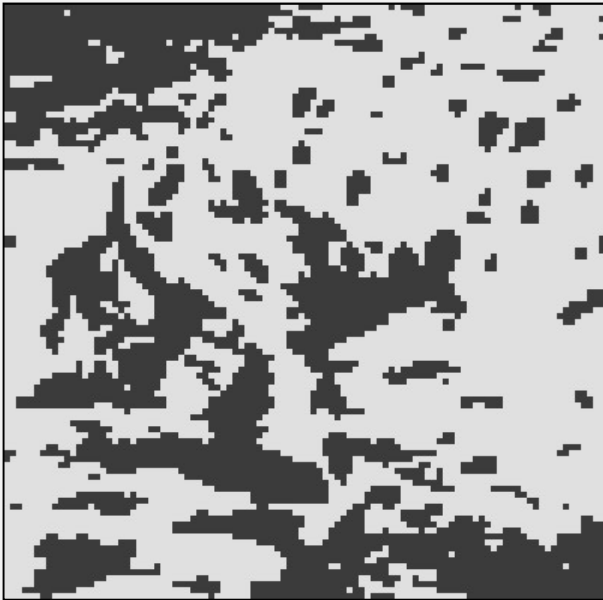


COMS30121 - Image Processing and Computer Vision

www.ole.bris.ac.uk/bbcswebdav/courses/COMS30121_2017/content

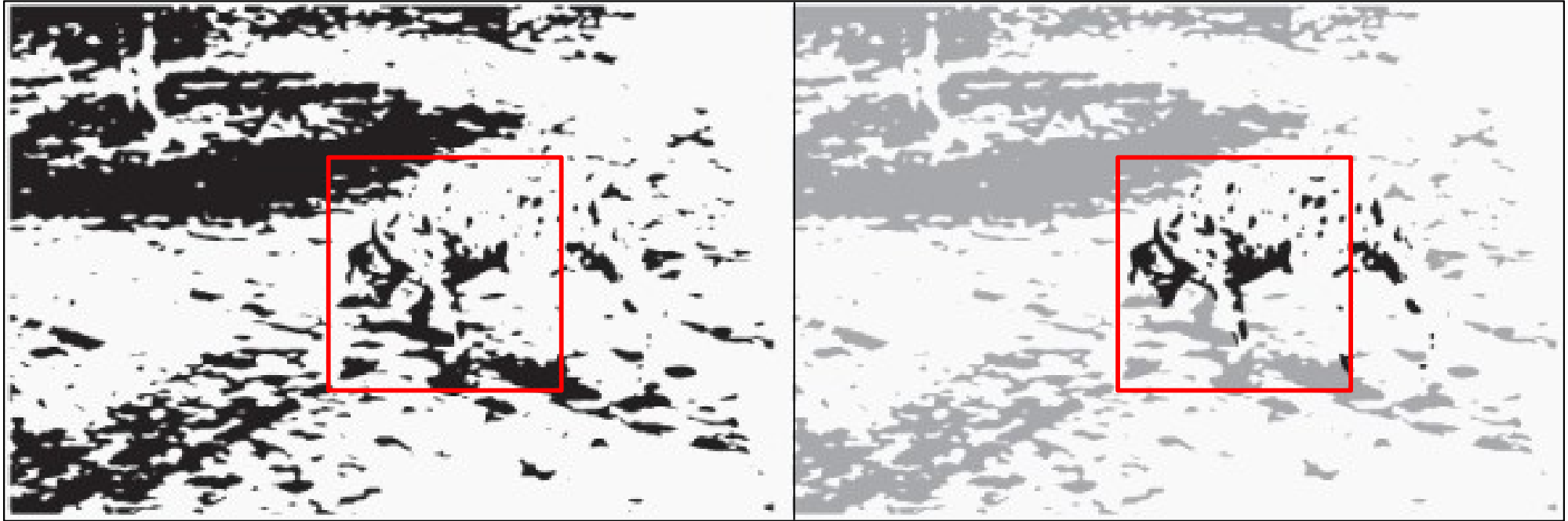


Lecture 01

Introduction

Andrew Calway | andrew@cs.bris.ac.uk
Tilo Burghardt | tilo@cs.bris.ac.uk

What is Computer Vision?



Computer Vision ... attempts bridging the semantic gap between picture elements [pixels] and meaning

What is Computer Vision?

Pixels

Features

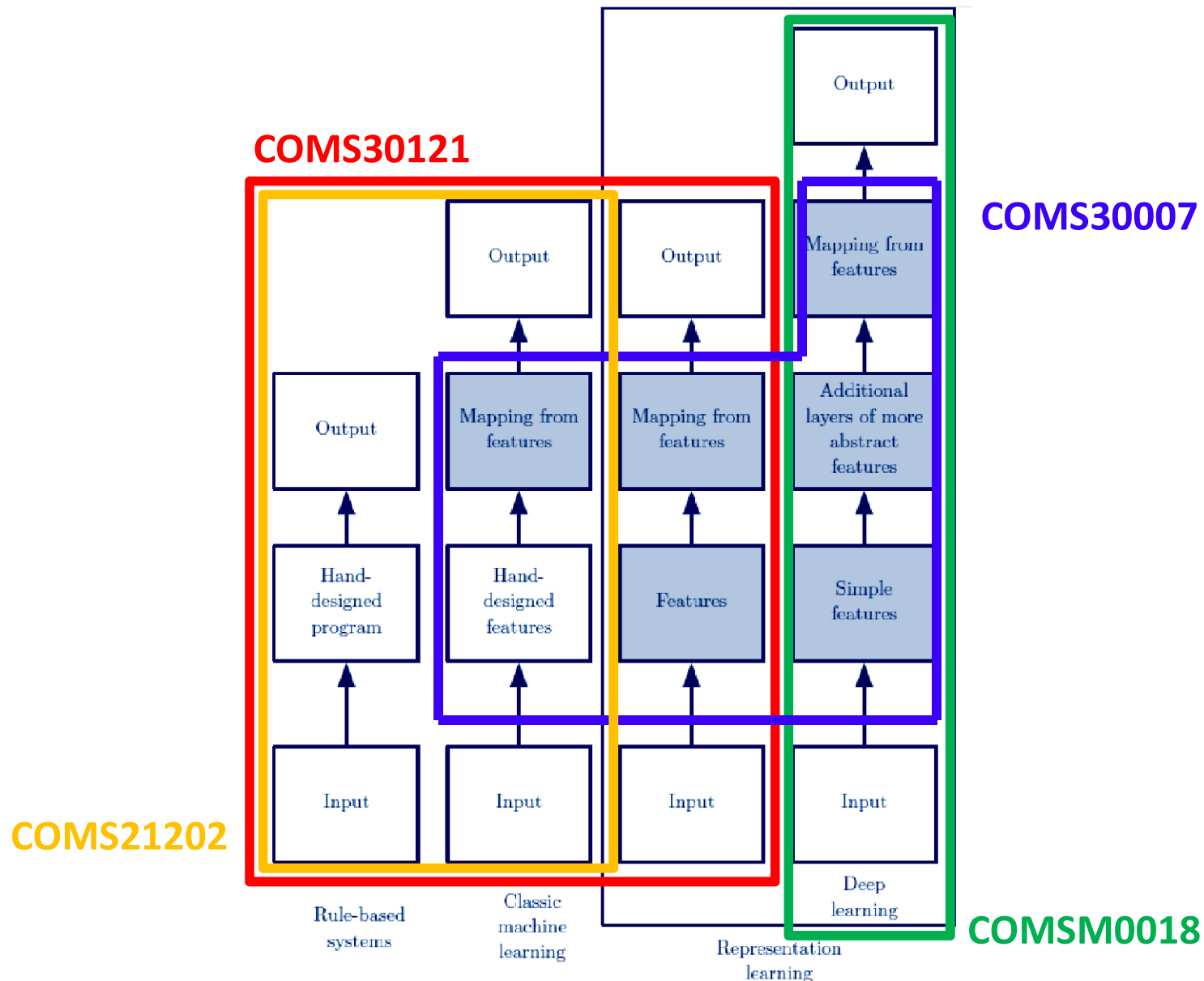
Models

Meaning

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

What will we teach in the subject?

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

worksheets
discussions
examples

Lab Sessions

coursework/project
implementation
evaluation



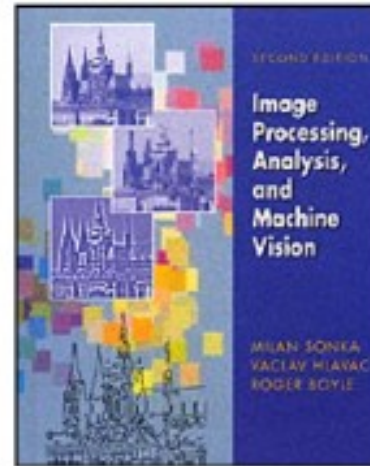
Self Study

Unit Topics in a Nutshell

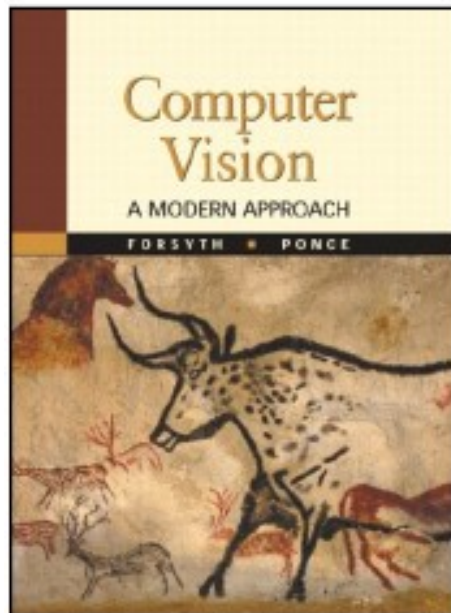
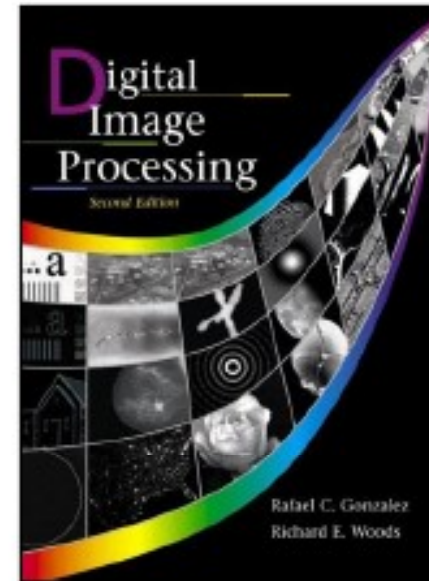
- Acquisition and Representation
- Image Transforms
- Edges and Shape
- Segmentation
- Object Detection
- Motion Analysis
- Stereo Vision

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

'Learning by Doing'

... you learn by implementing algorithms and experimenting with them, e.g. evaluating their performance.

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

We suggest you install it on your own machines.

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

You will work in pairs during the lab sessions and courseworks.

TASK: Form pairs and register online at the end of this lecture.

Unit Assessment

Coursework (50%)

- you will work in pairs on small projects
- there will be weekly formative lab feedback
- one final summative assessment will cover a lab presentation of your team project, its implementation and documentation

Exam - January 2018 (50%)

The Unit Website

Central Hub for all Learning Sessions, Materials, Courseworks, ...

www.ole.bris.ac.uk/bbcswebdav/courses/COMS30121_2017/content

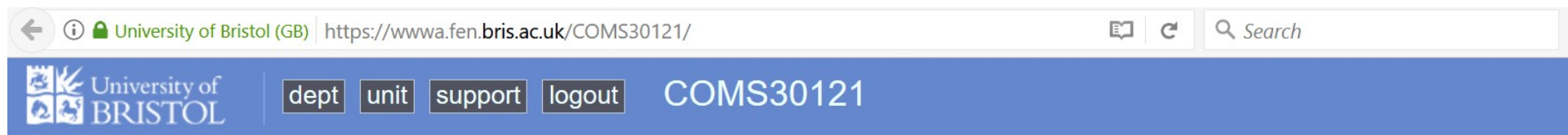
MATERIALS: Lecture Notes, Worksheets, Courseworks

WEEK	LECTURES	SEMINARS	LABS
01	<p>Mon 25/09/2017, QB 1.40 PUGSLEY, 12noon</p> <p>LECTURE 01 - INTRODUCTION</p> <p>Topic: What is Computer Vision?</p> <p>(No Tuesday seminar in week 1)</p> <p>-- TEAM SIGNUP --</p> <p>Signup as a pair for ONE lab slot with your TWO comma-separated usernames in the participant field. Deadline is end of Mon 25/09/17, 23:59. Then turn up to the lab slot you signed up for.</p> <p>Links related to Demos (only for interest):</p> <p>Website: Visual Information Laboratory at Bristol</p> <p>Website: Textureless Object Detector</p> <p>Paper Classic: Viola-Jones Face Detection</p> <p>Helpful Links to Get Started:</p> <p>Working Remotely using Snowy or MVB2.11 Lab Machines</p> <p>New to Linux? - A Hands-on Linux Tutorial</p>		<p>Group A: Tue 26/09/2017, 9am-11pm, MVB2.11</p> <p>Group B: Thu 28/09/2016, 9am-11am, MVB2.11</p> <p>LAB 01: Introduction to OpenCV Basics</p> <p>Part 1: Lab Setup and getting started...</p> <p>Part 2: Thresholding images...</p> <p>Example OpenCV Code (C++):</p> <p>hello.cpp, load.cpp, draw.cpp, pixels.cpp, thr.cpp</p> <p>Resources and Materials:</p> <p>Example Script .bashrc for MVB2.11, mandrill.jpg, mandrillRGB.jpg, OpenCV threshold function, OpenCV inRange function</p> <p>External Link: Download OpenCV</p> <p>External Link: OpenCV Manual</p>

SAFE Submission and Deadlines

Central Hub for Coursework Submissions ...

www.fen.bris.ac.uk/COMS30121



Unit Information

Image Processing and Computer Vision

For brief details of the unit, please see: [University Unit Catalogue](#)

Staff: [Tilo Burghardt](#) (Organiser), [Andrew Calway](#) (Organiser)

Assistants: [Chloe Massey](#), [Janet Woolway-Allen](#), [Emily Grundy](#), [Emma Tweddle](#)

Credits: 10 **Students:** 206 | [Cohort](#) | [Progress](#) (Staff View) | [Manage Unit](#) | [CS Unit](#) | [CS Forum](#) | [Unit Questionnaire Results](#)

Coursework Submission (Staff View): **tb2935**

Header	%W	Deadline		Submission	Feedback Due / Mode		Marks Release	Markers*	Submitted* / 206		Class Average Unit Average: 0
1. TEAMS, Pairings (G)		n/a					Not Released	n/a	n/a		0
2. CW, Project	50.0	Mon 04 Dec 2017	17:59	SAFE	Fri 15 Dec 2017	Ask Unit Staff	Not Released	All unit staff	0	0 %	0
3. EXAM	50.0	Not Set		Not Set	Wed 13 Sep 2017		Not Released	All unit staff	Offline		0

* Markers and Submissions not visible to students. Note: New system of [accounting](#) for submissions

Demo Applications



Don't leave the room without having registered a team!

'Team Formation'

Signup as a PAIR for ONE lab slot with your TWO comma-separated usernames in the participant field. Then turn up to the lab slot you signed up for.

Use the link on the website:

www.ole.bris.ac.uk/bbcswebdav/courses/COMS30121_2017/content

...or directly via this doodle link:

<https://doodle.com/poll/enrv95gzspg42dcs>

TASK: You have to signup TODAY – labs start tomorrow!