TorquePaper 2016.2: Steps Required to Achieve Autolock Vision Control

Matthew Webb

February 8, 2016

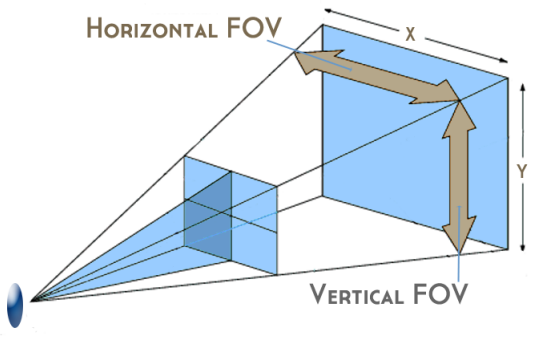
Contents

Chapter 1

Step 1: Match Turn Angle

1.1 Camera FOV

All cameras have a certain amount of degrees that they can see. The figure below shows how a camera's angle of view translates to an image.



The camera used on Sonic was an Axis Camera M1013 which has an angle of view of 67°. This means that if the camera faces the front of the robot, the camera will be able to see 33.5° left and right.

1.2 Simple Solution

OpenCV/GRIP is able to determine the center of the U shape that the reflective tape forms. If the vertical center of the image is treated as 0°, then the proportion from the center

can be used to determine the turn angle. The following equation formalizes this.

$$\theta_{yaw} = \frac{goalCenterX - \frac{imgWidth}{2}}{\frac{imgWidth}{2}} * 33.5^{\circ}$$

Chapter 2

Step 2: Match Tilt Angle

Chapter 3

Step 3: Spin Up Shooter to Constant Velocity

Chapter 4

Step 4: Signal Shot Ready