

Field of View

Finding out what targets are around the AI Agent might not be ideal in most situations. We want to have AIs that behave like humans. Human's field of view is limited by the eyes.

Here comes the field of view. Basically, field of view or FOV, is an area specified by the forward direction of the agent and an angle. What is within it, it will be visible.

For this we will need to make use of a little math.

What we want to achieve is a function that receives a target and returns TRUE or FALSE if it is inside the field of view of the AI Agent.

We will need 4 parameters internally:

- The position of the AI Agent
- The forward vector for the AI Agent
- The target which we want to check
- And, The field of view in degrees

First we need to determine the direction from the Agent to the target. We can achieve this by calculating the difference between the target's position and the AI Agent's position. Once we have this, we can normalize its value. Vector normalization means that all the values are clamped to the [0,1] interval.

Once we have the direction, we need to calculate the dot product between the vector that represents the forward direction and the difference vector (or the direction).

We need to check if the value is greater than the cosine of the field of view angle.

Now we will make a second function that will be used from the AI Agent to filter the targets.

If you check the example provided you can see how the field of view detects or not the target by moving it around.

Now that we have the range detector and the field of view detector there is one final step for detecting targets. We need to determine if a target is behind an obstacle or not. The first two sensors will say that the target is visible so they are not enough.

In the next lesson, let's look at raycasts and how we can use them to determine if the AI Agent actually sees a target or not.