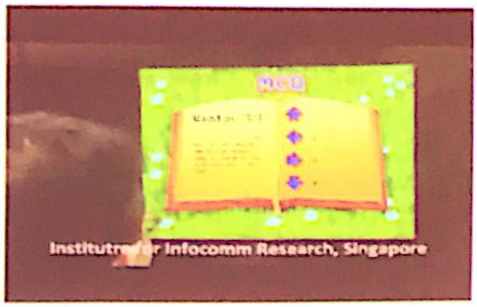
About me: Guan Cun Tai

- Professor, School of Computer Science and Engineering, NTU
- Co-Director, Rehabilitation Research Institute of Singapore (RRIS)

Research Areas:

- Brain-Computer Interfaces
- Machine Learning
- Medical Technologies
- Human Intelligence to Artificial Intelligence



Homepage:

http://www.ntu.edu.sg/home/ctguan

Contact:

- Office: N4-02B-52
- Email: ctguan@ntu.edu.sg
- Phone: (65) 6790 6205

Solution

Web-based news-filtering agent:

Goal:
Find all unread stories that contain the specified keywords (periodic search)

Performance measure:
Number of stories found?
No, rather
→news site entirely explored

Solution

Web-based news-filtering agent:

Environment:
Computer (agent), network, Internet (incl. the news site server itself), user

Actions:
- send a download request to retrieve a page
- search the text of a received page
- build a ranked list of stories (links), display
- handle error messages etc.
- query the user (keywords, stories read)

Solution

Web-based news-filtering agent:

Percepts:

- downloaded pages
- messages from the agent's computer, the news site's server, others
- user keywords
- unread stories

note: actuators / sensors are simply program modules to execute / interpret the above actions / percepts

Solution

Environment characteristics:

Observable:
fully if *assuming* no hidden / inaccessible pages *partially* otherwise

Deterministic:
not – unexpected events e.g., dead links
- assume the news site is error-free? *no*, still communication may break down / time out - assume a perfectly reliable Internet? *not!*

Solution

Environment characteristics:

Episodic:
no – sequential search, periodic but the agent must remember all stories read before

Dynamic:
yes – news site may change *during* search (pages/stories added, edited, removed, etc.) - assume it never changes? *not!*

Discrete:
yes – digital data and communication

Solution

Environment characteristics:

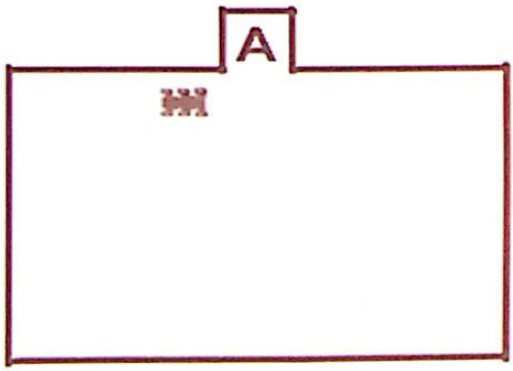
Suitable type of agent:
goal-based agent
→the task is essentially a search in a state space consisting of web pages

Characteristic of interest:
contingency problem
(agent must *interleave* search and execution – actions can only be decided after downloading a page and searching its content...)

Solution

No memory, front sensor:

IF wall ahead THEN turn left
IF no wall ahead THEN move forward



- agent initially facing A: trivial success

- any other initial config: agent keeps following the wall anti-clockwise and never detects the alcove A
  → not working (too limited)

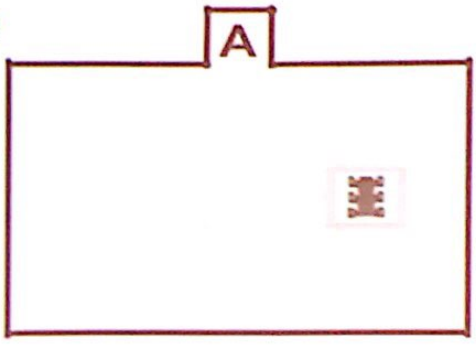
Solution

No memory, front and right sensors

IF wall ahead AND right wall THEN turn left
IF wall ahead AND no right wall THEN turn left
IF no wall ahead AND right wall THEN move forward
IF no wall ahead AND no right wall THEN turn right

- agent initially not close to any wall: keeps turning right
  → not working (information still too limited)

to succeed, the agent must turn right only when following a wall *and then* an opening appears:
→ the condition involves a *sequence* of events

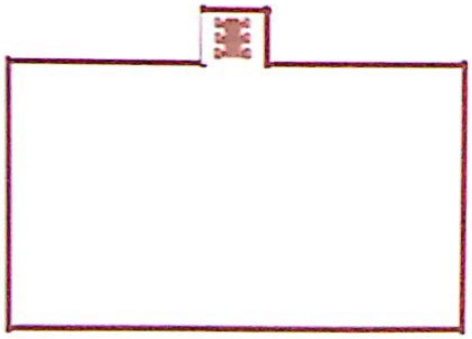


Solution

1-state memory, front and right sensors

sensor: current state – wall ahead, right wall
memory: previous state – wall ahead before,
right wall before

IF wall ahead THEN turn left
IF no wall ahead AND *// alcove detected*
(no right wall AND right wall before)
THEN turn right
IF no wall ahead AND not (...) *//noalcove*
THEN move forward



- agent reaches the alcove in all cases → success!