Report Behaviour Tree

Josep Bonet i Saez (1633723)

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1 Intro

In this assignment, we will use Behaviour Trees to implement relatively complex behaviours within the AAPE platform. Our main characters will be the Astronaut and CritterMantaRay agents.

Different code files were given at the start. An example behaviour tree, BTRoam.py was provided as a reference example. Goals BT.py included three example goals (DoNothing, ForwardDist, and Turn) so we could test BTRoam.py file.

AAgent-1.json is the configuration file for the Astronaut, while AAgent-2.json is for the Critter agent. You may modify these files as needed or create new ones. Additionally, APackAstroCritters.json is an example configuration file for the Spawner (Spawner.pt), which spawns one Astronaut and ten Critters. The $\text{AAgent}_{\text{BT.py}}$ is the agent's main code. Initially, you only need to modify that file to register your goals and behaviour trees.

2 Scenario Alone

Our Astronaut has been assigned to the DarkHole deep-space collection outpost. Her mission is to collect a rare species of alien flower. Fortunately, she is alone at the outpost,

so gathering the flowers should be straightforward.

The Astronaut starts at the Base outpost (spawn point 0). The number of alien flowers remains constant. Whenever the astronaut collects a flower, a new one will randomly spawn in the harvest zone after a short delay. Implement her behaviour.

2.1 Behaviour Tree Alone

The behaviour Tree is implemented in BTRoam.py:

Selector: Root

- Sequence: ReturnToBase –> BN_ CheckInventoryFull; BN_ ReturnToBase
- Sequence: CollectFlower –> BN_ DetectFlower; BN_ MoveToFlower
- Selector: Wander –> BN_ Avoid; BN_ RandomRoam

The following classes were implemented in Goals_ BT.py

- RandomRoam: Single-step stochastic roaming
  - If a flower is spotted: preempts
  - 20% chance to turn slightly, 80% chance to step forward
  - Returns true whenever it issues an action
- Avoid: Single-tick obstacle avoidance
  - If any Rock/wall is within threshold distance, turn away and return true
  - Return False so the tree moves on to RandomRoam
- DetectFlower: Checks if the sensor find an "AlienFlower"
- MoveToFlower:
- ReturnToBase: Returnsto the base and then the saves the flowers.
- CheckInventory: Counts the flowers in inventory and returns true if there are 2 or more.

3 Scenario Critters

We now move to a new collection outpost, situated on a small moon near Saturn. However, hostile life forms have been discovered there. Now we will implement the behaviour of these life forms.

3.1 Behaviour Tree Critters

4 Scenario Collect-and-run