# industrial vision

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## background

## objective

Industrial vision can detect and recognize features such as the color, shape and contour of an object, as well as recognizing faces. It has been used in the industry for sorting objects and is also used in artificial intelligence and autonomous cars.

Based on last year's project, we will write a programme which are used to avoid barriers for automous cars by using python.
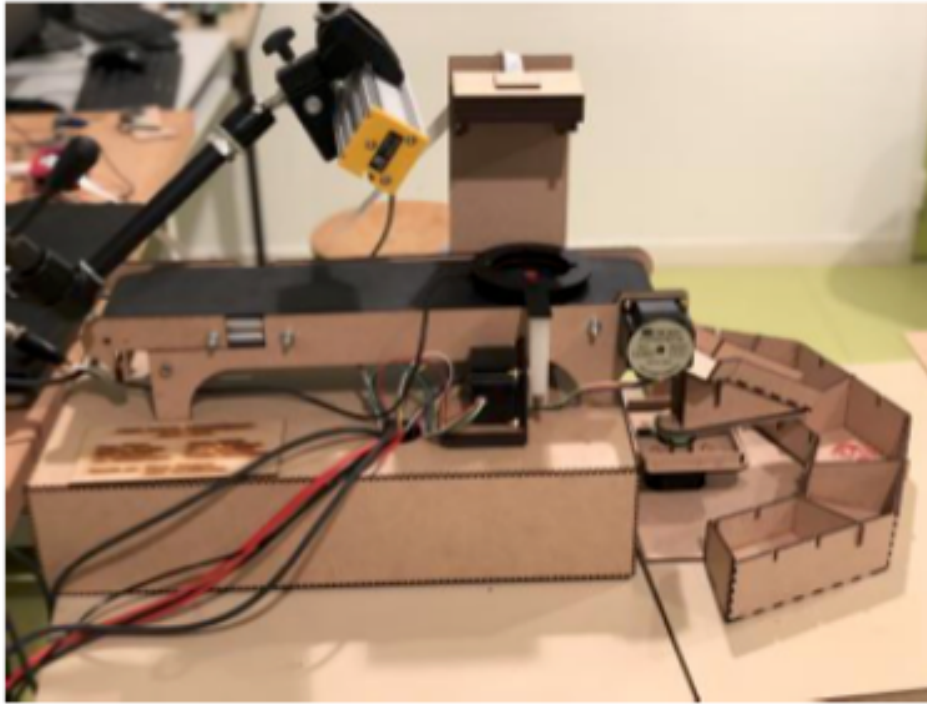
module

1 Previous work

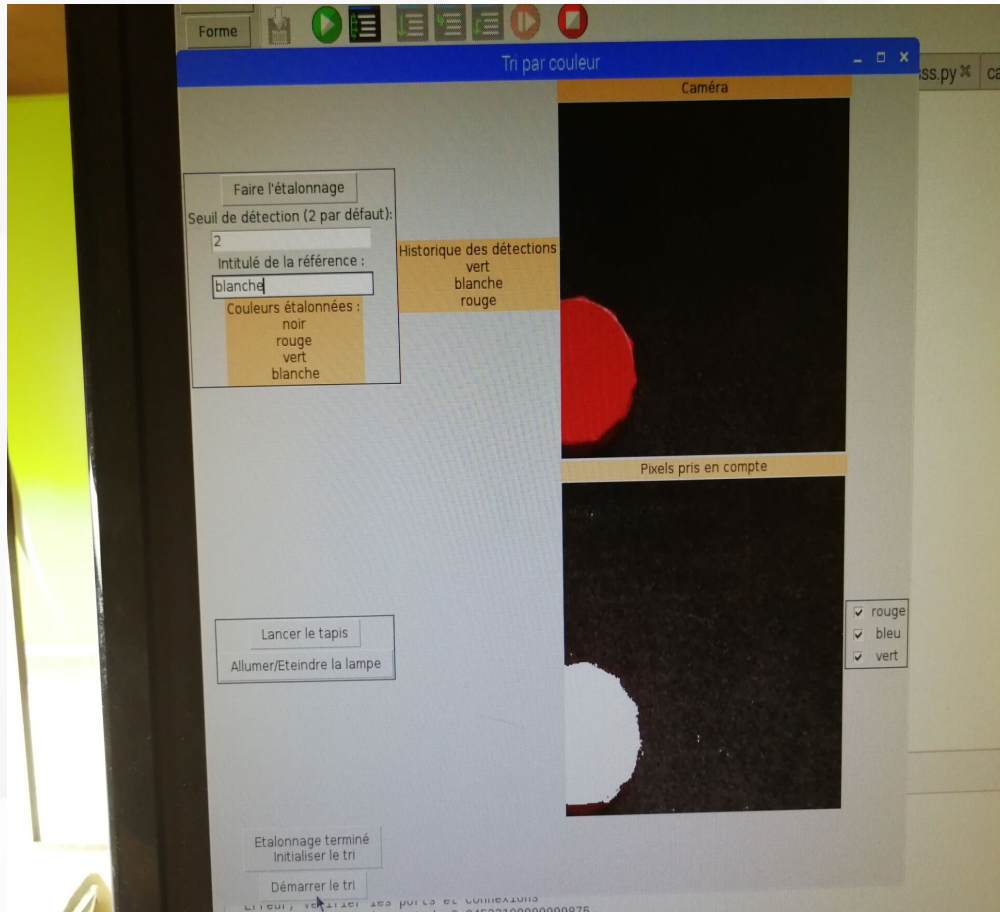2 What we did this week

3 Future plan

4 Difficult technical point

The hardware part is mainly composed of five parts,Raspberry camera,lighting, transmission track, sorter, receiving box.

In the software section, they used Python to write programs that can recognize objects based on color and shape,can control the light source and the transmission device through the nucleo

1,We learned Python, including various libraries and code structures.

2.We tested the previous work code by experiment

3.We studied and understood the code that worked before.

4.We writed a program to guide the direction of the smart car according to the color of the wall.

# What we did this week

```python
# Taking a picture of the camera and converting it to hsv
my_stream = BytesIO()
camera = PiCamera()
camera.start_preview(fullscreen = False,window = (200,150,500,250))
sleep(2)
camera.capture(my_stream,'png')
img_test = Image.open(my_stream)
camera.stop_preview()
weak = np.array([70, 100, 100])
strong = np.array([90, 255, 255])
img_test2 = getPixels(img_test)
hsv = cv2.cvtColor(img_test2, cv2.COLOR_BGR2HSV)
mask = cv2.inRange(hsv, weak, strong)
```

```python
# Get every pixel of the image that has been taken by the camera
def getPixels(image):
    width, height = image.size
    pixels = []
    for i in range(width):
        currentLine = []
        for j in range(height):
            pixel = list(image.getpixel((i, j)))
            pixel.pop()
            currentLine.append(pixel)
        pixels.append(currentLine)
    pixels = np.array(pixels).astype(np.uint8)
    return pixels
```

# What we did this week

```python
#Creating a mask to analyse the colored pixel on the right and on the left of the image
def compteMasque(mask) :
    nbPixelsGauche = 0
    nbPixelsDroite = 0
print("Le masque a pour dimensions {} x {}".format(len(mask), len(mask[0])))
for line in mask:
        for x, pixel in enumerate(line):
            if pixel:
                if x <= len(line)/2:
                    # On l'ajoute à gauche
                    nbPixelsGauche += 1
                else:
                    # On l'ajoute à droite
                    nbPixelsDroite += 1
    return nbPixelsGauche, nbPixelsDroite
nbPixelsGauche, nbPixelsDroite = compteMasque(mask)
cv2.imshow('Result',mask)
cv2.waitKey(0)
cv2.destroyAllWindows()
```

# Future plan
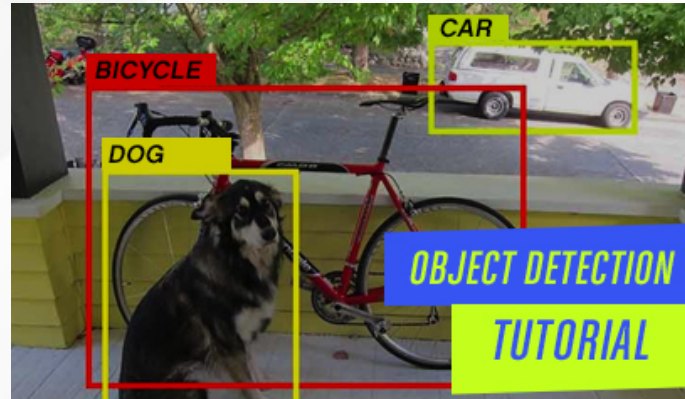


(This picture is from leveraging Data Science)

Step 1 :complete the program to guide the car according to the color of the wall

Step 2:Write a program that guides the direction of the car according to the white line on the road

Step 3:Write a program that lets the car identify obstacles and evade

# Difficult Technical Point

1, It's hard for us to master python in a short time,because we have no basics.

2, The programe previous work is too complex,we spend many time to study it and we can understand the primary sructure and the fonction of each subfunction.But we don't have the ability to modify it efficiently

3, The shape detection part of previous work is not good enough

Thanks for your attention