Tecnológico de Monterrey

Evidence 2. Review 2

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Team 2

Grp 301.

Modeling of Multi-Agent Systems with Computer Graphics

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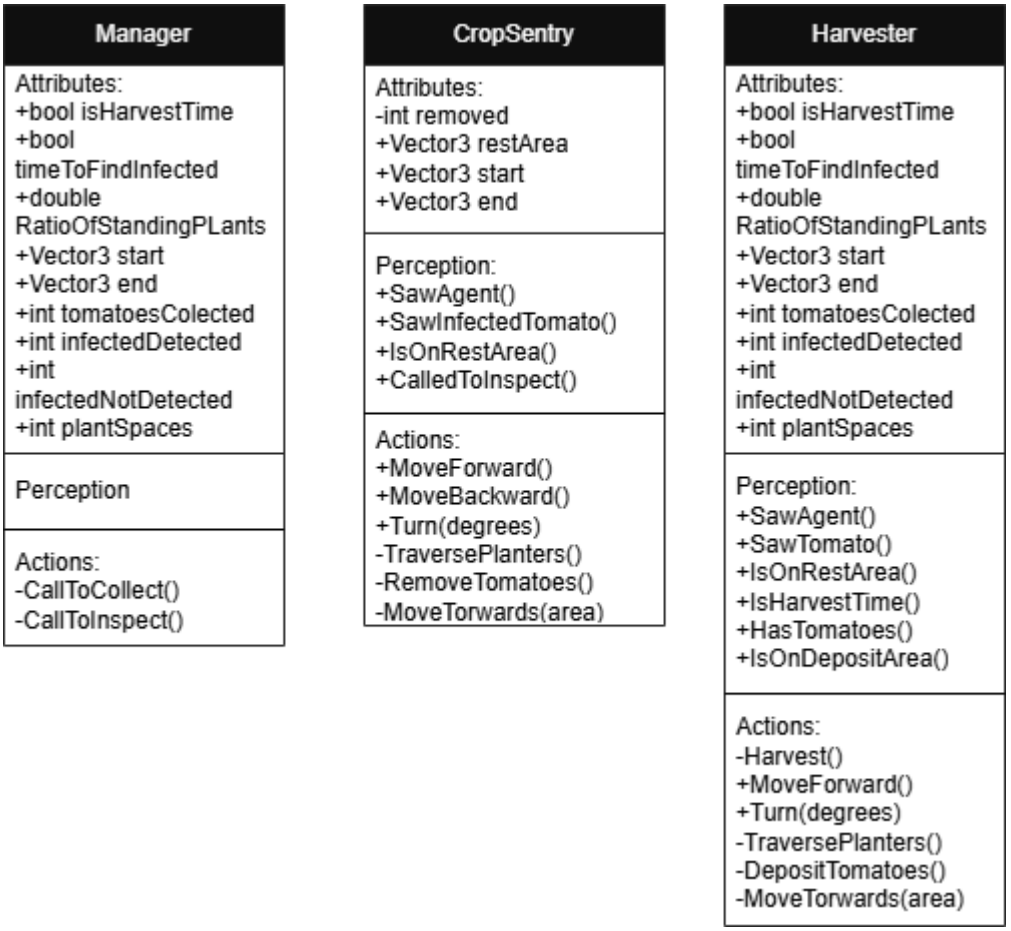
Tecnológico de Monterrey

Multi-Agent Systems:

- Agent Class Diagrams for each agent type/role.



Description:

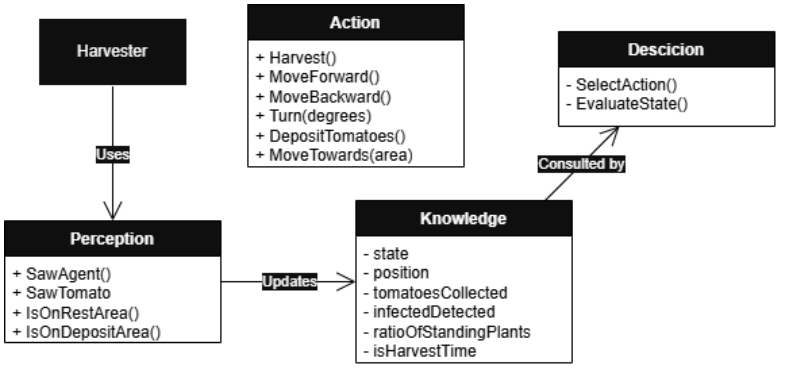
1. Manager: This agent monitors the overall status of the system. They control when it's harvest or inspection time and keep track of metrics such as the number of tomatoes harvested, detected and undetected infections, and plant spacing. Their main actions are to call for harvesting or inspection.
2. CropSentry: Agent responsible for identifying and removing infected tomatoes. They detect when they see an infected tomato or another agent and are called in when the Manager initiates an inspection. Their duties include moving around the greenhouse, removing tomatoes, and going to specific areas.

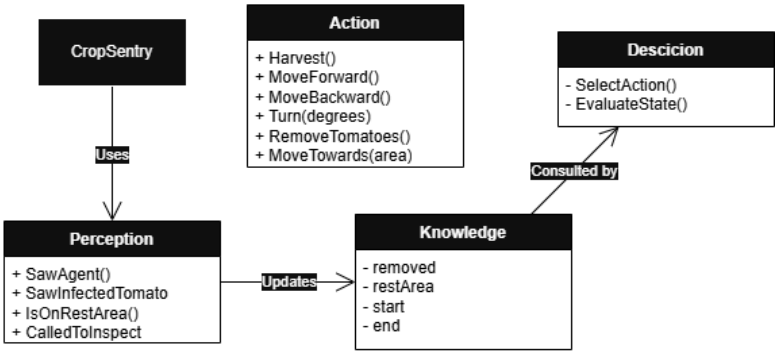
3. Harvester: Agent responsible for harvesting healthy tomatoes. Reacts to signals from the Manager to begin harvesting and can deposit tomatoes in the designated area. Their perceptions include detecting tomatoes, being in resting or storage areas, and knowing when it is harvest time.

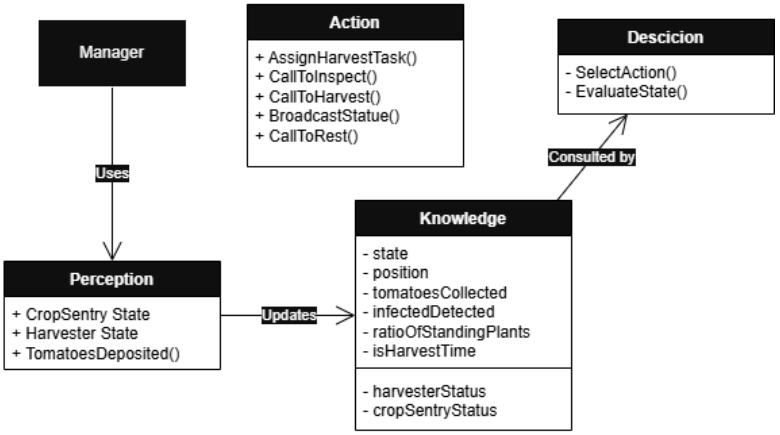
- Interaction Diagrams (AIP) for all the interactions considered in your simulation.

  Github upload

- Standard Class Diagrams to describe the agents' subsystems.

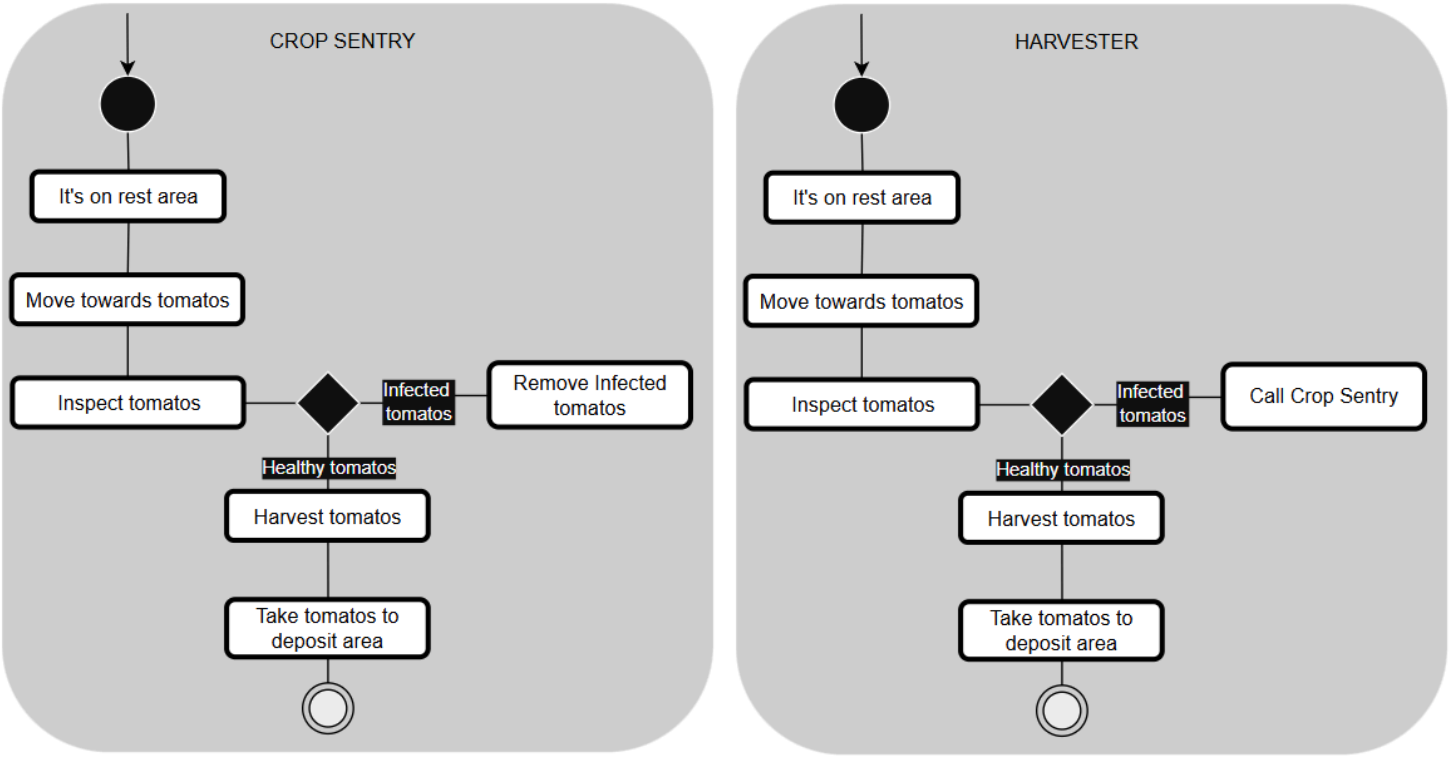






Description: This standard class diagram describes the internal architecture of each agent (Harvester, CropSentry, and Manager), detailing its main subsystems: Actions (available behaviors), Perception (sensory capabilities), Knowledge (internal state and memory), and Description (decision-making logic). It shows how each agent processes information from the environment, maintains its internal state, and selects appropriate actions using the SelectAction() and EvaluateState() methods.

- Activity or State Diagrams to describe the behavior of the agents' subsystems.



Computer Graphics (Describe the virtual world):

- How do you visualize the virtual world?

From a top down perspective where the agents can be seen traversing the greenhouse, which would be structured as a grid.

- What virtual elements (buildings, objects, etc.) are key to your proposal?
    - The greenhouse
    - Tomato (healthy and infected)
    - Agents
    - Tomato plant
    - Deposit area
    - Rest area
- How do you visualize the models of the agents and other relevant objects?

The greenhouse would be represented by the grid space, where the models of the relevant objects lie and the agents traverse.

A full row of tomato plants would be placed, with the row underneath and the two adjacent blocks on the plant row being free, so that the agents can move through rows. If we were to have 5 rows of tomato plants, this would mean a grid of 7 x 11.

Tomatoes spawn on the tomato plants, with random chances of being healthy or infected. As time goes on, unhealthy tomatoes infect those adjacent to them, filling the row or jumping to others, if they are not taken care of.

At the bottom corner, the rest area would not be an object, but rather a designated part of the grid floor, of one square. Same goes for the deposit area, which would be at the opposite side (both vertically and horizontally) of the rest area.

- Include schematics or hand-drawn sketches to support these descriptions.