

Studentische Mitschrift von
André Egners
Last Update: November 8, 2006

<Introduction to AI: Notes>

<Wintersemester 06/07>

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Abstract

This document only provides the notes Prof. Lakemeyer makes on the board during the lecture. I do not claim this document to be without errors, so if you find any, please contact me at andre.egners@rwth-aachen.de .

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1 Agents

Ideal Agent

- automatic taxi driver
 - sensors: GPS, radar, camera, microphone, odometer
 - actuators: steering wheel, brake pedal, accelerator, loud speaker
 - percepts: location, traffic signs, directions from customer, distance to other cars
 - performance (means/goals): safety of customer, avoid traffic tickets, earn money, reach destination quickly, comfortable ride
 - environment: traffic, streets, weather, customers

Note: Goals may interfere.

Reflexive Agents

if car_in_front_brakes **then** decelerate
if stop_sign_ahead **then** brake

Agents with internal world model

Example: Remember that you saw a car in the rear mirror.

Vacuum Robot (for the corresponding example see slides)

Actions: Left, Right, Suck

Goal States: all rooms are clean (states 7,8)

$1 \xrightarrow{S} 5 \xrightarrow{R} 6 \xrightarrow{S} 8$ robot is happy now. (this is a **single-state** problem)

$\{1, 2, \dots, 8\} \xrightarrow{R} \{2, 4, 6, 8\} \xrightarrow{S} \{4, 8\} \xrightarrow{L} \{3, 7\} \xrightarrow{S} \{7\}$ (**multiple-state** problem)

Murphy's Law for vacuumers:

"Sucking dust sometimes generates dust, but only if the room is clean."

$4 \xrightarrow{S} \{4, 2\}$

$\{1, 3\} \xrightarrow{S} \{5, 7\} \xrightarrow{R} \{6, 8\} \xrightarrow{S} \{6, 8\} \dots$

(**contingency** problem)

Solution: $\{1, 3\} \xrightarrow{S} \{5, 7\} \xrightarrow{R} \{6, 8\} \xrightarrow{\text{sense_dust}} \{.\} \xrightarrow{\text{if_clean} \rightarrow \text{noop}; \text{if_dirty} \rightarrow \text{suck}} \{8\}$