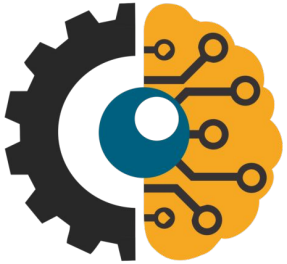

Computer Vision

Project

Project Overview

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- Detection of Marbles - Hough Circle Transform
- Localization of the Marble
  - Angle to marble
  - Distance to marble
- Test in Simulated environment
- Tuning of Parameters

Monocular Camera Geometry

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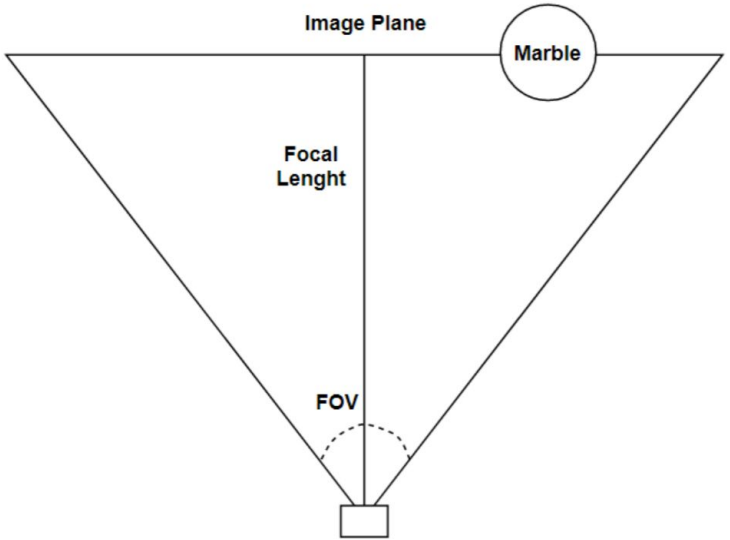
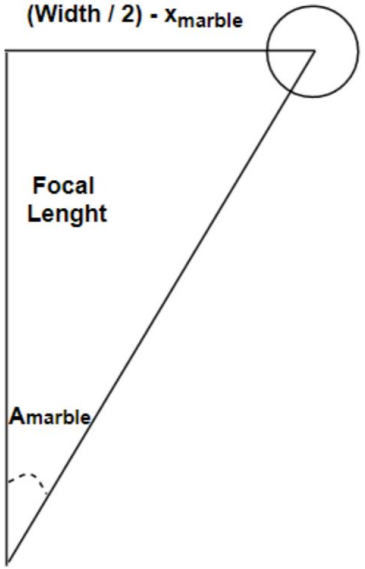


$$f = \frac{Width}{2 \tan \frac{FOV}{2}}$$

Monocular Camera Geometry



$$\alpha_{angleToMarble} = \tan^{-1} \frac{(Width/2) - x_{marbleCenter}}{f}$$

$$D_{distToMarble} = f \frac{Width}{2r_{marbleRadius}}$$

Marble Detection

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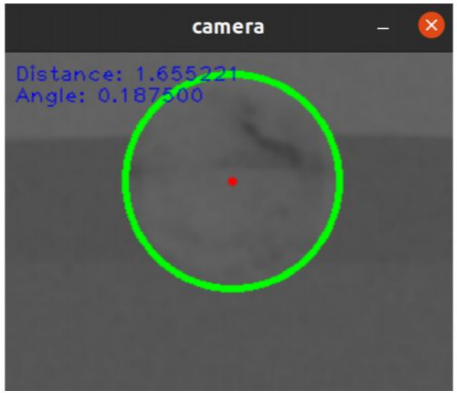
(a) Far distance.

(b) Medium distance.



(c) Close distance.