Exercise 2: A Reactive Agent for the Pickup and Delivery Problem

Group №: 90 Kyle Gerard, Yann Bolliger

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1 Problem Representation

1.1 Representation Description

We wanted our state to contain two types of information: the current city of the agent as well as the fact whether there is a task available in this city. For the tasks, we also need to distinguish between the different destinations of the tasks. Therefore our state is modelled by a tuple from the set:

$$\mathcal{S} = \{(c_{current}, c_{destination}) | c_{current} \in \mathcal{C}, c_{destination} \in (\mathcal{C} - \{c_{current}\}) \cup \{\texttt{null}\}\}$$

where $\mathcal{C}$ is the set of all cities. Note that `null` denotes the case where there is no task available in the current city. The exclusion of $c_{current}$ in the second place encodes that there are no tasks with delivery city equal to the pickup city.

Our actions are either a `Pickup` for the given task or a move to a neighboring city given by the set:

$$\mathcal{A} = \{\texttt{Pickup}\} \cup \{\texttt{Move}(c) | c \in \mathcal{C}\}$$

1.2 Implementation Details

2 Results

2.1 Experiment 1: Discount factor

2.1.1 Setting

2.1.2 Observations

2.2 Experiment 2: Comparisons with dummy agents

2.2.1 Setting

2.2.2 Observations

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2.3 Experiment n

2.3.1 Setting

2.3.2 Observations