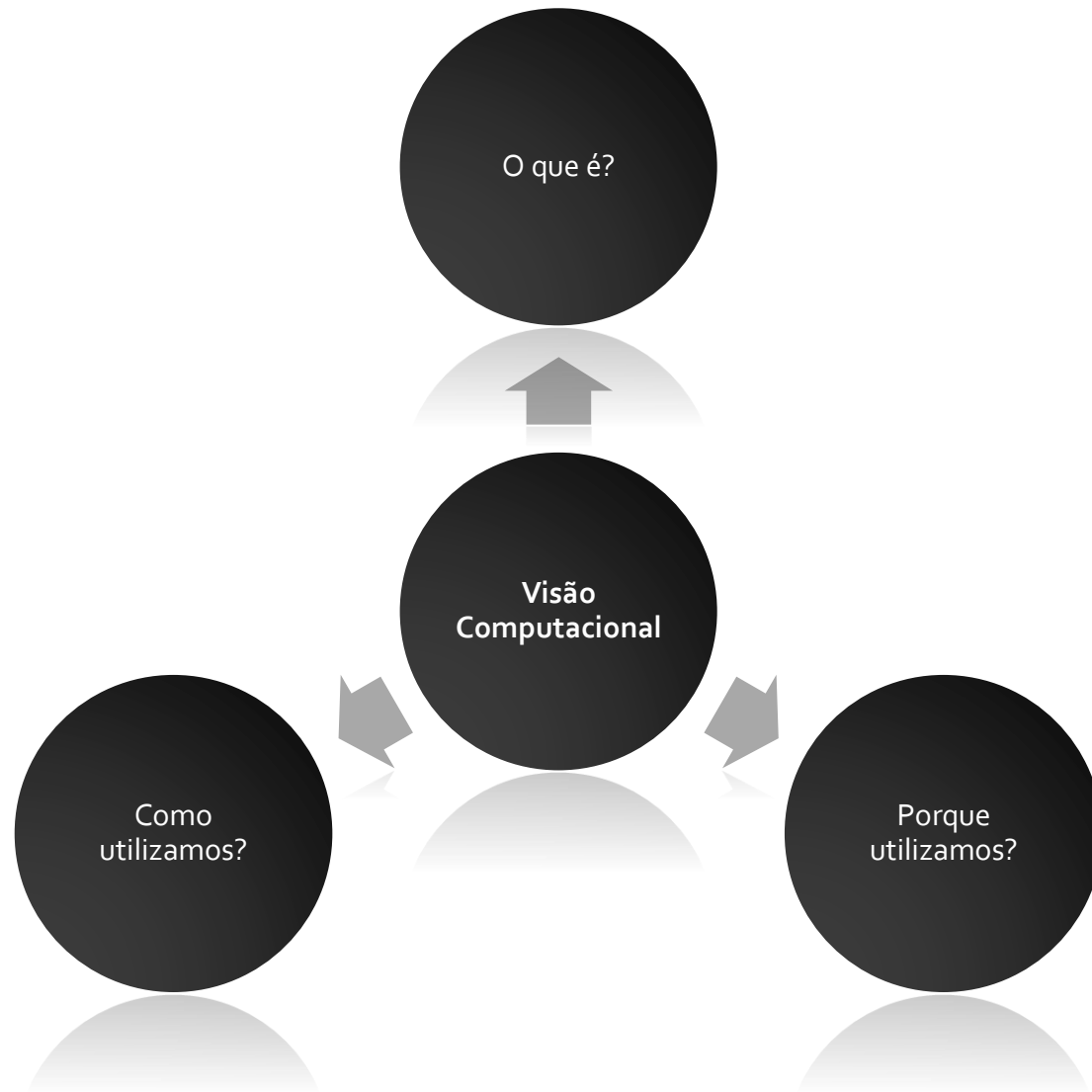


Aplicação de PDI e Machine Learning em Sistemas Embarcados

David S. Medeiros

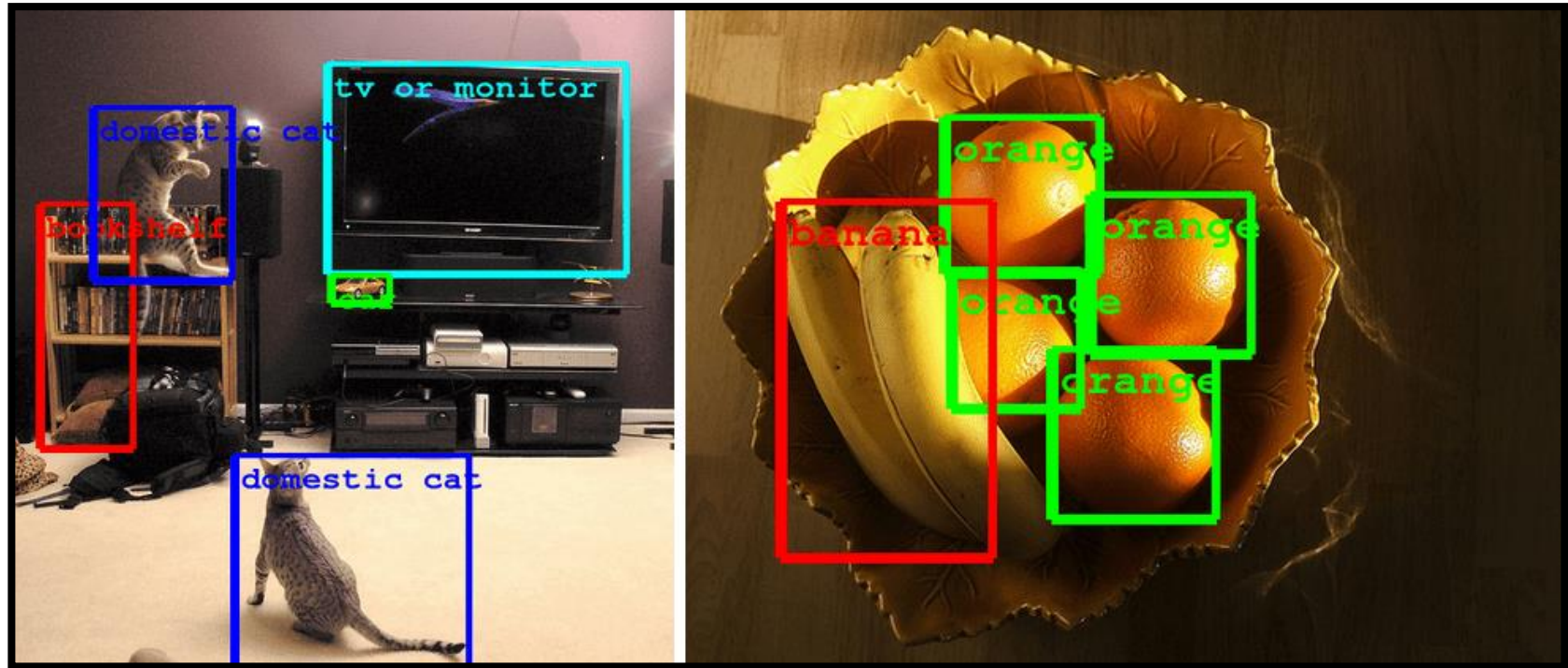
Visão Computacional



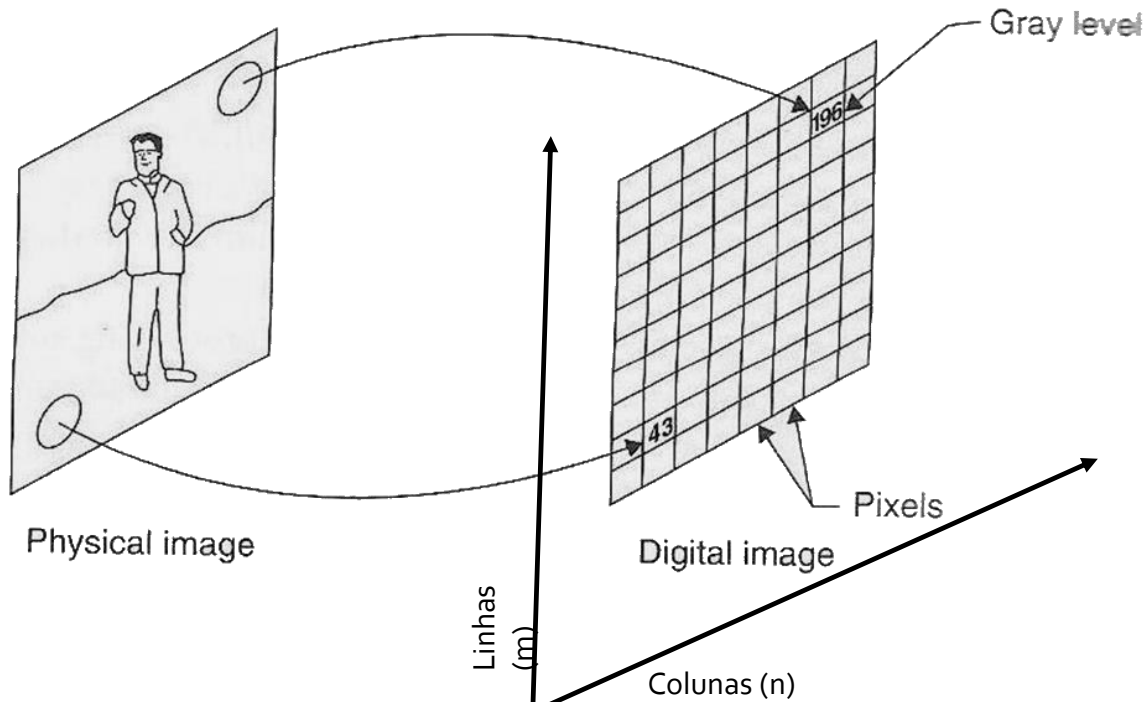
Visão Computacional



A visão computacional é o processo de modelagem e replicação da visão humana usando software e hardware.

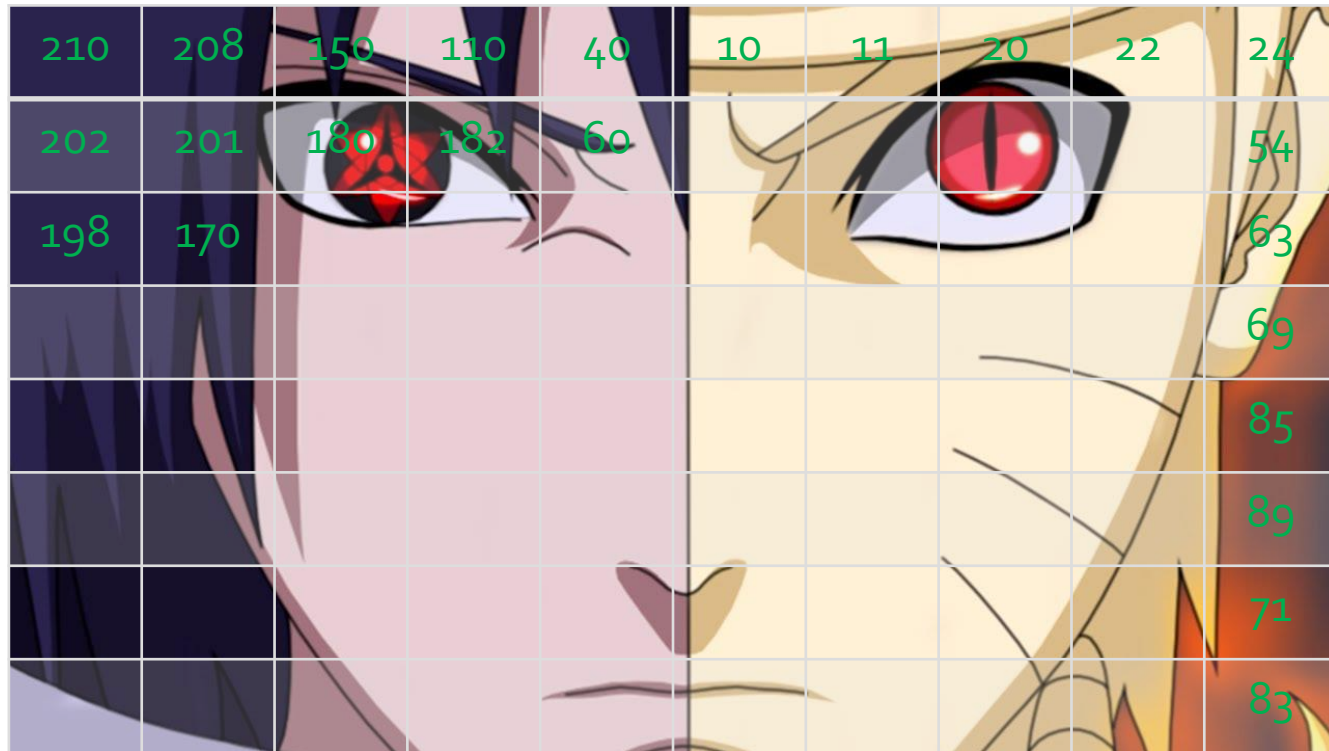


Processamento de Imagem



Processamento de Imagem

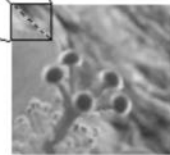
Imagem digital



Processamento de Imagem

Imagem digital

168	153	131	109	94
174	163	148	131	114
177	169	159	150	138
181	175	167	164	159
187	179	171	171	172
194	185	177	175	176
202	194	184	179	178
209	202	191	182	179
212	207	198	189	183
212	212	207	199	192
211	212	212	209	204
204	206	210	210	208



Preto: valores baixos (0)

Cinza: valores intermediários

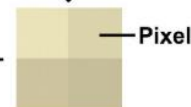
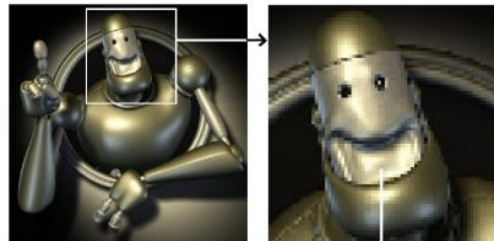
Branco: valores altos (255)



0



255



Pixel

Aprendizagem de Máquina

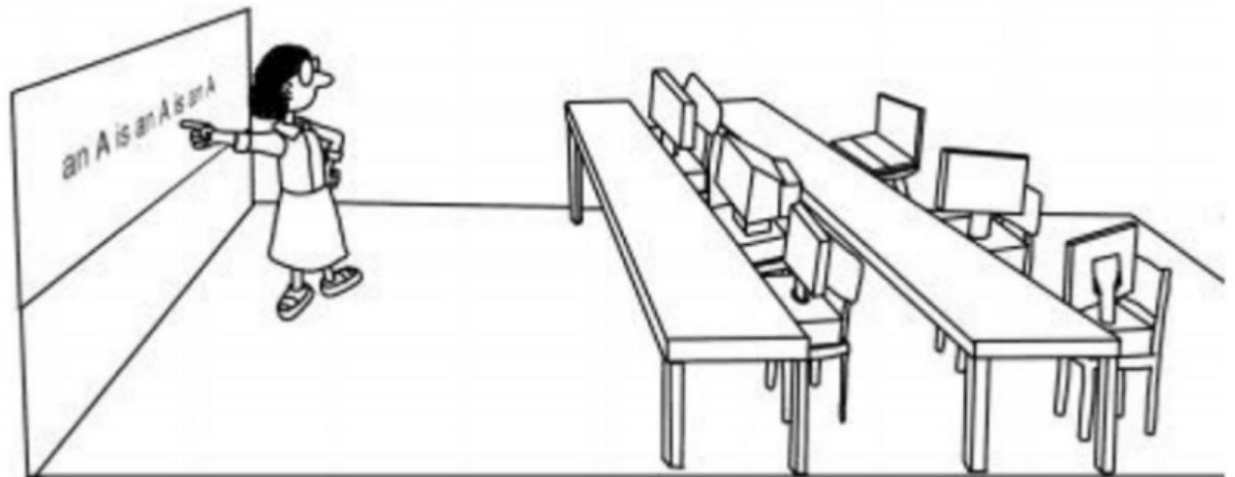
Extração de
característica



Treinamento

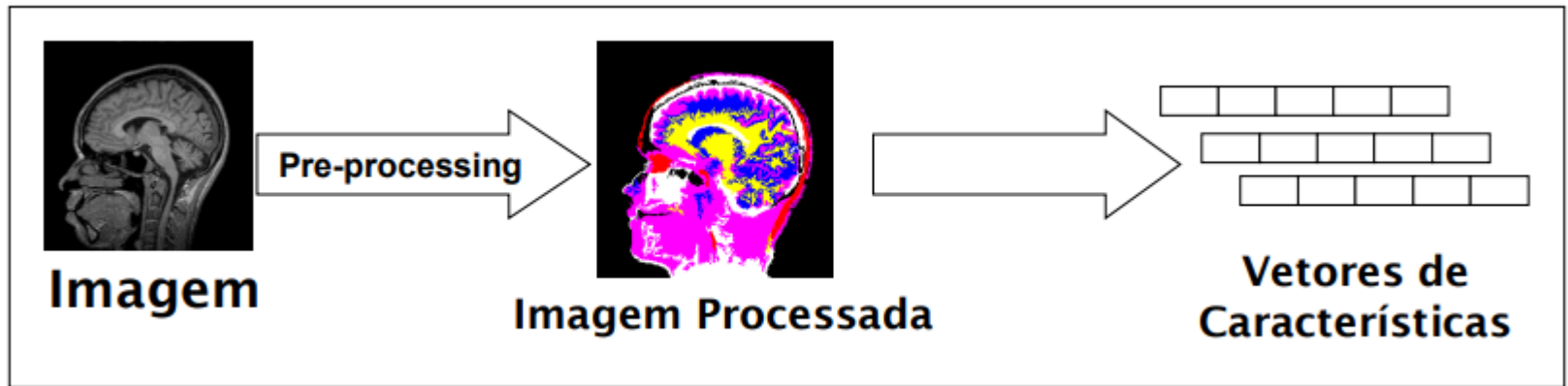


Classificação



Aprendizagem de Máquina

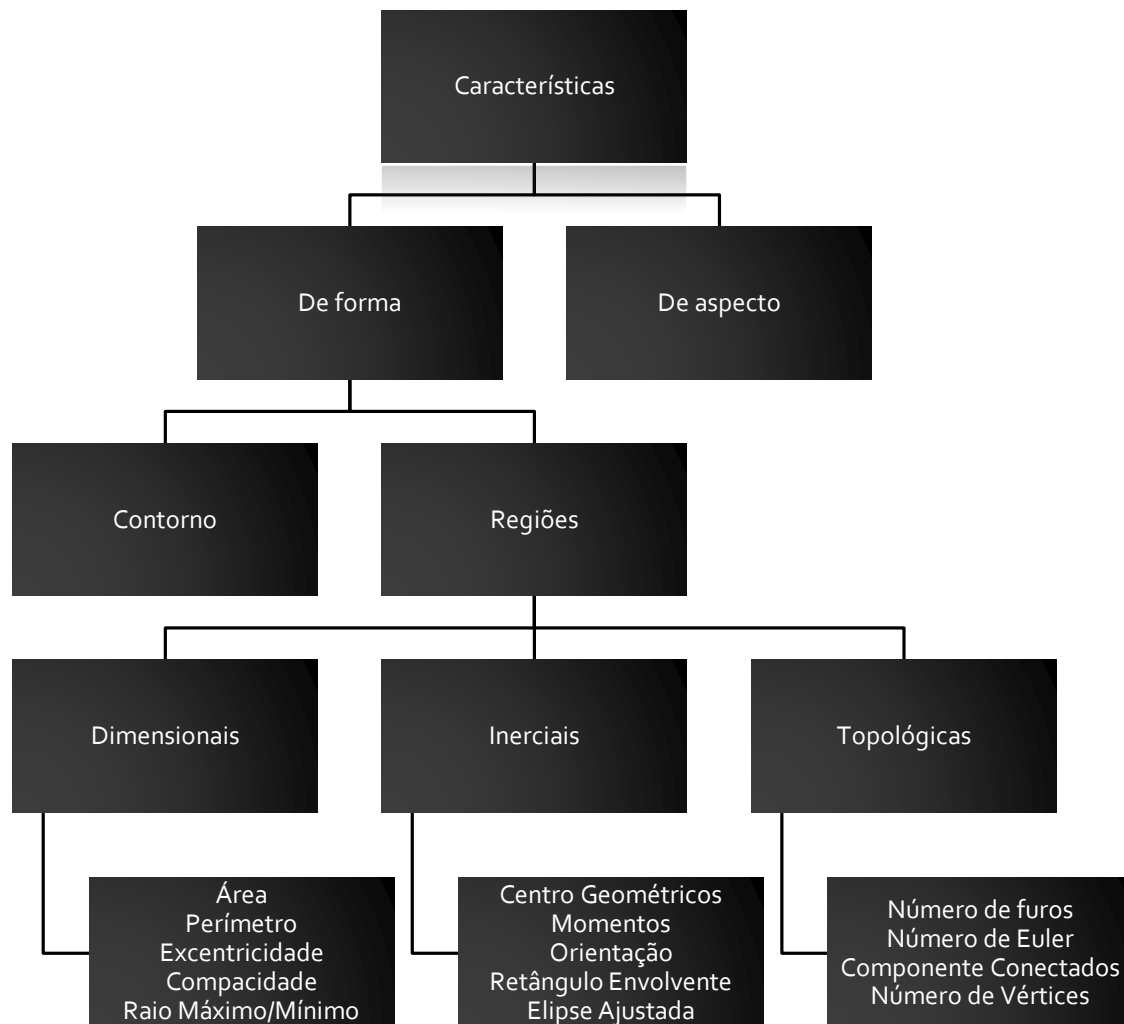
Extração de Características



Método para computar valores a partir dos pixels da imagem, sem preocupação com detecção falsa ou falhas na detecção

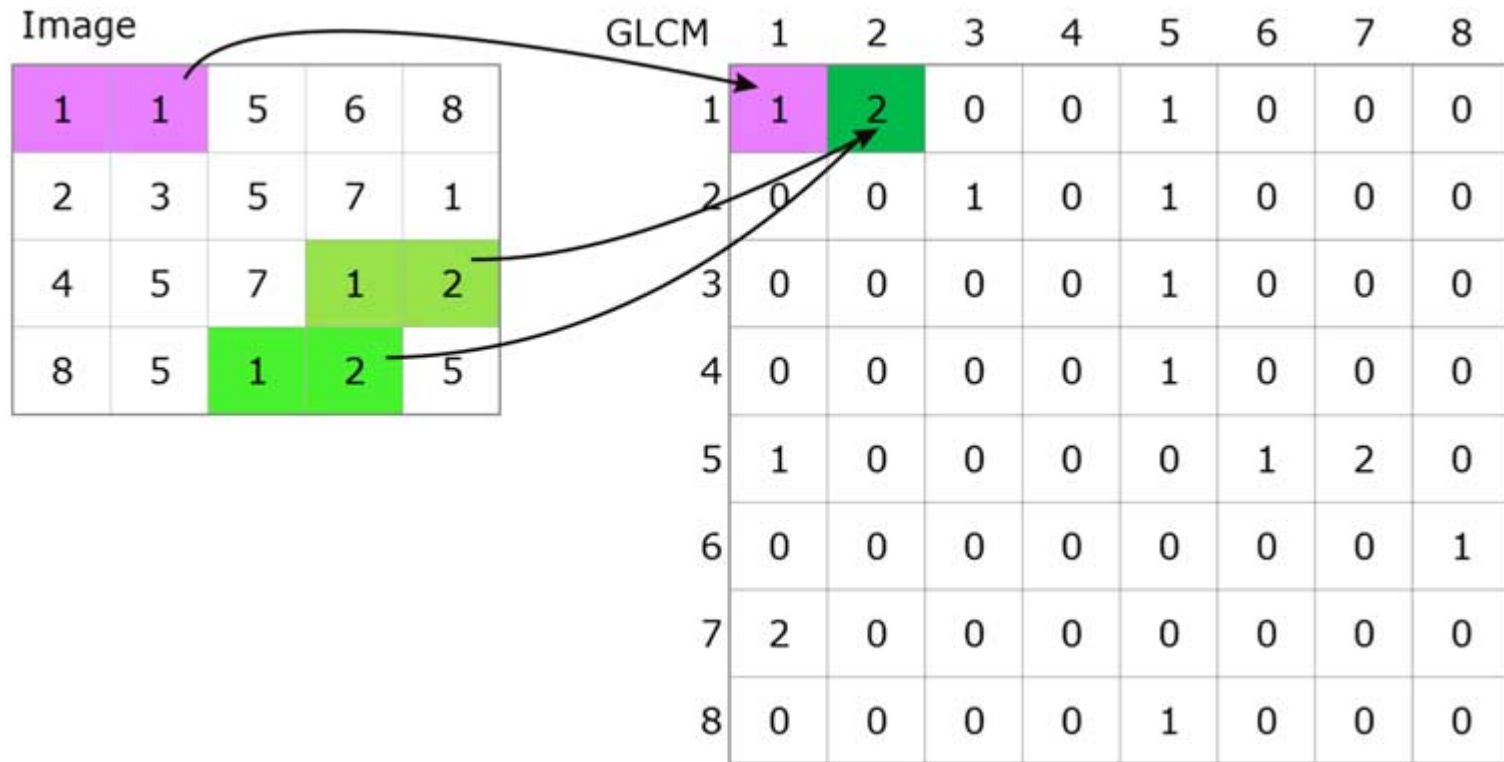
Aprendizagem de Máquina

Extração de Características



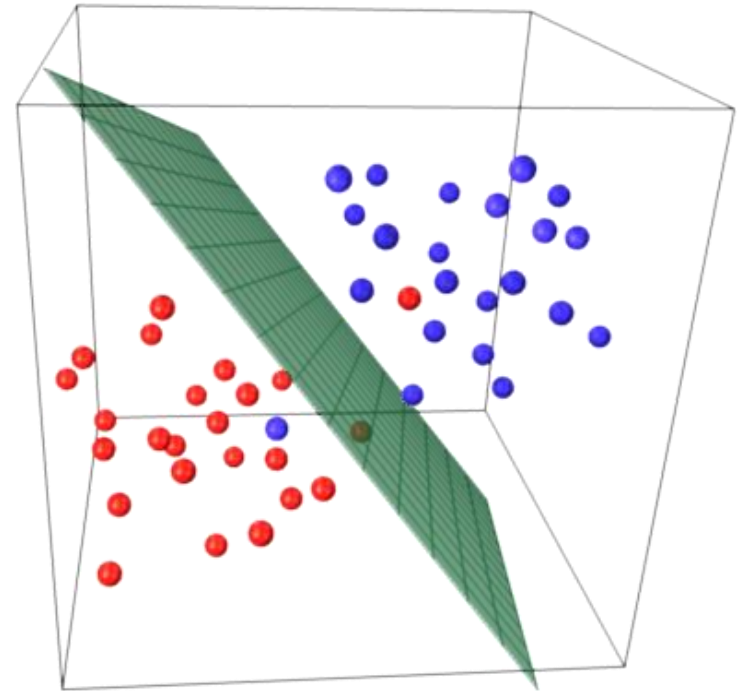
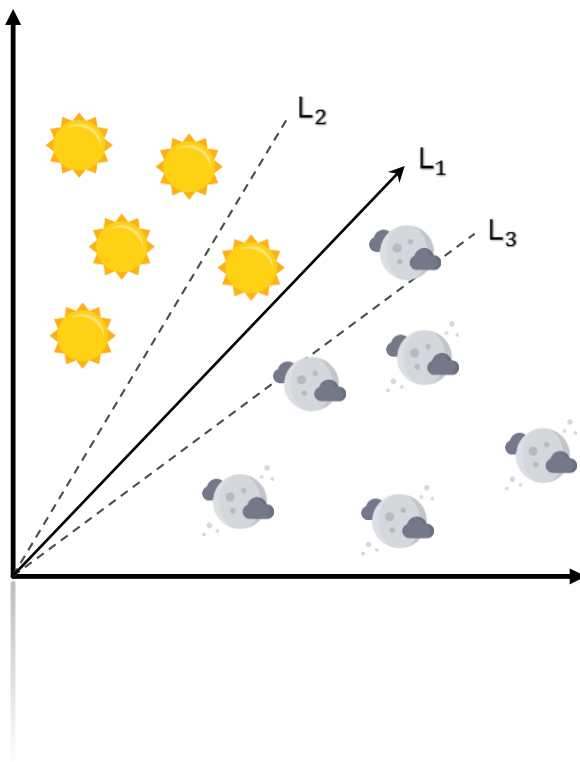
Extração de características

Grey Level Co-occurrence Matrix - GLCM



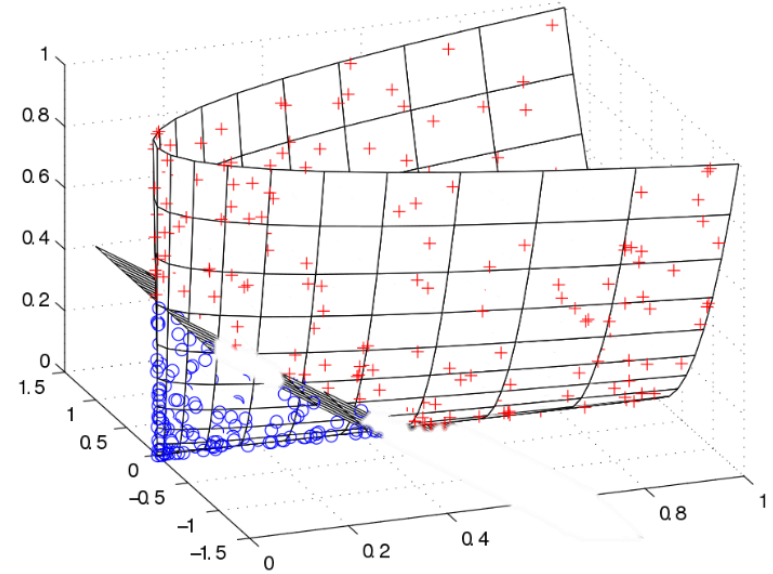
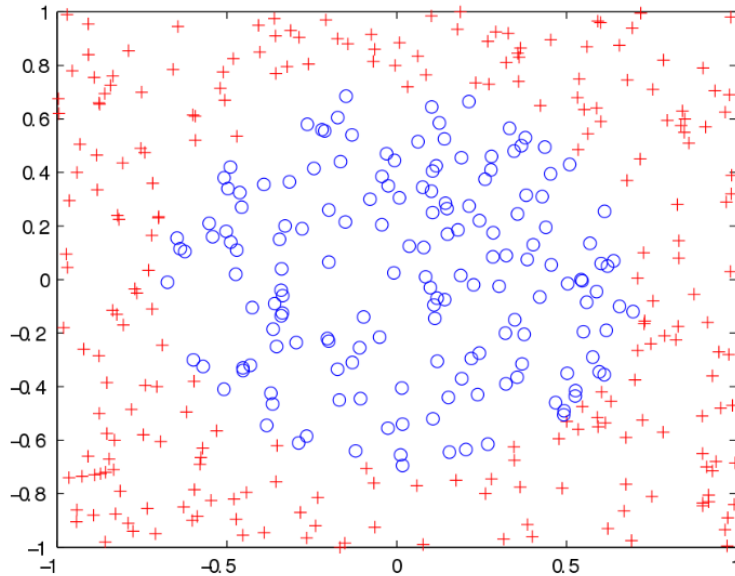
Aprendizagem de Máquina

Classificador – SVM (Máquina de vetores de suporte)

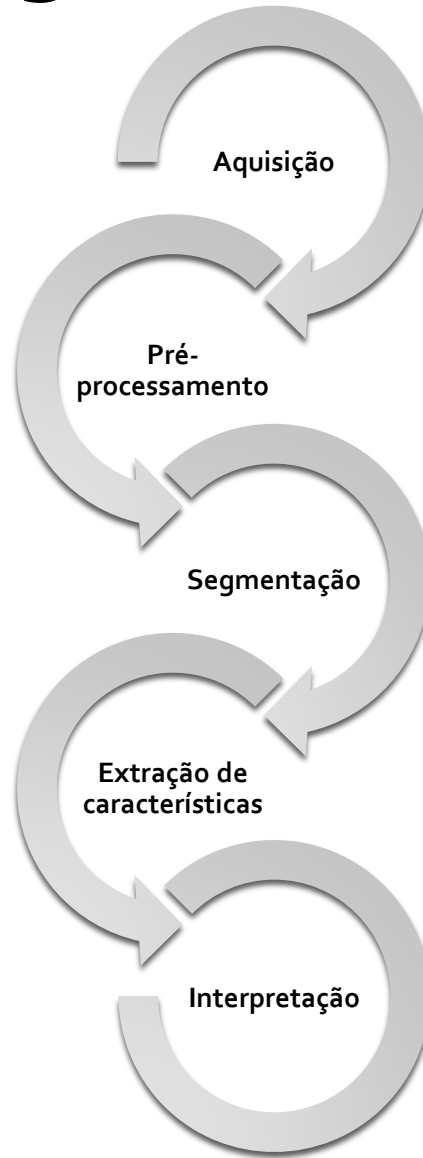


Aprendizagem de Máquina

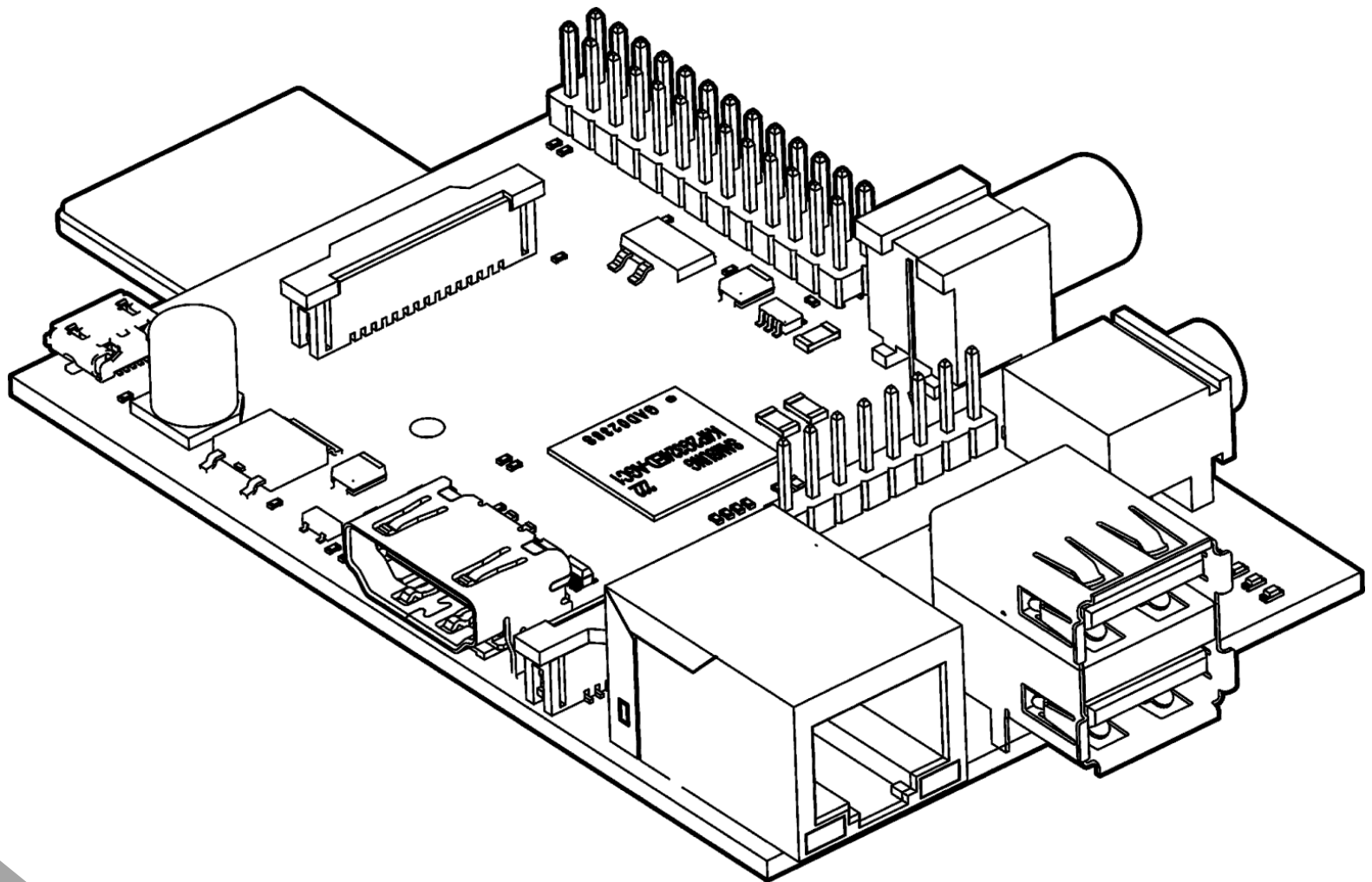
Classificador – SVM (Máquina de vetores de suporte)



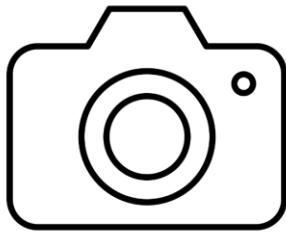
Aprendizagem de Máquina



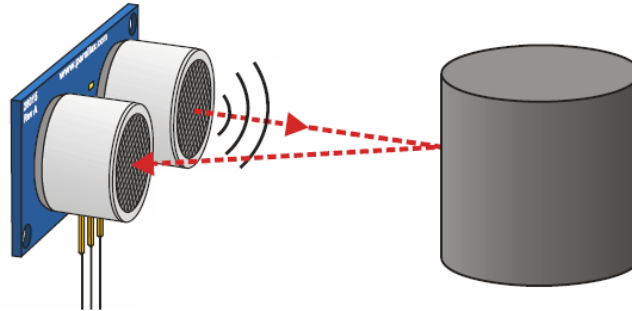
Sistema Embarcado



Obtendo informações do meio

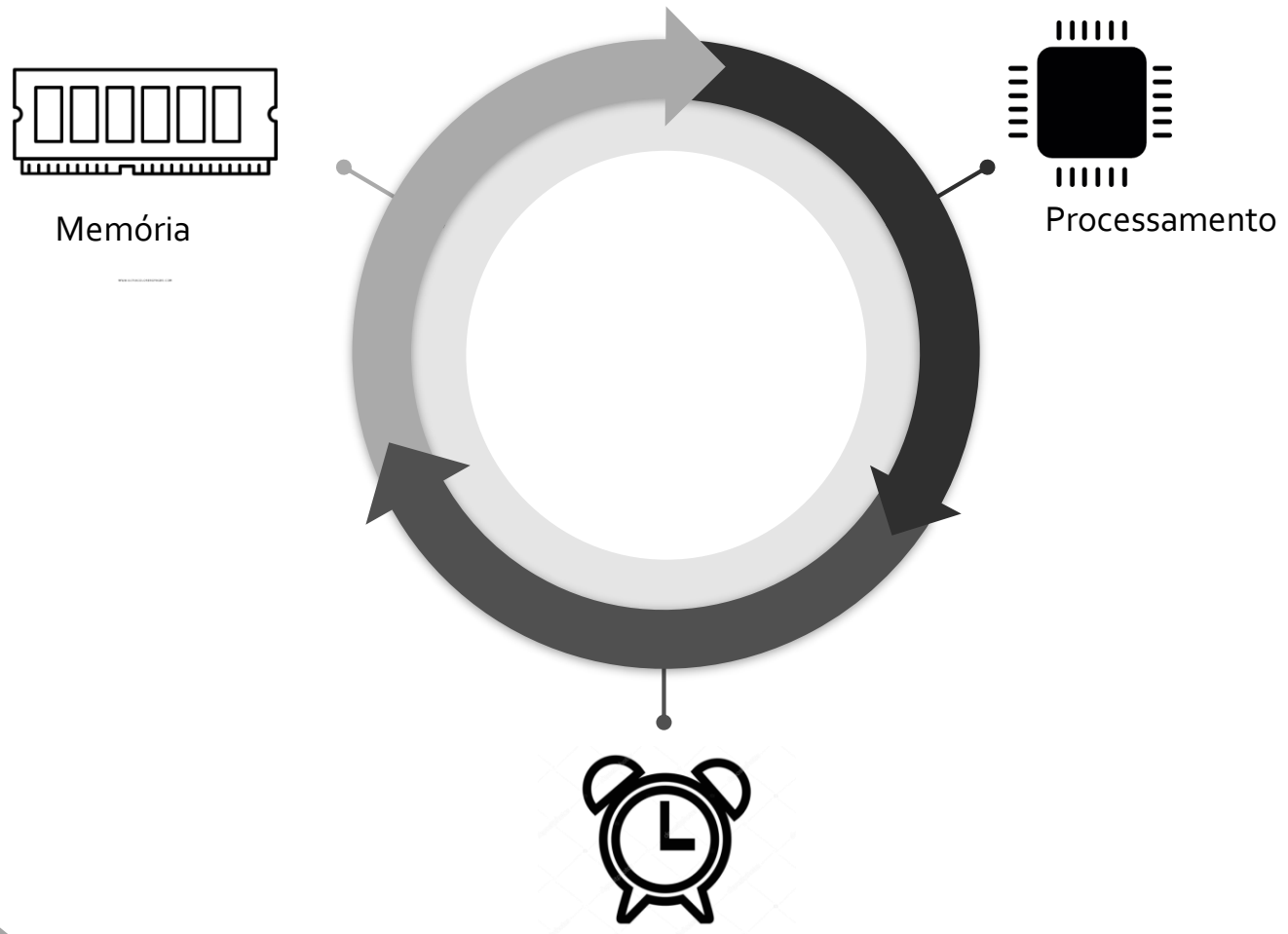


Imagens

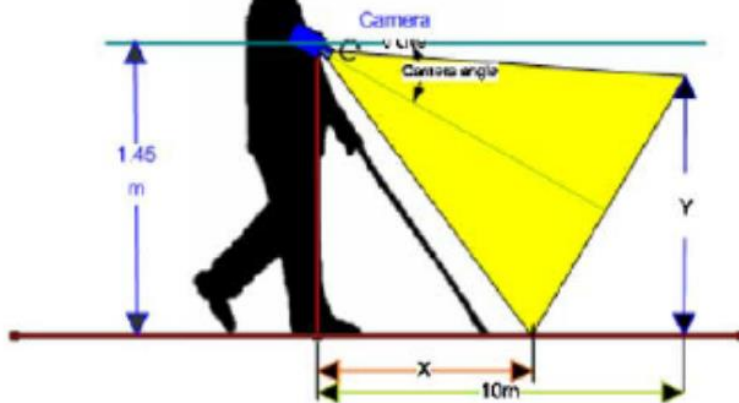


Outros Sensores

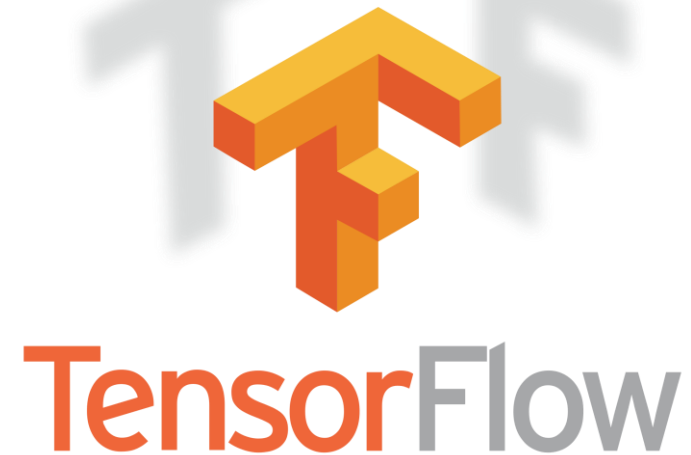
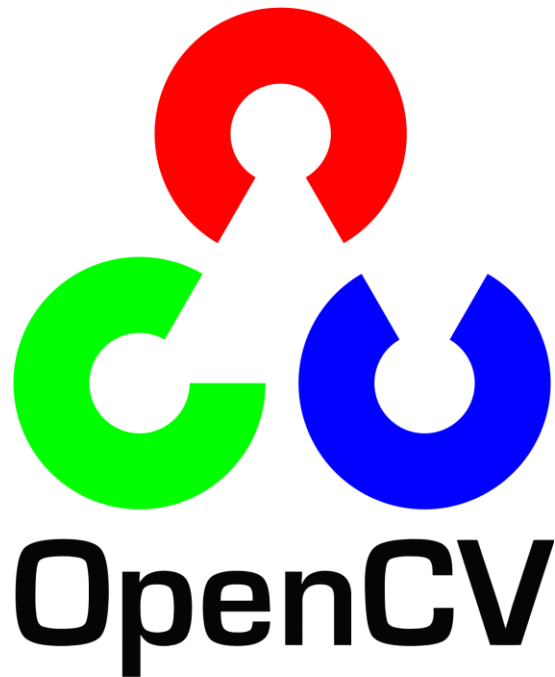
Embarcando o algoritmo de Machine Learning



Exemplos de aplicações



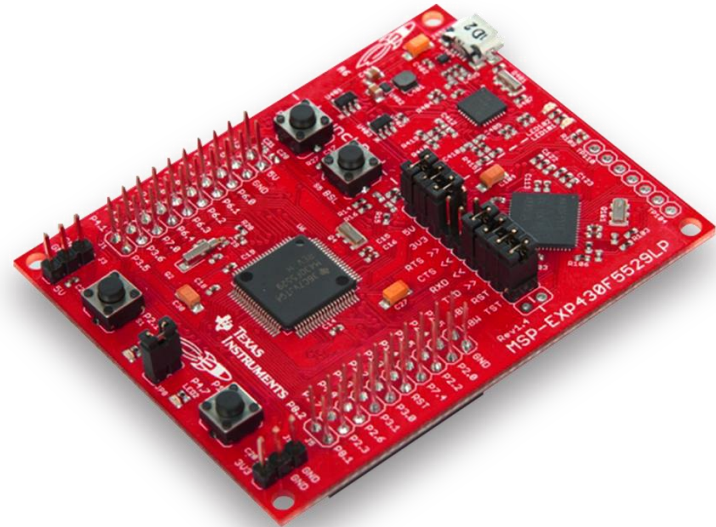
Alguns Frameworks



Algumas plataformas



Raspberry Pi



Tiva-C

Perguntas?





Obrigado!