# Characteristics of the environment

## Accessible or inaccessible.

An accessible environment is where an agent can obtain complete, accurate, up-to-date information about the environment's state. In this project we have different agents, one of which is the scout agent; this agent is particularly important since the job of the scout agents is to explore the map of the city. These agents will move through the city discovering the buildings that have garbage. This agent is the one that knows most of the map, it has access to all the information in the environment that is relevant to its task[[1]](#footnote-1). For this reason, we have to consider the environment accessible since there is at least one agent that knows the complete, up-to-date information of the environment.

## Deterministic or non-deterministic.

An environment in which any action has a single guaranteed effect, this means that there is no uncertainty about the resulting state after performing an action. All agents fill this characteristic. There is a clear difference in the states after each agent performs an action, for example, the harvester once it collects the garbage, the state changes to ‘no garbage’, there is no other state it could change to.

## Episodic or non-episodic.

In an environment that can be considered episodic each episode accounts for the agent’s actions and reactions of the current episode. This means that every input and output are independent in each episode. This kind of environment has a considerable advantage compared with non-episodic due to agents not having to think further. This attribute is seen in the agents where their actions are delimited by each episode and do not require information of previous steps; for example, a scout does not require any previous information from previous episodes to collect the garbage.

## Static or dynamic.

This environment is static, considering the definition a static environment is one that can be assumed to remain unchanged except by the performance of actions by the agent. In this problem, the effect on the environment is always determined by the agents. There is no other process aside from the agents that is affecting the world.

## Discrete or continuous.

The environment is discrete since it has a fixed grid organization in the environment. This problem has a set of specific rules that govern the environment. There exists a number of finite actions that the agents have to do to finish the task. The time is represented in a discrete quantity of steps.

# KIND OF ARCHITECTURES

## System Agent

* Reactive: the system agent reacts to the message from the coordinator agent to know when to start a new simulation.

## Coordinator Agent

* Reactive: this agent only reacts to two things. The first one is to transfer information from both the scout and harvester coordinator. The second one is to tell the system agent when the task has been completed.

## Scout Coordinator

* Hybrid: this coordinator focuses on long-term planning of finding the garbage but also has to react for fast reactions in case there is garbage discovered.

## Harvester Coordinator

* Hybrid: this coordinator focuses on long-term planning of recollecting the garbage but also has to react for fast reactions in case there is garbage discovered.

## Scouts

* Reactive: they have to react fast to changes detected such as discovering new garbage.

## Harvesters

* Reactive: they have to react fast to changes detected such as picking up garbage.

# PROPERTIES:

## System Agent

* Reactivity: once the coordinator agent has informed that the simulation has been completed, system agent reacts to it and initiates another simulation.
* Social: this agent has to communicate with the coordinate agent to know when the simulation has finished.

## Coordinator Agent

* Reactivity: once both scout and harvester coordinator finish their task, the coordinator has to inform the system agent to start a new simulation.
* Social: The agent coordinator has to communicate with both scout and harvester coordinator and also with the system agent.

## Scout Coordinator

* Social: The scout coordinator has to communicate with all the scouts and the coordinator agent.
* Deliberative: coordinator has a representation of the map and city. The scout coordinator calculates the optimal routes.

## Harvester Coordinator

* Social: The harvester coordinator has to communicate with all the harvesters and the coordinator agent.
* Deliberative: coordinator has a representation of the map and city. The harvester coordinator calculates the optimal routes.

## Scouts

* Social: The scouts have to communicate with the scout coordinator and share information.
* Reactive: they react to heir sensors to identify when there’s garbage.

## Harvesters

* Social: The harvesters have to communicate with the harvester coordinator and share information.
* Reactive: they react to heir sensors to identify when to pick up garbage.

Bibliography:

https://en.wikibooks.org/w/index.php?title=Artificial\_Intelligence/AI\_Agents\_and\_their\_Environments&oldid=3034421&diff=cur&diffonly=0

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Russell, S. & Norvig, S. (2009). Artificial Intelligence: A Modern Approach. Third Edition. Prentice Hall.

1. [↑](#footnote-ref-1)