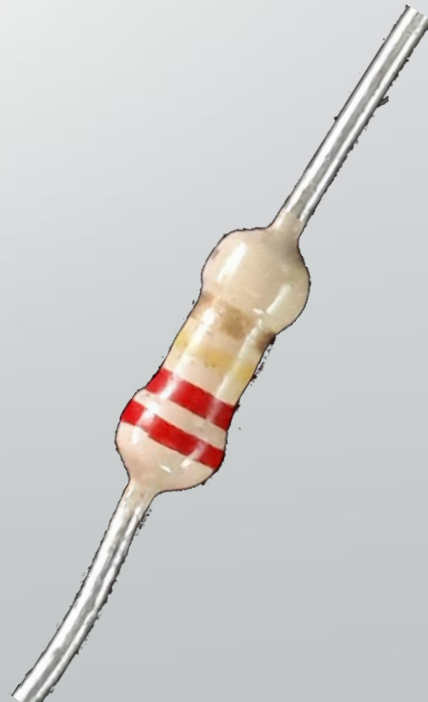
Resistor Detector

Disciplina: Introdução a recuperação multimídia

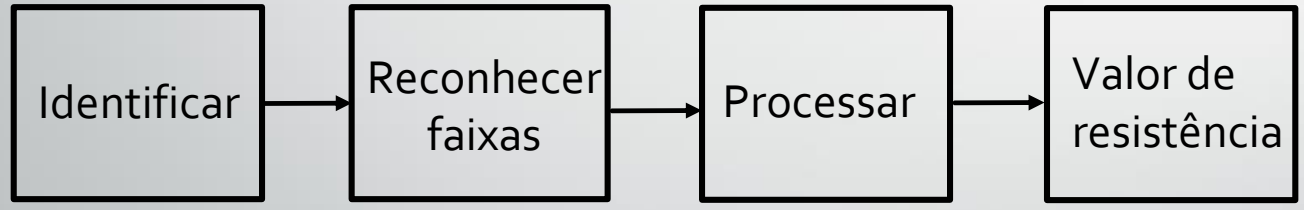
Professor: Eduardo Valle

Grupo: Adauto Braz de Pádua
Lindomar Jose Batistão
Lucas da Silva Moraes
Osvaldo Xavier Dias Junior



Escopo

- Identificar o valor da resistência do componente através de reconhecimento e processamento de imagem.

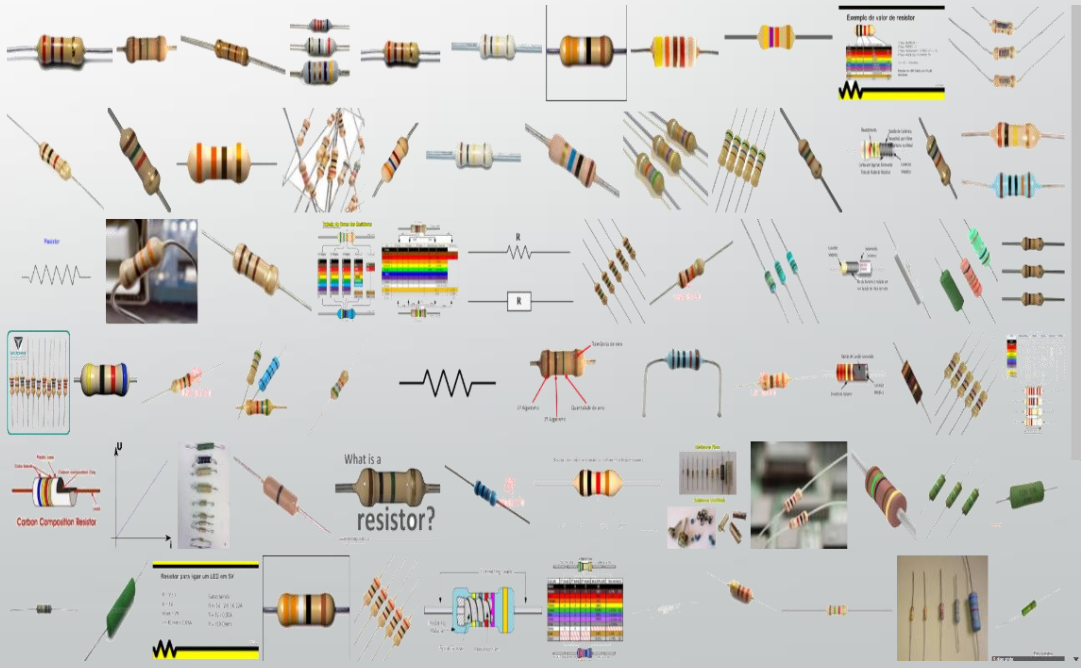


Desenvolvimento: Base de dados

- Como?
- Qual a quantidade de imagens ?
- Qual o formato das imagens ?

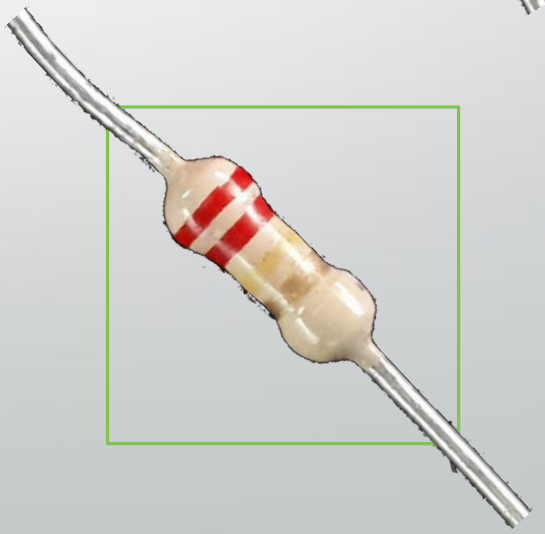
Google Imagens

IMAGENET



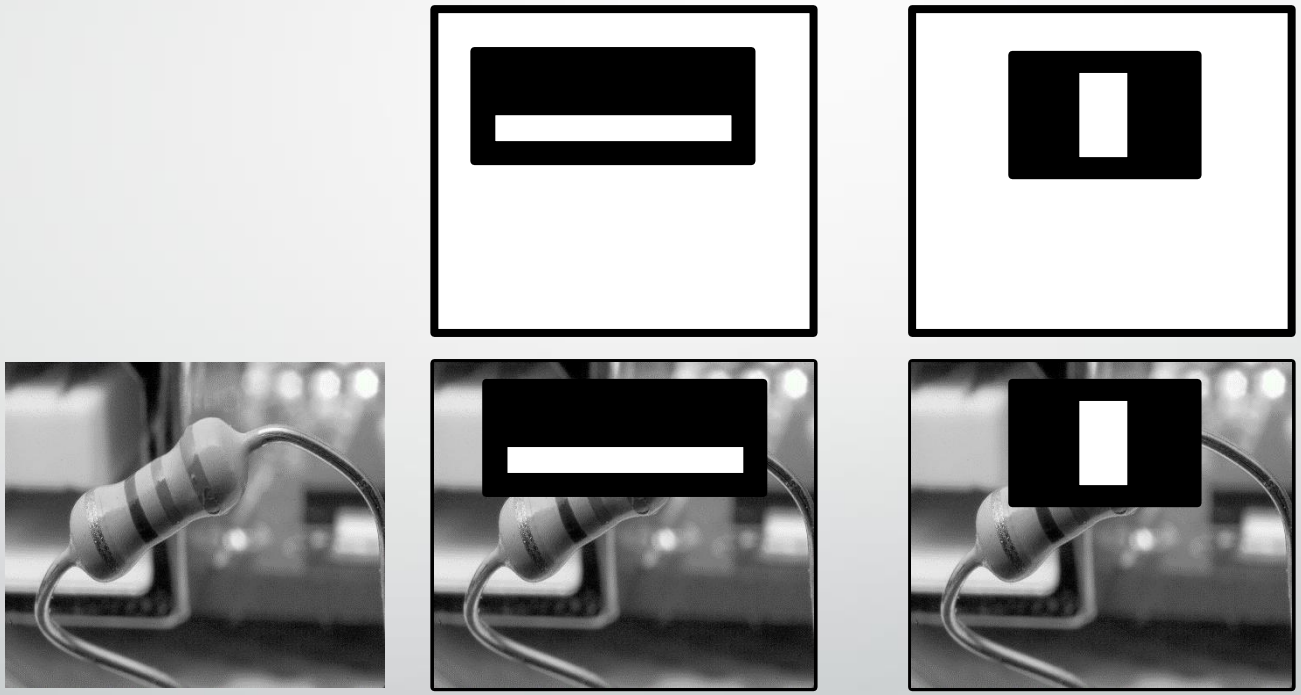
Desenvolvimento: Haar Cascade

- Treinamento
- Base de dados
- Teste e aplicação



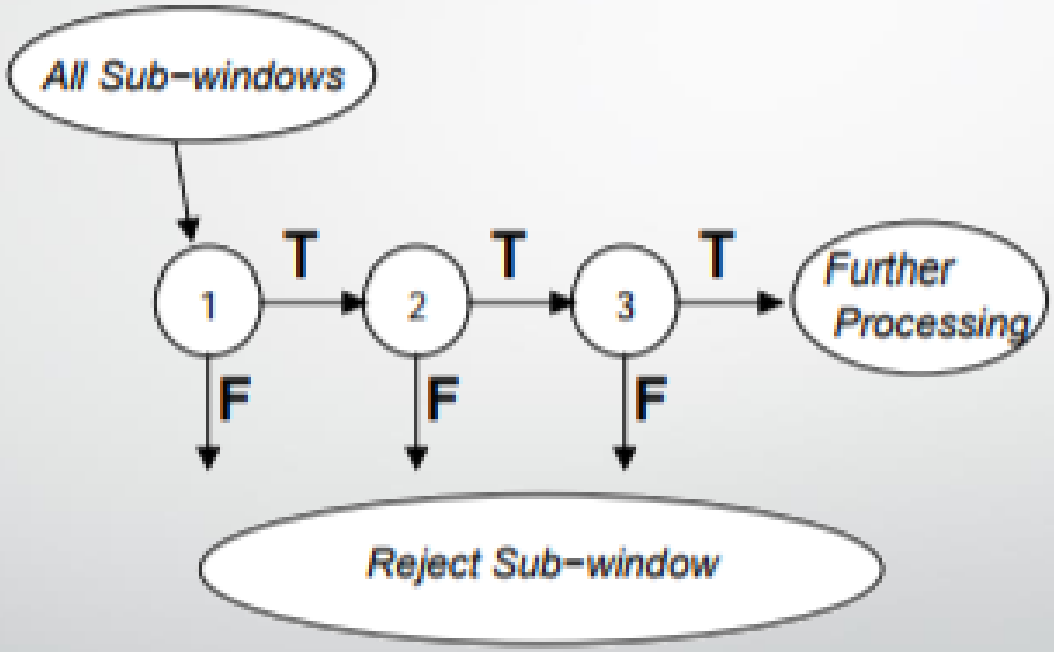
Desenvolvimento: Haar Cascade

- Funcionamento: Features e Imagens Integrais



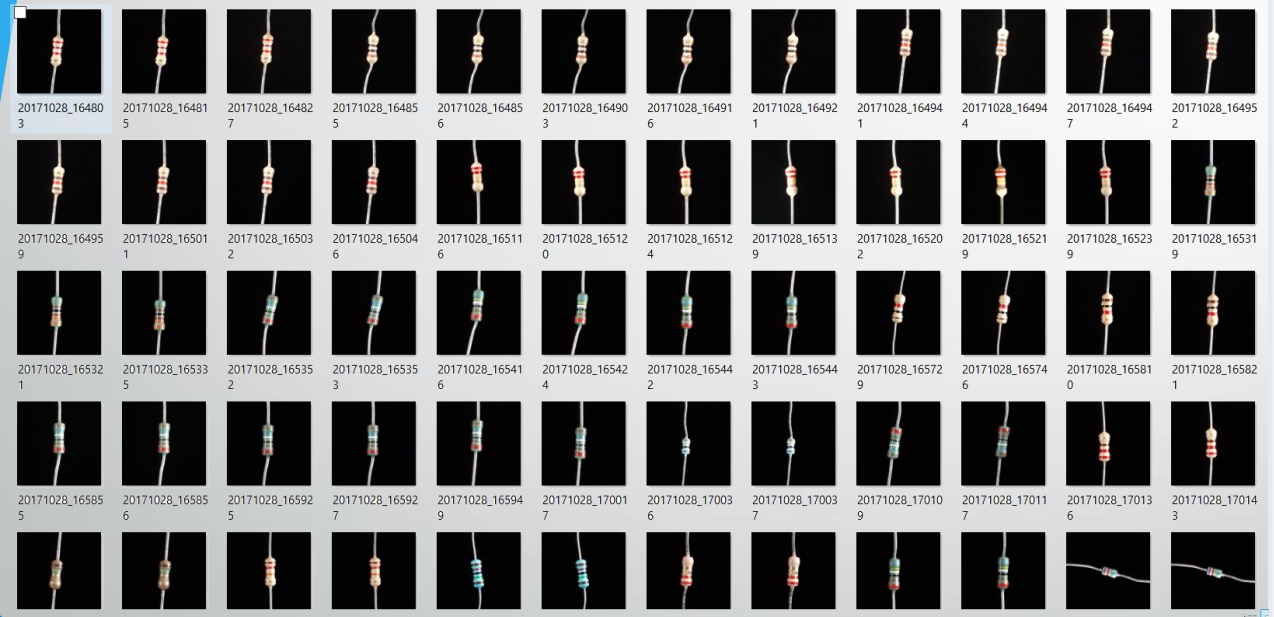
Desenvolvimento: Haar Cascade

- Aprendizado e Classificador em Cascata



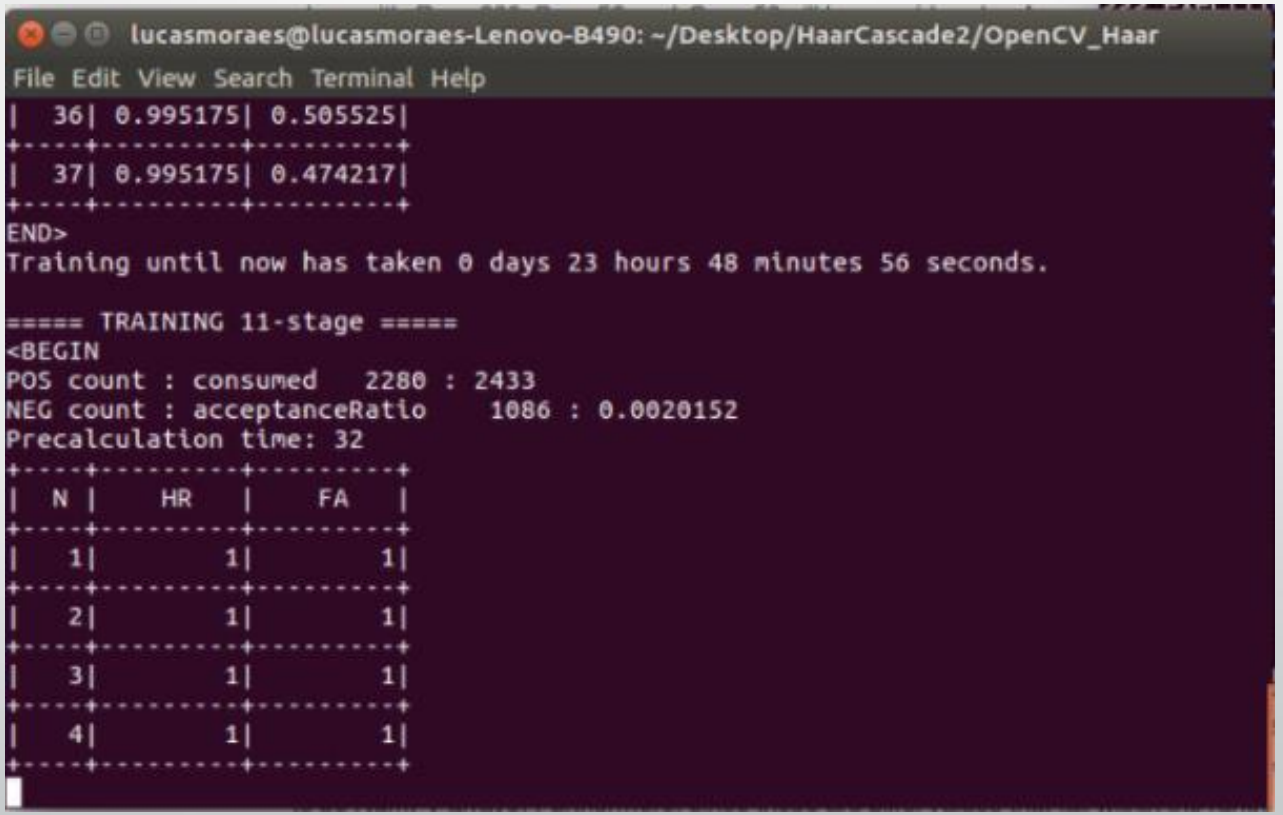
Desenvolvimento: Base de dados

- Base de dados final.



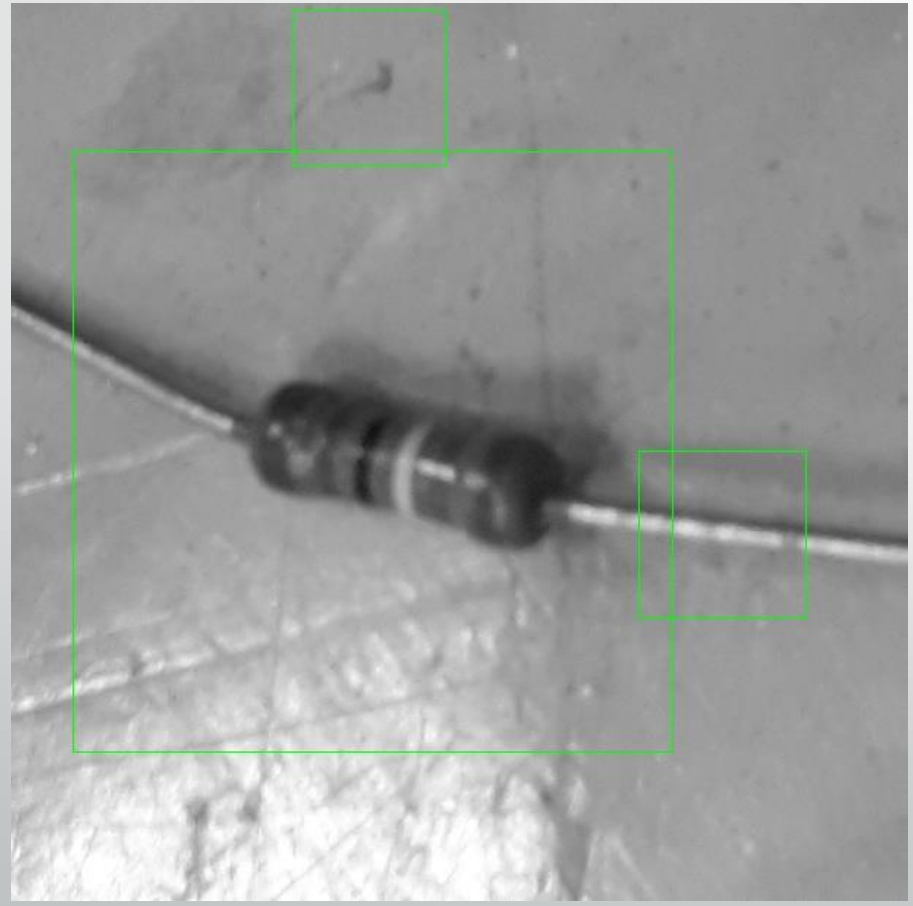
Desenvolvimento: Haar Cascade

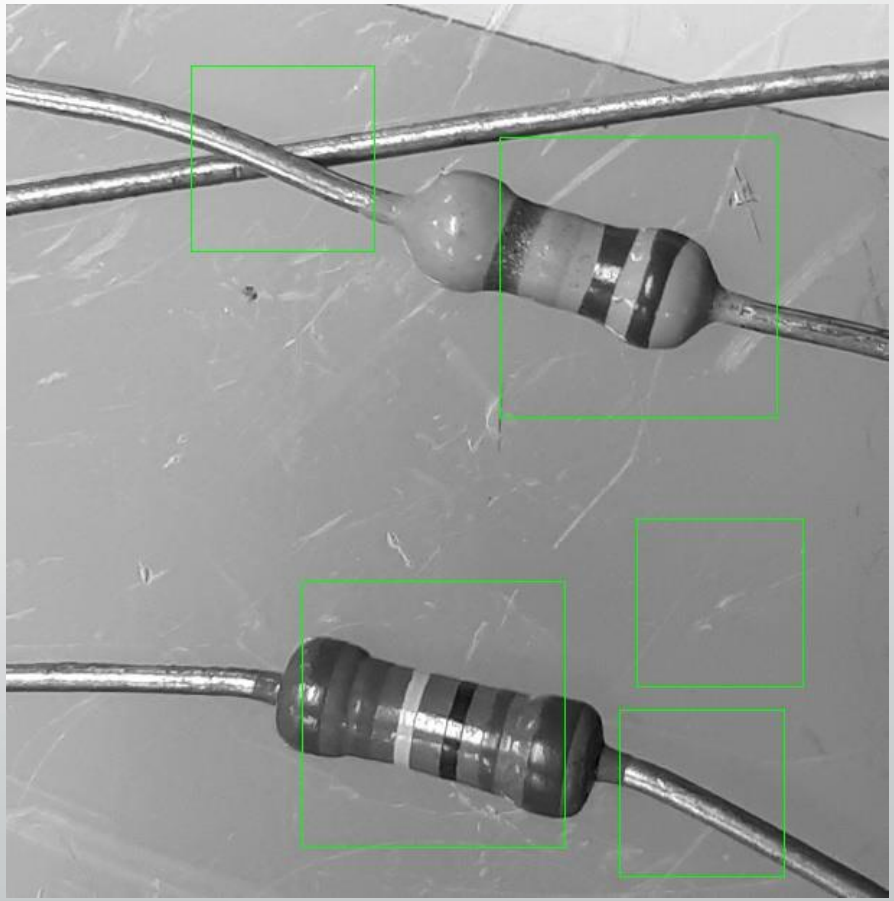
- Treinamento



Desenvolvimento: Testes

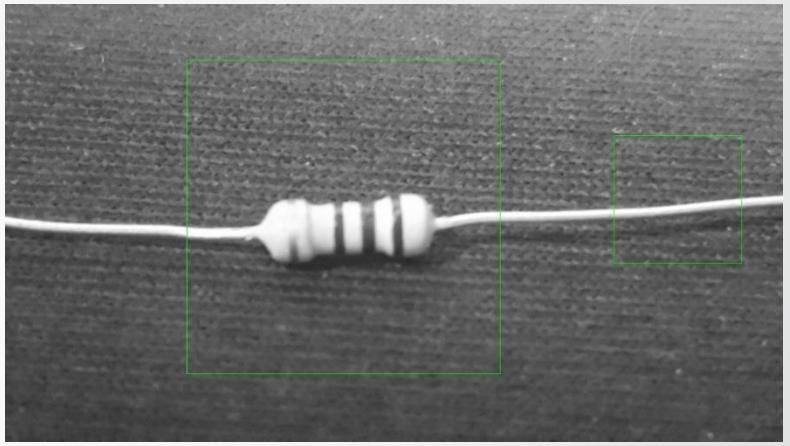
- Identificação de falsos positivos

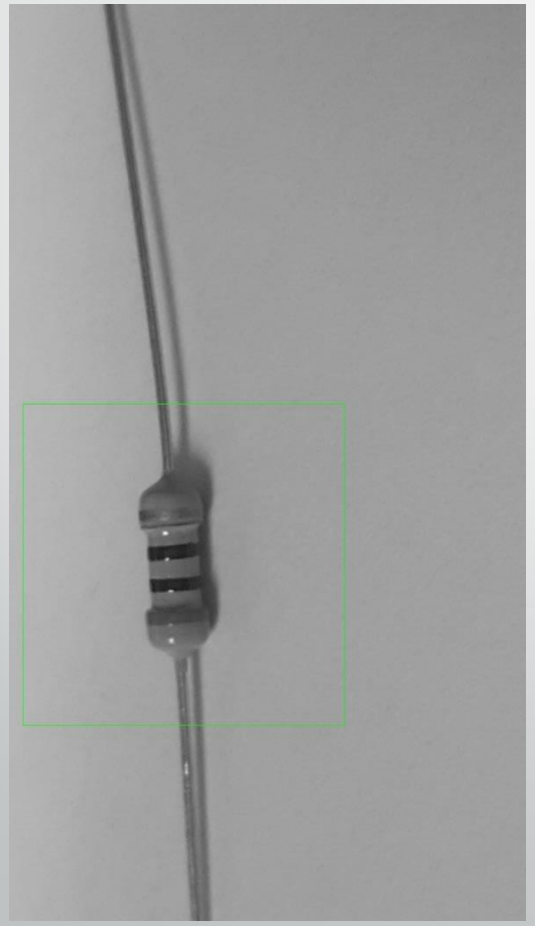


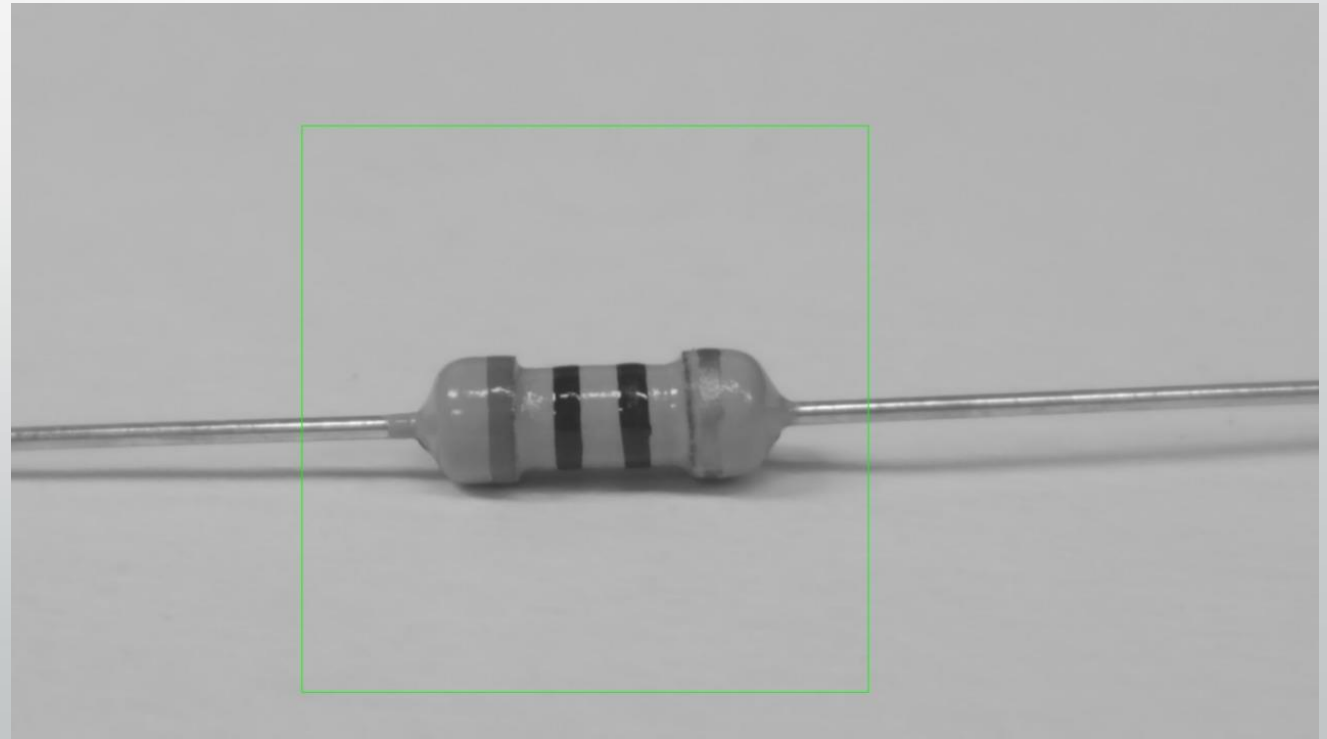


Desenvolvimento: Testes

- Identificação de verdadeiros positivos

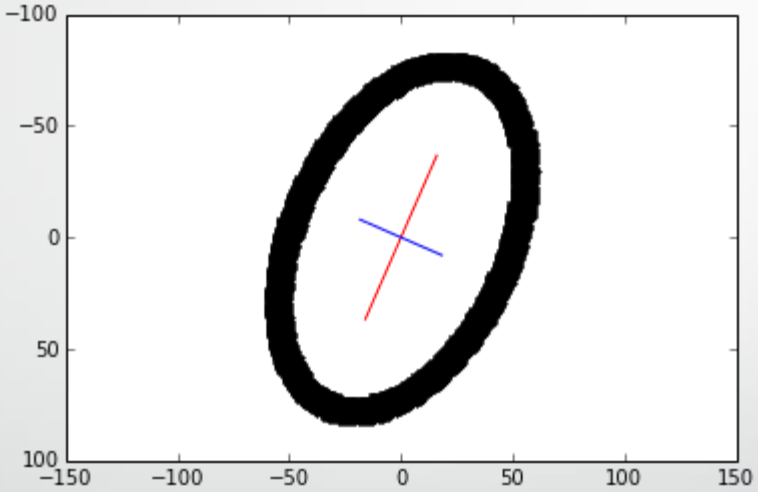


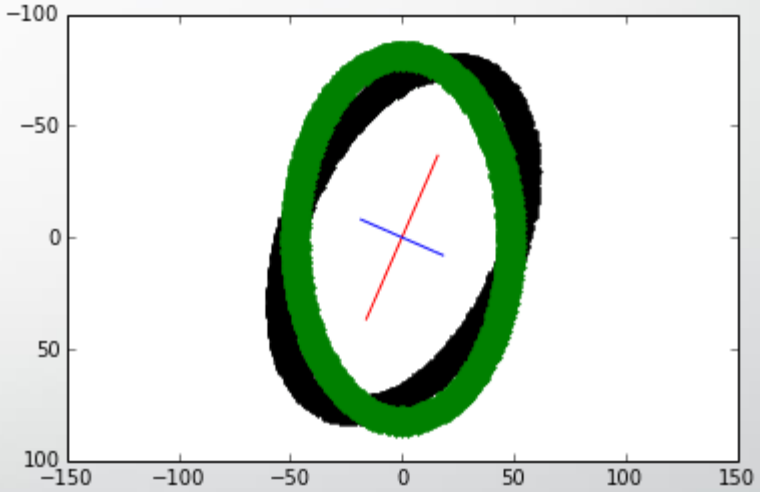




Desenvolvimento: Segmentação

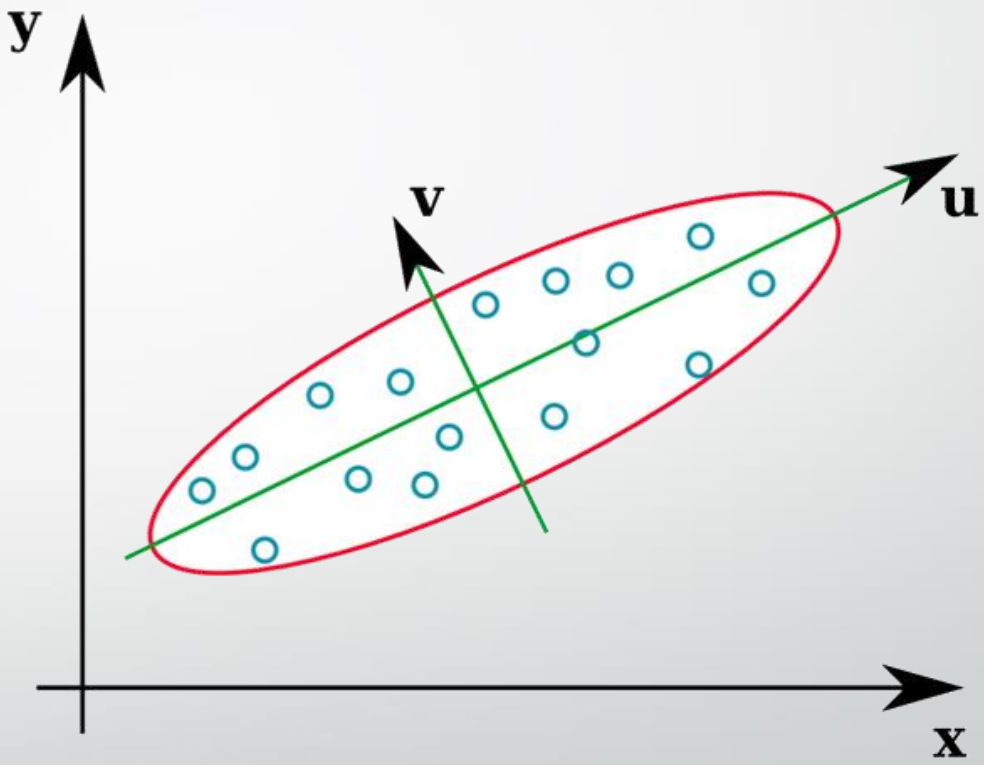
Covariance Matrix and Eigens





Desenvolvimento: Segmentação

$$COV(X,Y) = \frac{\sum_{i=1}^{n}\left(X_i - \bar{X}\right)\left(Y_i - \bar{Y}\right)}{n-1}$$



Desenvolvimento: Segmentação

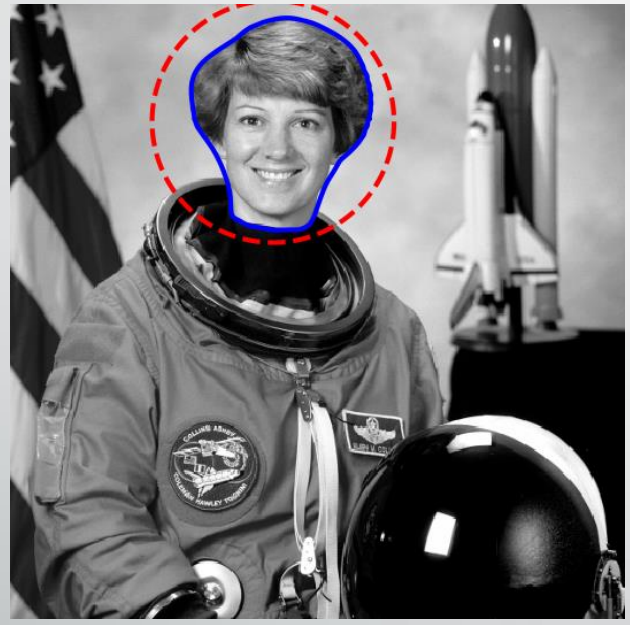
Imagem Binarizada

Imagem Rotacionada

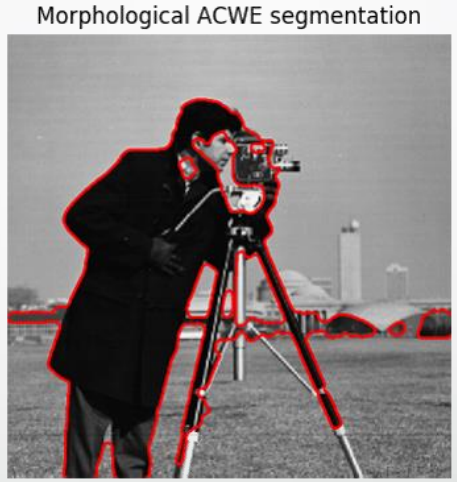
OpenCV

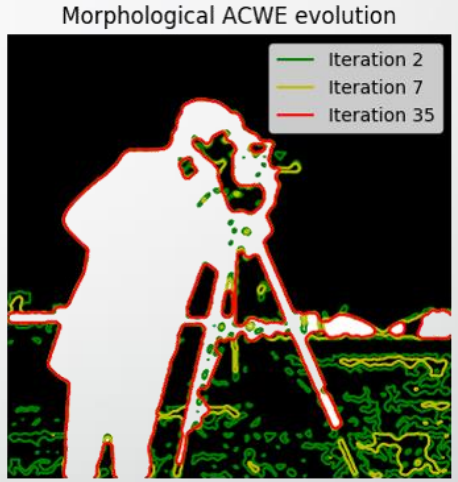
Desenvolvimento: Snake Adaptative

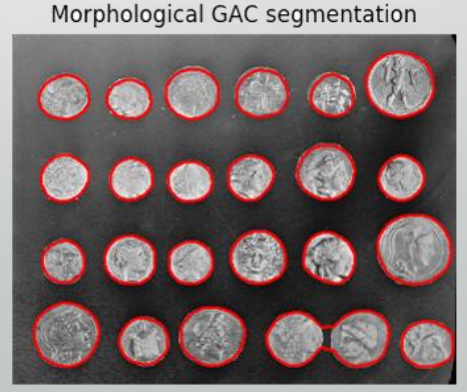
Active Contour Model

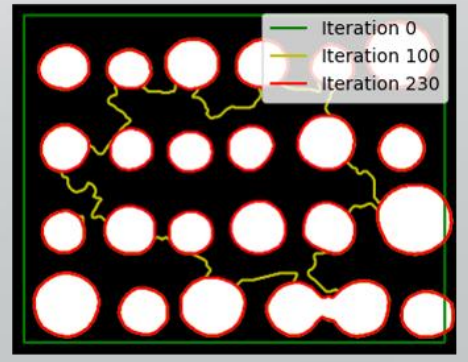


Morphological Snakes



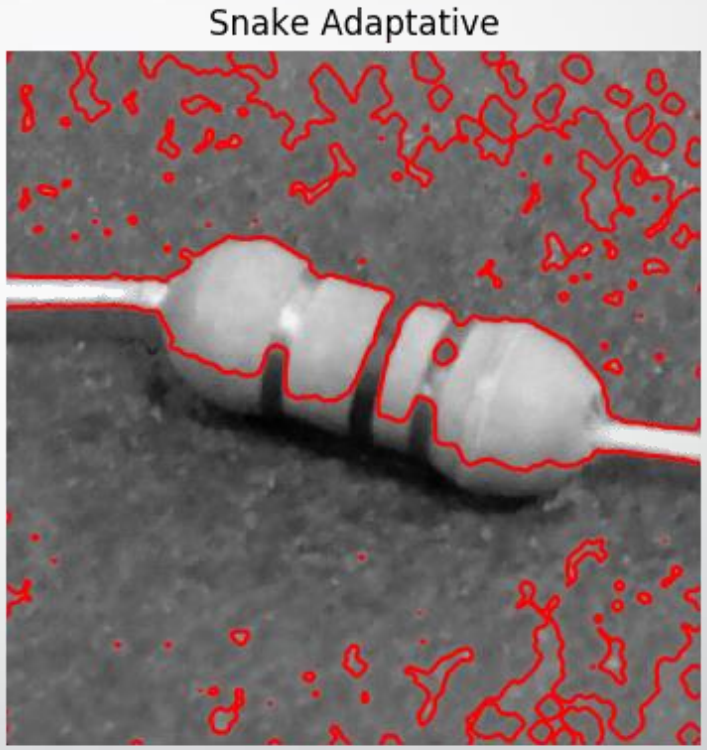






Desenvolvimento: Snake Adaptative

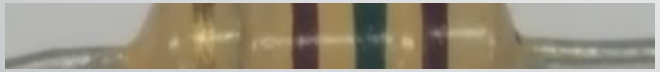
- Processamento do resistor com fundo complexo
- Problemas encontrados

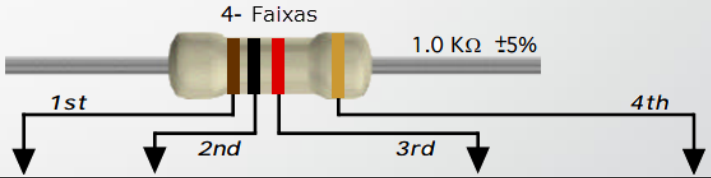


scikit-image
image processing in python

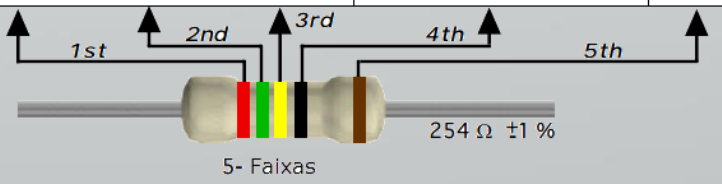
Desenvolvimento: Identificação de faixa

- Identificação do faixas de cores.

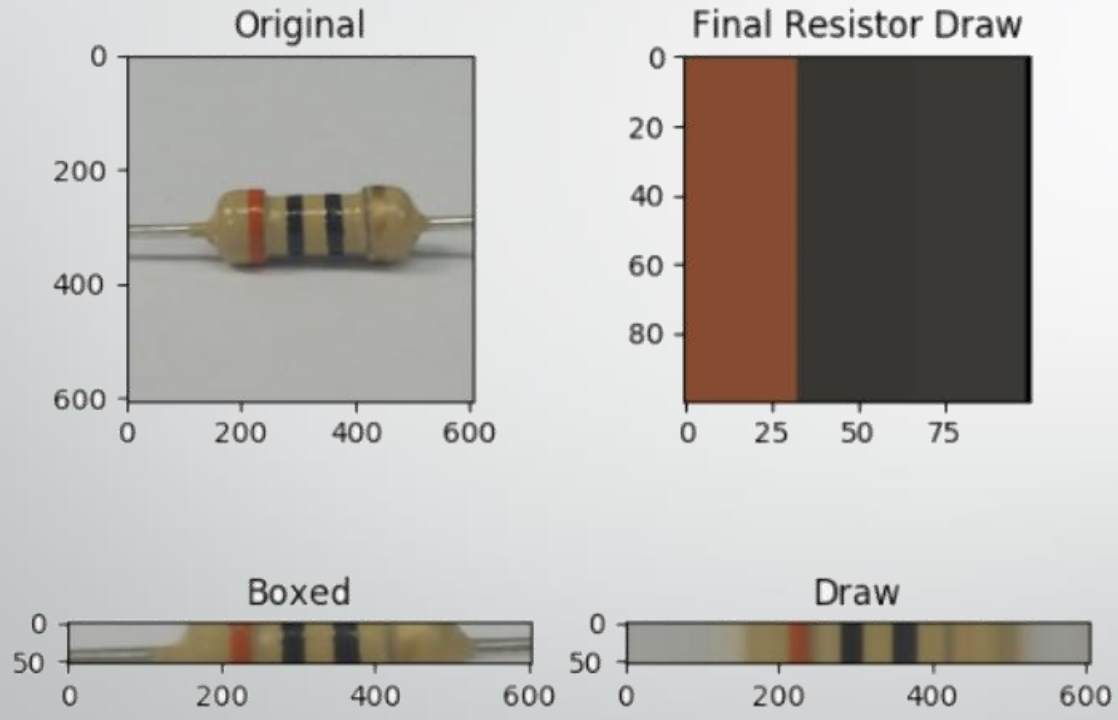


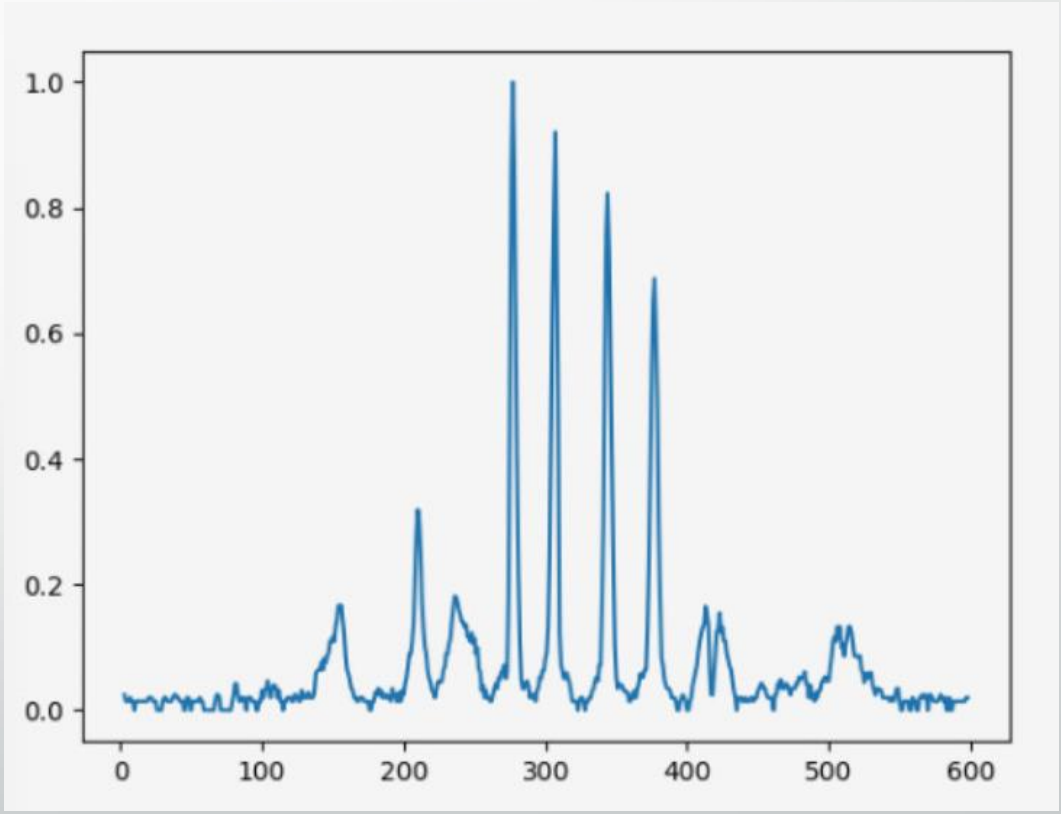


Cor	1ª Faixa	2ª Faixa	3ª Faixa	Multiplicador Decimal		Tolerância
Preto	0	0	0	1	1	
Marrom	1	1	1	10	10	± 1%
Vermelho	2	2	2	100	100	± 2%
Laranja	3	3	3	1K	1.000	
Amarelo	4	4	4	10K	10.000	
Verde	5	5	5	100K	100.000	
Azul	6	6	6	1M	1.000.000	
Violeta	7	7	7	10M	10.000.000	
Cinza	8	8	8		100.000.000	
Branco	9	9	9		1.000.000.000	
Ouro					0.1	± 5%
Prata					0.01	± 10%
Branco						± 20%



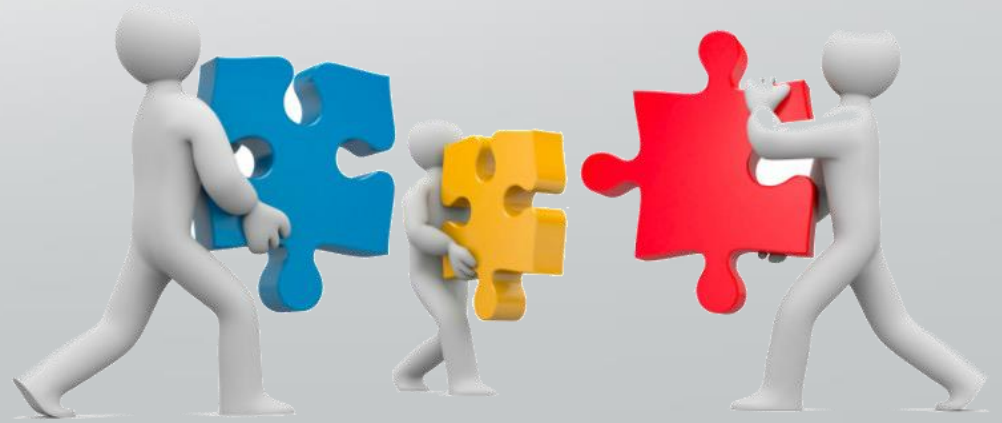
Desenvolvimento: Identificação da resistência



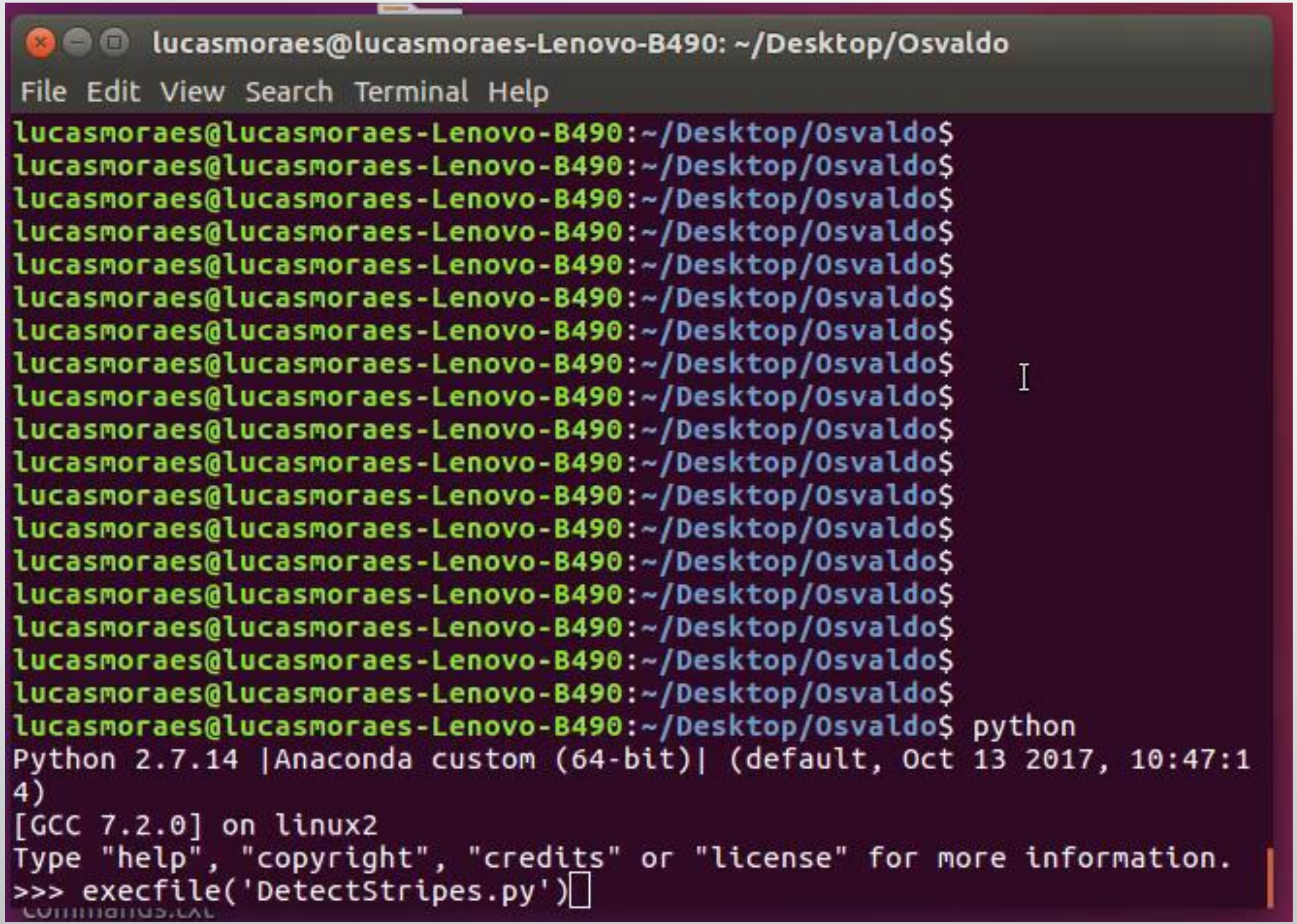


Conclusão

- Base de dados do Haar Cascade
- Segmentação e Orientação
- Performance
- Avanços



Demonstração



Referencias bibliográficas

[1] JONES, Viola. Rapid Object Detection Using a Boosted Cascade of Simple Features. Disponível em: <http://www.merl.com/publications/docs/TR2004-043.pdf>. Acesso em: 03 out. 2017.

[2] PUTTEMANS, Steven. Cascade Classifier Training. Disponível em: <https://docs.opencv.org/3.3.0/dc/d88/tutorial_traincascade.html>. Acesso em: 20 set. 2017.

[3] LIENHART, Rainer et al. Empirical Analysis of Detection Cascades of Boosted Classifiers for Rapid Object Detection.Disponível em: <Empirical Analysis of Detection Cascades of Boosted Classifiers for Rapid Object Detection>. Acesso em: 17 out. 2017.

[4] SCIKIT-IMAGE DEVELOPMENT TEAM. Active Contour Model. Disponível em: <http://scikit-image.org/docs/dev/auto_examples/edges/plot_active_contours.html>. Acesso em: 10 out. 2017.

[5] SCIKIT-IMAGE DEVELOPMENT TEAM. Morphological Snakes. Disponível em: <http://scikit-image.org/docs/dev/auto_examples/segmentation/plot_morphsnakes.html>. Acesso em: 10 out. 2017.

[6] MORDVINTSEV, Alexander; REVISION, Abid K.. Contours : Getting Started. Disponível em: <http://opencv-python-tutroals.readthedocs.io/en/latest/py_tutorials/py_imgproc/py_contours/py_contours_begin/py_contours_begin.html#contours-getting-started>. Acesso em: 12 out. 2017.

[7] QUEK, Alyssa. Computing the Axes or Orientation of a Blob. Disponível em: <https://alyssaq.github.io/2015/computing-the-axes-or-orientation-of-a-blob/>. Acesso em: 17 out. 2017.

Obrigado!

Duvidas?