

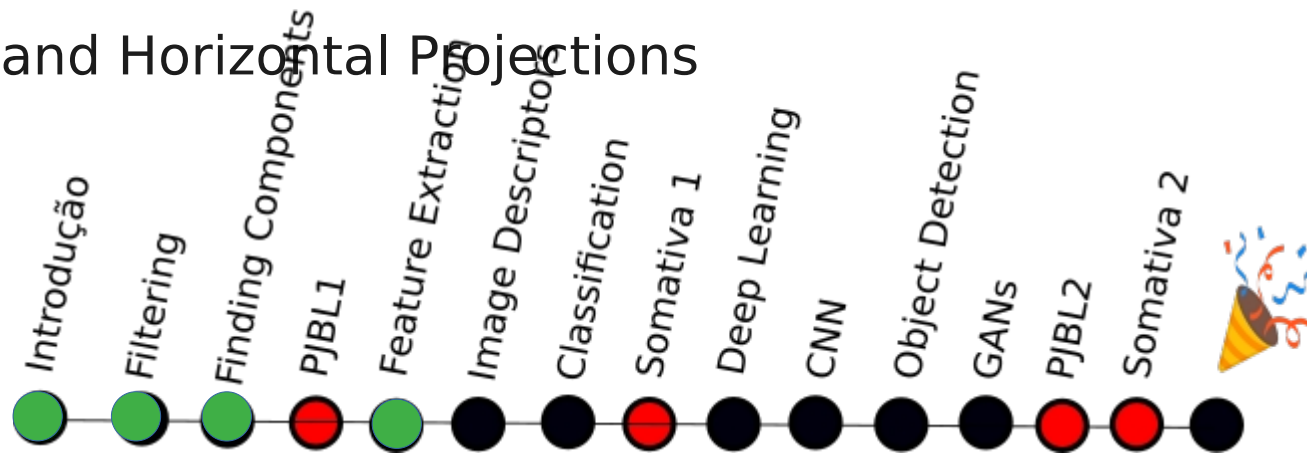
Lecture 05 - Feature Extraction

Prof. André Gustavo Hochuli

gustavo.hochuli@pucpr.br
aghochuli@ppgia.pucpr.br

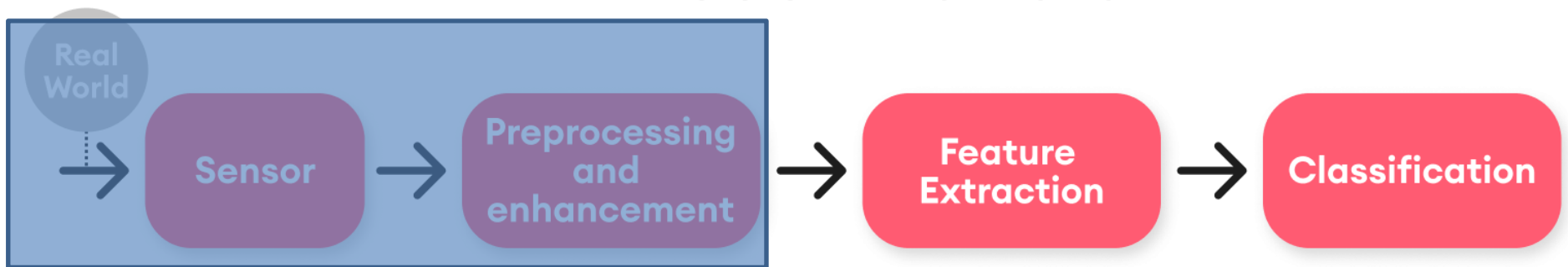
Topics

- Discussion of PJBL #01
- Feature Extraction
 - Feature Vector
 - Feature Space
- Feature Engineering
- Image Descriptors
 - Vertical and Horizontal Projections
- Practice



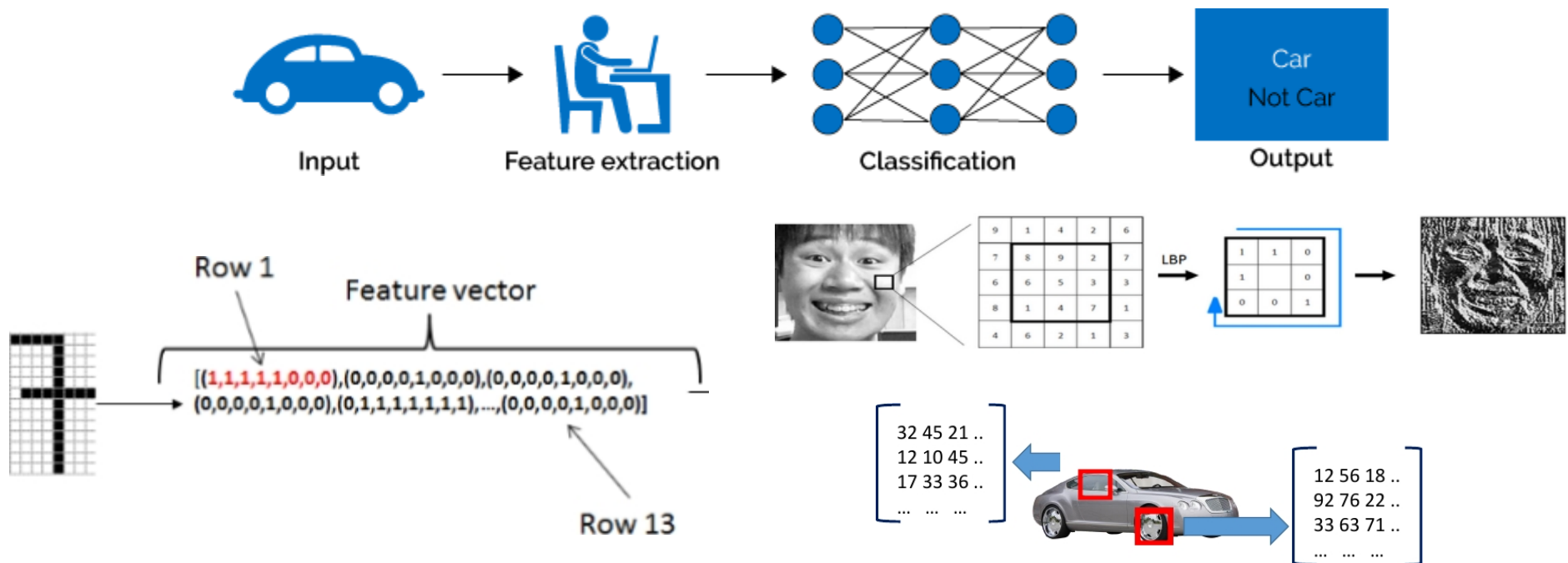
Computer Vision & Pattern Recognition Pipeline

PATTERN RECOGNITION SYSTEM



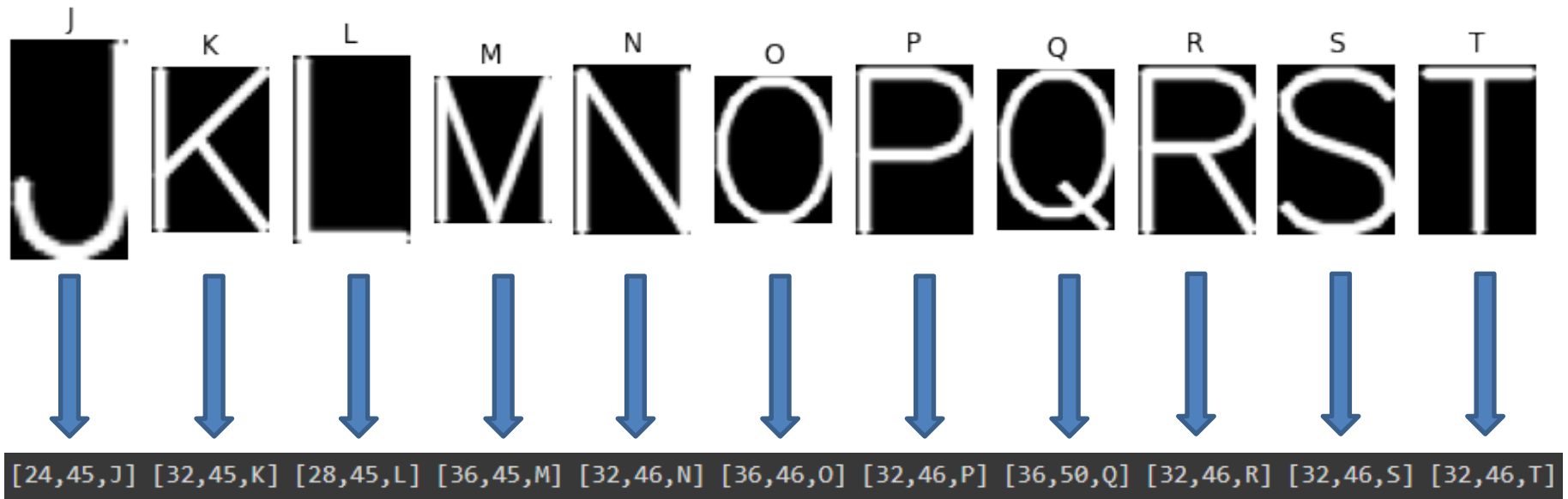
Feature Extraction

- A feature descriptor translates high-dimensional data to a feature space
- A feature vector represents the input data produced by the feature descriptor
- Later, a machine learning model will learn the representations



Feature Extraction

- Let's represent our image by its size, so an image I that belongs to class X is represented by:
 - $f(I, X) = [I.width, I.height, X]$

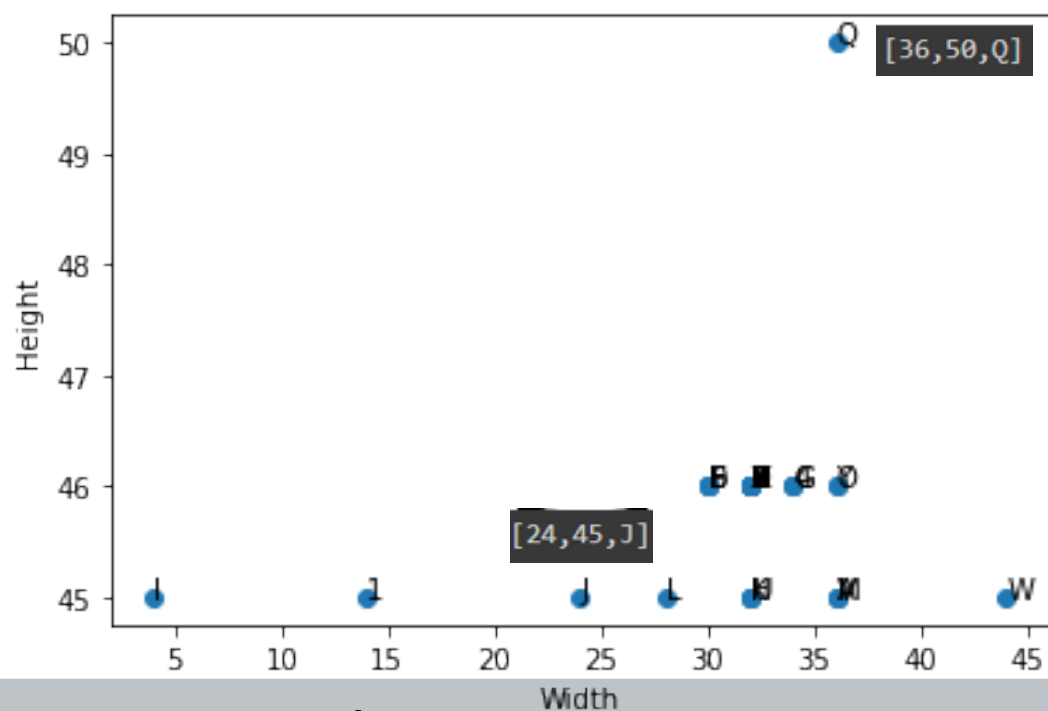


Feature Vector

- Is the feature vector representative?



[24,45,J] [32,45,K] [28,45,L] [36,45,M] [32,46,N] [36,46,O] [32,46,P] [36,50,Q] [32,46,R] [32,46,S] [32,46,T]

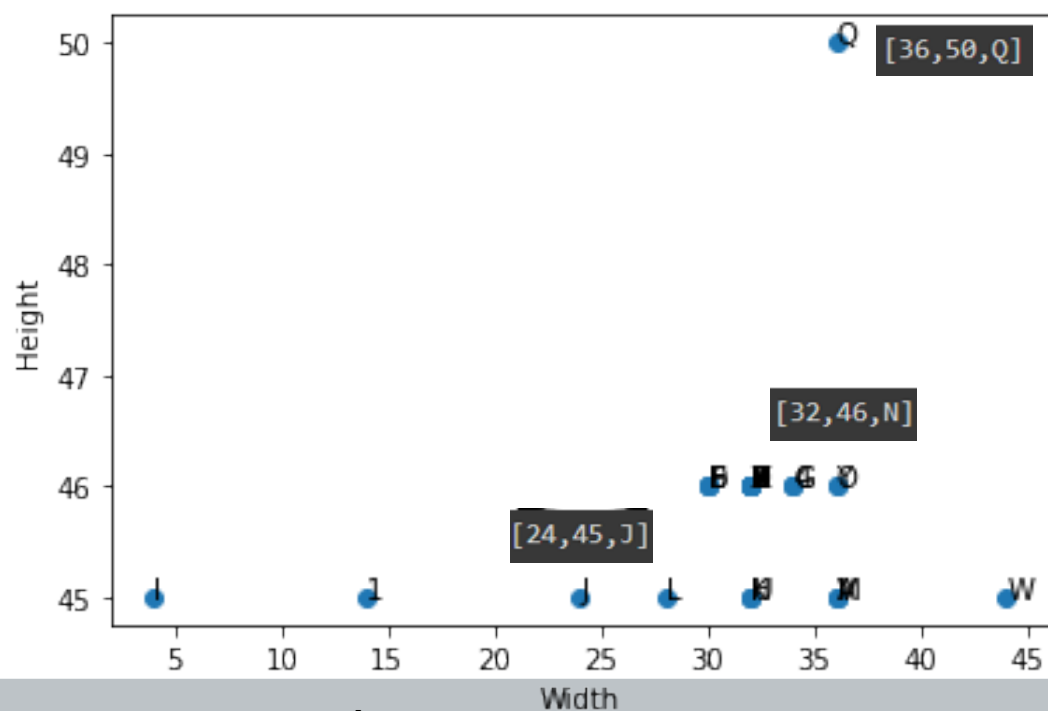


Feature Vector

- Is the feature vector representative?

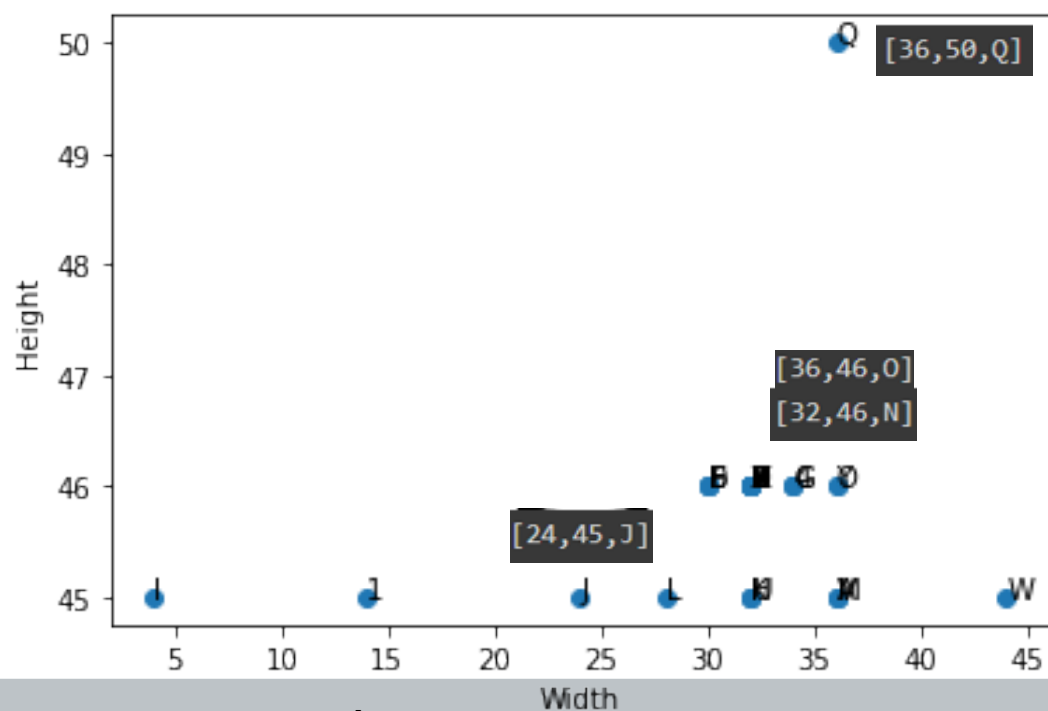
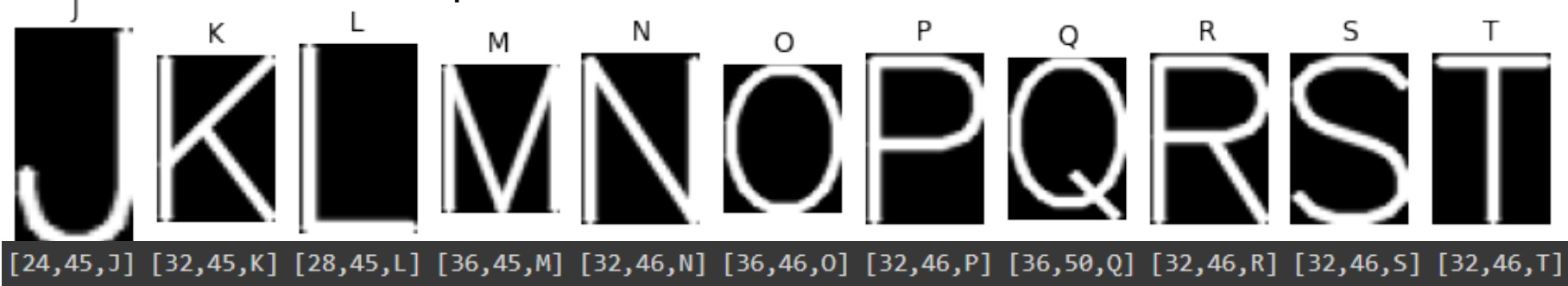


[24,45,J] [32,45,K] [28,45,L] [36,45,M] [32,46,N] [36,46,O] [32,46,P] [36,50,Q] [32,46,R] [32,46,S] [32,46,T]



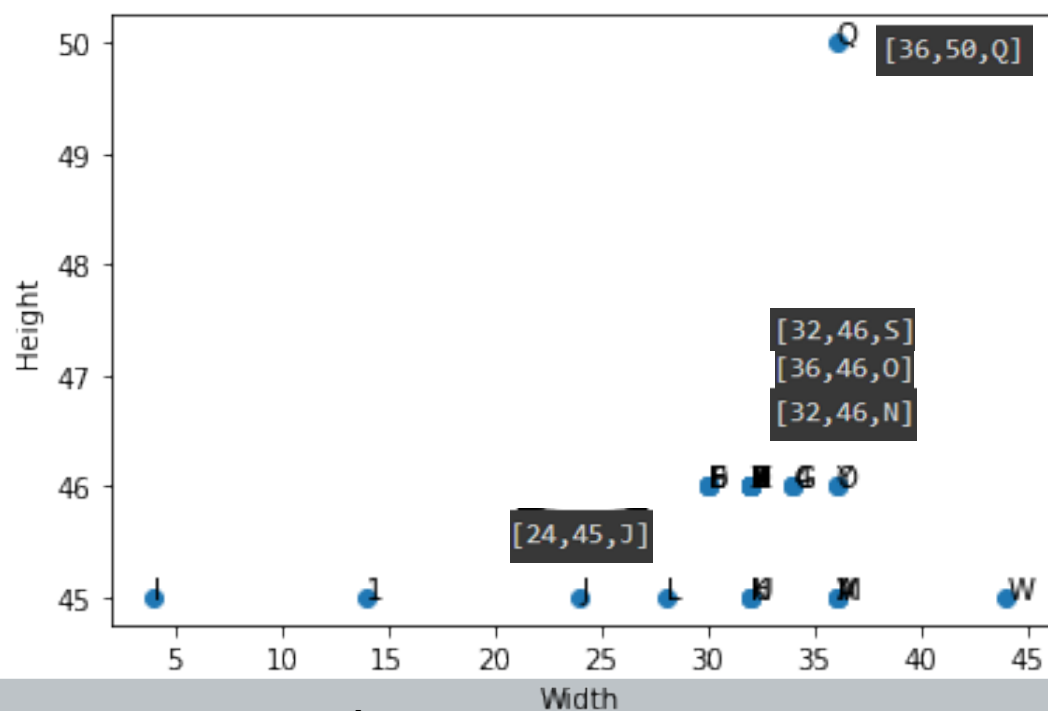
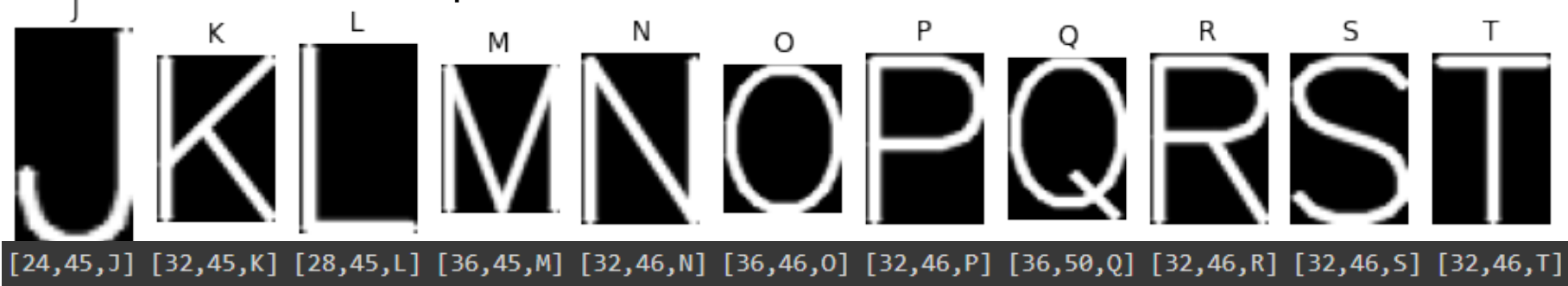
Feature Vector

- Is the feature vector representative?



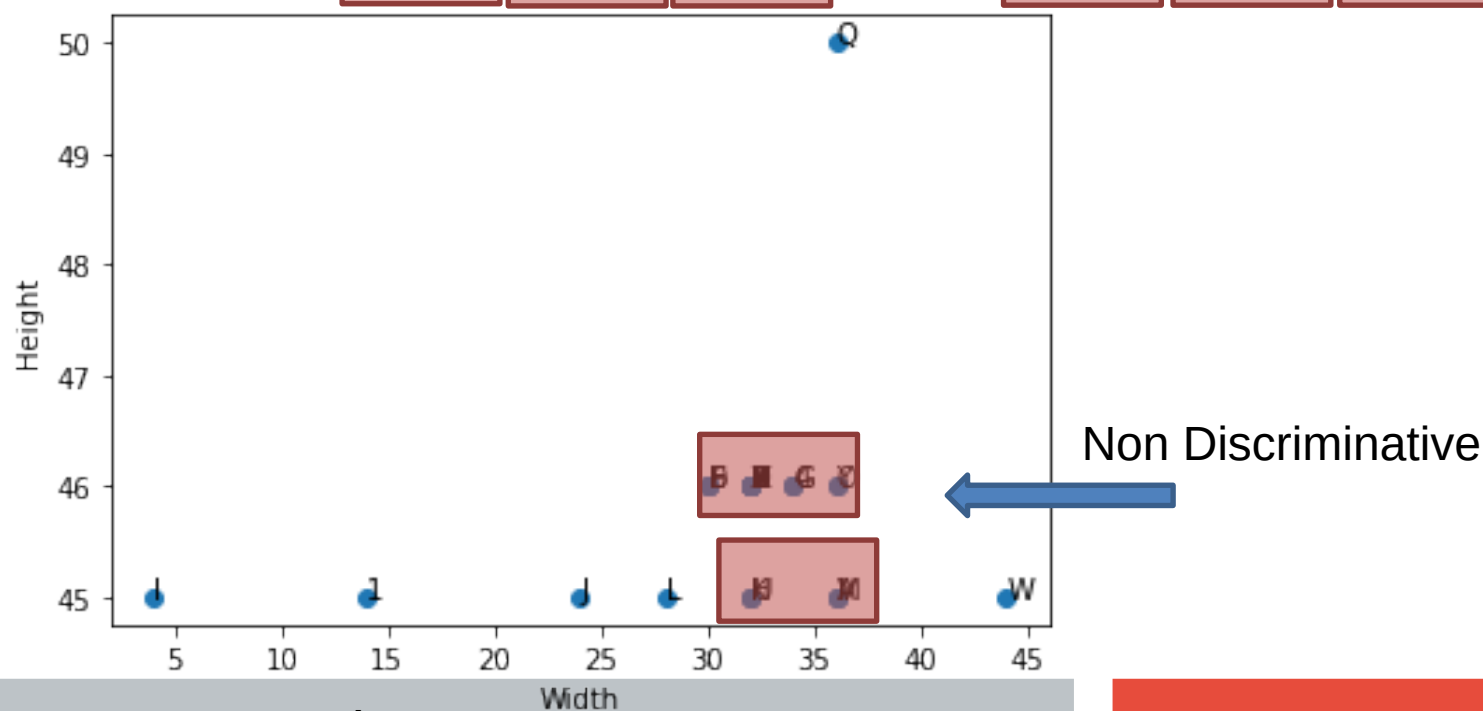
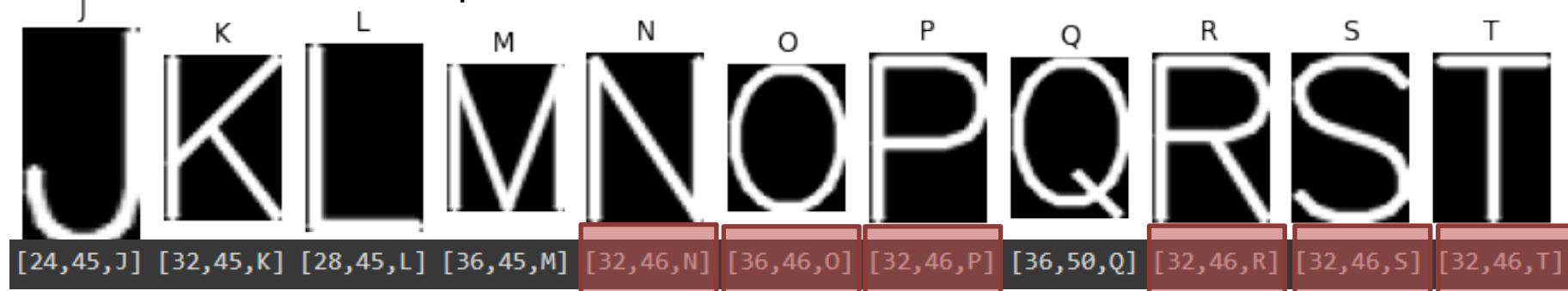
Feature Vector

- Is the feature vector representative?



Feature Vector

- Is the feature vector representative?



Feature Engineering

- How to produce a discriminative feature space?
- Features must describe a singular characteristic of the problem for good generalization.

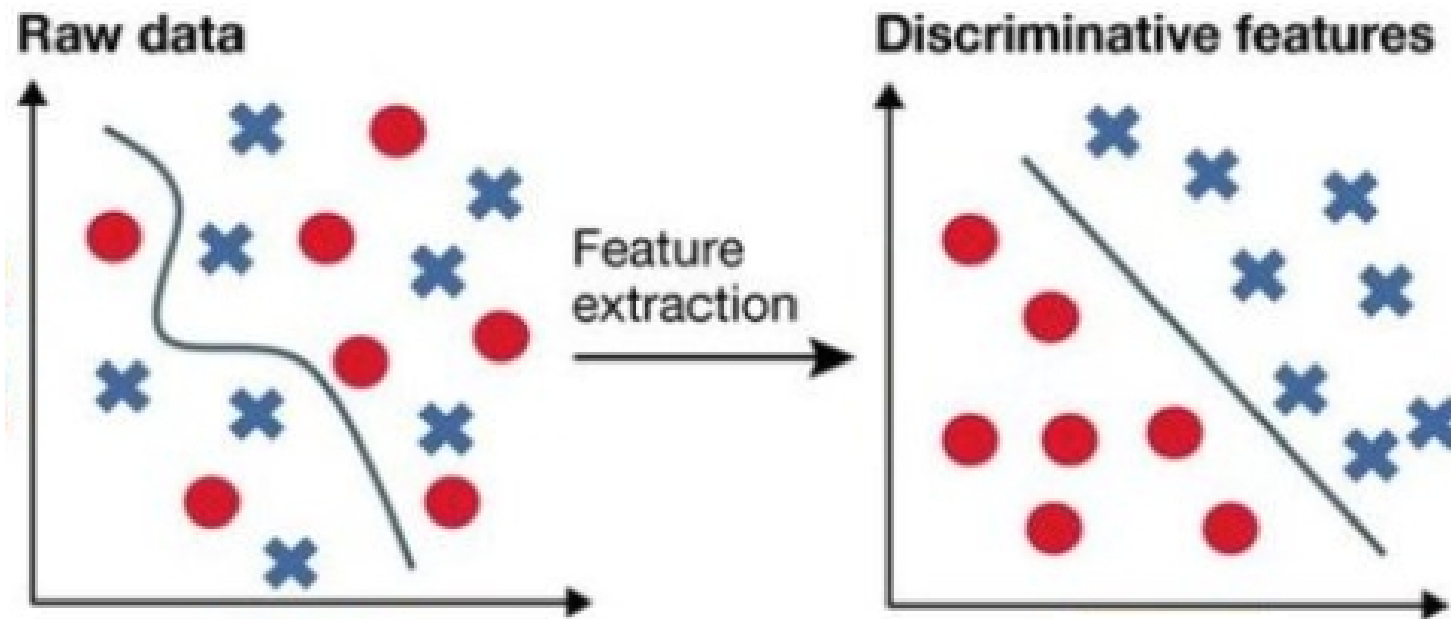


Image Descriptors

- Vertical and Horizontal Projection

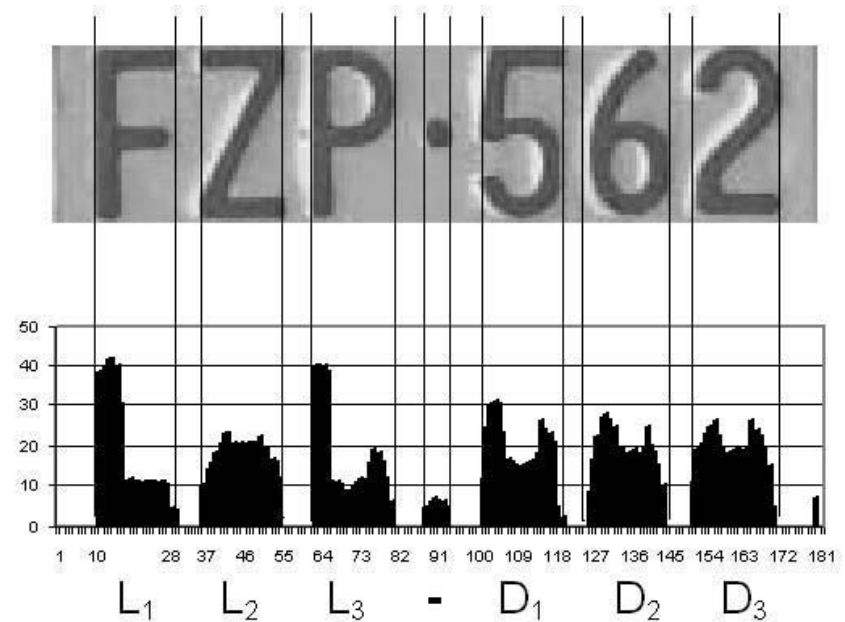
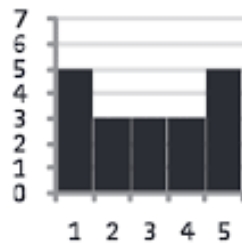
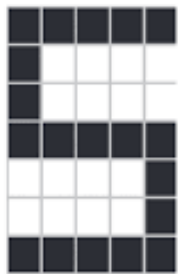
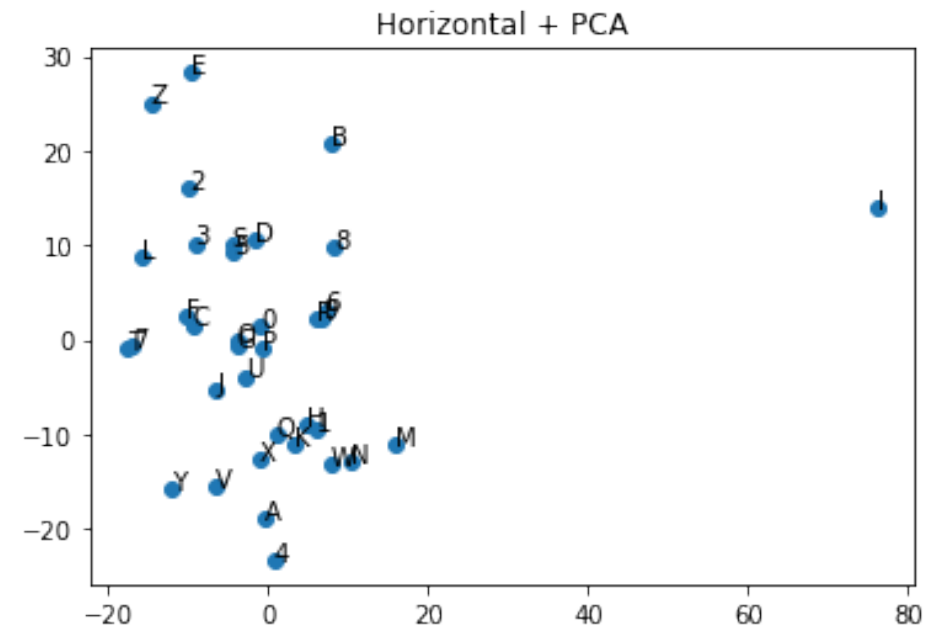
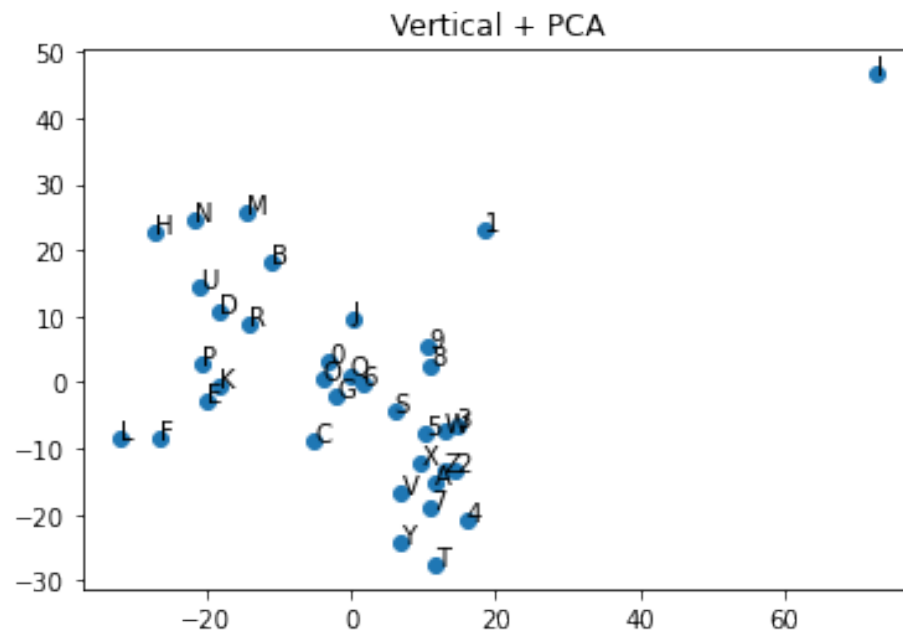
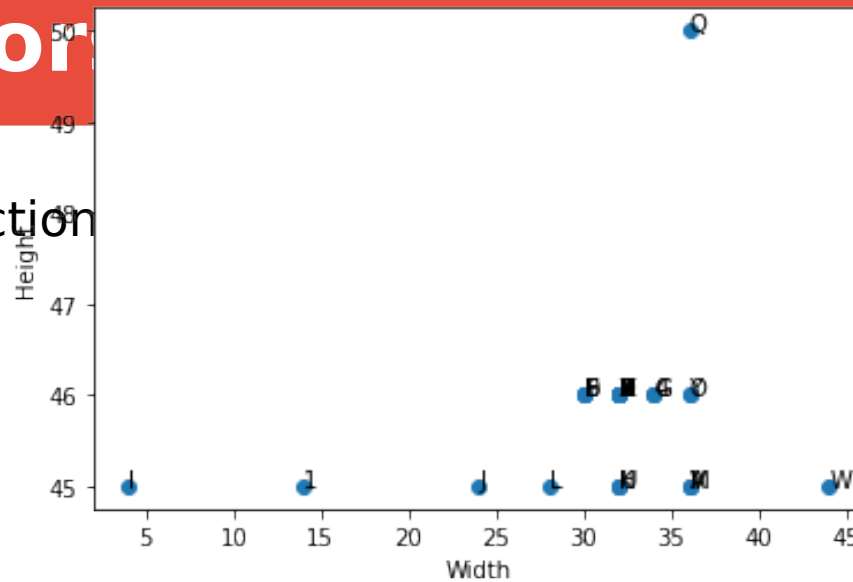


Image Descriptor

- Vertical and Horizontal Projection



Let's Code!!

- [Link](#)

Didactic Quality Questionnaire

- Let me know your thoughts about
 - Lectures, Didactic, Materials and Professor



<https://forms.office.com/r/4ewHS74yrK>