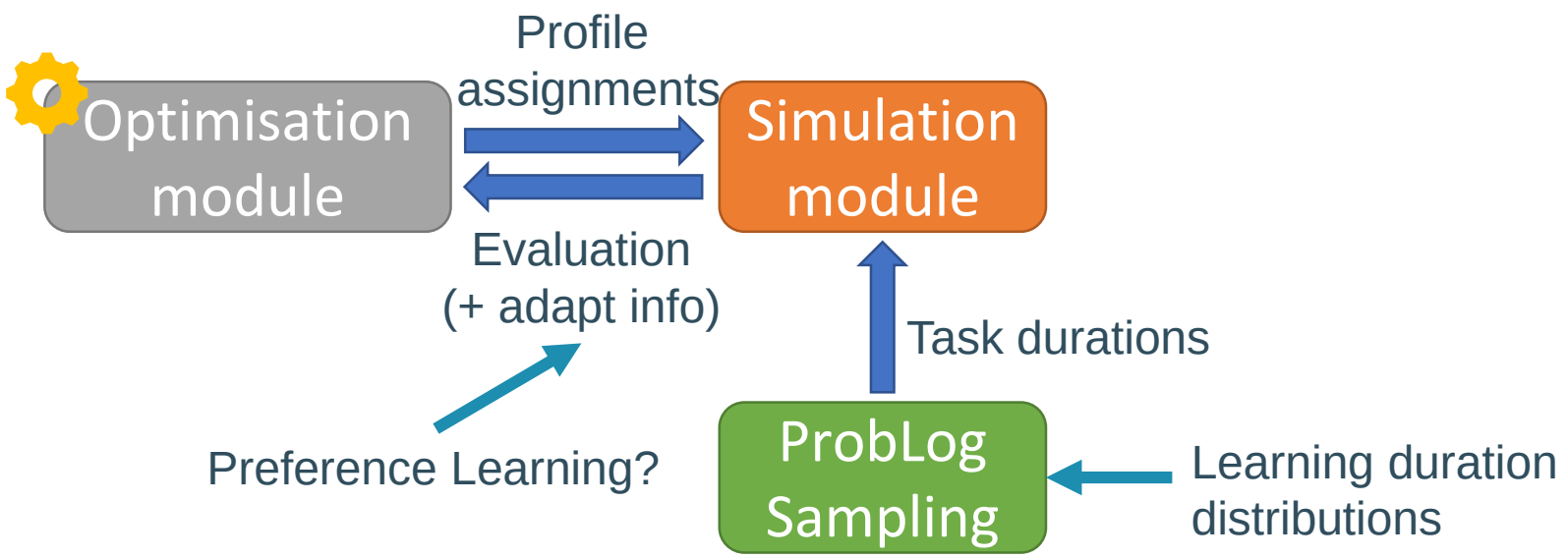
Related/Other possibilities

- Change the planning component
- Dynamic profile assignments
- Learning preferences

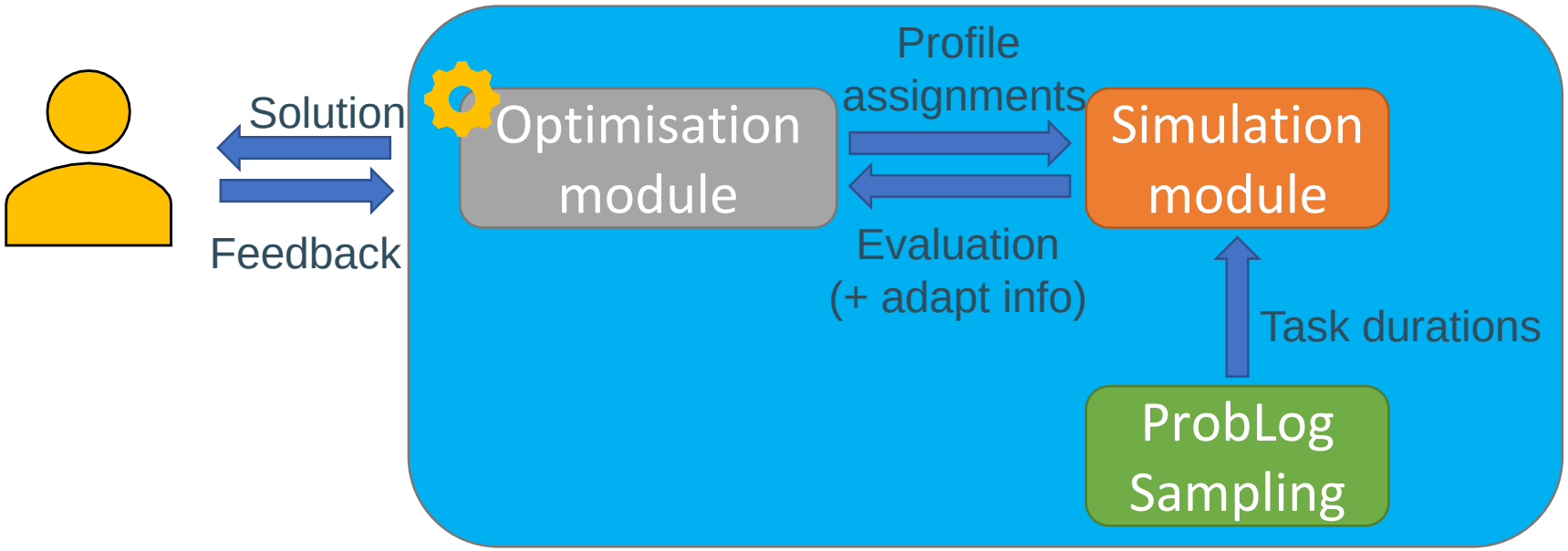
Looking into

- …

Simulation-based Approach



Simulation-based Approach



Recap

- Warehousing use case: Plan + Task Pool + Profiles
- Automating profile assignments using simulations
- Preference Learning

Interested?
Come talk to me!

The end!