Image Processing Project
Object recognition for coins calculation

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Agenda

- Problems
- Project progress
- Object recognition
- Money calculation
- Conclusion

Problems

- Gold of 1 & 2 Euros is different from one of 10-50 Cents
- Similar color problem in silver and white background
- Non-homogenous lighting problem

Project progress

Preprocessing

- Noise removal
- Color enhancement

Segmentation

- Background isolation and shadow subtraction
- Objects splitting (individuals and in-groups)

Object recognition

Contour Diameter

$$D\_P * SF = D\_MM$$

$$Diff\_MM = abs(D\_MM - D\_Coins)$$

Target coin converges to desired class with minimum difference in diameters

Object recognition

Contour Color

C = (C_R, C_G, C_B)

Diff_C = sqrt((C_R-Ref_R)^2 +
(C_G-Ref_G)^2 +
(C_B-Ref_B)^2)

Target coin converges to desired color class with minimum euclidean distance

Object recognition

Find circular objects inside label image and ignore the rest

- MATLAB “imfindcircles” / google ‘circle detector hough transform’
- Google ‘Pixel position of circle on image’

Find RGB color of region

- MATLAB “find” to get XY coordinates
- Get corresponding RGB color values from original image
- Calculate mean/median values in each color channel for comparison

Find diameter of region

- MATLAB “regionprops” → 'EquivDiameter'

Money calculation

Coin calculation

Create a vector for each coin which contains center pixel (x,y) for each detected corresponding object

Total Money

= 0.01*numel(c1) + 0.02*numel(c2) + 0.05*numel(c5) + 0.1*numel(c10) + 0.2*numel(c20) + 0.5*numel(c50) + 1*numel(e1) + 2*numel(e2)

Conclusion

- Session output: frequency of each coin according to your chosen recognition method
- Compare your full chosen method with all your failed methods
- Validate your code with whole dataset
- Don’t forget to cite
- Organize your MATLAB files (functions)