Methods:

* Override InitializeAgent()
* IncrementDecisionTimer()
* CollectObservationBodyPart()
* Override CollectObservations()
* TouchedTarget()
* getRandomTargetPos()
* override AgentAction()
* RewardFunctionMovingTowards()
* RewardFunctionFacingTarget()
* RewardFunctionTimePenaly()
* Override AgentReset()

Main methods (overrides from Agent class):

* InitializeAgent()

This function caches a script from the agent called JointDriveController, and then initializes the body parts of the agent, saving them on a dictionary with the transform of each body part as the key, and a custom class “BodyPart” as the data.

This class contains all the relevant information of the body part (initial position and rotation, script references for handling the contacts and other debug info).

* CollectObservations()

Joints:

For each joint the crawler agent collects the force, speed, torque and angular velocity.

If it isn’t evaluating the body (root) joint, it also gets the position of the joint relative to the body, and the current rotation (in each axis).

Finally, it also checks whether the joint is touching the ground and how much force is using (as a ratio over the maximum possible force).

Body:

Ouside of the data from the joints the Neural Network also gets the normalized direction to the target, the forward and up vectors of the main body and its height.

* AgentAction()

This function starts by checking if any body part has touched the target. In case any did touch it, the agent gets a reward of 1 and the target is setted to a new random position inside the field.

After that it updates de vector direction to the target (from the body).

Then, if a new decision has happened, the target rotations of each leg gets updated.

The upper parts have 2 degrees of freedom (x and y axis), while the lower legs only have 1 (x axis).

After that it sets the strength of each joint.

Finally, it rewards the agent on moving towards the target, looking at it and a time penalty (each on only if activated).

* AgentReset()

This function sets the agent rotation to make it look at the target and each body part to its initial state.