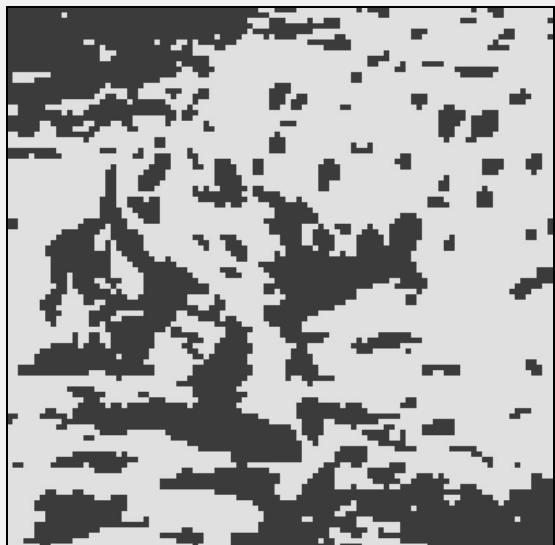


COMS30030 - Image Processing and Computer Vision



Video Lecture 01 Introduction

Majid Mirmehdi | majid@cs.bris.ac.uk

Staff on the unit



Prof. Majid Mirmehdi



Dr. Pui Anantrasirichai



Prof. Andrew Calway



Dr. Alessandro Masullo



Dr. Toby Perrett

Images or Image Frames



A single image



**A bunch of image frames
that make up a video**

What is Image Processing?

How to Brighten Images or Videos



Source images from: MIHO GmbH and minitool.com

What is Image Processing?

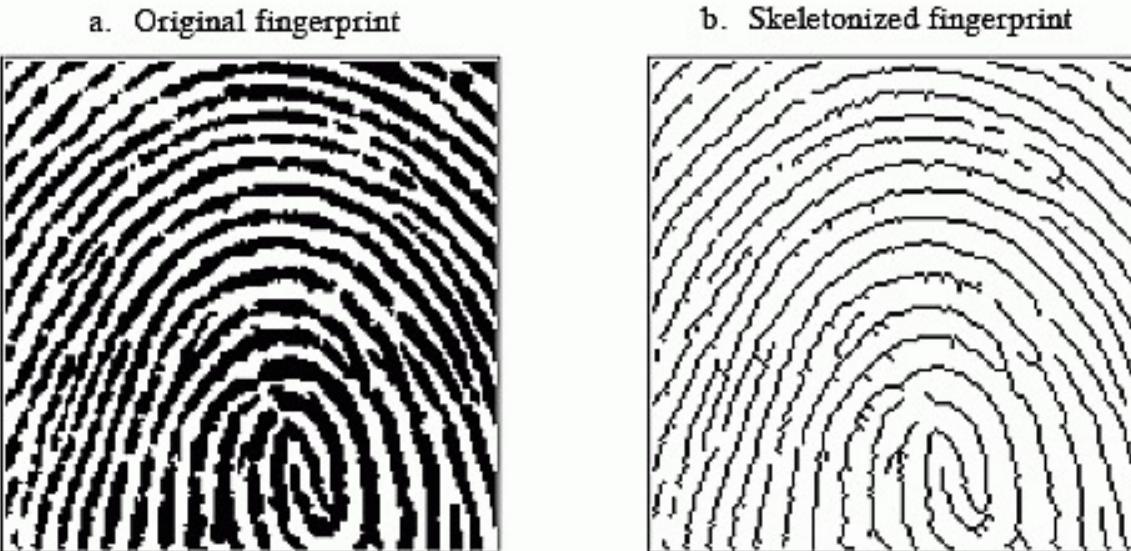


Image Processing... is the digital manipulation of an image to enhance it or extract some useful information from it.

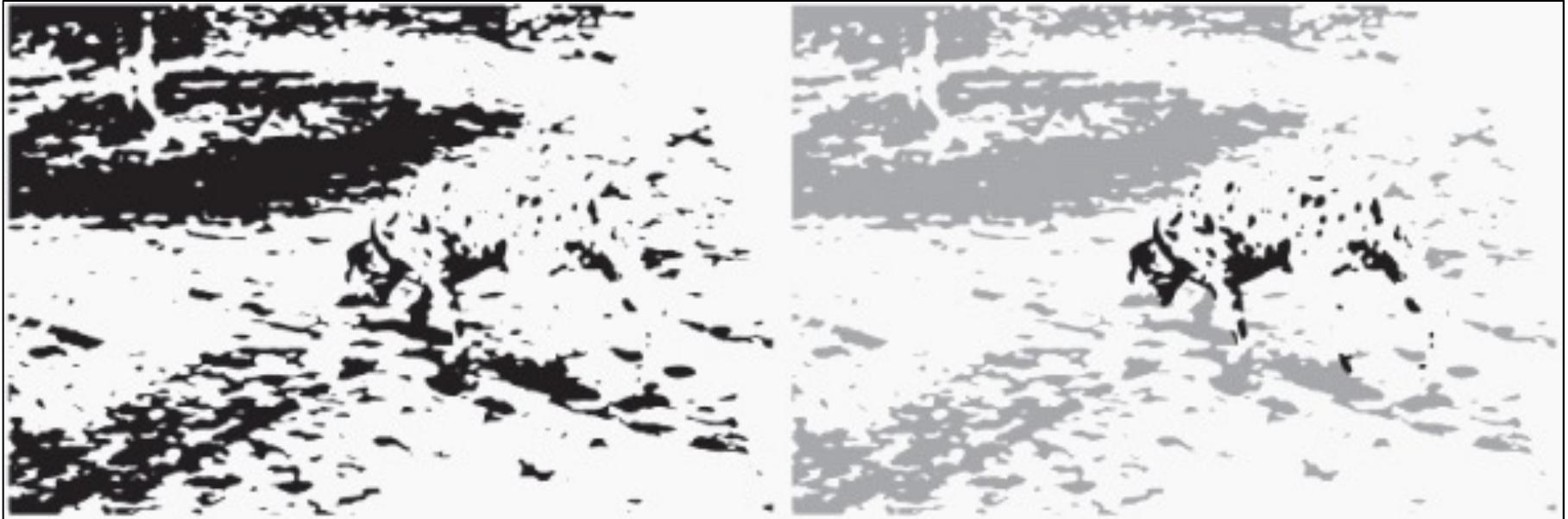
Source image from: <https://www.dspguide.com/ch25/4.htm>

What is Computer Vision?



Source image from: www.hubone.fr

What is Computer Vision?



Computer Vision ... attempts to bridge the semantic gap between pixels and their meaning

What is Computer Vision?

Pixels

Features

Models

Meaning



Source image from Dan Ruta on medium.com

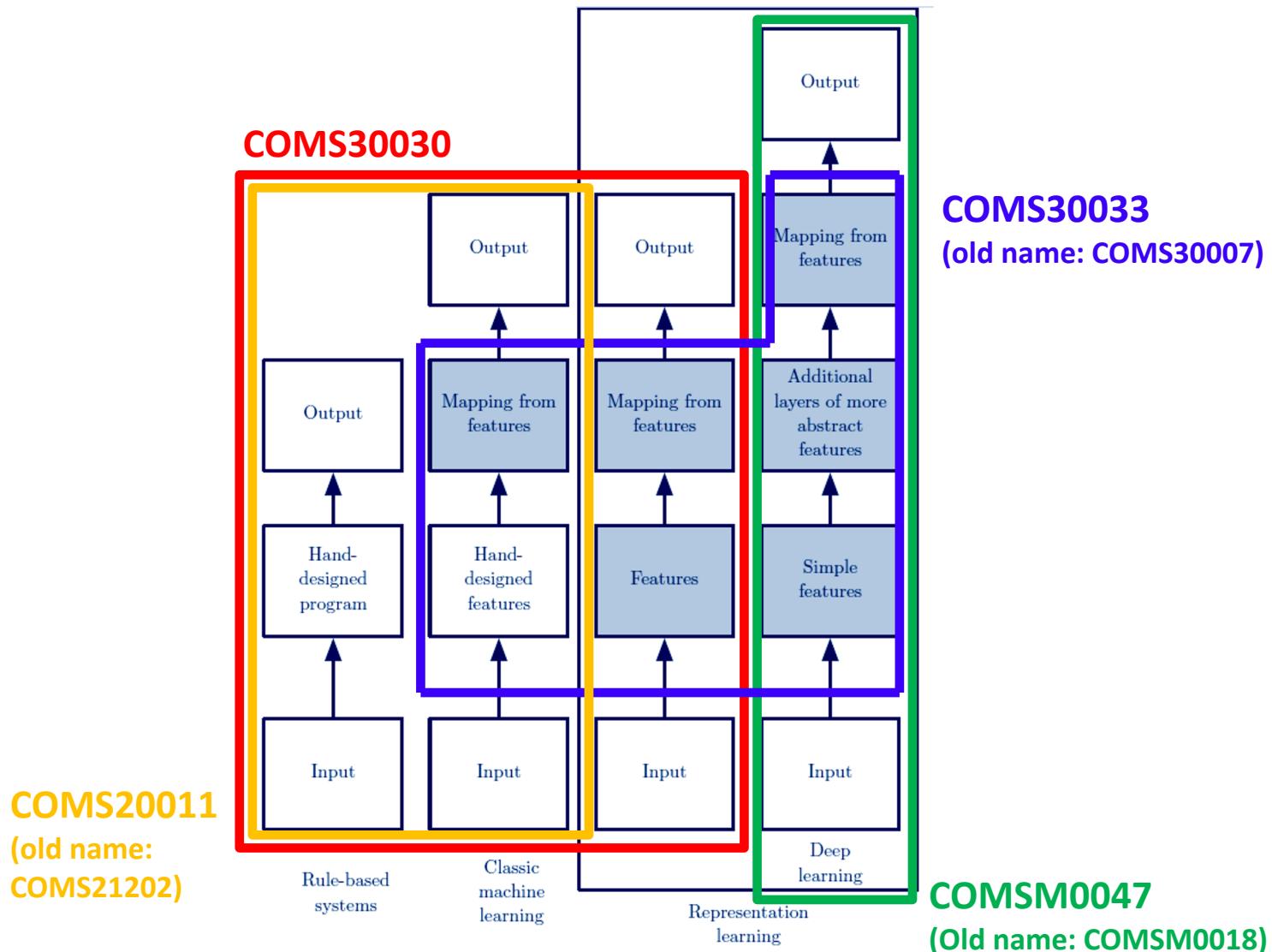
What is Computer Vision?

Pixels	Features	Models	Meaning
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Computer Vision ...

... concerns the study of the theory, engineering and application of artificial systems that extract semantic information from images or other structured, multidimensional data.

The Unit in its Machine Learning Context



Source modified from: Ian Goodfellow, www.deeplearningbook.org

COMS30030 Topics in a Nutshell

- Acquisition and Representation  Majid
- Image Transforms  Majid
- Edges and Shape  Alessandro
- Segmentation  Majid
- Object Detection  Toby
- Motion Analysis  Andrew
- Stereo Vision  Andrew

What will we do in COMS30030?

A first introduction to classical computational vision: the theory, principles, techniques, algorithms and applications.

The unit is structured in terms of topics. For each topic, we cover the basics of the underlying theory, some practical challenges, important algorithms, and example applications.

Lectures

principles
algorithms
context

Seminars

Problemsheets
Q&As/discussions
examples

Lab Sessions

coursework/project
implementation
evaluation

In-Person!

In-Person!

Delivery and Assessment

EXAM ONLY

Lectures+Seminars

The unit aims at providing a first theoretical introduction to classical computational vision: theory, techniques, and algorithms.

Lectures will introduce a topic and identify the key theory, challenges and applications. Students are expected to follow this up with self study based on a problem sheet, revision and further reading.

The problem sheet will be worked on in the seminars where students will discuss solutions with their peers directed by a member of the teaching team.

ASSESSMENT: 100% Final Exam

COURSEWORK ONLY

Lectures+Seminars+Labs

As well as lectures and seminars there are labs to give you a practical introduction to classical computational vision to help you experience implementing such algorithms.

Implementations will be via OpenCV, which is open-source and freely available for most platforms and languages.

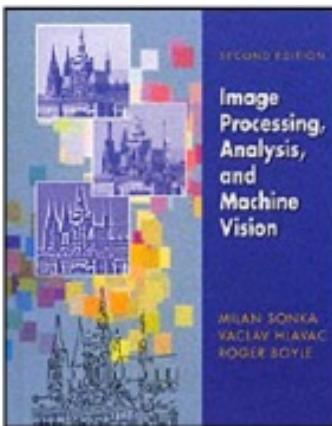
You can choose to work on your platform in a language you are most fluent in (at your own risk!); we will only support the MVB2.11 lab setup and the C++ interface of OpenCV.

You will work individually during the lab sessions and for your coursework. You will submit both code and a report.

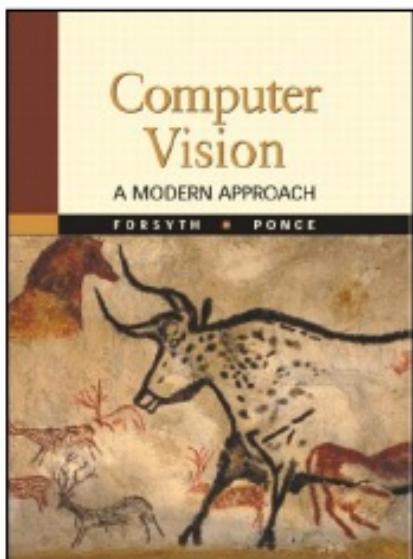
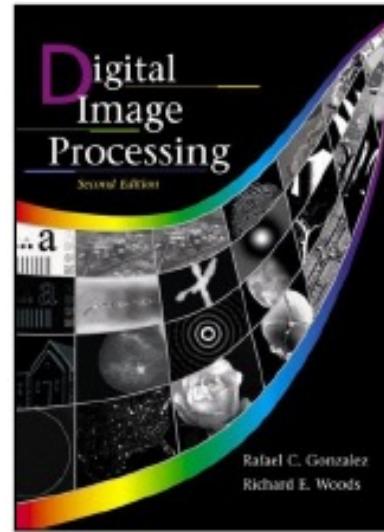
ASSESSMENT: 100% Coursework

Some Suggestions for General Reading

Image Processing
Analysis and
Machine Vision
by Sonka, Boyle and Hlavac



Digital
Image
Processing
by Gonzalez and Woods



Computer Vision:
A Modern Approach
by Forsyth and Ponce

Example Applications of Computer Vision