



SCC0276 - APRENDIZADO DE MÁQUINA

Projeto final

Classificação dos tipos de uso de máscara

Introdução

No contexto global pós COVID-19, se tornou necessário fiscalizar o uso correto de máscaras.



A base de dados: MaskedFace-Net

USO CORRETO



Mask



Mask_chin



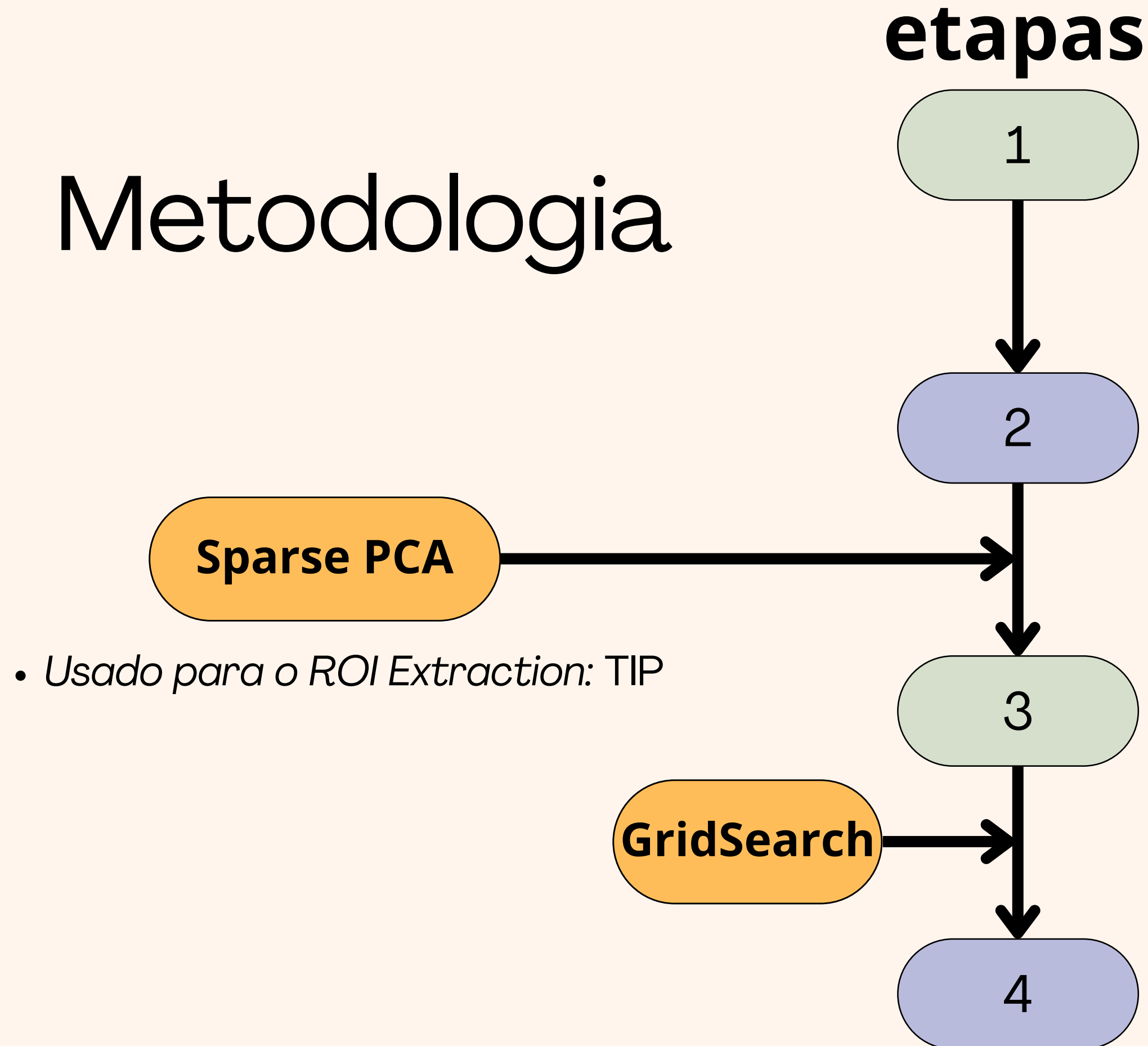
Mask_nose_mouth



Mask_mouth_chin

USO INCORRETO

Metodologia



Análise exploratória dos dados:

- Proporção entre as classes;
- *Hot encoding*

Pré-processamento:

- *ROI Extraction*: TIP;
- *Image Descriptor*: HOG.

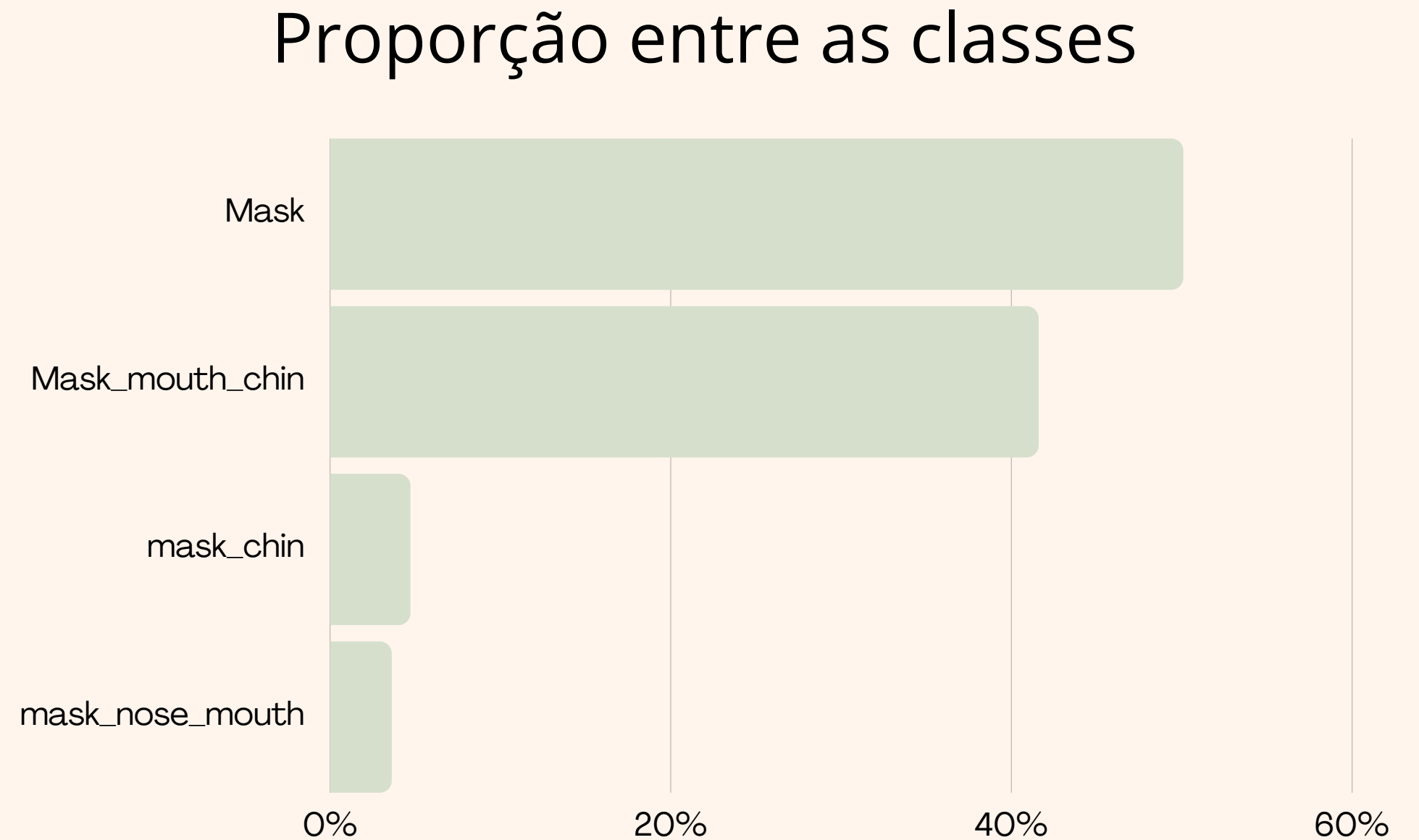
Modelos de classificação:

- KNN;
- SVM;
- Rede neural MLP.

Comparação com *benchmarks*

- Superação do artigo;
- Problemáticas.

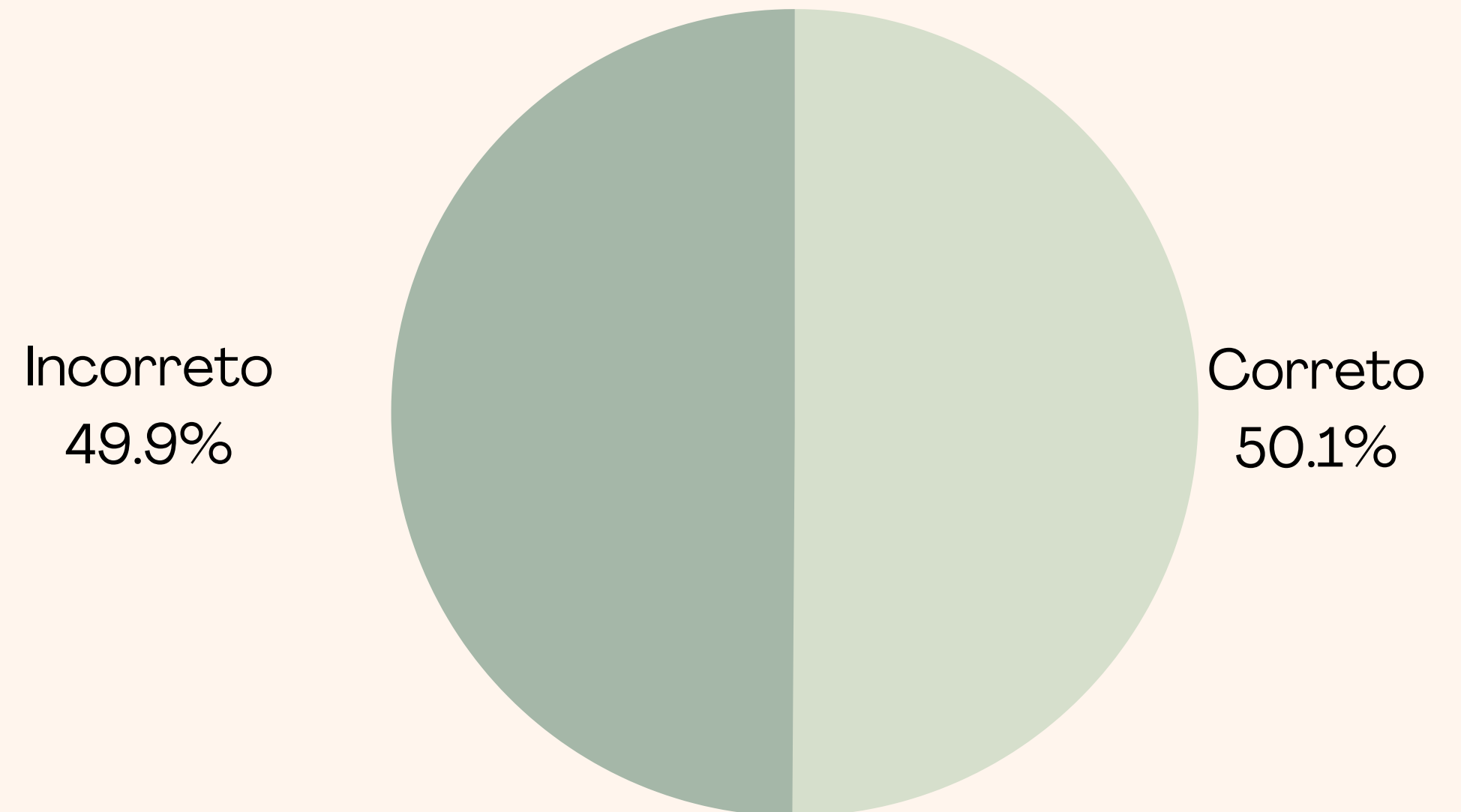
Análise Exploratória



Hot encoding utilizado

Tipo de uso	Correto
Mask	1
Mask_chin	0
Mask_mouth_chin	0
Mask_nose_mouth	0

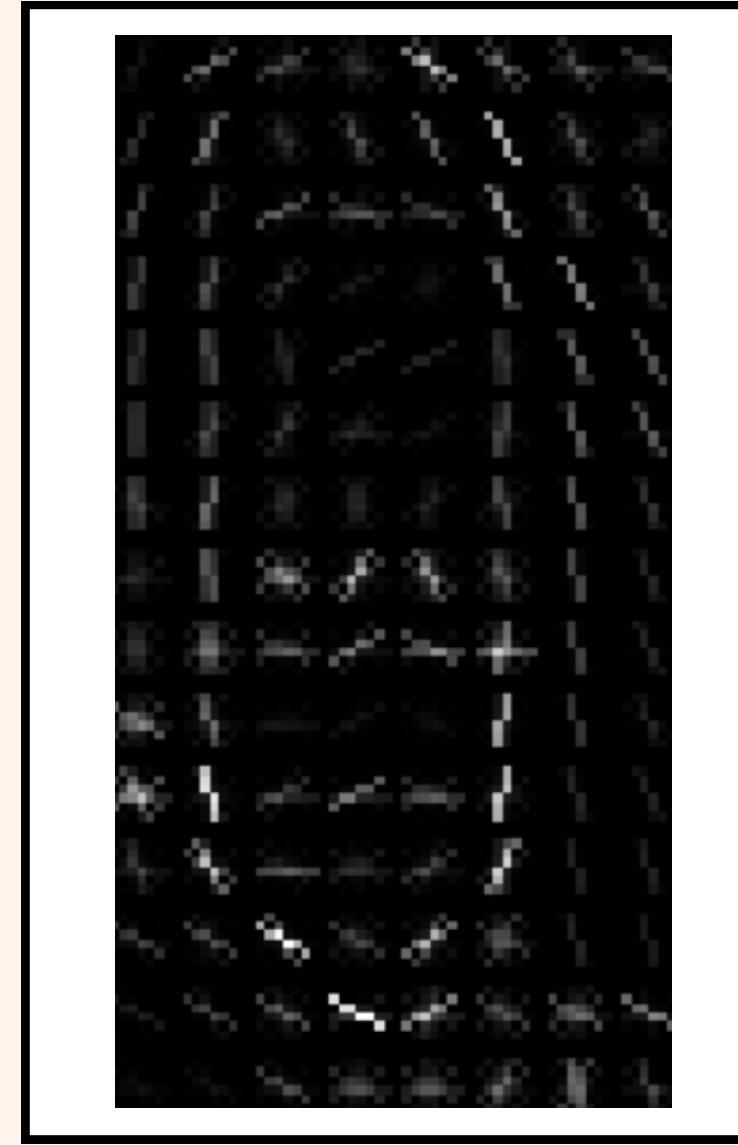
Nova proporção entre as classes





Topological Image Processing (TIP)

Método utilizado como extrator de regiões de interesse.

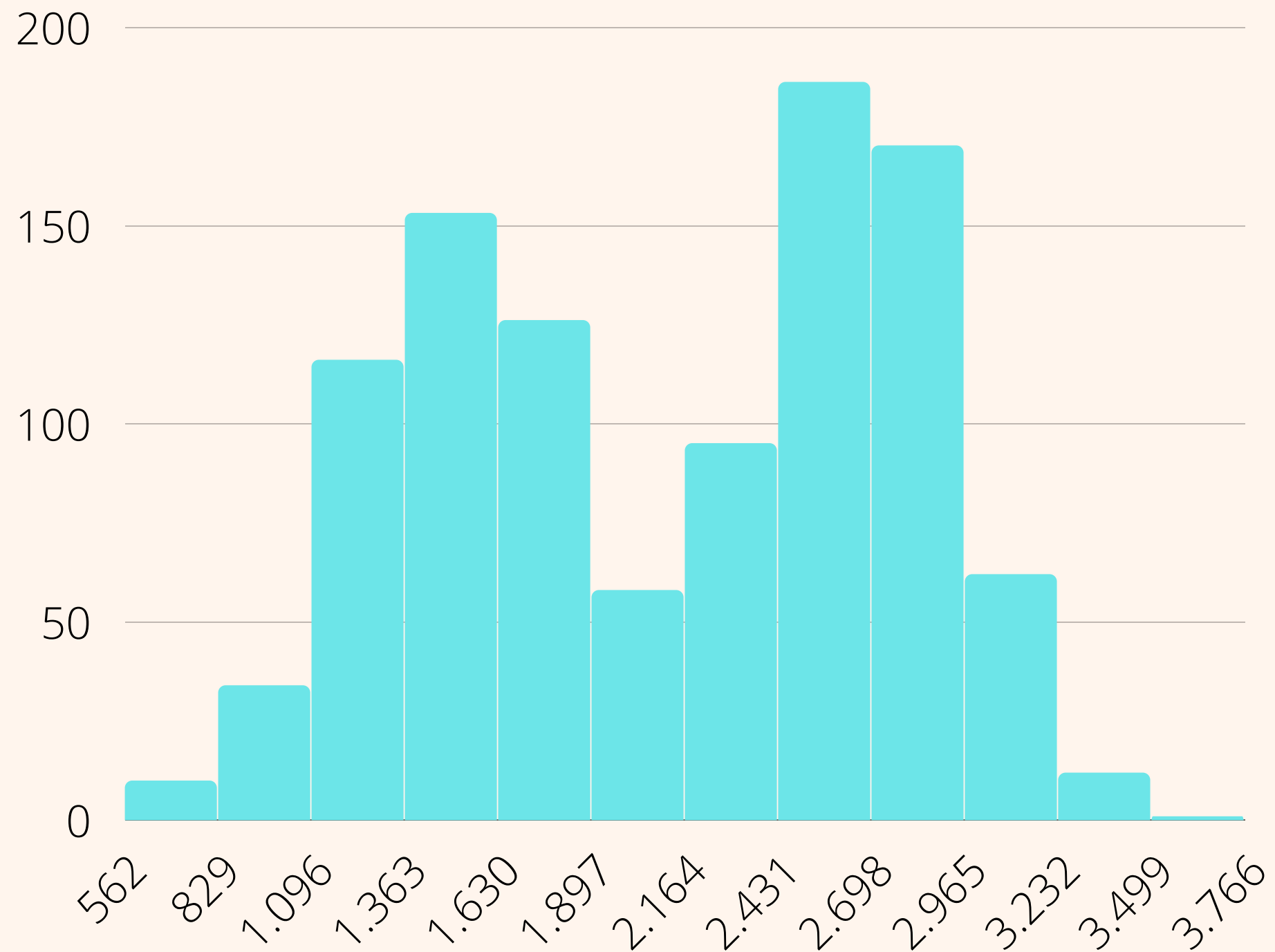


Histogram of oriented gradients (HOG)

Método utilizado como descritor dos contornos das imagens

Sparsity of Data

Distribuição do valor de entradas não nulas das features hog

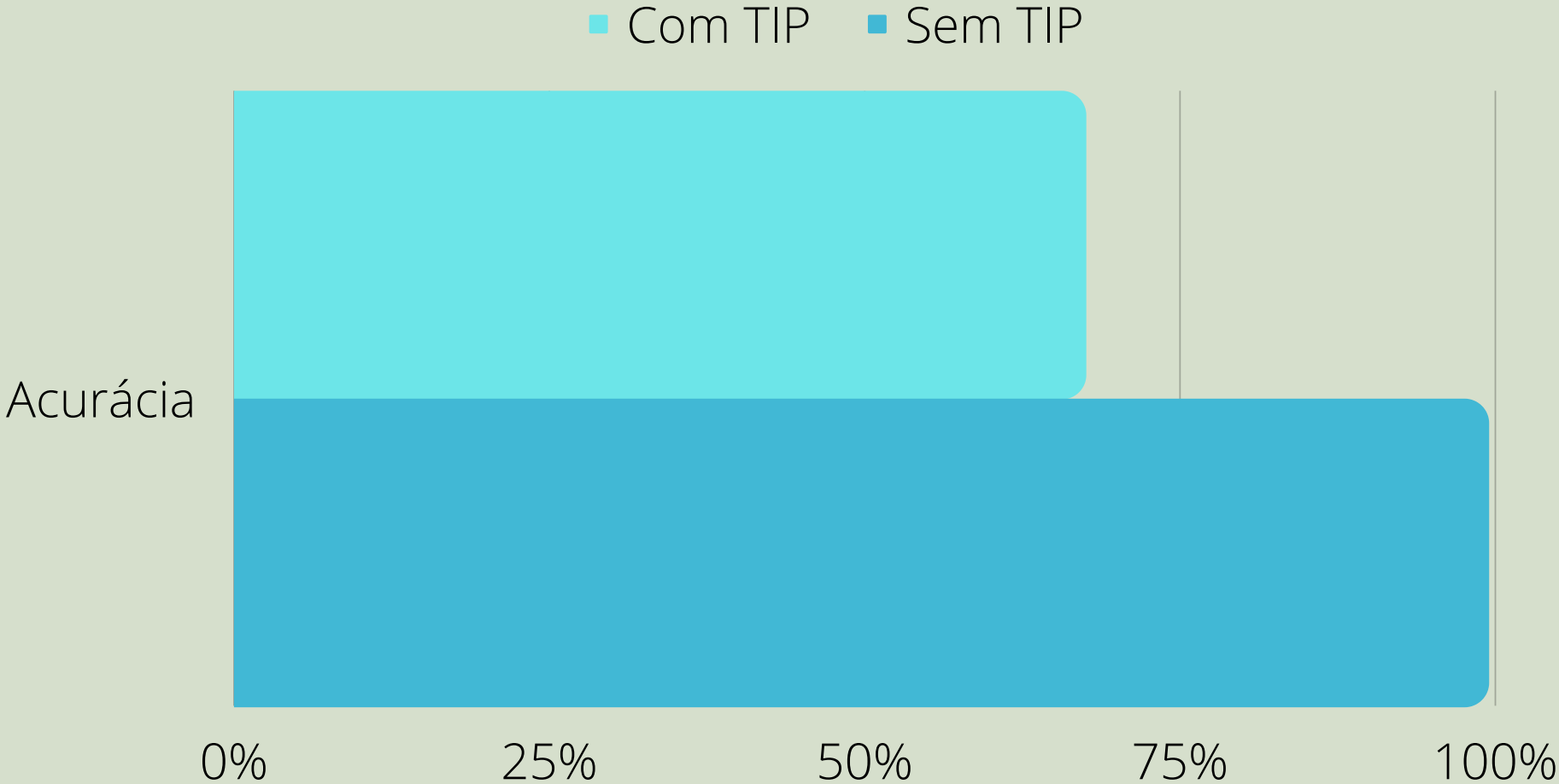


• Média:
2139

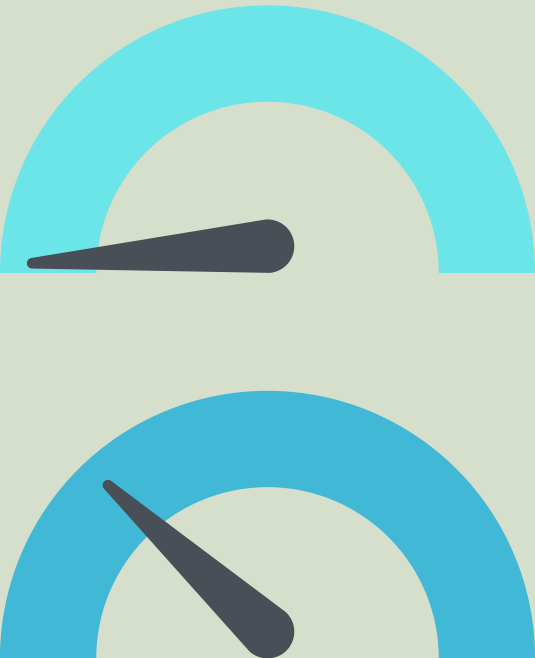
KNN

(K-Nearest Neighbors)

	Com TIP	Sem TIP
Parametros	n_neighbors: 11, weights: uniform	Nº neighbors: 7 weights: uniform
Acurácia	0.675	0.957
ROC AUC	0.675	0.957
Tempo (min)	0.33	15.58



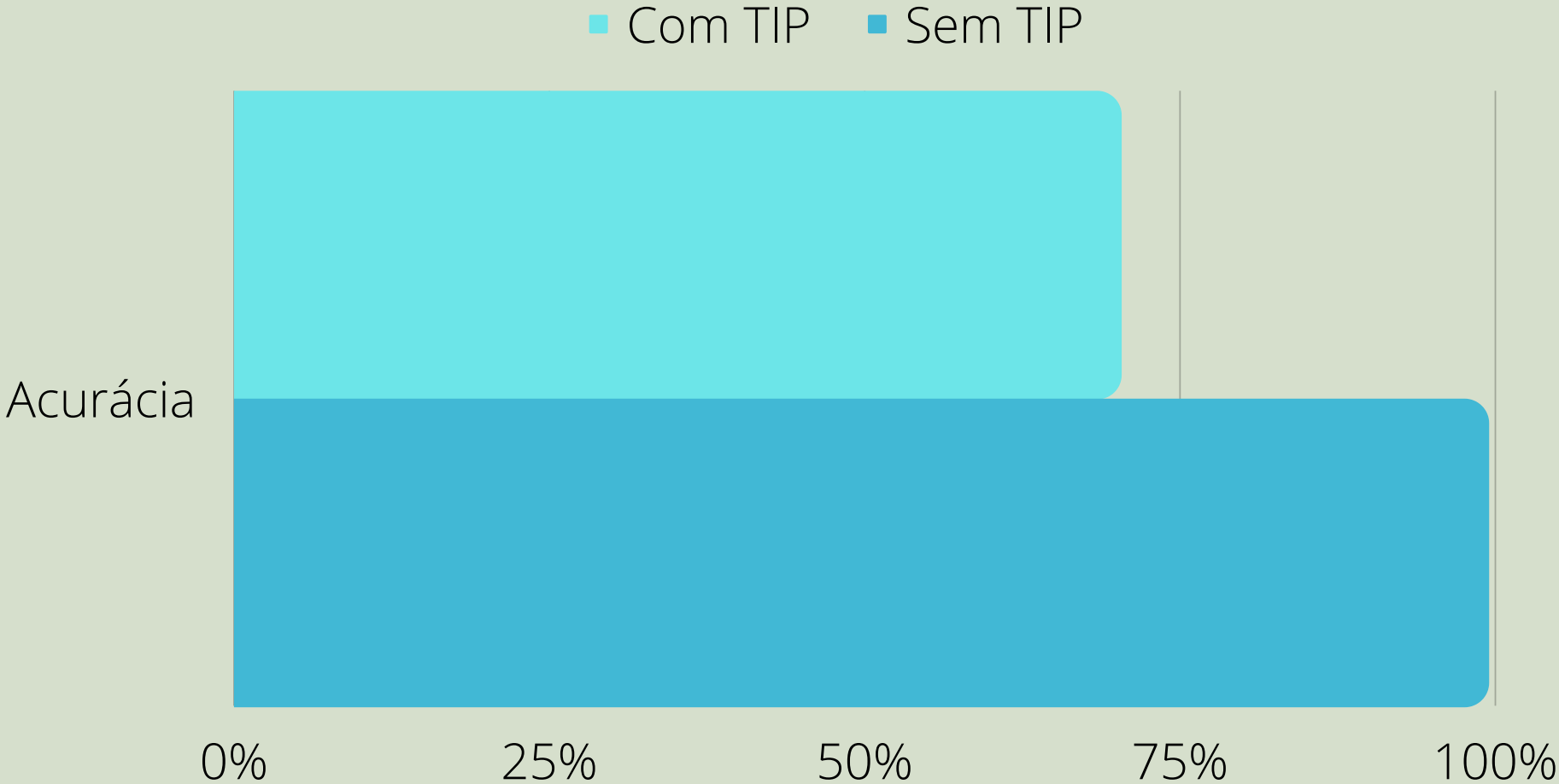
Tempo



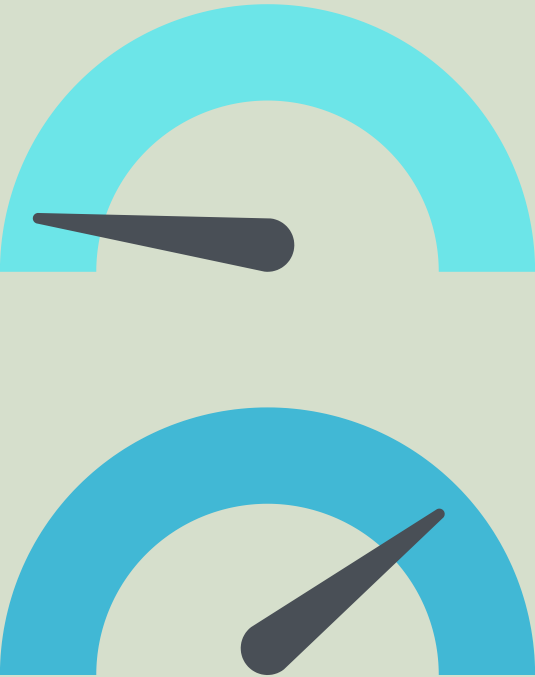
SVM

(Suport Vector Machine)

	Com TIP	Sem TIP
Parametros	kernel: rbf	kernel: poly
Acurácia	0.703	0.994
ROC AUC	0.703	0.994
Tempo (min)	4.00	45.85



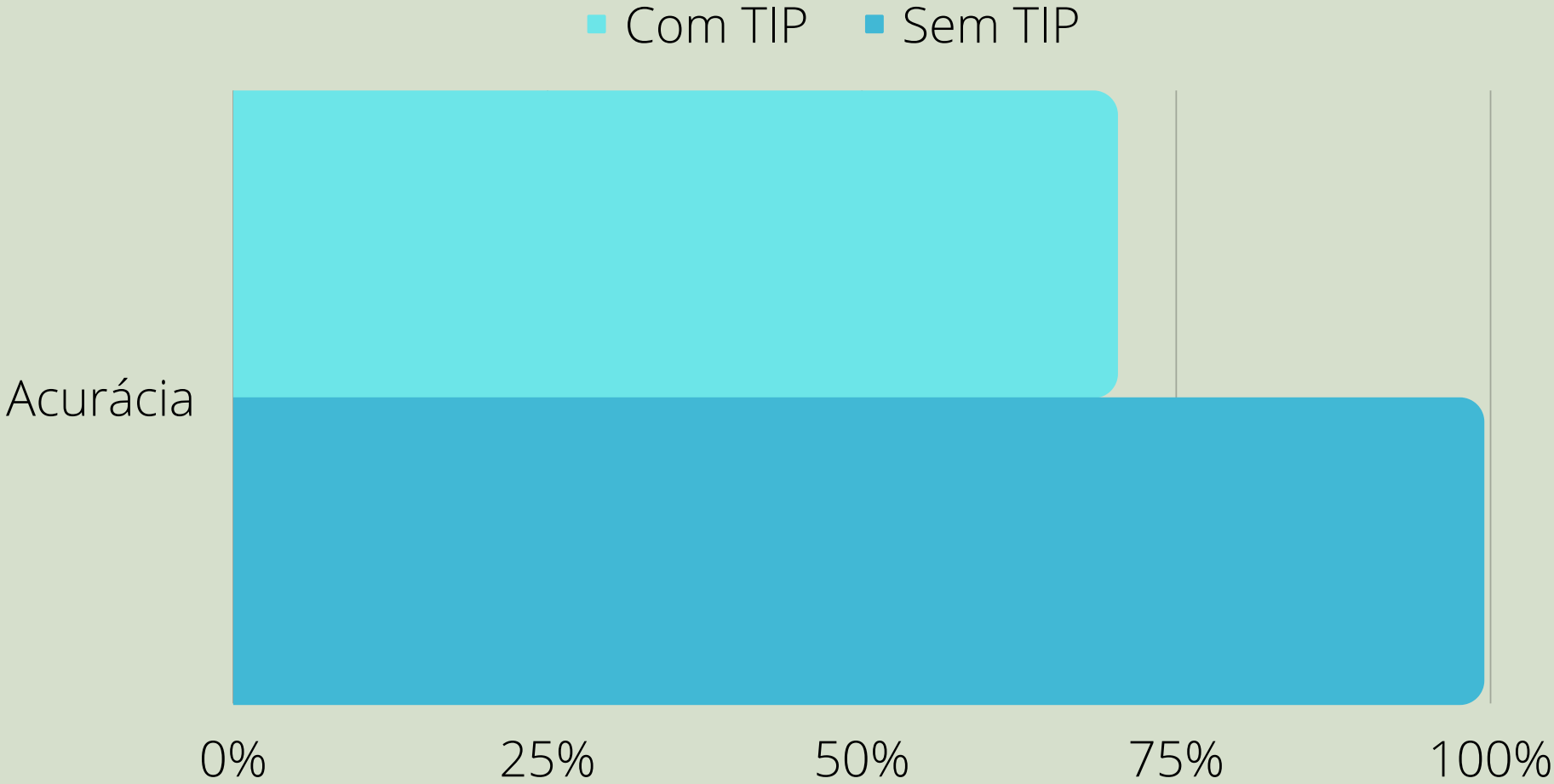
Tempo



MLP

(MultiLayer Perceptron)

	Com TIP	Sem TIP
Parametros	activation: logistic solver: adam	activation: logistic solver: lbfgs
Acurácia	0.691	0.989
ROC AUC	0.691	0.989
Tempo	7.35	19.73



Tempo



Benchmarks
(Acurácia)

KNN

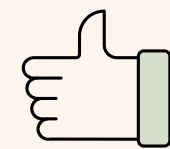
87.8%

SVM

89.4%

Mobile Net

94.2%



Benchmarks
superados



Obrigado!