

Door Detection

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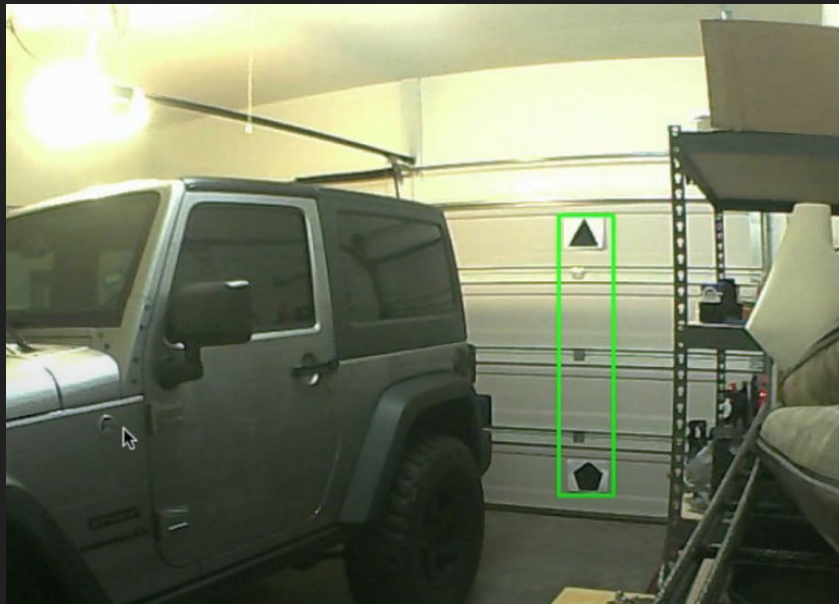
Problem

Why is door detection needed?

- Assist those with impaired vision
- Implementation in robots
- Control doors remotely through cameras

Similar Project

Garage Door Detection

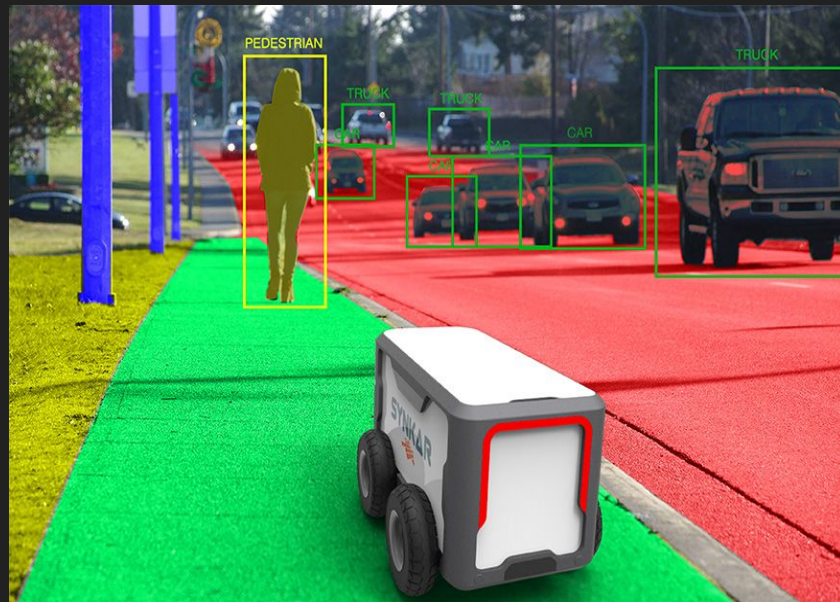


Door Detection for Visually Impaired



Real World Applications

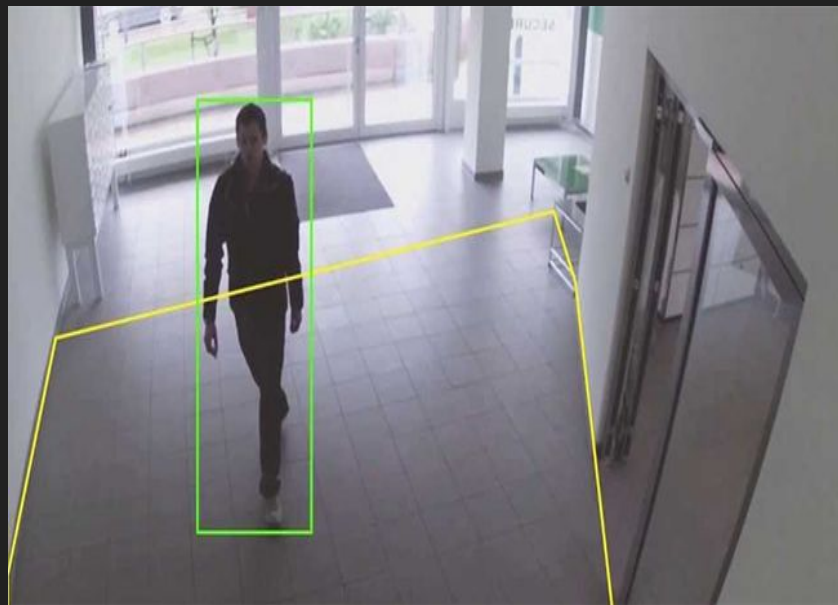
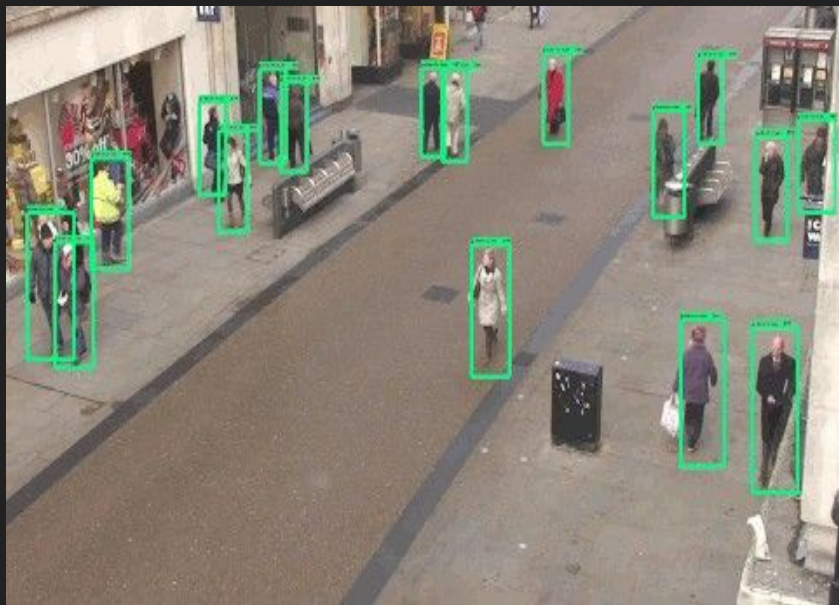
Robotics



Impaired Vision App



Video Surveillance



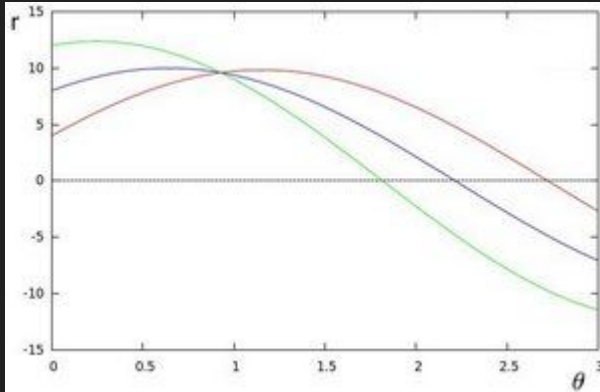
Approach

What is our plan?

- Utilize OpenCV library
- Preprocess image for detection
- Apply algorithm to detect door(Hough Transform, Line Segmentation)
- Draw bounding box around detected door

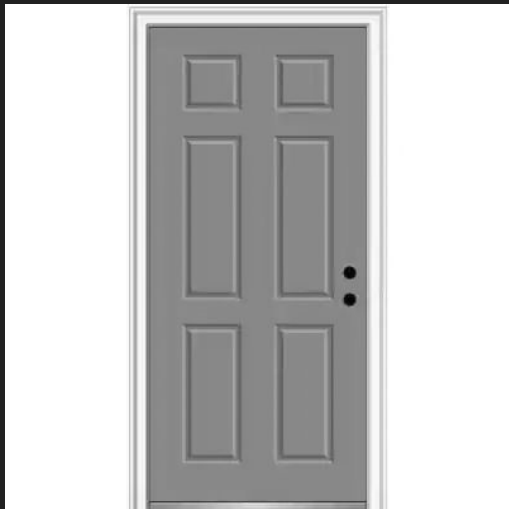
Method to Detect Points that Form Lines - Hough Transform

$$y = \left(-\frac{\cos \theta}{\sin \theta} \right) x + \left(\frac{r}{\sin \theta} \right)$$

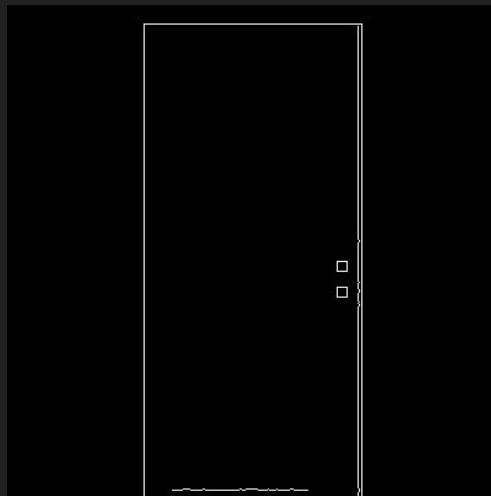


Implementation and Analysis

Image Preprocessing

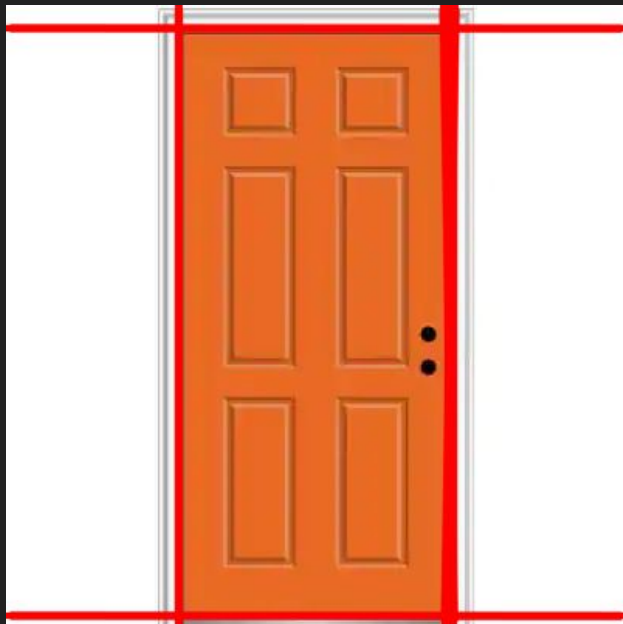


**Grayscale Our
Image**

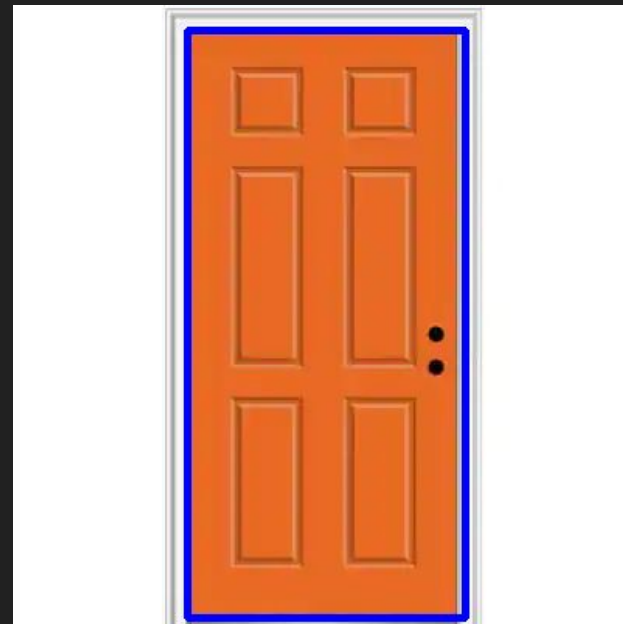


Canny Edge Detection

Door Detection



Hough Transform



Position:
center

Door Detected

Door Detection With A Camera Image of A Door



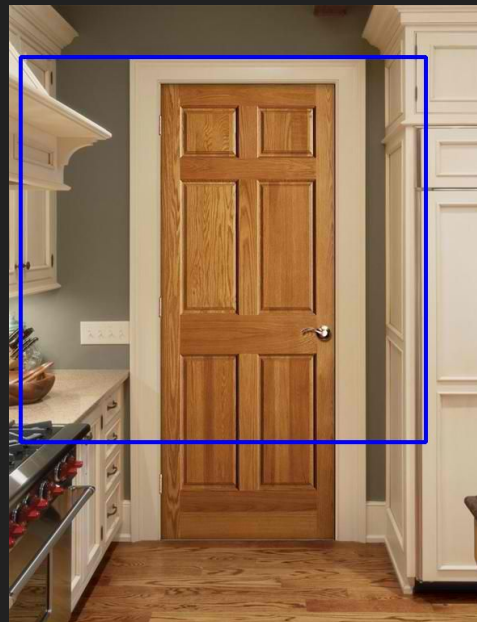
Morphing

Slanted Line

Challenges that we encountered



Doors, with a background scene



Full door not detected
Ohte objects detected a

Conclusions

Major Observations

- Important in helping those who have vision impairments
- A door detection algorithm needs to have a way to ignore objects in the background and create clear lines to detect a door
- Curved doors does not work well with this algorithm