

Working with Large Sets of Images in MATLAB Just Got Easier

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Why Are We Talking About Large Sets of Images ?

- 100 hours of video uploaded to YouTube per minute¹
- Explosive increase in number of imaging devices
 - Webcams
 - Smartphone Cameras
 - IP Cameras
 - Industrial Cameras



1- KPCB 2013 Internet Trends <http://www.kpcb.com/blog/2013-internet-trends>

Challenges Posed by Large Sets of Images

1. How do I import several thousand images into MATLAB?
2. Can I find patterns or models to represent my image data?
3. How do I test and visualize my algorithm on many images?
4. What if my desktop or laptop doesn't have enough computing power?
5. Can I acquire large sets of images using MATLAB ?

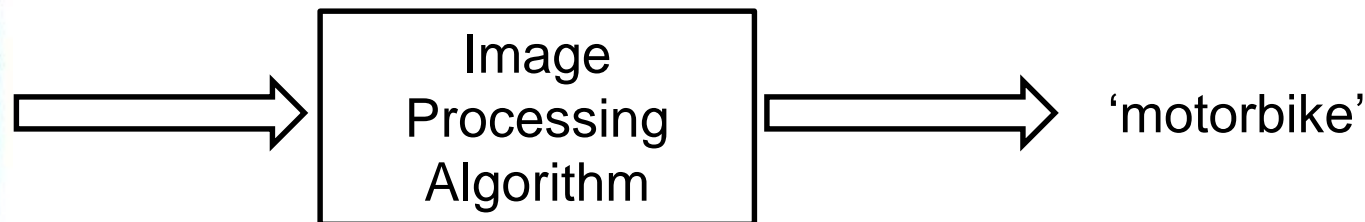
Goal: Show you **new functionality** in MATLAB to **augment existing workflows** to solve these challenges

Problem: Image Category Classification

Given a large set of images of cars, planes and motorbikes



How to model the data to recognize which category an image belongs to ?



Data from Caltech 101: L. Fei-Fei, R. Fergus and P. Perona. *Learning generative visual models from few training examples: an incremental Bayesian approach tested on 101 object categories.* IEEE. CVPR 2004, Workshop on Generative-Model Based Vision. 2004

http://www.vision.caltech.edu/Image_Datasets/Caltech101/

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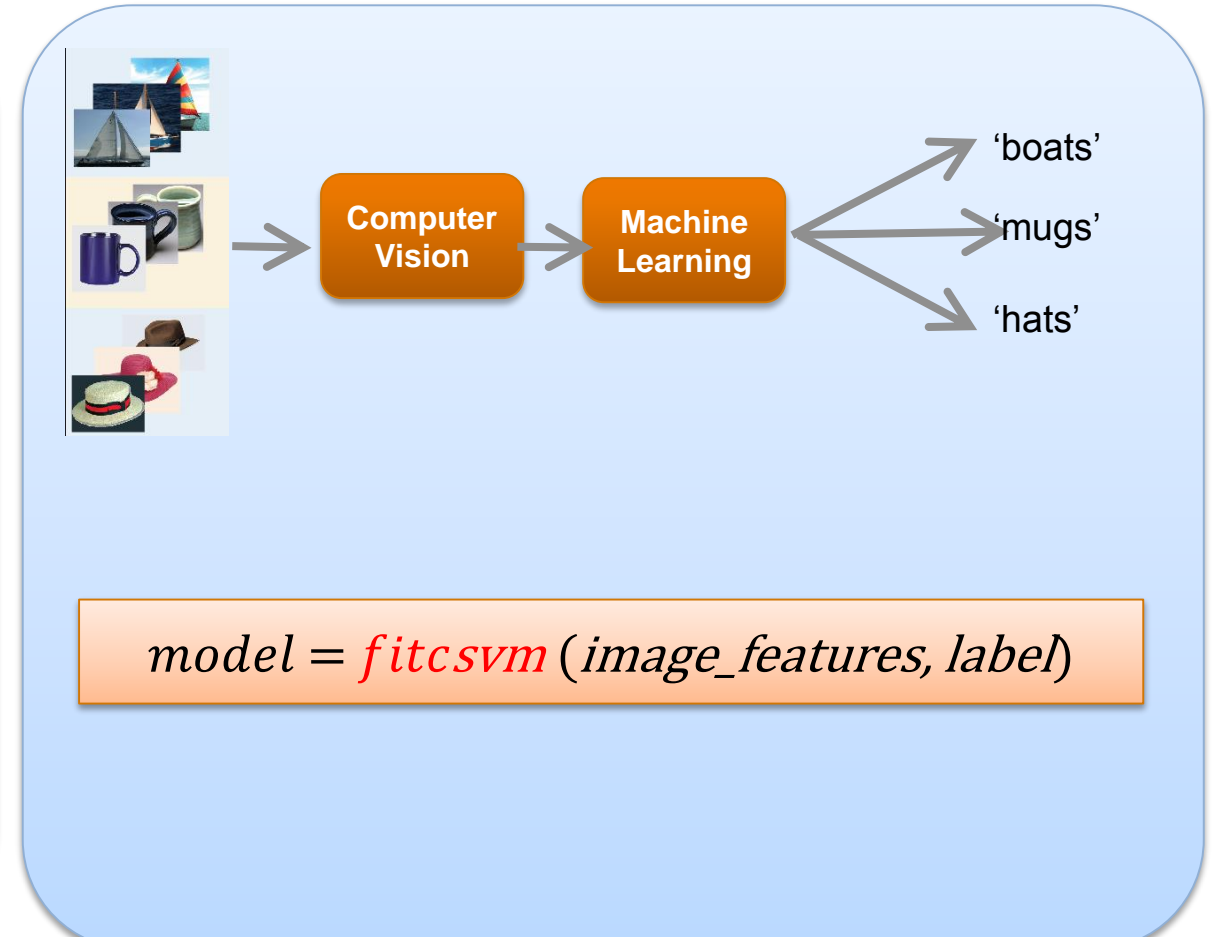
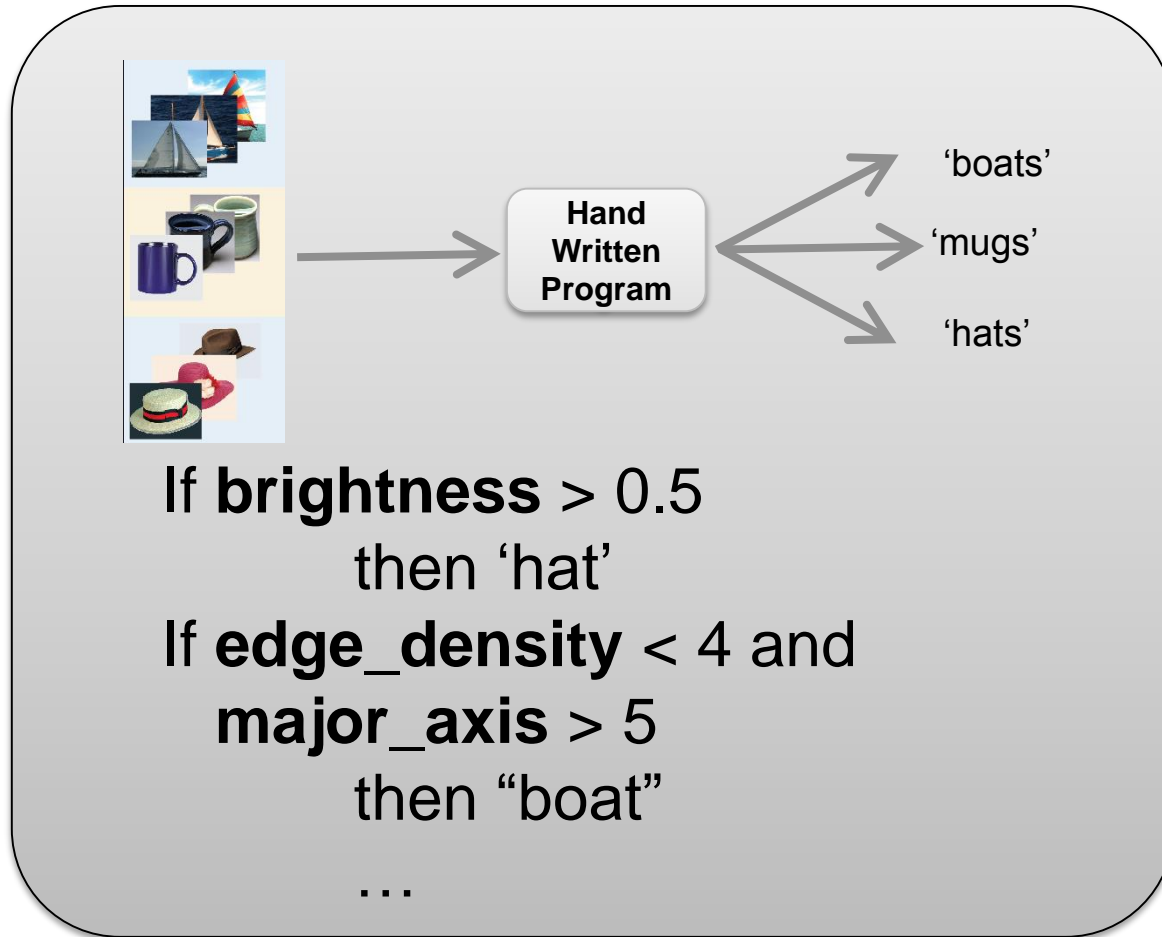
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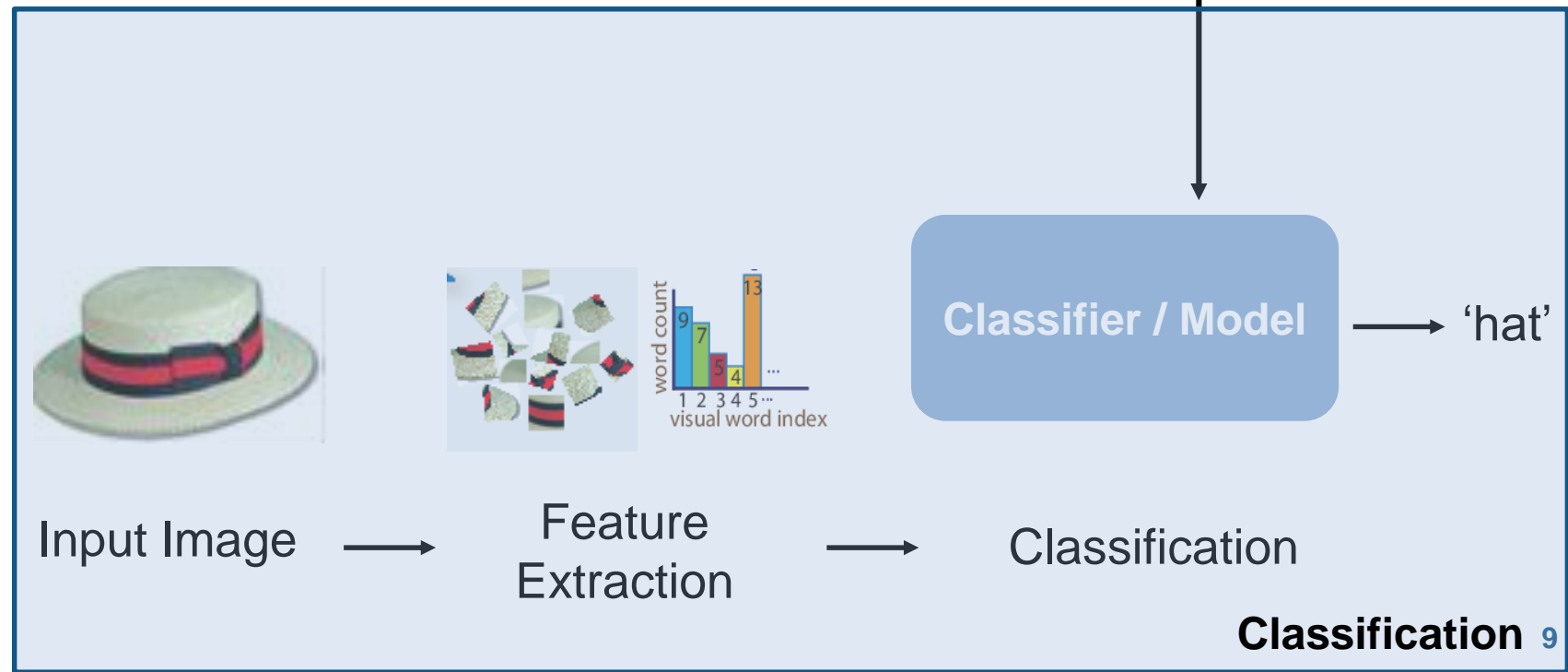
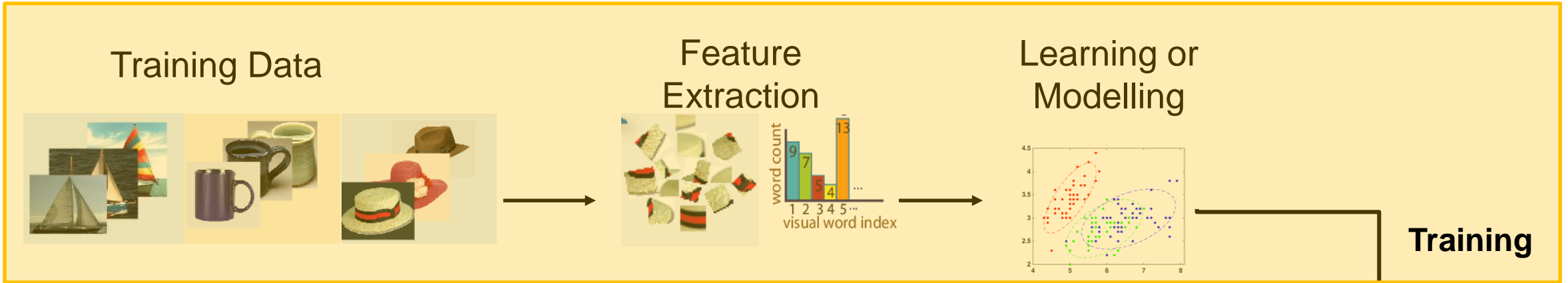
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Machine Learning

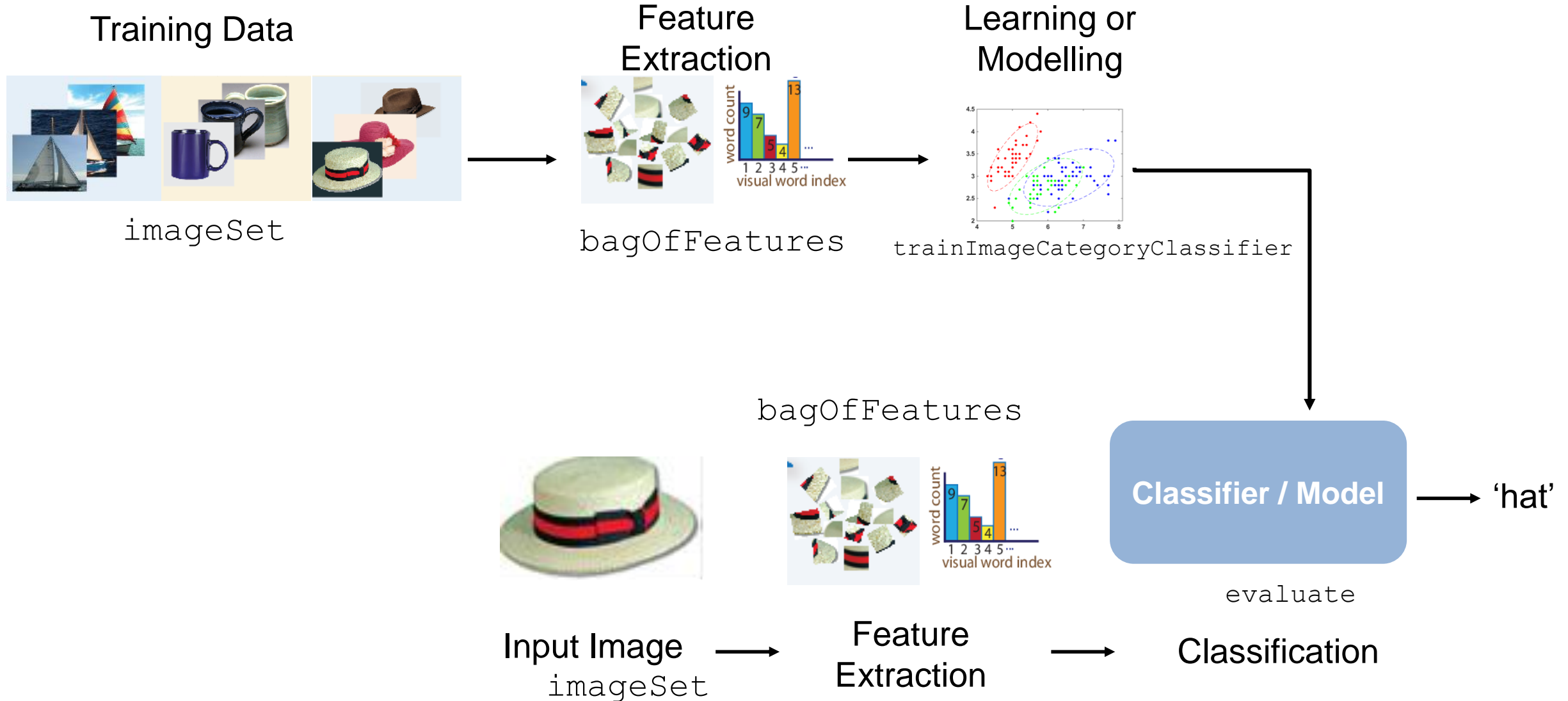
A machine learning algorithm takes examples of inputs and outputs associated with a task and produces a program that can perform the task.



Machine Learning Workflow Using Images



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Everyday Applications of Machine Learning



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Additional Algorithms Available*

- Cascade Object Detector
 - Pre-trained models for faces, facial features etc.
 - Framework for training
- People Detector
- Optical Character Recognition

* Requires Computer Vision System Toolbox



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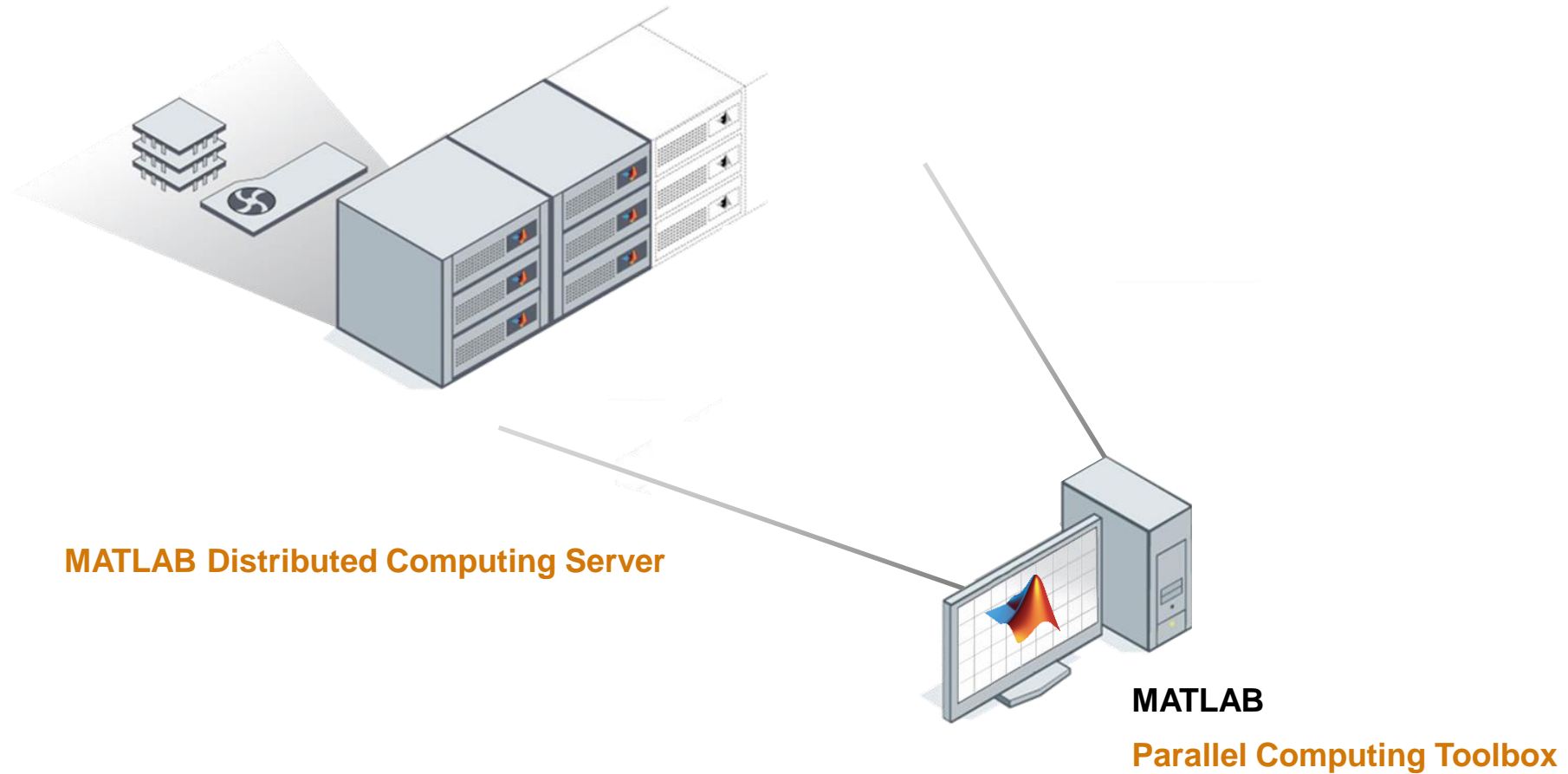
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Parallel Computing with MATLAB



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Thank You !