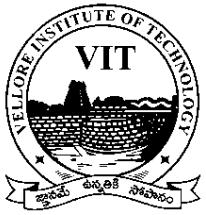



VIT-AP UNIVERSITY

# Computer Vision

(Course Code: 4047)

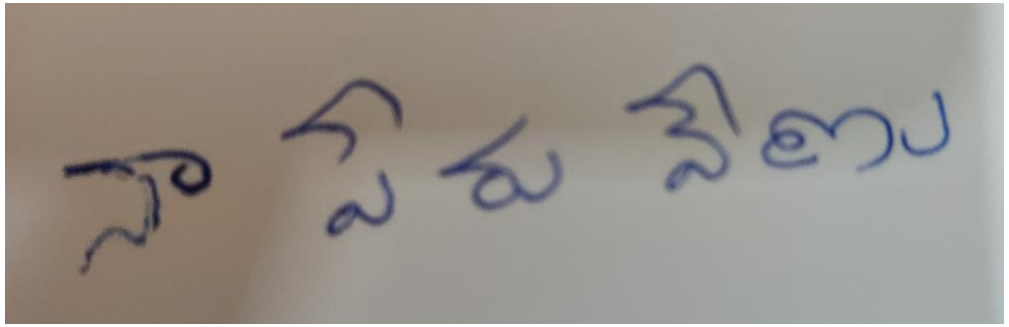
## Module-1:Lecture-2: Real time computer vision applications

Gundimeda Venugopal, Professor of Practice, SCOPE

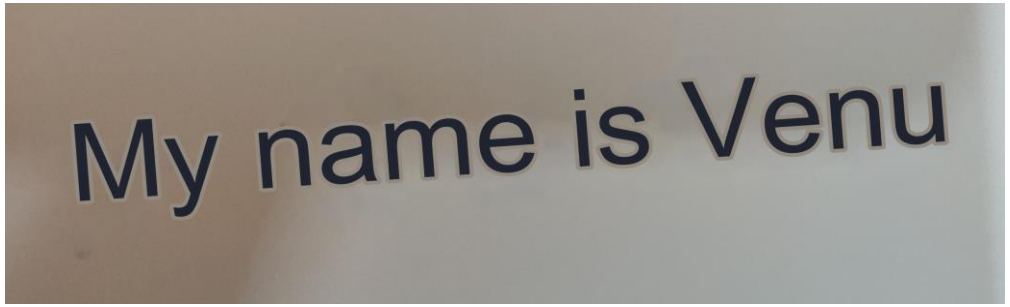
# Application: Google Translate

Google Translate

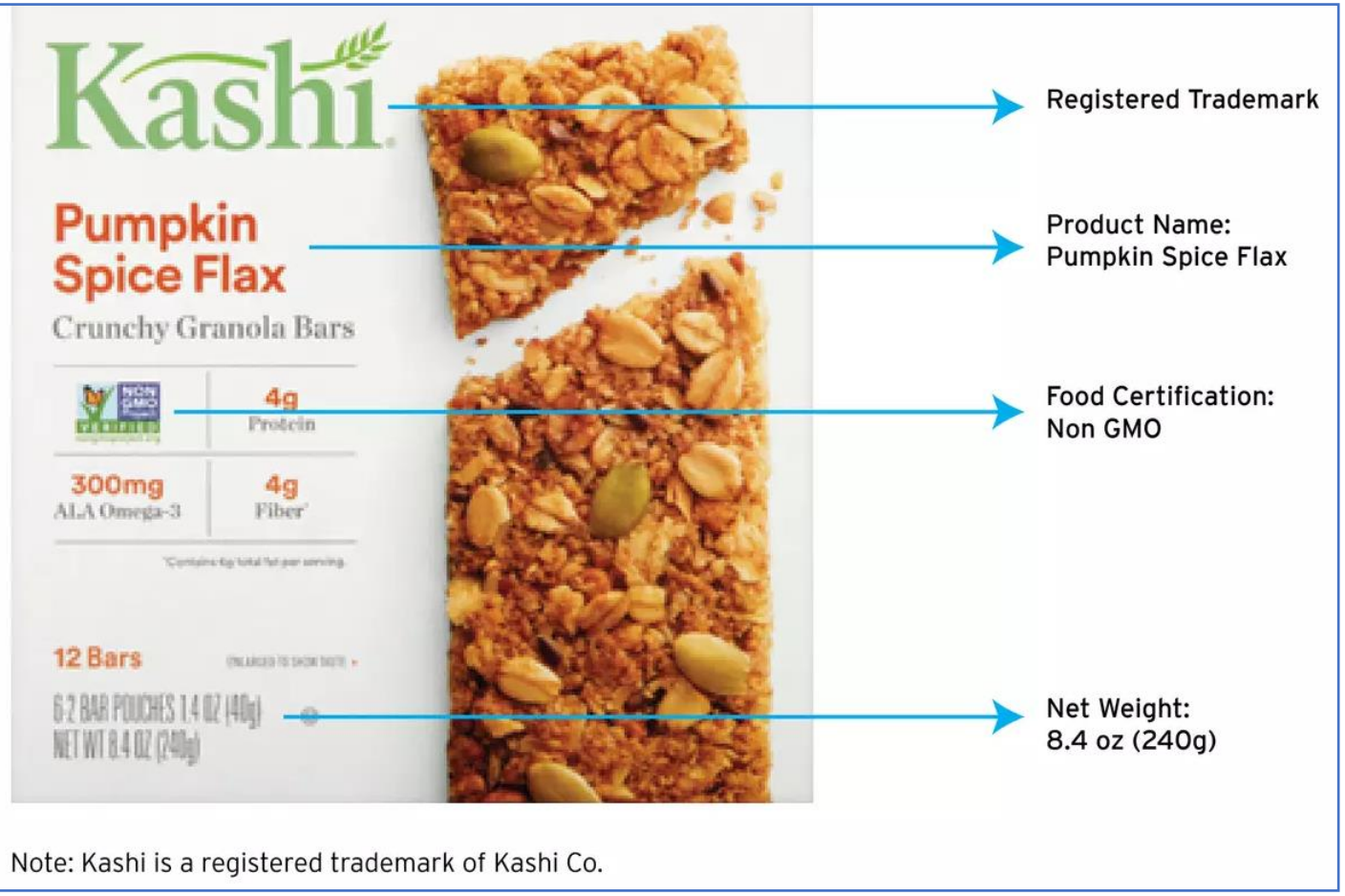
Input



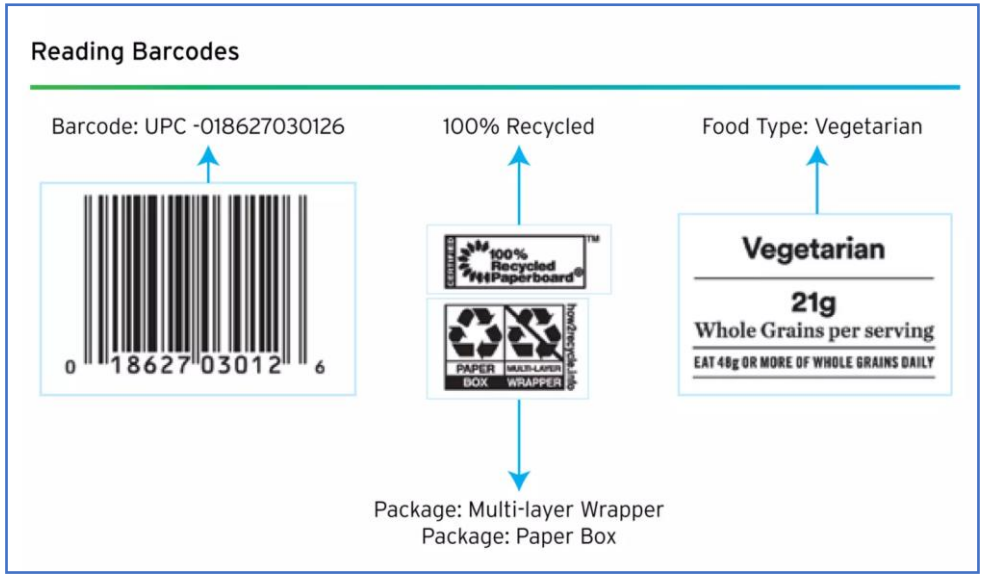
Output



# Application: Product Metadata Extraction from Labels

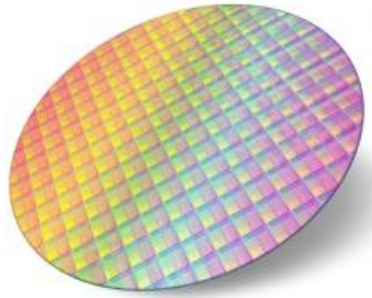


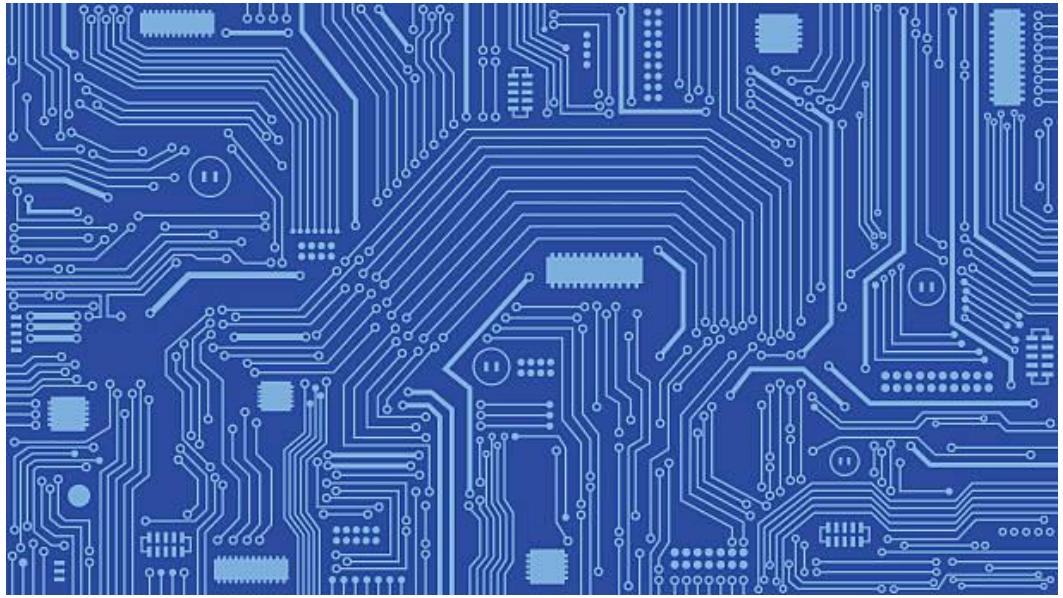

Note: Kashi is a registered trademark of Kashi Co.



# Machine vision

Automated visual inspection



# Object Recognition

Toshiba Tech IS-910T

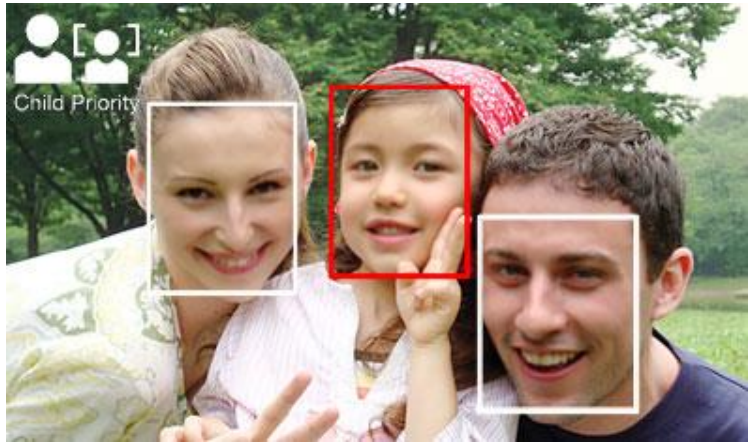
2013


DataLogic LaneHawk LH4000

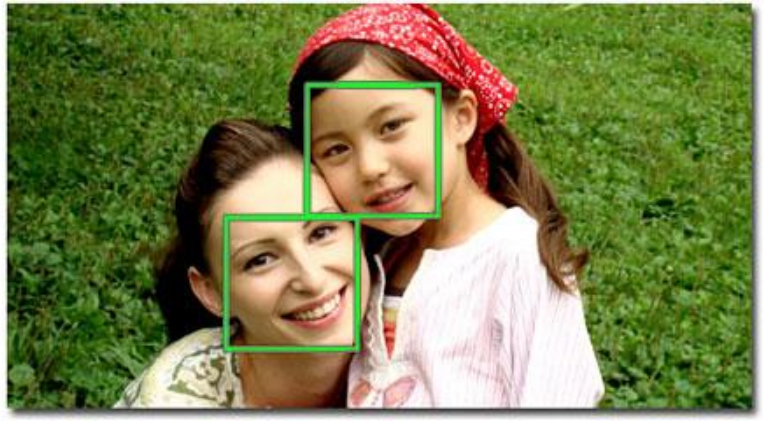
2012

# Face d


Sony Cyber-shot



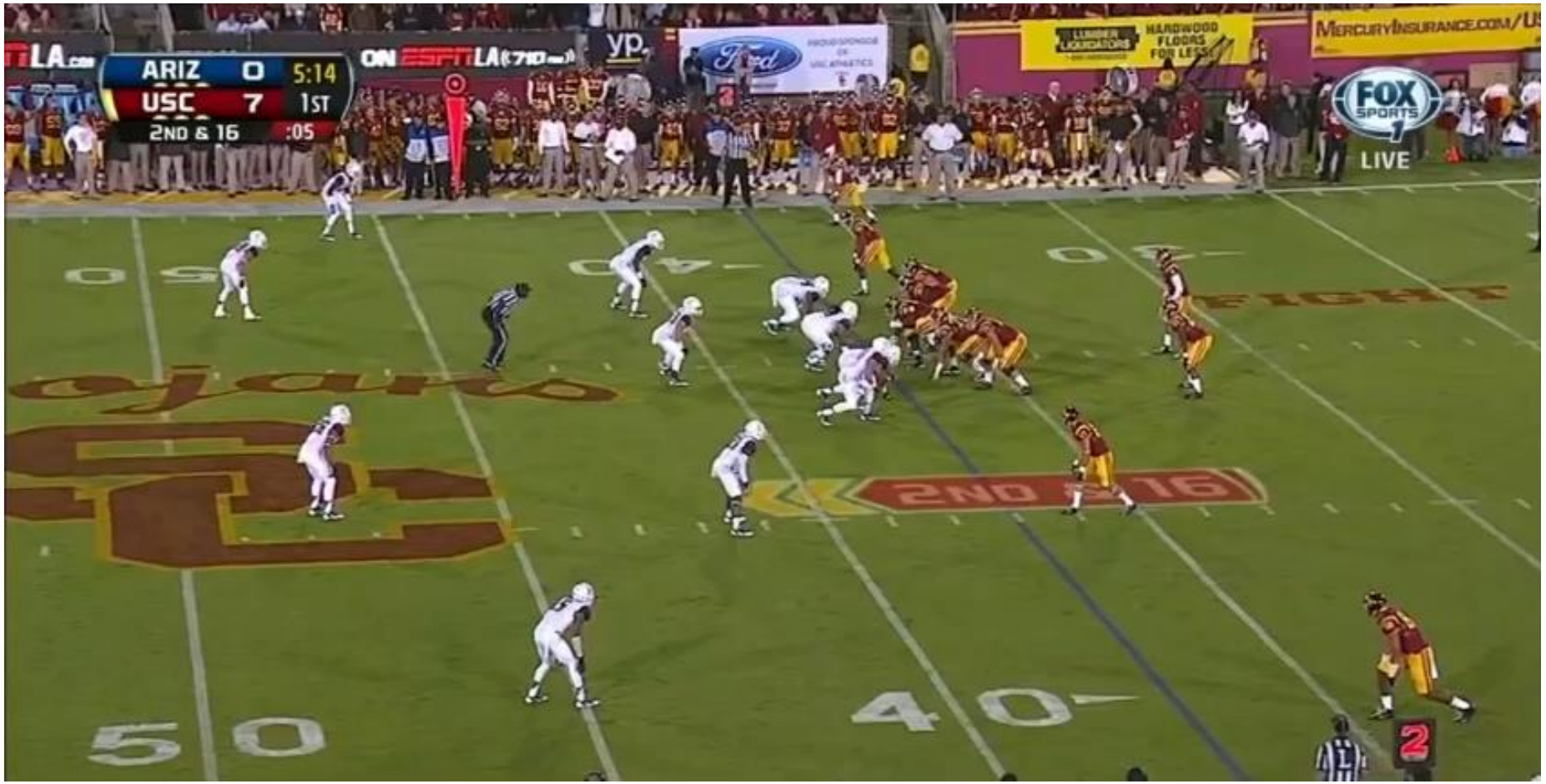

Age recognition



Smile recognition

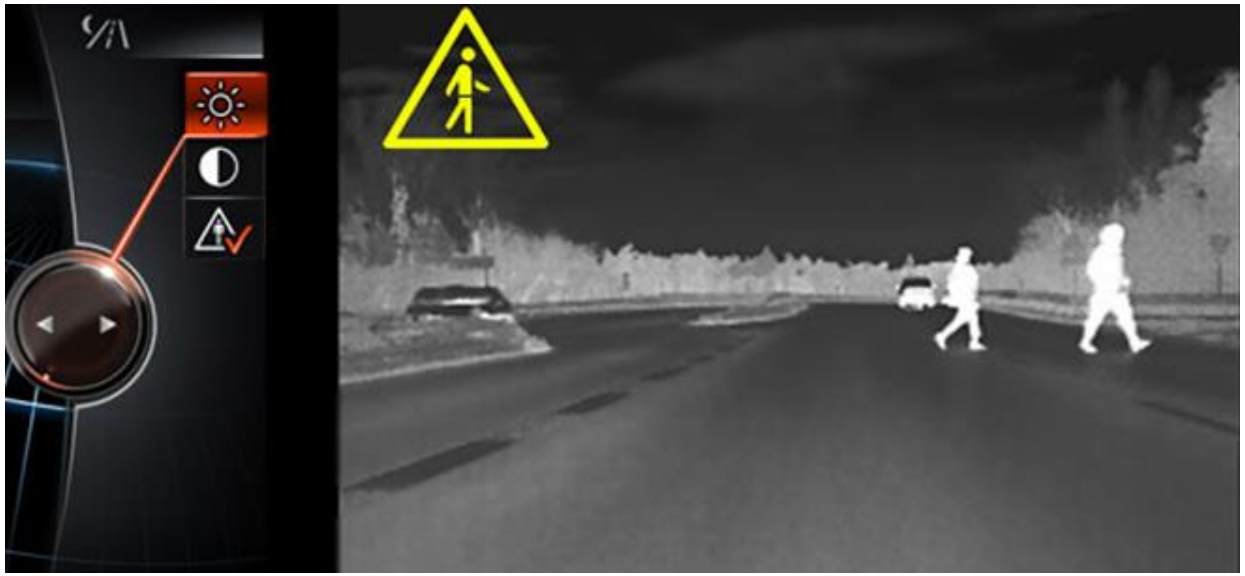

Word Lens
www.QuestVisual.com

# First-down line



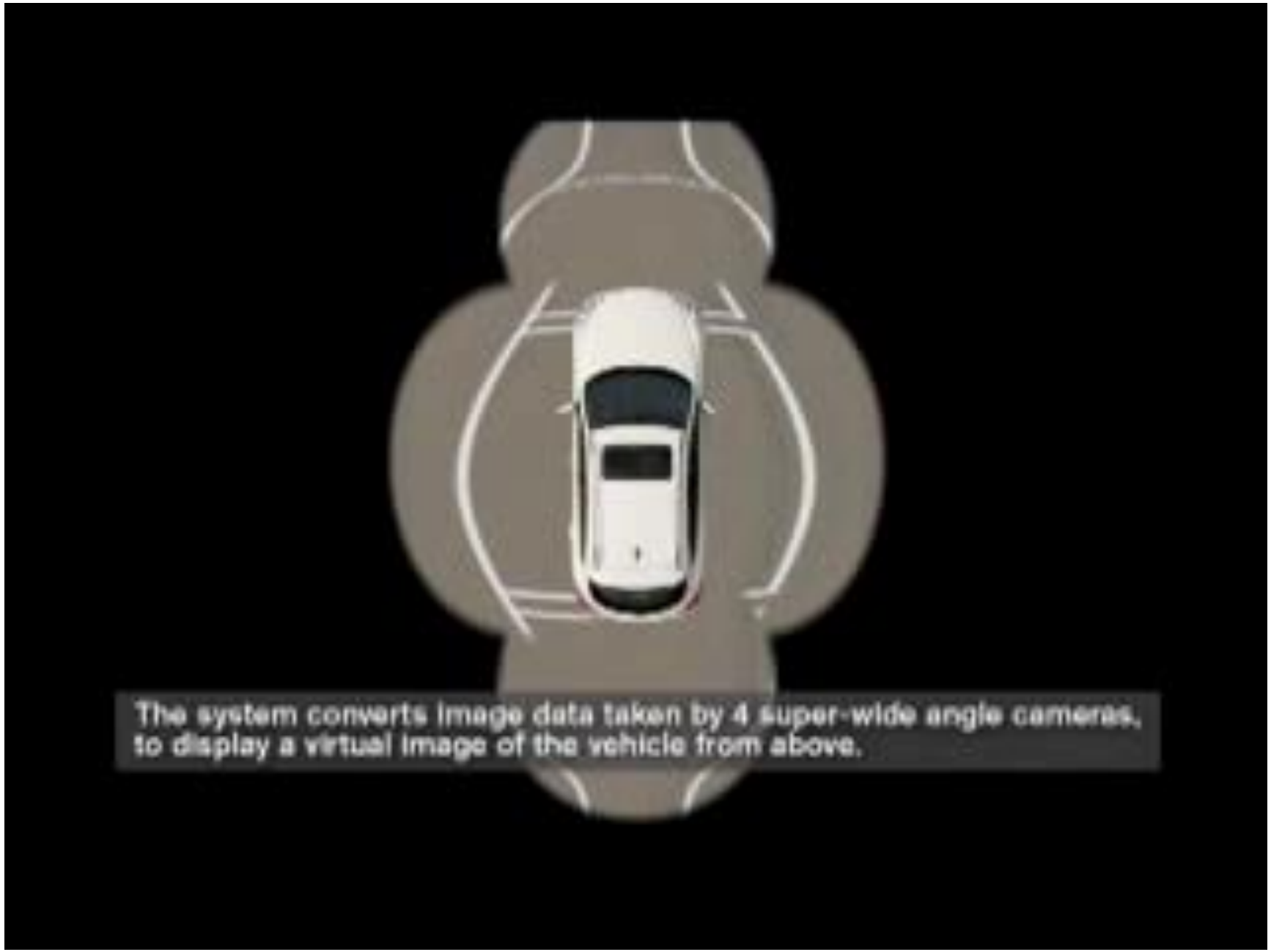

BMW 5 series

BMW night vision



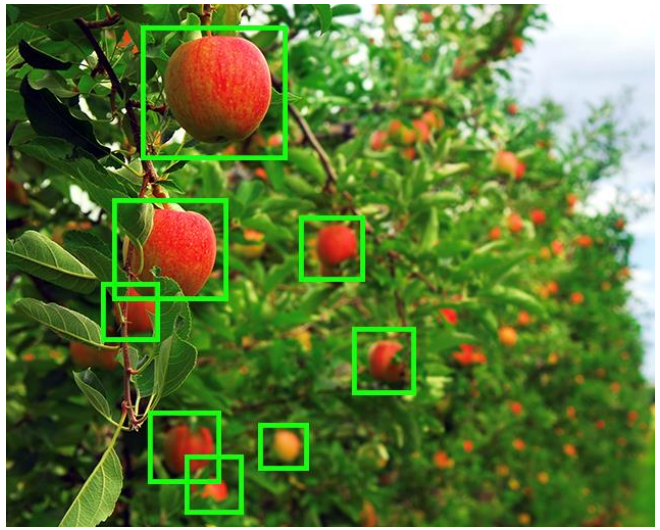

Infinity EX

“Around view” camera

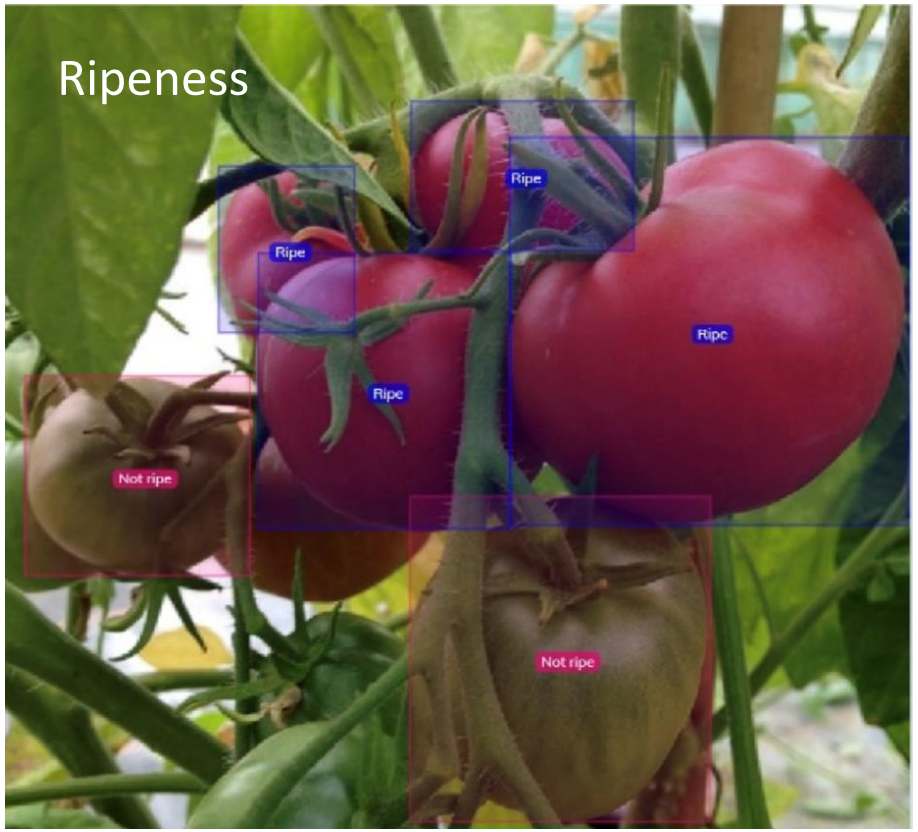

The system converts image data taken by 4 super-wide angle cameras,
to display a virtual image of the vehicle from above.

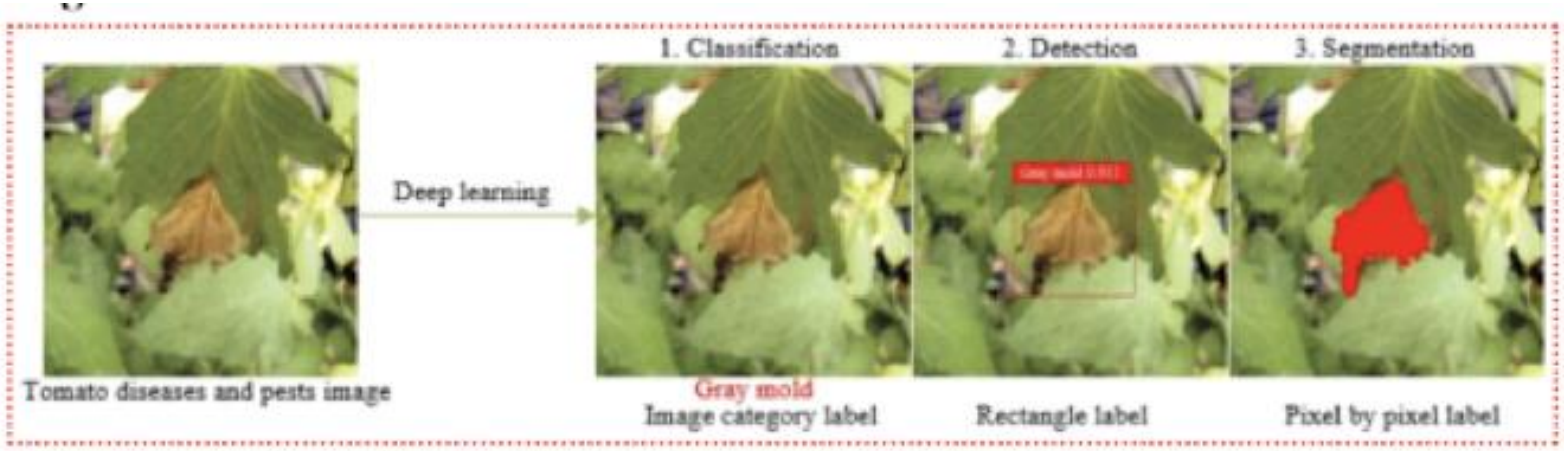
# Image stitching

# Machine Vision Examples in Agriculture



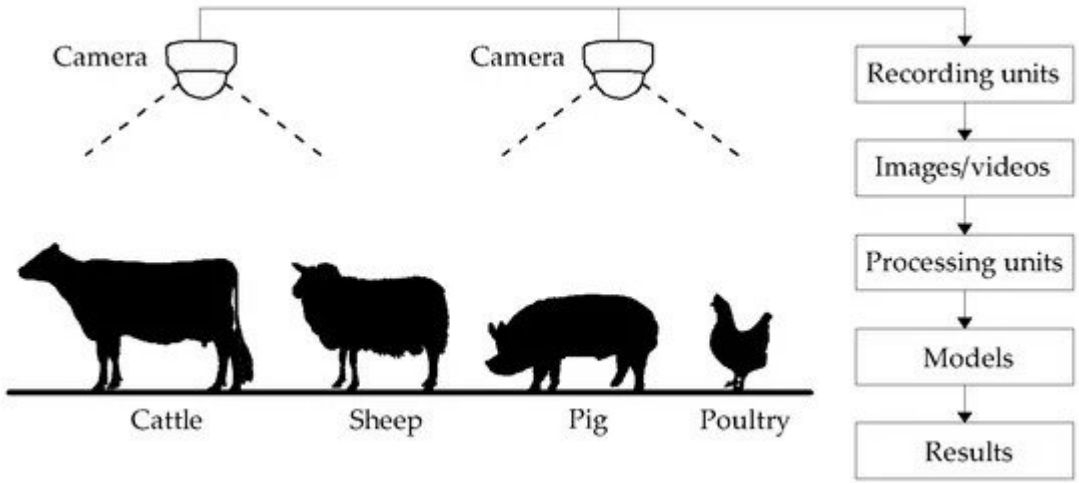
Fruit Recognition

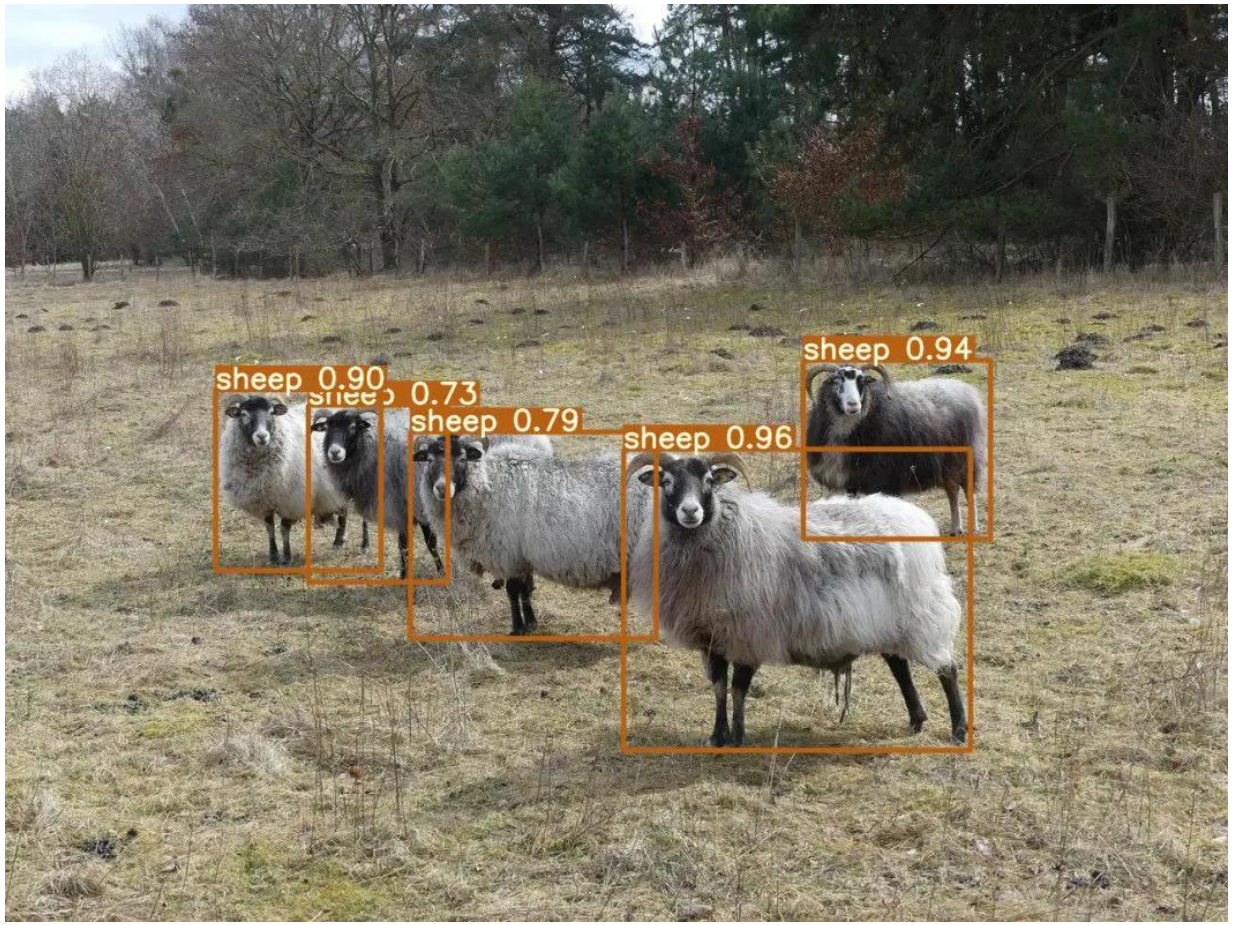



Definition of plant diseases and pests detection problem

# Animal Farming



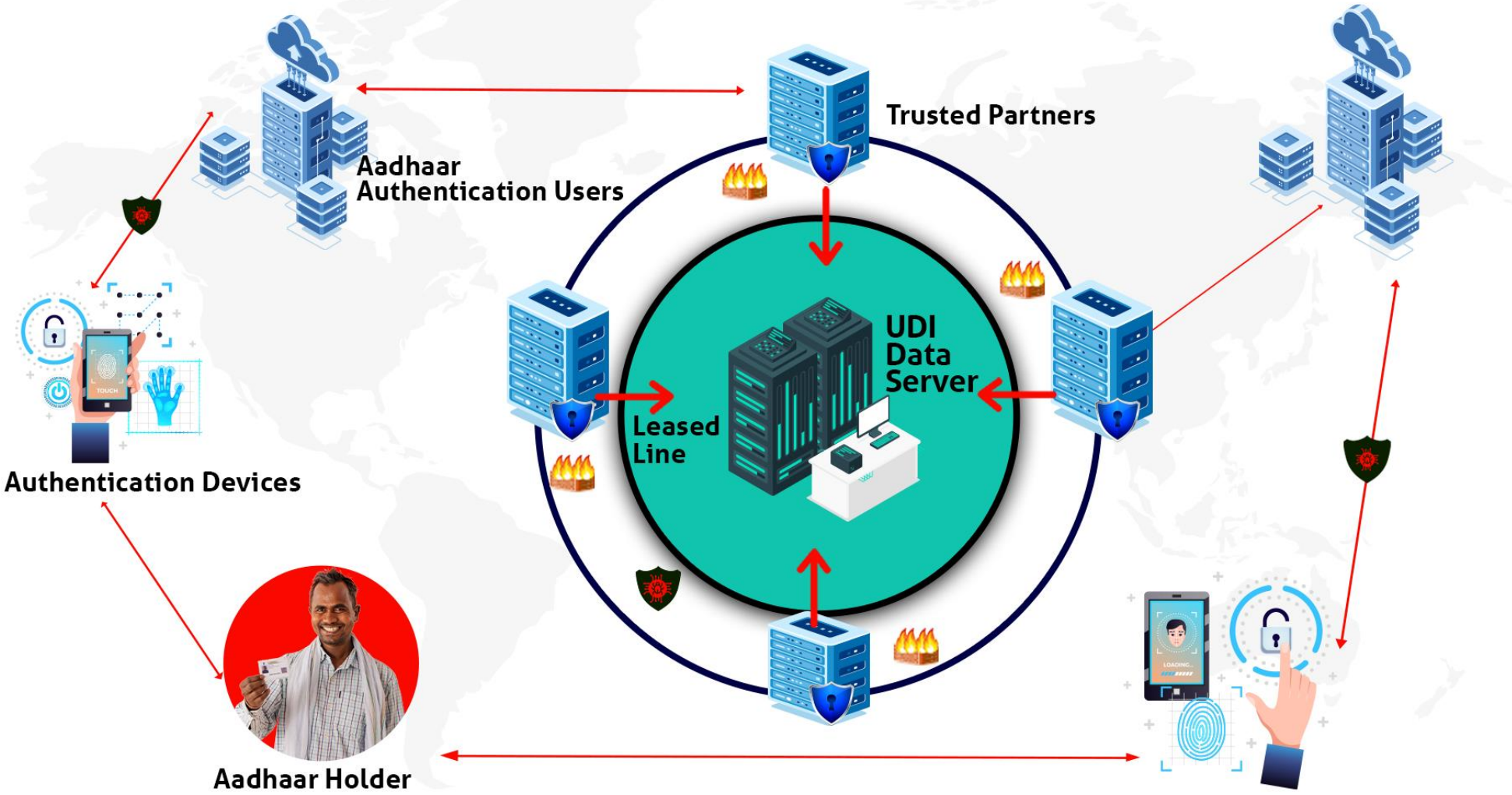
# NEC Multi-modal authentication at airports


Image of Authentication Flow

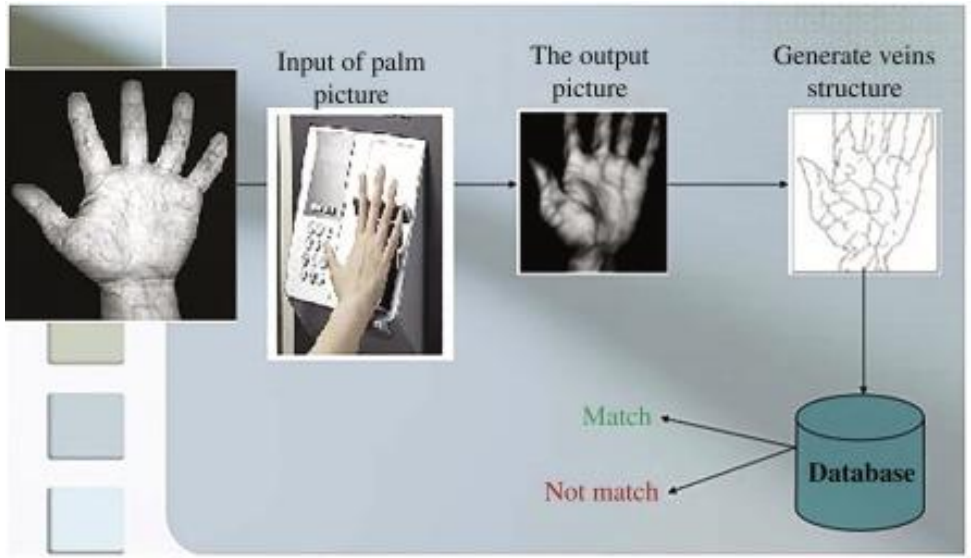
Face + Iris

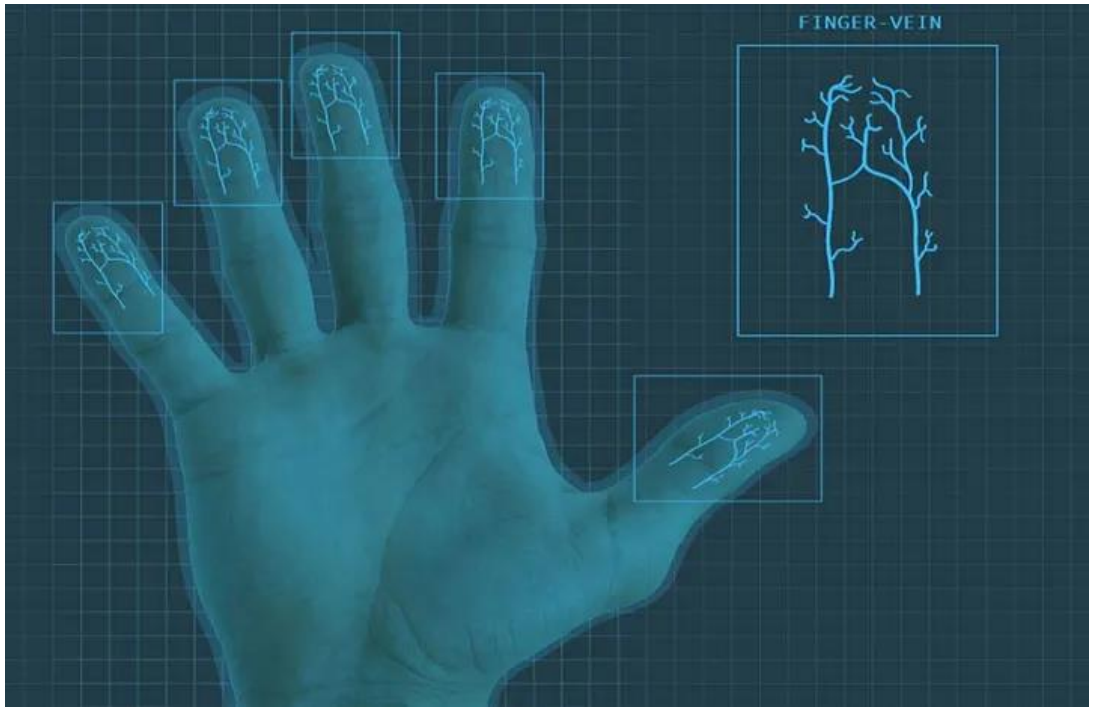

**Highly authentication accuracy  certification with false acceptance rate of one in 10 billion**

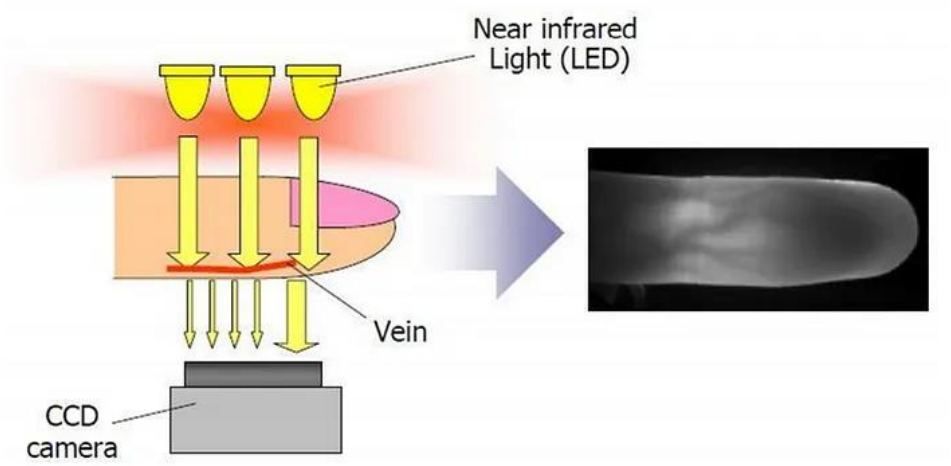
# Aadhar enabled Biometric authentication

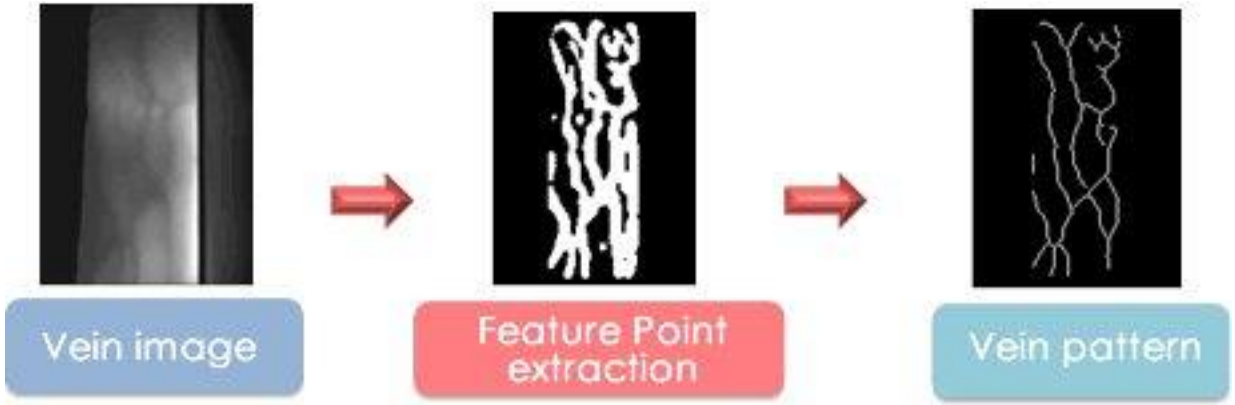


# Finger Vein Recognition



# Virtual Fitting

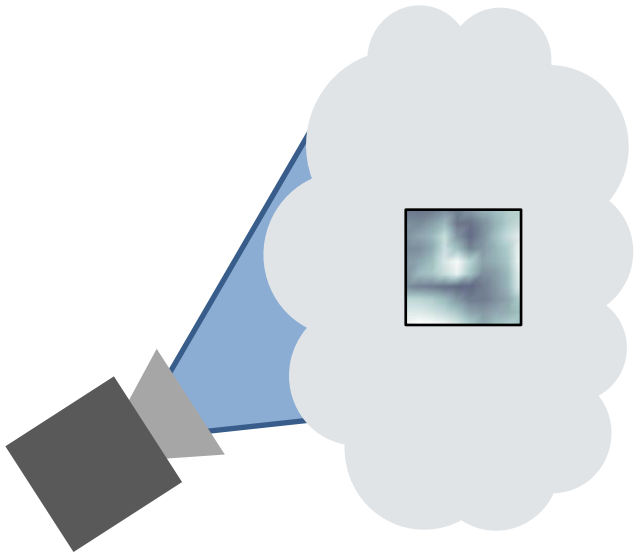

2015

# Computer Vision for VR

# Deep Face

# Facebook video style transfer

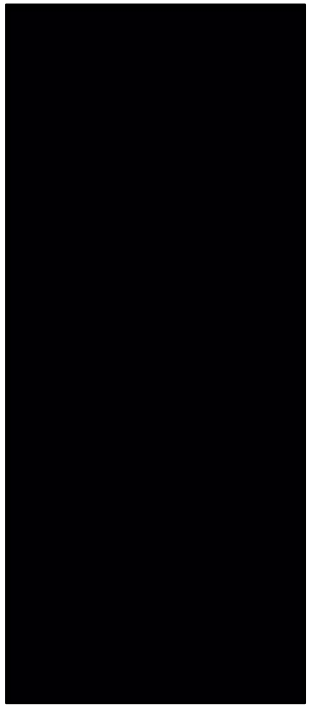
# Seeing inside objects



camera

thick smoke cloud

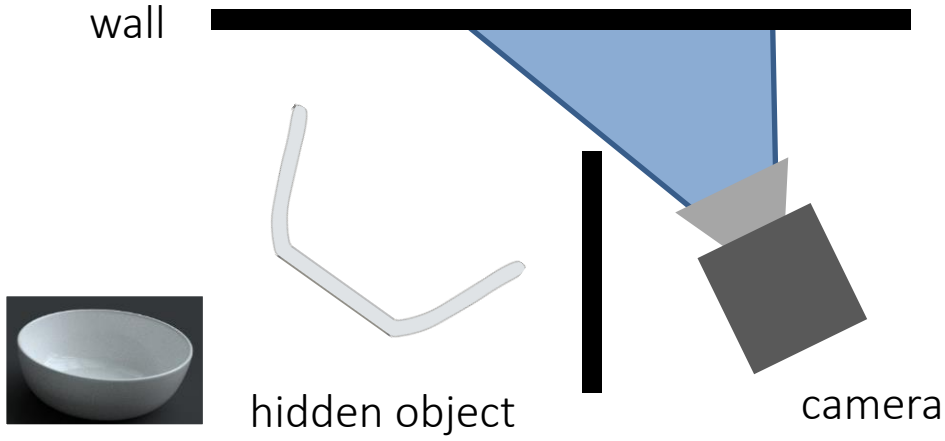
what a regular camera sees

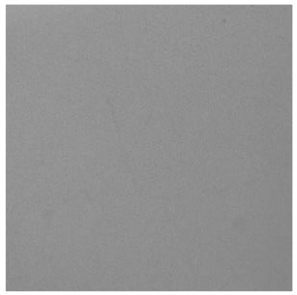


what our camera sees

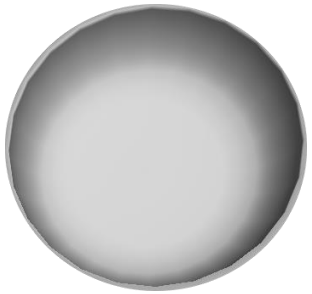
a slice through the cloud

# Seeing around walls

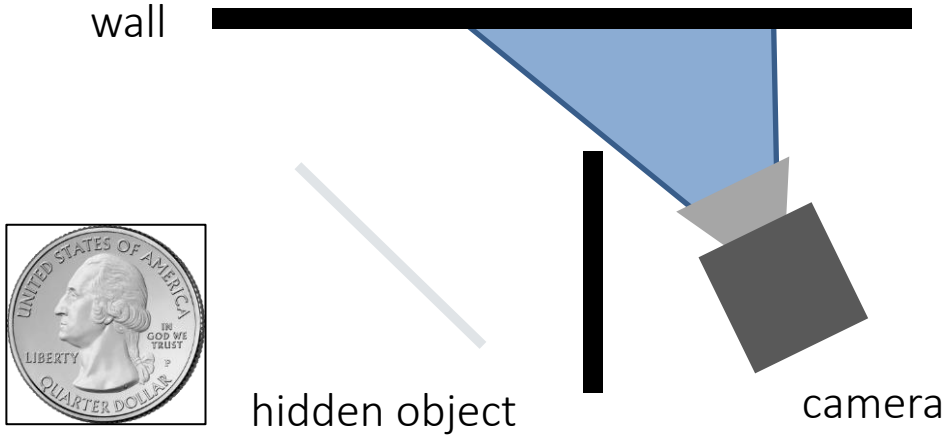


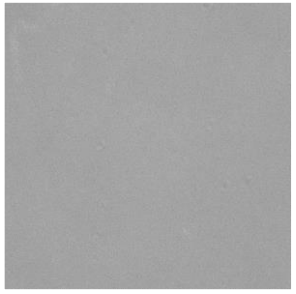



what a regular camera sees



what shape our camera sees



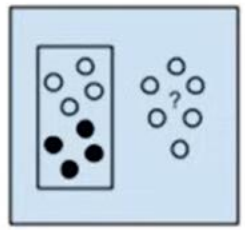



what a regular camera sees

what depth our camera sees

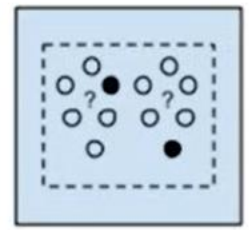
# It’s a good time to do computer vision

# **Computer Vision** is Deep Learning

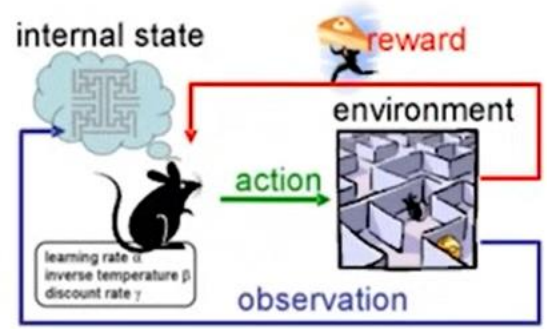


Supervised Learning

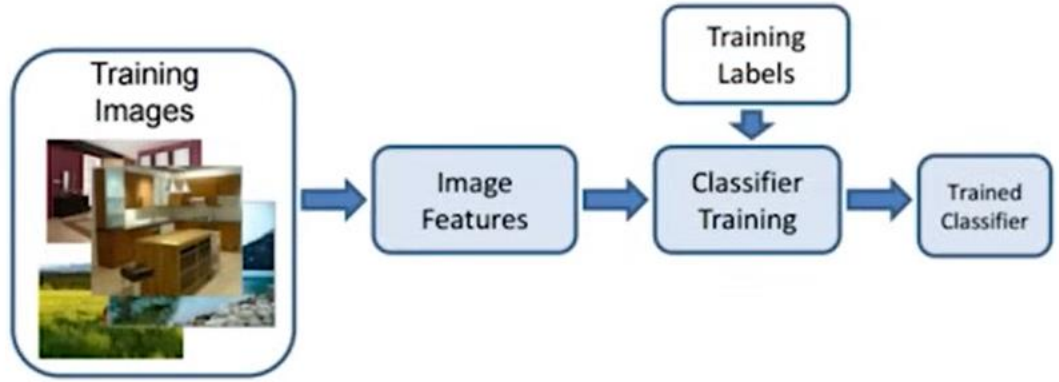
Unsupervised Learning



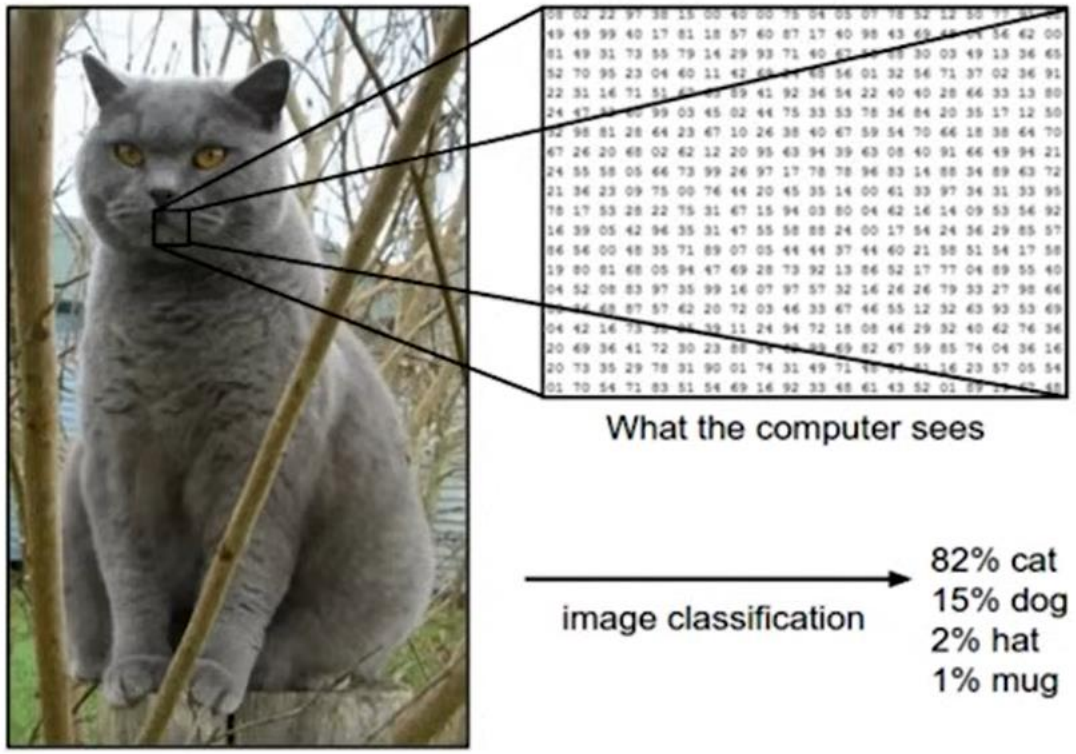
Semi-Supervised Learning




Reinforcement Learning

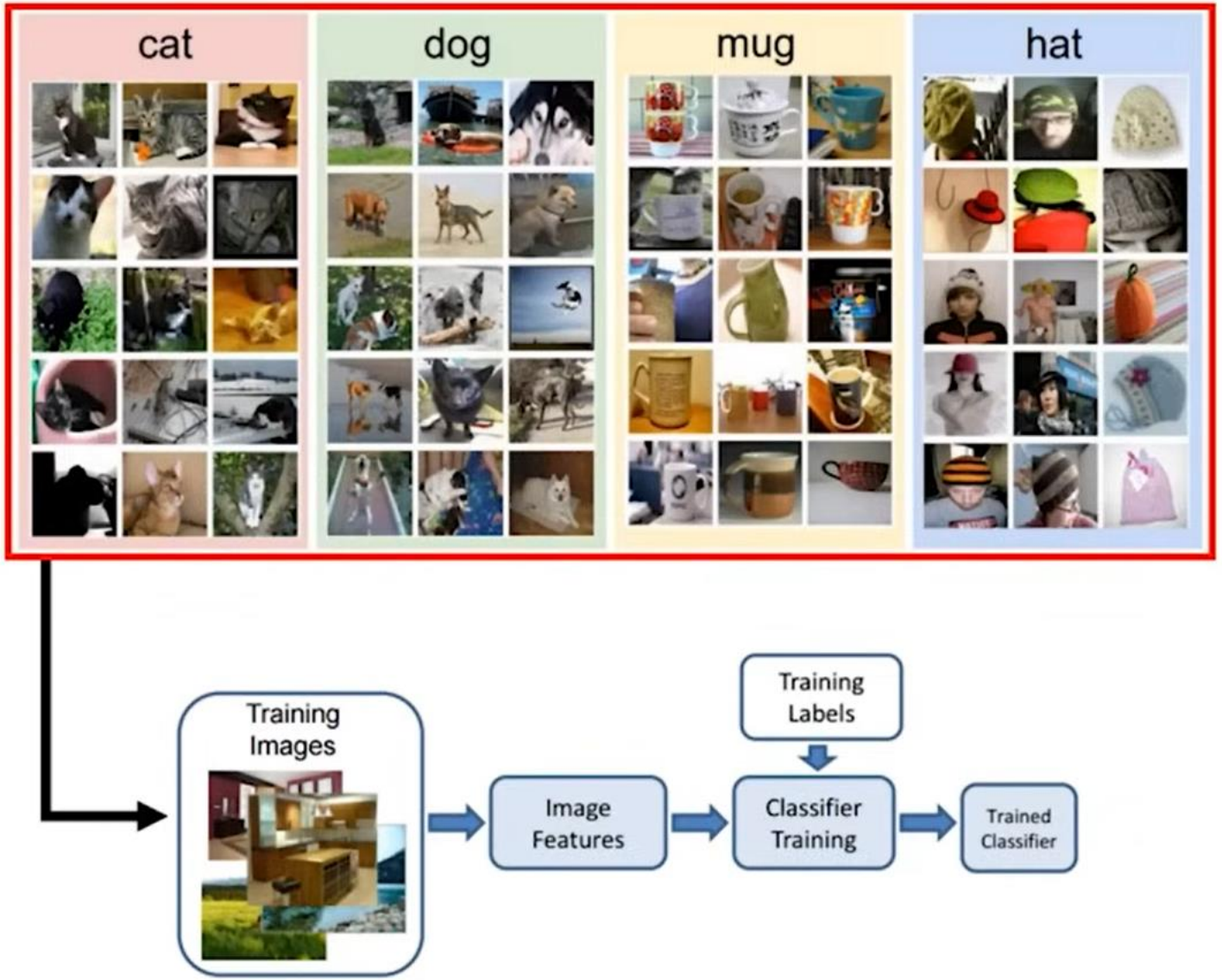



# Images are Numbers




- **Regression:** The output variable takes continuous values
- **Classification:** The output variable takes class labels
  - Underneath it may still produce continuous values such as probability of belonging to a particular class.

# Image Classification Pipeline



# Famous Computer Vision Datasets

**MNIST:** handwritten digits


**ImageNet:** WordNet hierarchy


**CIFAR-10(0):** tiny images


**Places:** natural scenes

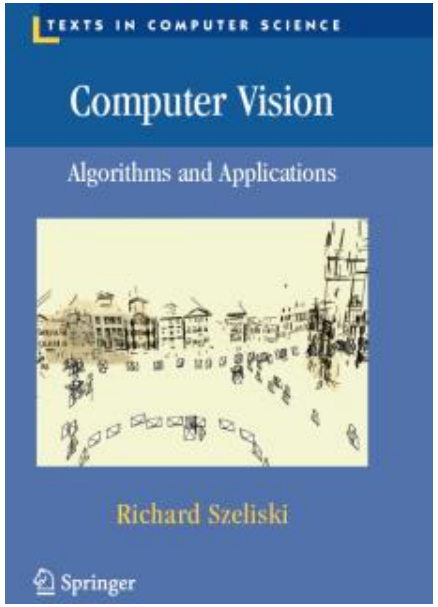
# Text Books and References

## ❖Text Books

- Richard Szeliski. ”Computer vision: Algorithms and Applications. Springer Nature, Second Edition”, 2022
- E. R. Davies, Computer Vision Principles, Algorithms, Applications, Learning, Elsevier,5th Edition, 2017

## ❖ References

- Rafael C. Gonzales, Richard E. Woods, “Digital Image Processing”, Fourth Edition, Pearson Education, 2018.
- Richard Szeliski ,”Computer Vision: Algorithms and Applications” , Springer 2015
- Intro to Digital Image Processing
- Digital Image Processing 2nd edition




PDF online

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- **MIT Introduction to Deep Learning | 6.S191**
- Digital Image Processing 2nd edition