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User manual Airplane AI

Research Project Jarne Demoen 2022-2023

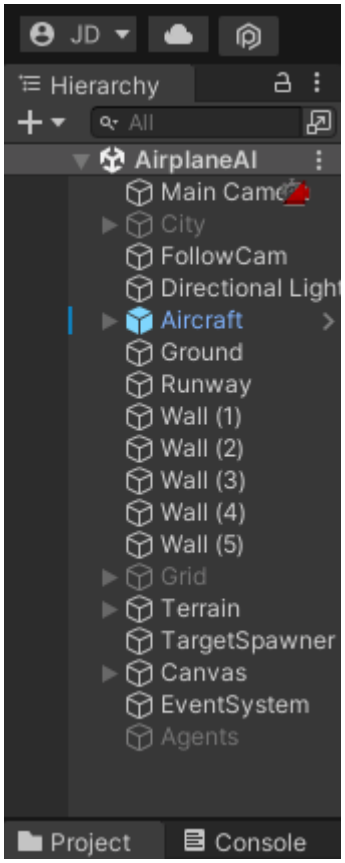
Contents

Intro

In the **installation manual** we set up the Unity Project. The only thing you should know to run the project is that you have to press **play** in the **Unity Editor** once you have opened the scene. You can find the scene in this directory: **Assets/AirplaneAI/Scenes/AirplaneAI**. But in this document I can explain a bit more about the project.

Getting started with the Unity Project

Once you have the scene open, there are several things that might be interesting.



First of all, on the left hand side you can see all of the objects in the scene. If you would enable the **City** game object, buildings will spawn. The airplane is going to avoid those buildings but there is a higher chance that the airplane will crash because it is trained on an environment without the buildings.

Enabling the **Grid** game object will initiate roads on the ground, this is not that important.

If you would enable the game object **Agents**, multiple airplanes will spawn and fly to a random target that is assigned to each of the airplanes.

You can change the number of airplanes by just clicking on the **Agents** game object and change the number of airplanes in the inspector on the right hand side.

Changing variables

If you want you can change the **speed** and the sensitivity of the **roll**, **pitch** and **yaw** of the airplane. Roll, pitch and yaw are the three axes of rotation for an airplane.

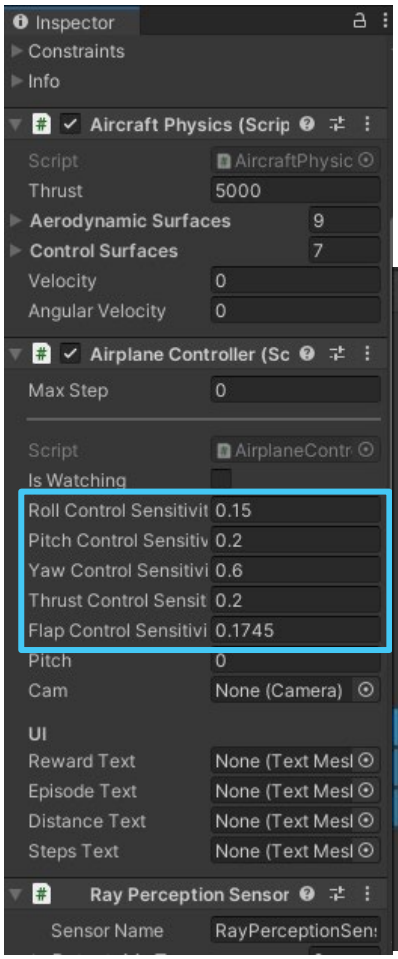
Roll refers to rotation around the longitudinal axis, which runs from the nose to the tail of the aircraft. This causes the wings to tilt up or down.

Pitch refers to rotation around the lateral axis, which runs from wingtip to wingtip. This causes the nose of the aircraft to rise or lower. Yaw refers to rotation around the vertical axis, which runs from the top to the bottom of the aircraft. This causes the aircraft to turn left or right.

Together, these movements allow an airplane to navigate through the skies and make precise maneuvers.

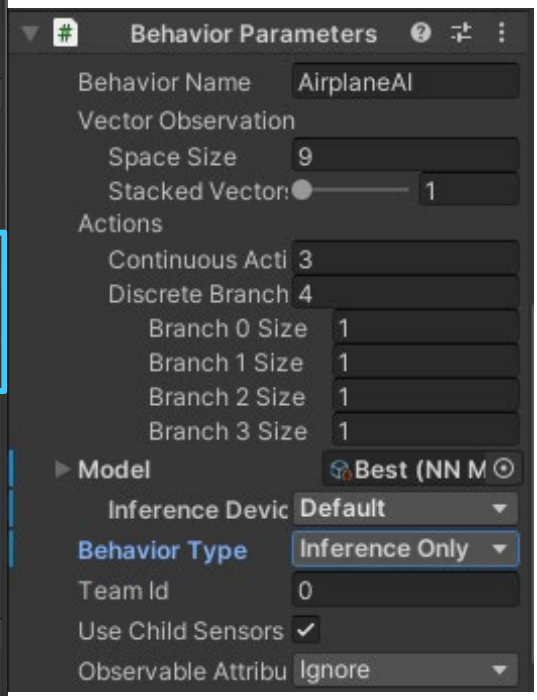
You can change the **speed** by going to **Assets/AirplaneAI/Prefabs** and there you select the **aircraft prefab**. If you double click on it you can change this prefab. In the inspector on the right hand side you can see a variable **thrust**. There you can change the amount of thrust.

If you scroll down a bit you can see the following:



You can change the **roll, pitch, yaw, thrust and flap sensitivity** to the desired amount. Flaps are implemented in the project but never used. They would be important while landing but I didn't have the time to implement an landing AI to the project.

Before running this project and pressing **play**, make sure that the behavior type is set to **inference only.**



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