

Master Mathematical Analysis and Applications
Course M1 - S2

Computer vision
Introduction

Week 1

Mohammed Hachama

`hachamam@gmail.com`

`http://hachama.github.io/home/`

University of Khemis Miliana

-2020-

Plan

1. Introduction

Extract "information" from pixels



What we see

0	3	2	5	4	7	6	9	8
3	0	1	2	3	4	5	6	7
2	1	0	3	2	5	4	7	6
5	2	3	0	1	2	3	4	5
4	3	2	1	0	3	2	5	4
7	4	5	2	3	0	1	2	3
6	5	4	3	2	1	0	3	2
9	6	7	4	5	2	3	0	1
8	7	6	5	4	3	2	1	0

What computer sees

Extract "information" from pixels

What kind of information ?



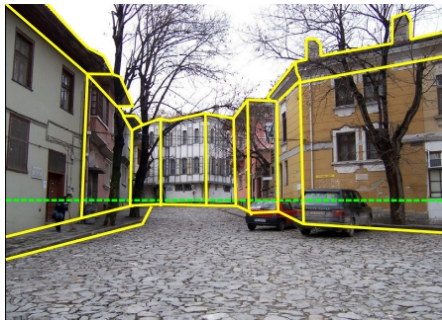
Input Image

Extract "information" from pixels

What kind of information ?



Input Image



Geometric information

Extract "information" from pixels

What kind of information?



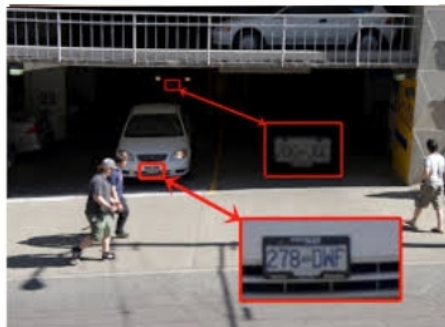
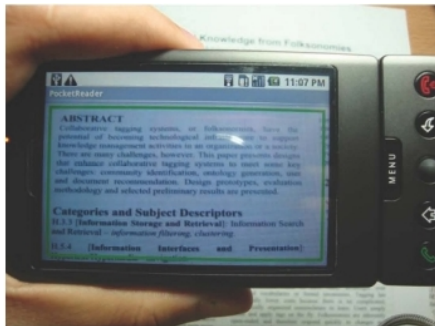
Input Image



Semantic information

Industrial vision

Optical character recognition (OCR)



Industrial vision

Visual inspection for quality assurance



Computer animation

Use of retro-reflective markers to capture actors motion

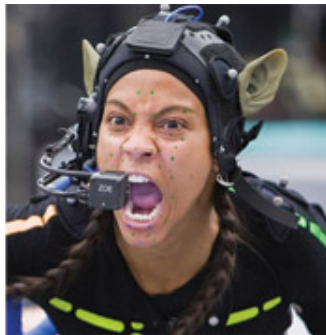


Image edition

Editing images as if they were 3D scenes



Vision-based biometrics

How the Afghan girl was Identified by Her Iris Patterns



Grading

- Attendance and class participation : 5 points
- Two interrogations : 10 points
- Programming assignments : 5 points
- Final exam

Resources

- Course web page : [*https://hachama.github.io/vision/*](https://hachama.github.io/vision/)
- Courses
 - CS131 : Computer Vision : Foundations and Applications.
 - CS231A : Computer Vision, From 3D Reconstruction to Recognition
 - CS543/ECE549 : Computer Vision
 - CAP 5415 - Computer Vision
- Books
 - Computer Vision : Algorithms and Applications.
 - Computer vision, A modern approach.
 - Concise Computer Vision, An Introd. into Theo. and Alg.
 - Advanced Image and Video Processing Using MATLAB.
 - Hands-On Image Processing with Python.