Group 02

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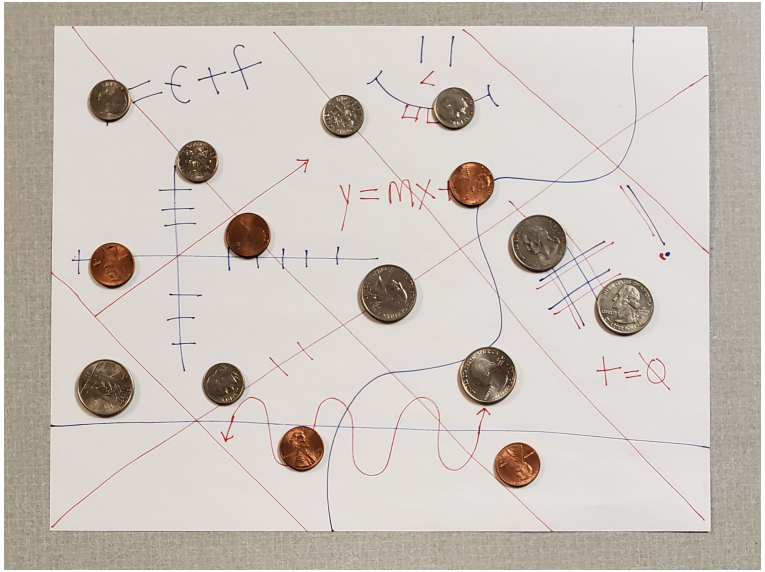
Image Data

- Added complexity with adding more writing and lines on images
  - Curves of the lines confuse the Circular Hough Transform
  - More lines intersecting coins affect the coin mask generation
- Added complexity with additional background noise of countertop
  - Countertop border affect object detection & use of morphological methods



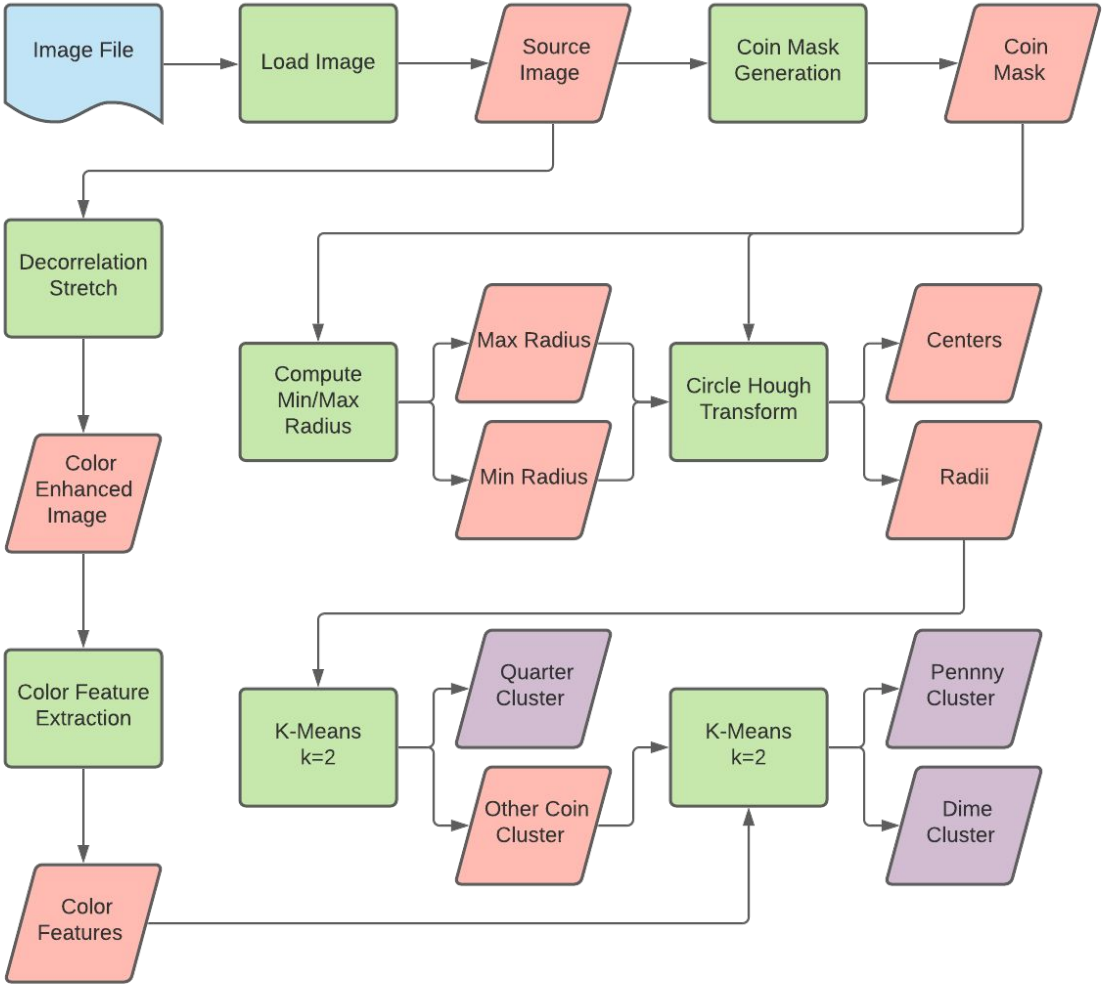
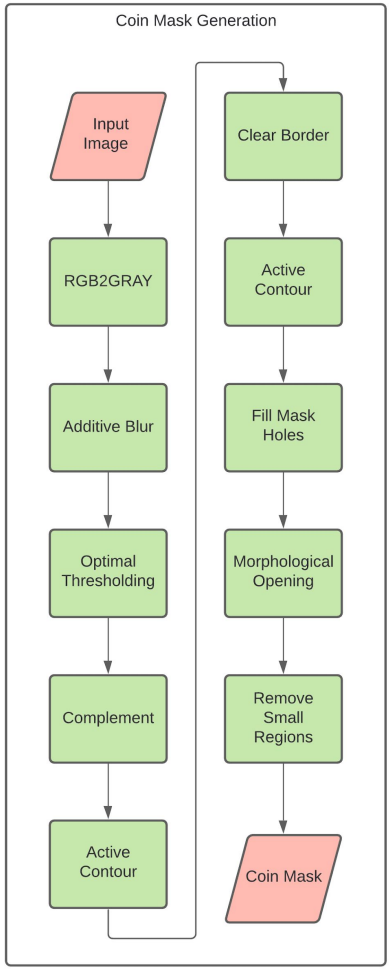


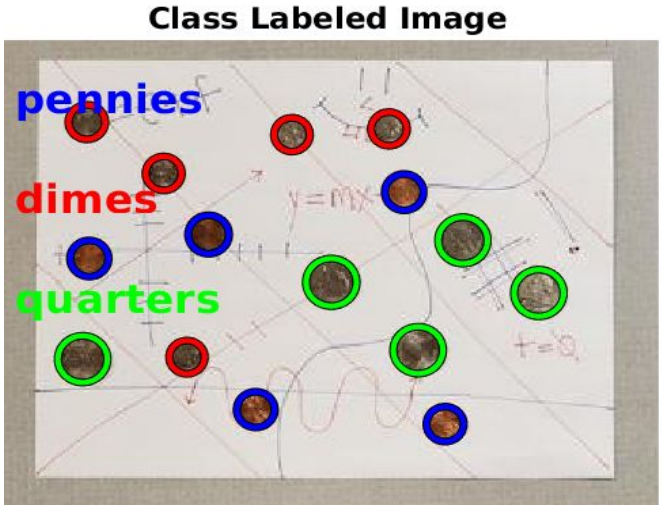
Image File
Load Image
Source Image
Coin Mask Generation
Coin Mask
Decorrelation Stretch
Color Enhanced Image
Color Feature Extraction
Color Features
Compute Min/Max Radius
Max Radius
Min Radius
Circle Hough Transform
Centers
Radii
K-Means k=2
Quarter Cluster
Other Coin Cluster
K-Means k=2
Pennny Cluster
Dime Cluster

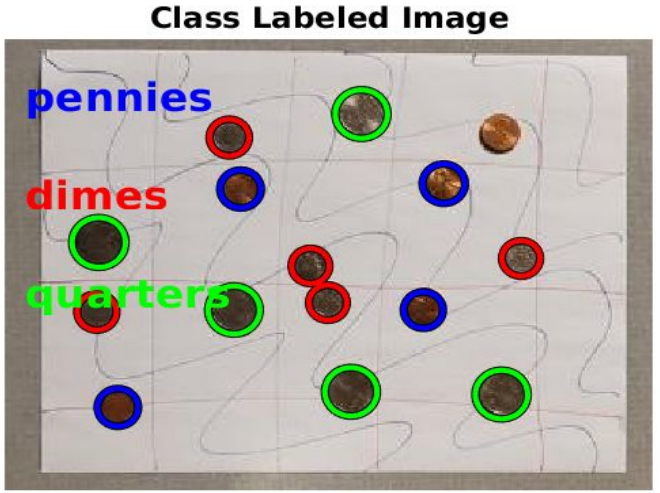

Coin Mask Generation
Input Image
RGB2GRAY
Additive Blur
Optimal Thresholding
Complement
Active Contour
Clear Border
Active Contour
Fill Mask Holes
Morphological Opening
Remove Small Regions
Coin Mask

Results

- Success:
  - Detected 419/420 coins
  - Classified 419/419 coins on the 28 different images correctly (7 images with 4 different resolutions)

- Failure:
  - 1 penny not detected
  - Combination of glare and issue with low resolution when morphological opening step is applied





Conclusion

- Issues
  - Attempting to determine complex vs simple background
  - Determining min/max radius values for CHT at multiple resolutions
  - Disconnected edges in edge images before application of morphological methods
  - Color differentiation not contrasted enough between color channels for classification

- Insights
  - Difficult to develop an algorithm generalized enough for ALL possible complex backgrounds
  - It is easy to design input images that will fail

- Caveats:
  - Algorithm assumes coins are the largest circular objects in the image