Algoritmos de classificação na detecção de pessoas em imagens de praia

Leonardo Monte

Problema

- Ataque de tubarão
- Afogamentos
- Diminuição no turismo

Base de dados

Foto da praia de boa viagem

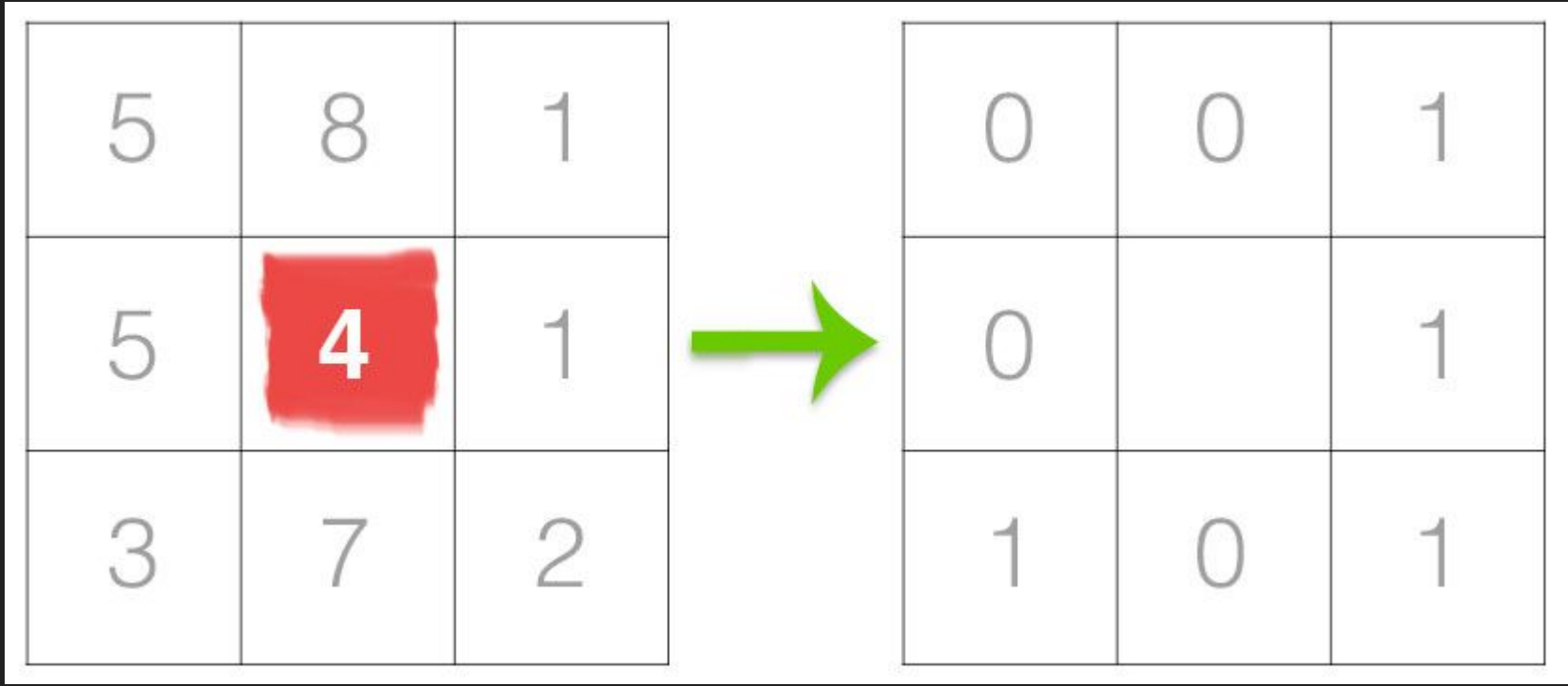
Banhista

Não banhista

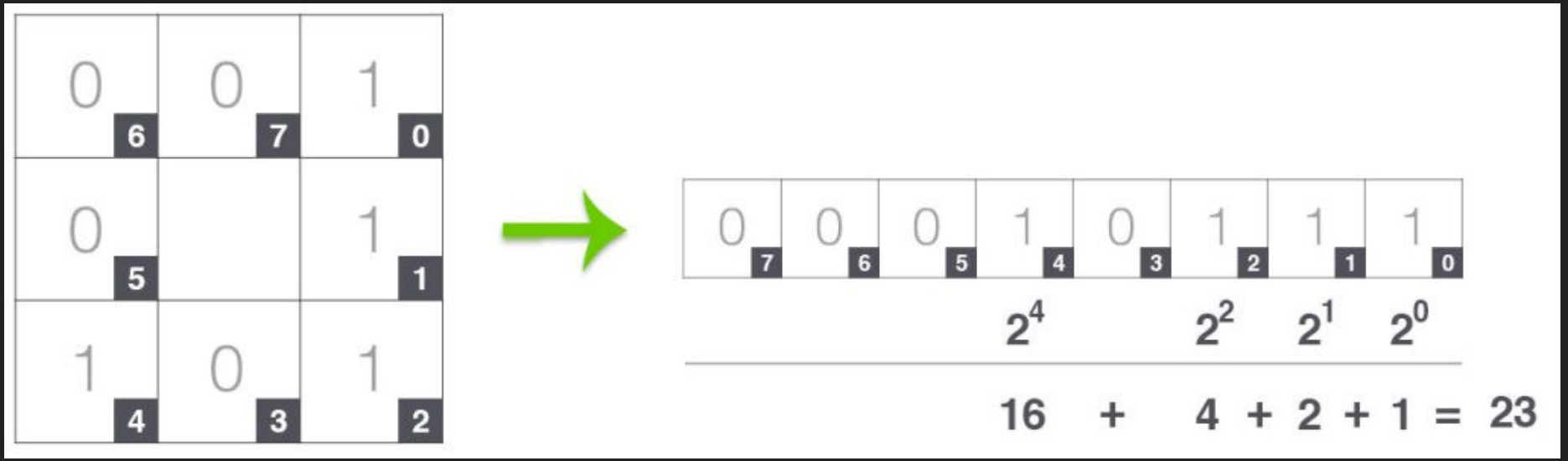
Pré-Processamento / Abordagem Clássica

- Hu moments
- HOG - Histograma de gradientes orientados
- LBP - Local Binary Patterns
- Combinações dos 3.

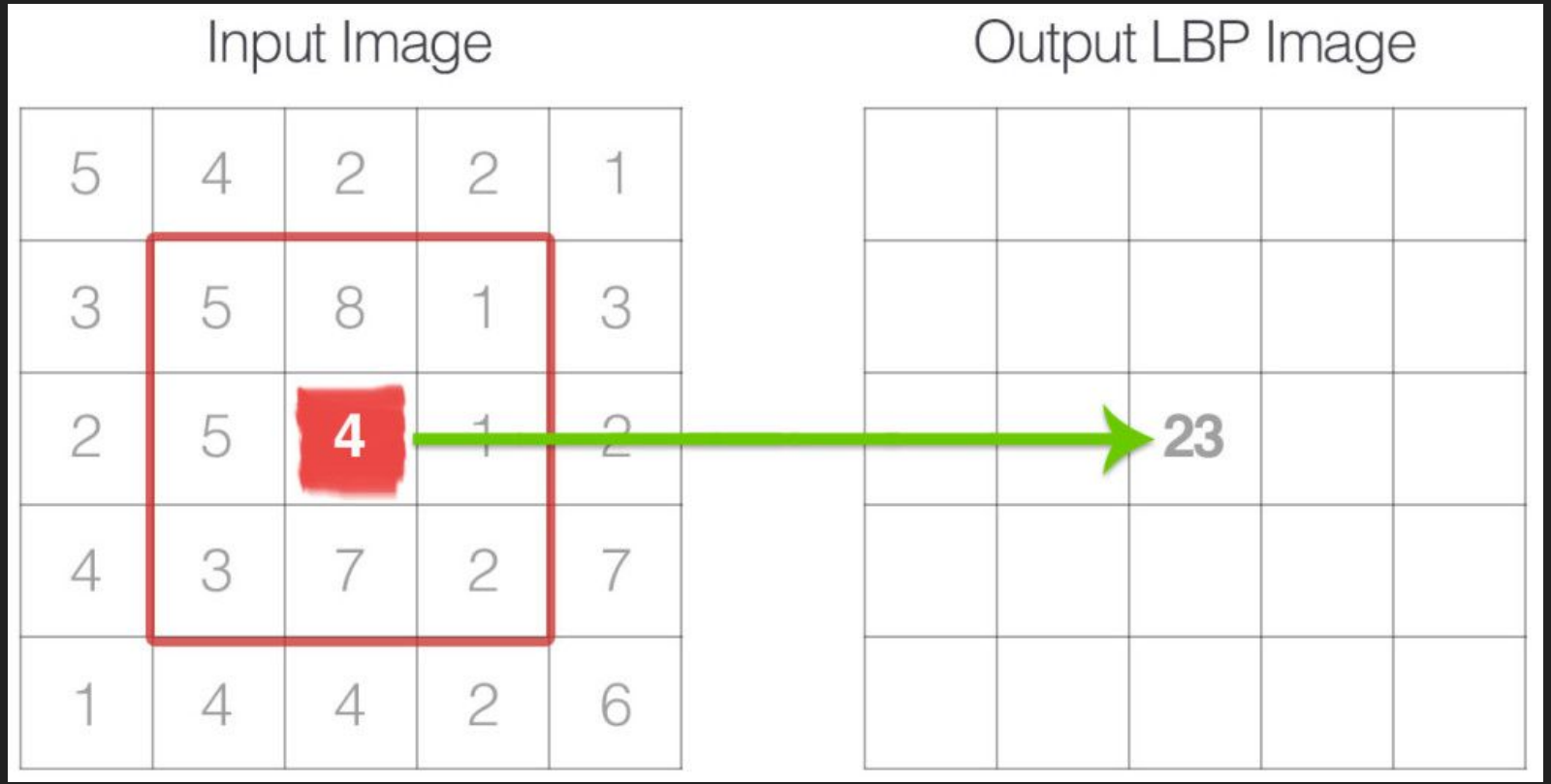
LBP



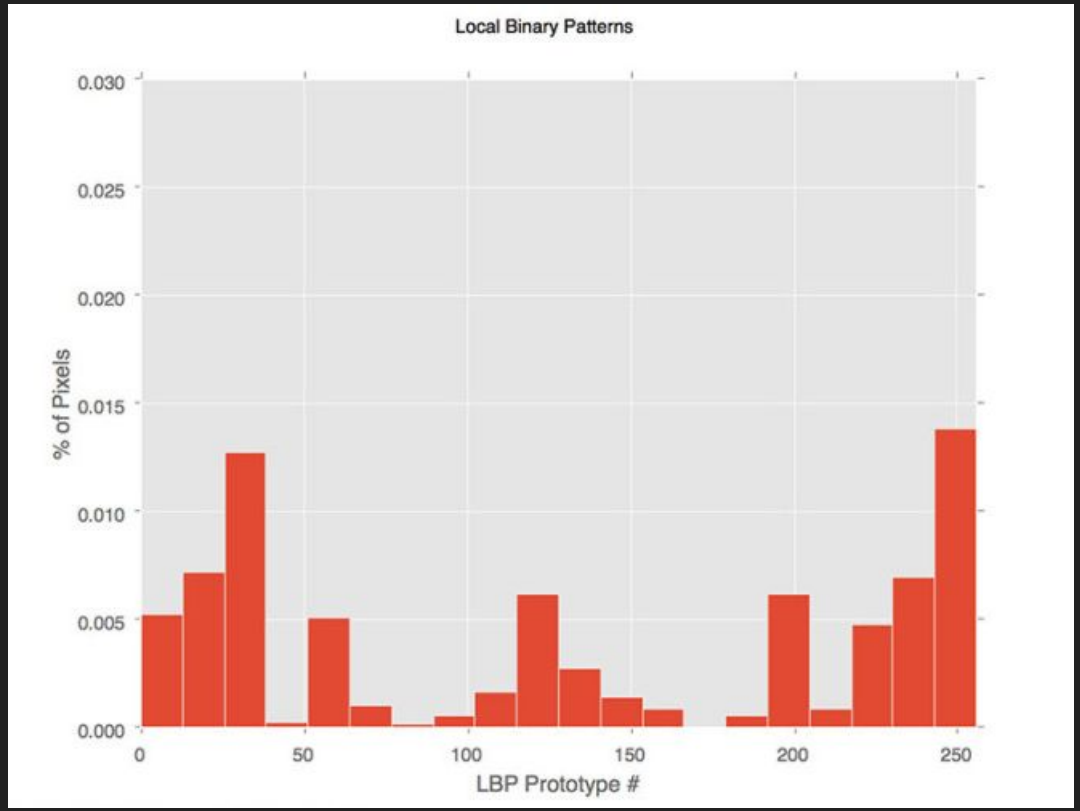
LBP



LBP

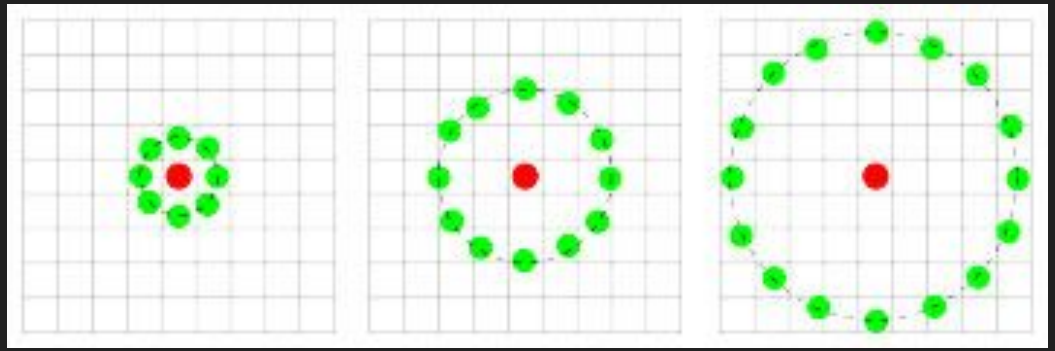

Input Image
Output LBP Image
5 4 2 2 1
3 5 8 1 3
2 5 4 1 2
4 3 7 2 7
1 4 4 2 6
23

LBP


Local Binary Patterns
0.030
0.025
0.020
0.015
0.010
0.005
0.000
% of Pixels
0
50
100
150
200
250
LBP Prototype #

LBP

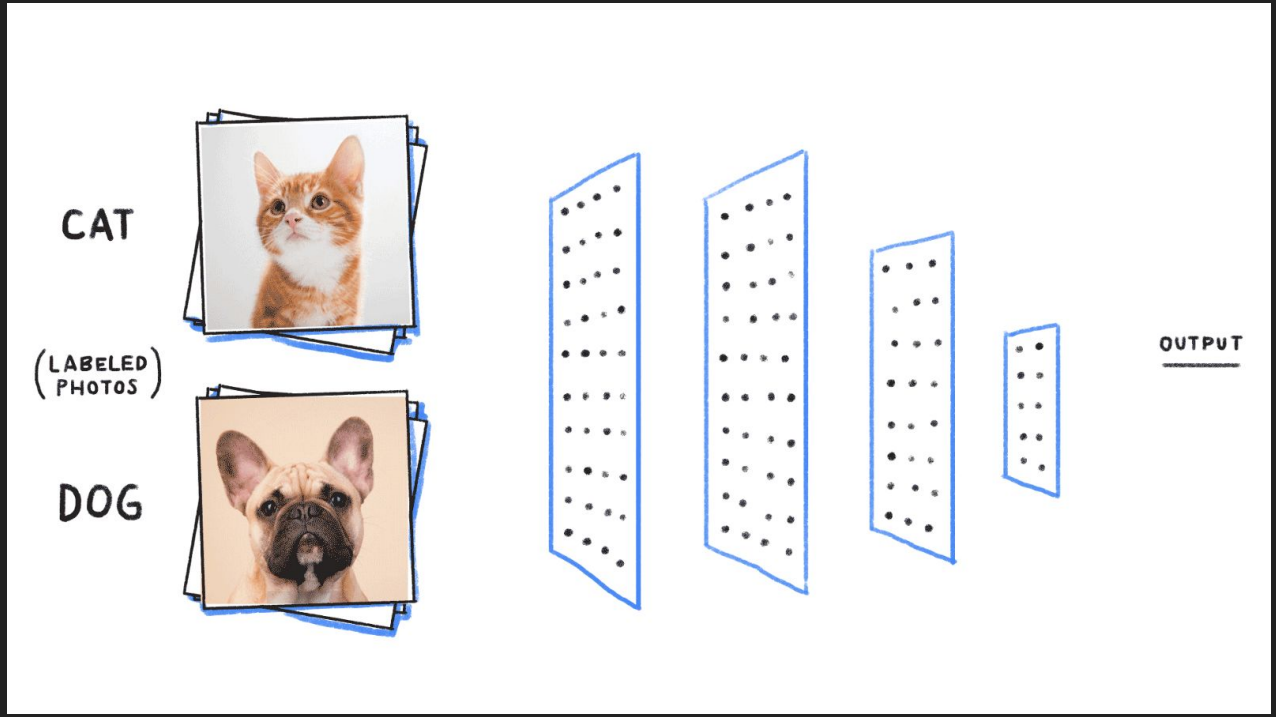
- Expandido para uso de diferentes valores de vizinhança.
- Ojara et Al (2002)



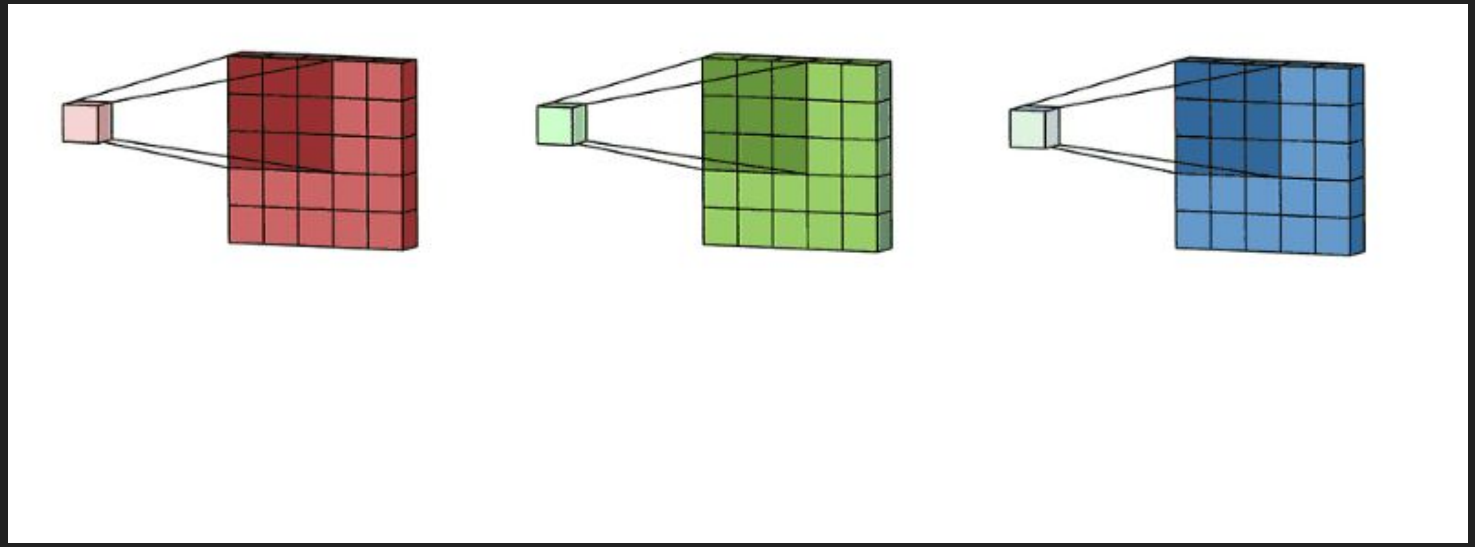
Algoritmos

- Máquina de Vetores de Suporte
- Árvore de decisão
- Regressão Logística
- MLP
- CNN - MiniVGG

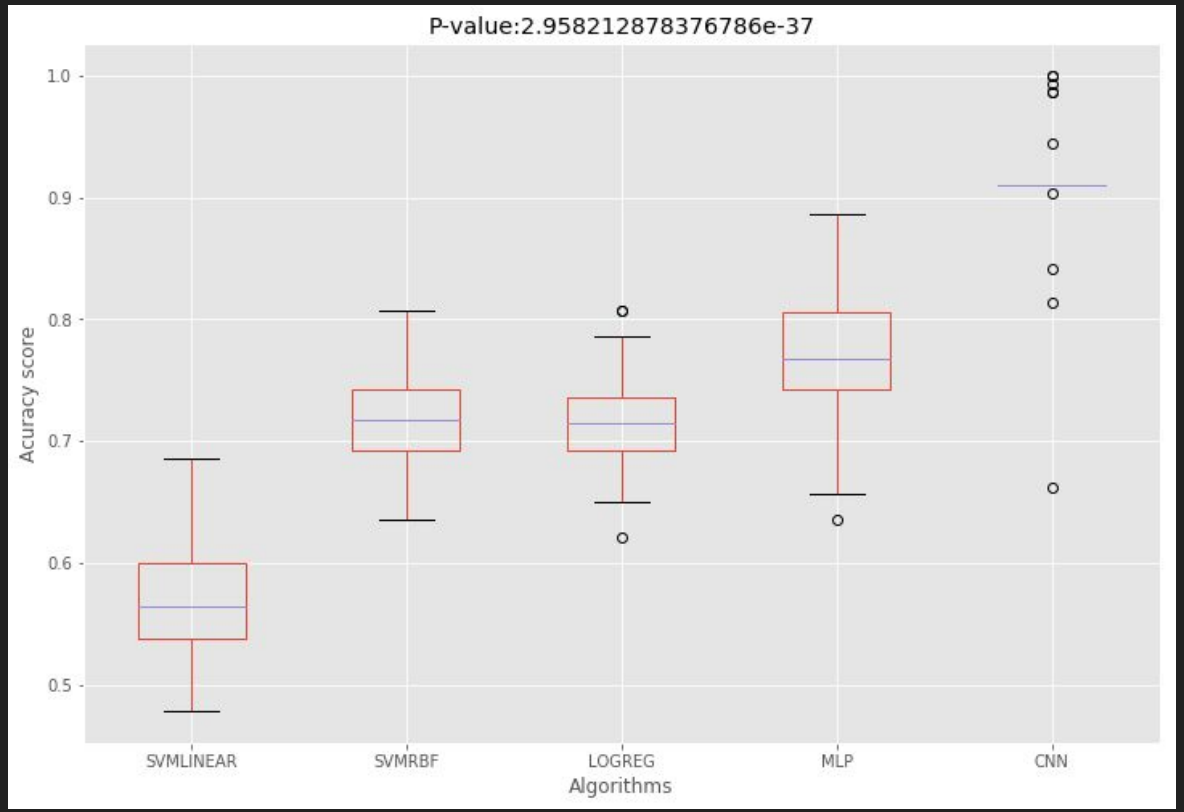
Convolução



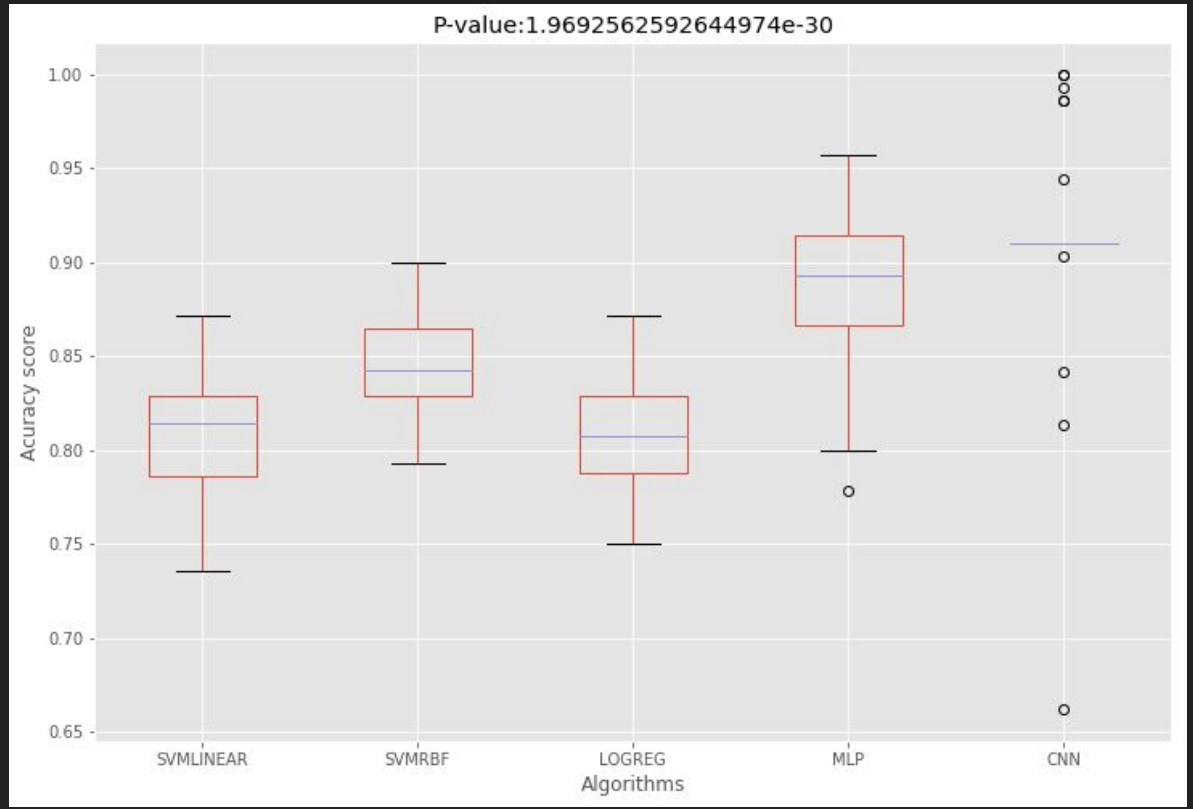
Convolução



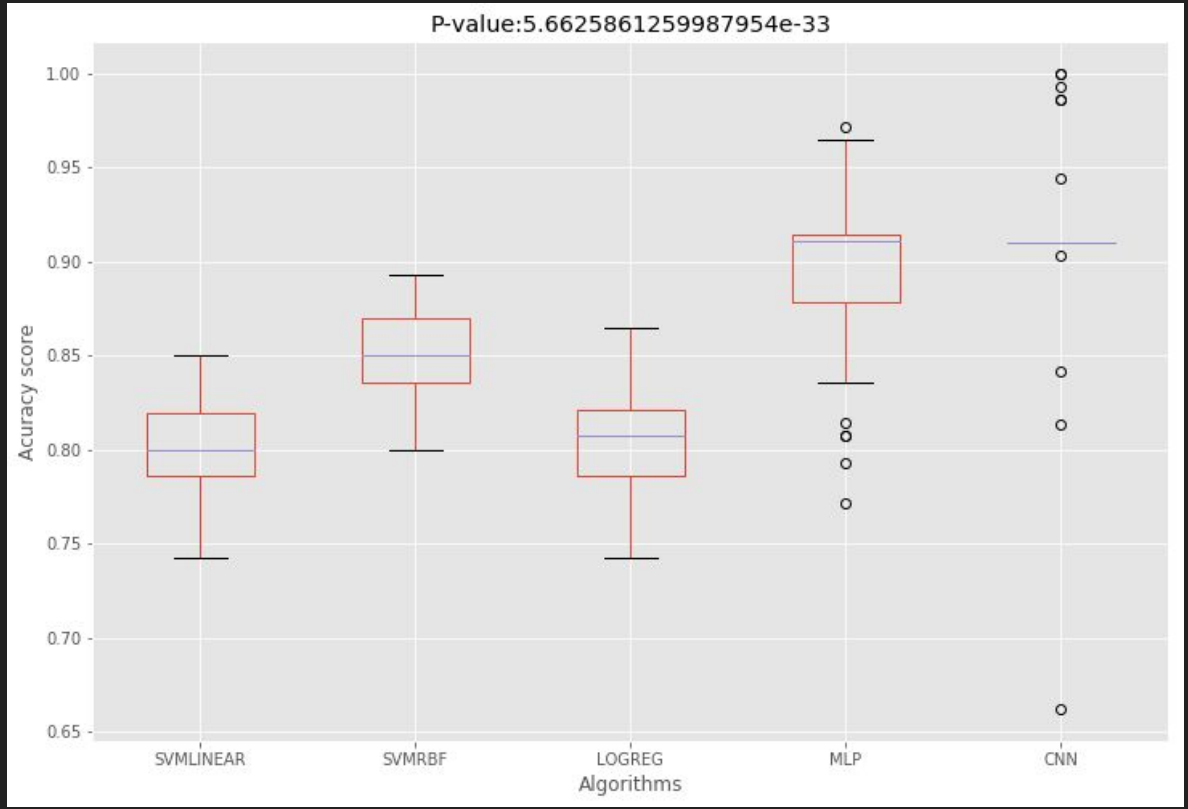
Hu moments


P-value:2.958212878376786e-37
Acuracy score
1.0
0.9
0.8
0.7
0.6
0.5
SVMLINEAR
SVMRBF
LOGREG
MLP
CNN
Algorithms

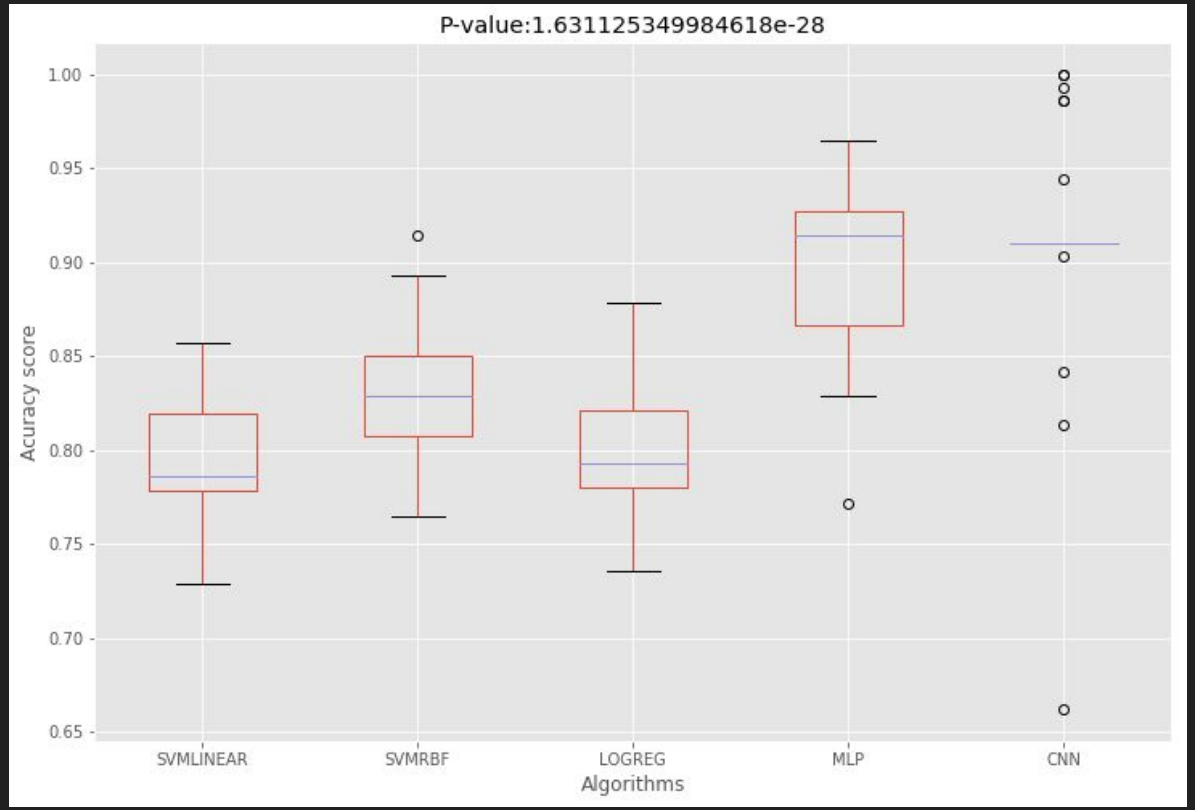
HOG


P-value:1.9692562592644974e-30
Acuracy score
1.00
0.95
0.90
0.85
0.80
0.75
0.70
0.65
SVMLINEAR
SVMRBF
LOGREG
MLP
CNN
Algorithms

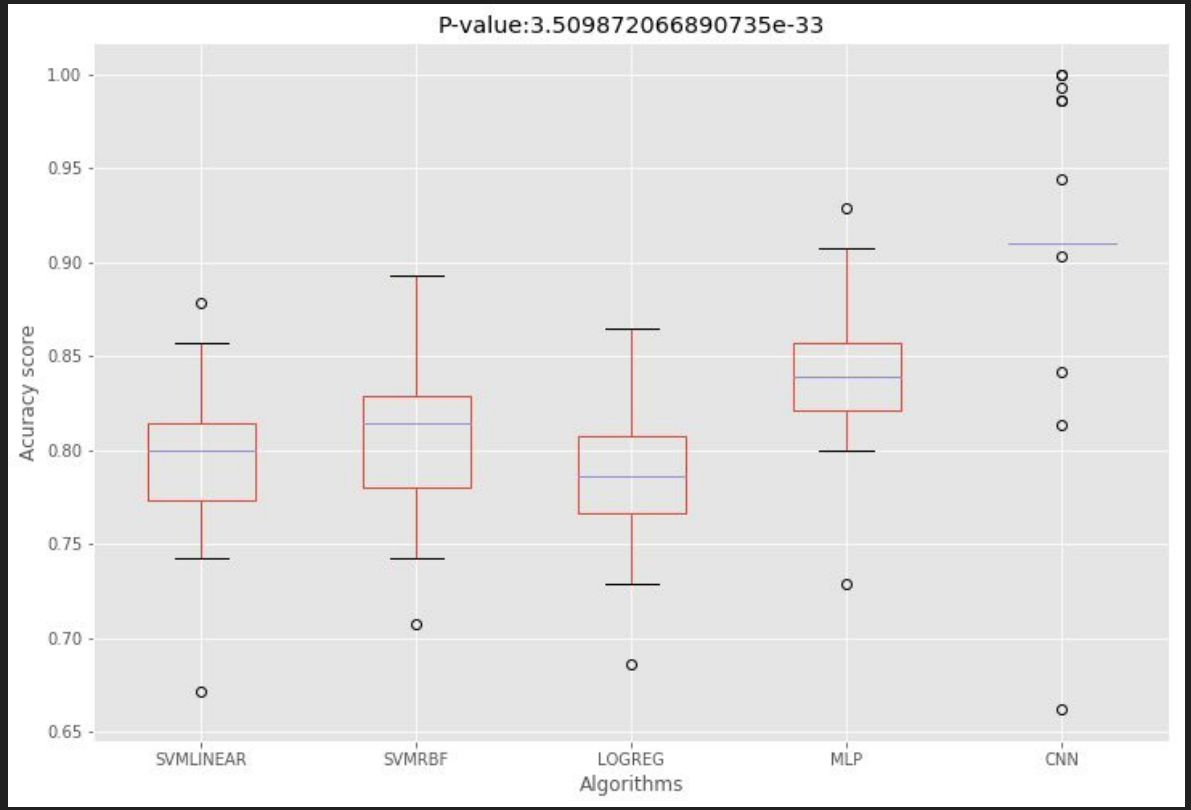
HOG e HU


P-value:5.6625861259987954e-33
1.00
0.95
0.90
0.85
0.80
0.75
0.70
0.65
Acuracy score
SVMLINEAR
SVMRBF
LOGREG
MLP
CNN
Algorithms

HOG e LBP


P-value:1.631125349984618e-28
Acuracy score
1.00
0.95
0.90
0.85
0.80
0.75
0.70
0.65
SVMLINEAR
SVMRBF
LOGREG
MLP
CNN
Algorithms

LBP


P-value:3.509872066890735e-33
Acuracy score
1.00
0.95
0.90
0.85
0.80
0.75
0.70
0.65
SVMLINEAR
SVMRBF
LOGREG
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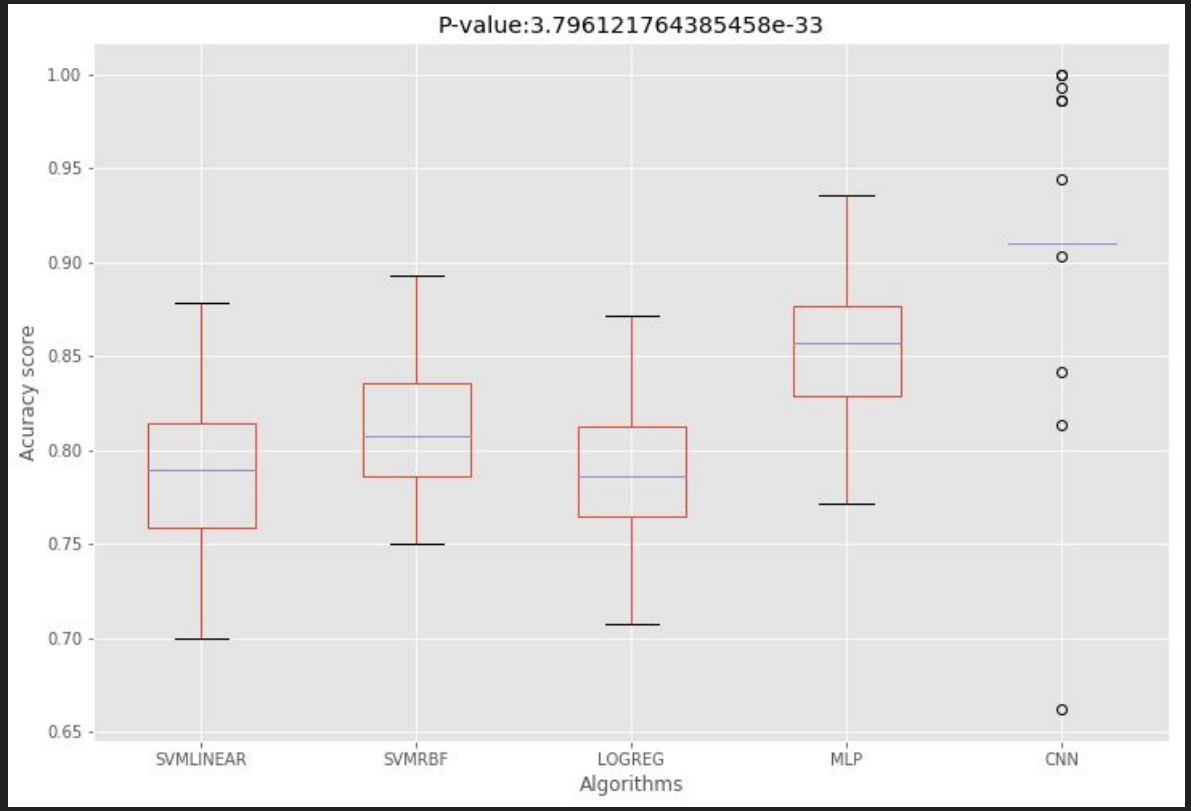
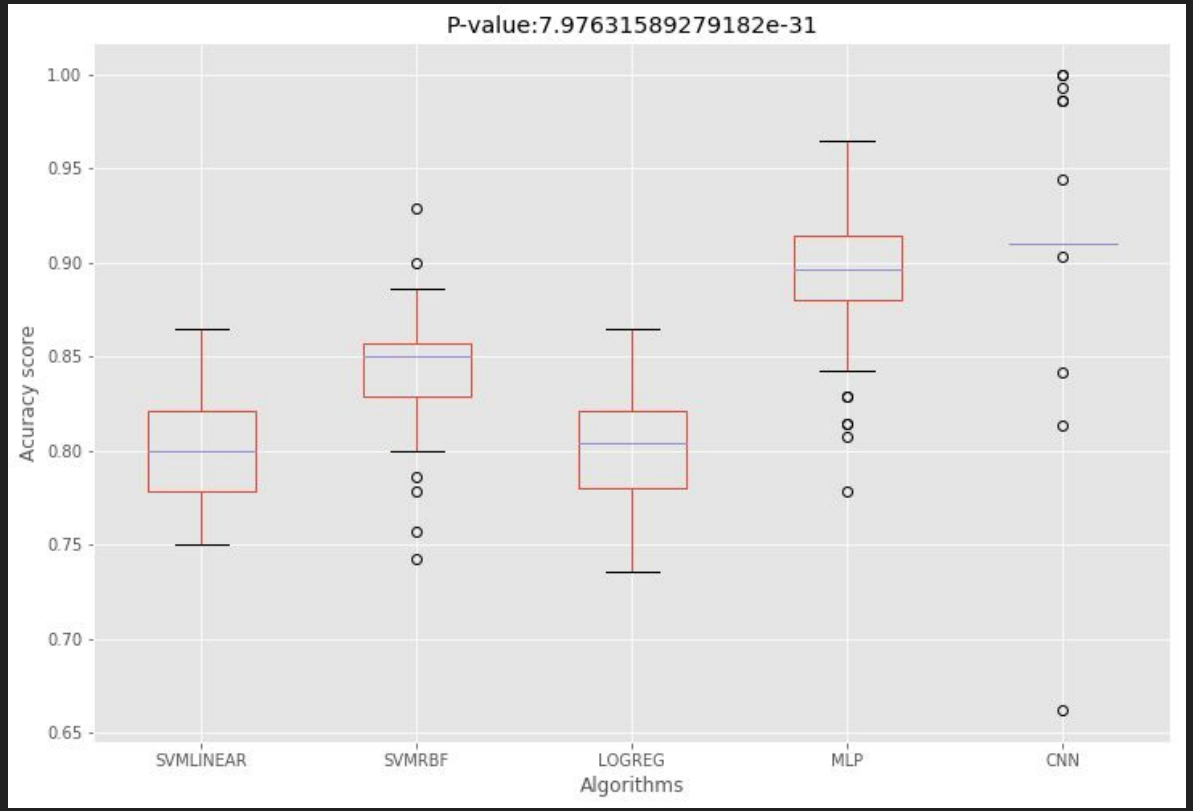
Algorithms

LBP e HU


P-value:3.796121764385458e-33
Acuracy score
1.00
0.95
0.90
0.85
0.80
0.75
0.70
0.65
SVMLINEAR
SVMRBF
LOGREG
MLP
CNN
Algorithms

HOG, LBP e HU


P-value:7.97631589279182e-31
Acuracy score
1.00
0.95
0.90
0.85
0.80
0.75
0.70
0.65
SVMLINEAR
SVMRBF
LOGREG
MLP
CNN
Algorithms

Conclusão

- Melhores resultados na abordagem clássica com a MLP e o descritores HOG e LBP
- CNN com melhores resultados.