



universidade  
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# Garbage Classification

Fundamentos de Aprendizagem Automática  
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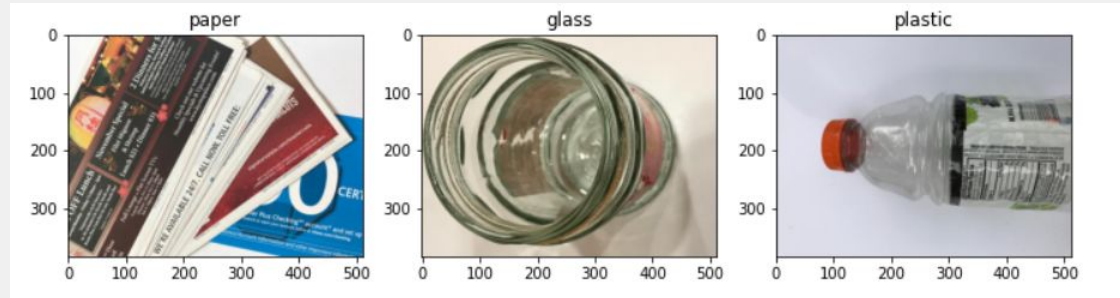
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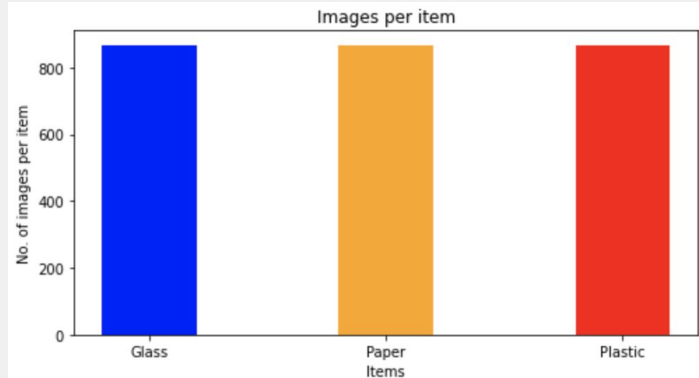
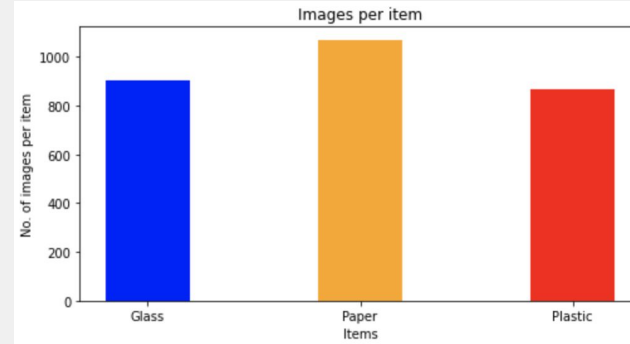
# Context

- Why?
- Dataset available on Kaggle
- Different machine learning models implemented:
  - Logistic Regression
  - SVM
  - Decision Tree
  - Random Forest
  - Neural Networks



# Dataset Preparation

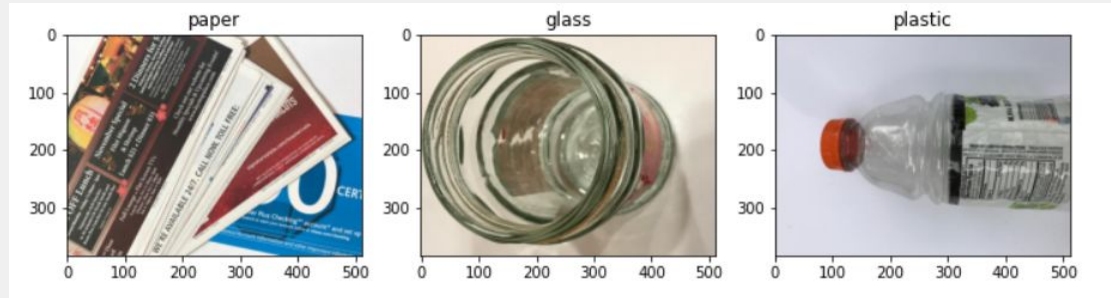
- Unbalanced Dataset
  - Glass - 900 images
  - Paper - 1070 images
  - Plastic - 868 images



- Balanced Dataset
  - Glass - 868 images
  - Paper - 868 images
  - Plastic - 868 images

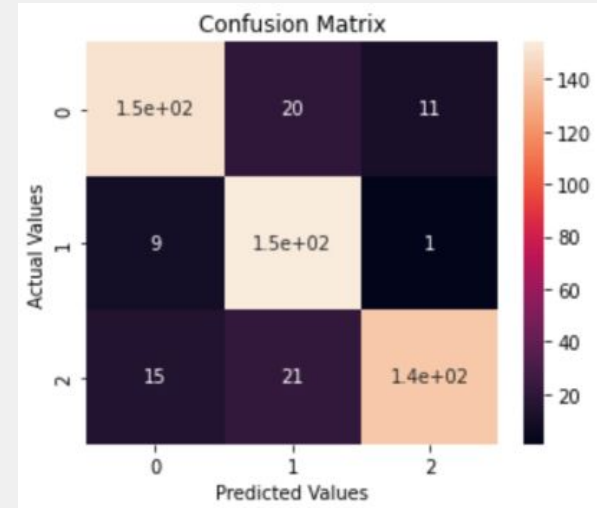
# Dataset Preparation

- Image size 512\*384
- Large number of features
- Final: 32\*32
- Pixel normalization



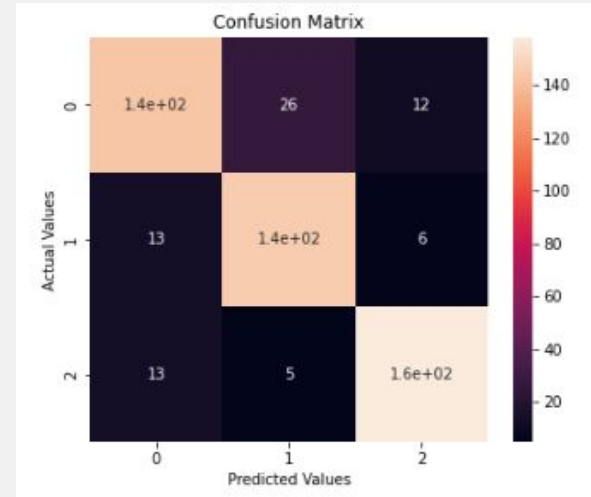
# Logistic Regression

	Base	K-fold CV	HyperTuned
Accuracy	84.64%	84.64%	85.60%
F1 Score	84.67%	84.67%	85.62%



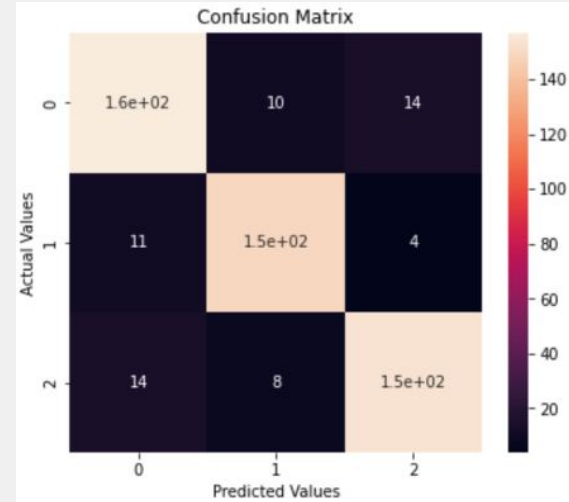
# SVM

	Base	K-fold CV	Hypertuned
Accuracy	85.22%	85.22%	90.02%
F1 Score	85.20%	85.20%	90.07%



# Decision Tree

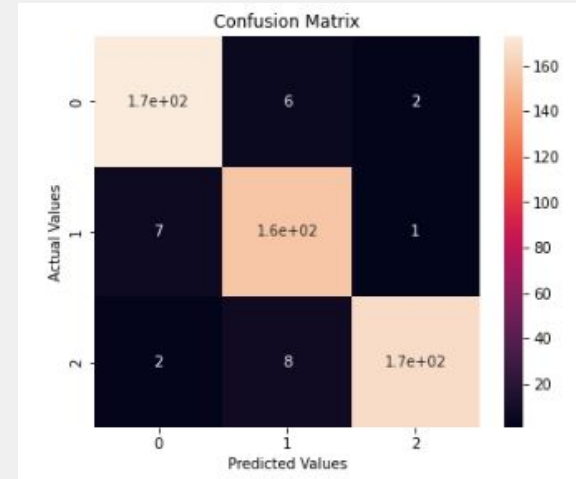
	Base	K-fold CV	Hypertuned
Accuracy	88.68%	89.25%	86.96%
F1 Score	88.69%	89.25%	86.95%





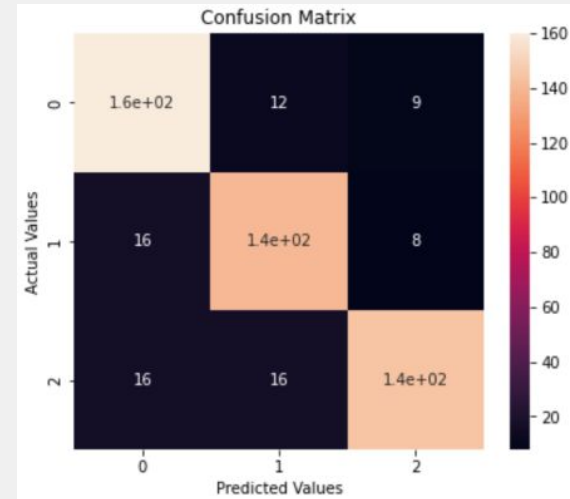
# Random Forest

	Base	K-fold CV	Hypertuned
Accuracy	95.01%	93.47%	96.16%
F1 Score	95.03%	93.48%	96.16%

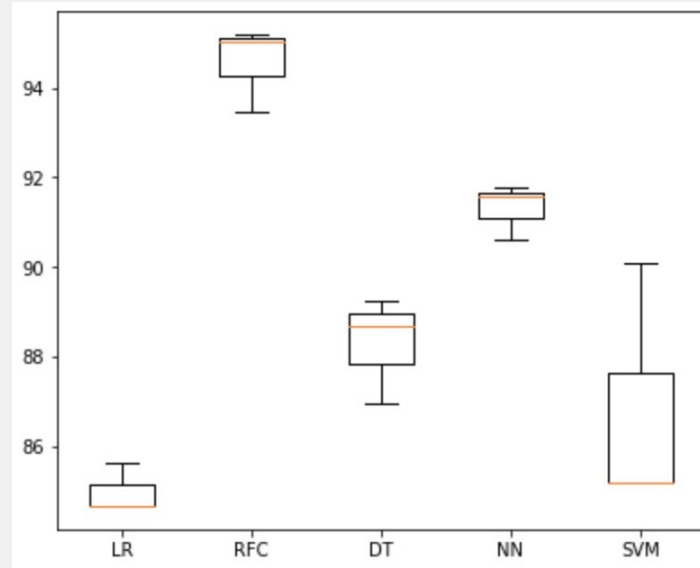


# Neural Networks

	Base	K-fold CV	Hypertuned
Accuracy	91.75%	90.59%	91.55%
F1 Score	91.77%	90.63%	91.57%



# Models Comparison



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# Other Works

- Random Forests : An algorithm for image classification, Ned Horning
- Image Classification using Random Forests and Ferns, Anna Bosch, Andrew Zisserman and Xavier Munoz
- Image Classification and Recognition Based on Deep Learning and Random Forest Algorithm, Erhui Xi
- Image recognition using Machine learning, Abhinav N Patil
- Fine-Tuning Models Comparisons on Garbage Classification for Recyclability, Umut Özkaya and Levent Seyfi



# Thanks!

