

Question

Solution

To Calculate the depth from the camera to each pole, you would need additional information such as the distance between the poles and their relative positions in the camera's field of view. The actual diameter of the poles and the horizontal field of view (HFOV) of the camera alone are not sufficient to determine the depth.

If you know the actual diameters of two poles (15 cm and 10 cm) and the horizontal field of view of the camera (72 degrees), you can estimate the depth from the camera to each pole, but you would need to make some assumptions.

Angular Size: It represents how much of camera's horizontal field of view the pole appears to occupy, typically measured in degrees or radians.

To calculate the depth to each pole, you need to know the angular size of each pole in the camera's field of view. The formula to calculate the angular size (A) is:

$$A = 2 * \arctan (S / (2 * D))$$

Where:

- A is the angular size in radians.
- S is the actual size of the object (diameter of each pole).
- D is the distance from the camera to the object.

In this case, you want to find the distance D for each pole. We can rearrange the formula:

$$D = S / (2 * \tan(A/2))$$

Now, you need to make assumptions about how much of the camera's field of view each pole occupies. Without additional information, you can't directly calculate D for each pole.

For example:

- If you assume that the 15 cm diameter pole spans the entire HFOV of 72 degrees, then A would be 72 degrees, and you could calculate the distance $D1$ for that pole.
- If you assume that the 10 cm diameter pole spans a certain portion of the HFOV (let's say half, 36 degrees), then A for that pole would be 36 degrees, and you could calculate the distance $D2$ for that pole.

In summary, you can estimate the depth from the camera to each pole if you make assumptions about the angular size each pole occupies in the camera's field of view. Without these assumptions or additional information, you can't determine the exact depth.