Instituto Tecnológico y de Estudios Superiores de Monterrey

Integrative Activity - Multiagent Systems with CG

Profesor:
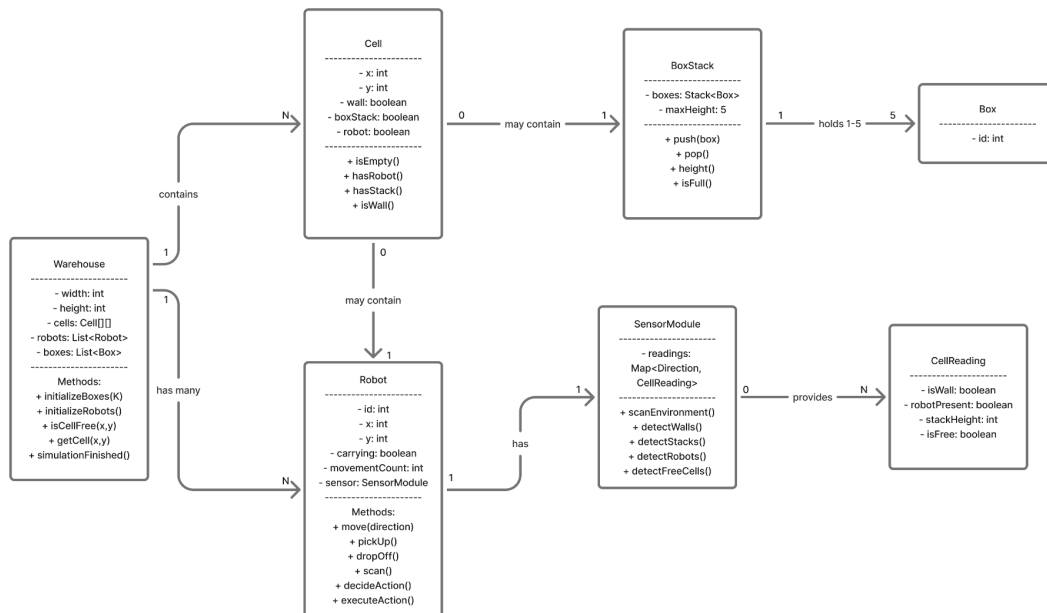
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Class diagram:

Agent Protocols:

Participants:
      MonitoringAgent
      ResponseAgent
      NotificationAgent
      Human being

// 1. MonitoringAgent detects anomaly and requests analysis
(performative: CFP
 :sender MonitoringAgent
 :receiver ALL_ResponseAgents
 :content (task_id = analyze_anomaly,
      position = (plant),
      initialInfo = (sensor_data))
 :ontology NOMBRE DE LA ONTOLOGIA
)

// 2. Bid (PROPOSE) from ResponseAgentX (Calculates its distance and availability)
(performative: CFP
 :sender ResponseAgentX

```
 :receiver MonitoringAgent
 :content (task_id=inspect_plant_x,
        bid = {distance(ResponseAgentX, plant), availability(boolean)})
)
```

```
// 3. Award (ACCEPT) to the winner
(performative: Accept
:sender MonitoringAgent
:receiver ResponseAgent_winner
:content (task_id=inspect_plant_x)
)
```

```
// 3. Award (REJECT) to all others
(performative: Reject
  :sender MonitoringAgent
  :receiver ResponseAgent_not_winner
  :content (task_id=inspect_plant_x)
)
```

```
// 4. Execution (INFORM) if there IS a problem
(performative: Inform
  :sender ResponseAgentX
  :receiver NotificationAgent
  :content (task_id=inspect_plant_x, "Anomaly detected", SendAnomalyReport)
)
```

```
// 4. Execution (INFORM) if there ISN´T a problem
(performative: Inform
  :sender ResponseAgentX
  :receiver NotificationAgent
  :content (task_id=inspect_plant_x, "no anomaly", NULL)
)
```

```
// 5. Execution (INFORM) the human in charge
(performative: Inform
  :sender NotificationAgent
  :receiver Human being
  :content (task_id="sendInformAlert(plant, diagnosis, severity, reasons)")
)
```

cooperative strategy:

Our multi-agent system design operates under a global cooperative objective: detect plant anomalies, confirm them, apply changes to the environment and inform the person in charge. For this objective we decided to implement a cooperation model.

For the cooperative model, we detected that the actions that each agent is assigned are not too complex to communicate and that in almost all actions there was not a competition amongst the agents. The only action where we detected that .there could be some sort of problem was when the MonitoringAgent asked for a ResponseAgent to analyze a plant, to decide who would come we decided to implement a simple Contract Net, in which the ResponseAgents reported their conditions (distance and availability) and based on those conditions the MonitoringAgent would decide who should come to analyze the plant.

In summary, the agent interaction protocol and cooperative strategy (Contract Net) implemented in our system provide a structured, efficient, and reliable approach for detecting and responding to plant anomalies. This ensures that the most suitable ResponseAgent to go analyze the plant without introducing unnecessary complexity.