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**Determining the Field of View of the VEX Distance Sensor and Vision Sensor**

Background and Motivation:

The field of view of the VEX Distance Sensor and Vision sensor are not directly provided by the manufacturer. VEX simply states that, for the distance sensor, “the laser allows the sensor to have a very narrow field of view, so detection is always directly in front of the sensor” (Distance Sensor – VEX Robotics). For the vision sensor, only the number of pixels for the width of the vision sensor is stated.

Method and Results:

To determine the field of view for the distance sensor, the VEX brain was set to show device info for the distance sensor. An object was placed directly in front of the distance sensor, 30 cm away. This object was then moved horizontally away from the distance sensor until no object was detected by the distance sensor. Similarly, a second object was moved the opposite direction horizontally away from the distance sensor until no object was detected. The distance between the two objects and the centerline of the distance sensor was measured. A diagram of the set-up as well as the measurements is shown in Figure 1.

A diagram of a table and chairs

Description automatically generated

Figure 1: Diagram of Distance Sensor Field of View Set-Up

The angle of the field of view, α, was calculated as follows:

The field of view was calculated to be approximately .

A similar method was used to determine the field of view for the Vision Sensor. The vision sensor was connected to a computer using the VEX software so that the live image of the vision sensor could be viewed. Objects were placed at the left and right extreme of the field of view, 60 cm from the vision sensor. The distance between the objects was measured to be 78 cm, where each object was 39cm from the line of sight of the vision sensor. The angle of the field of view, α, was calculated as follows:

The field of view was calculated to be approximately .

Analysis:

The field of view of distance and vision provides important limitations for the sensors. A narrow field of view can be leveraged to the user advantage to focus in a specific direction, while a wide field of view can be used to survey a larger range. It is important to know the limitations of the sensors so that the programmer works within the limitations.

Sources:

[Distance Sensor - VEX Robotics](https://www.vexrobotics.com/276-4852.html)

Some icons from the VEX 5 programming application were used.