Welcome to
COMP 6206 Computer Vision
Mark Nixon and John Carter
Welcome!

• It’s **advanced**
• It’s **fun**
• We’ve done it for years (and **enjoyed** it)
• **Students** always enjoy it (perhaps except one...)
• Who’ve we got.......
Today

1. Kinda depends on who we got!
2. First ½ overview
3. Cover computer vision
4. Second ½ overview
5. Implementation
Course Structure

Week 1 is this meeting, then...

<table>
<thead>
<tr>
<th>Week</th>
<th>Easter term</th>
<th>Summer</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>A Groups</td>
<td>Task 1</td>
<td>Task 2</td>
</tr>
<tr>
<td>B Groups</td>
<td>Task 1</td>
<td>Task 2</td>
</tr>
</tbody>
</table>
(Highly) Recommended Textbook

Currently ~£40 (or £121!!)
Plenty of chances to win (real) beer!

Direct from the Library!!

In webcat [https://www-lib.soton.ac.uk/](https://www-lib.soton.ac.uk/) I have searched for your book

If off campus the students need to use the VPN or Southampton virtual environment - then click on the highlighted link to access the full text of the book. This is not available on kindles etc

---

**Feature extraction & image processing for computer vision [electronic resource] 3rd ed.**

Nixon, Mark S.

Internet

2012

1 copy available in Our Online Collection

[Online link to document]
Process

• Choose your *partner*
• Choose *assignment topic*
• *Implement* it (or if you can’t do it, steal it and admit it)
• Give a *talk* on it, and *demonstrate* it
• *Submit* it and we put it on the web
Assessment

• General feedback at lectures, all submitted material will be marked (inc. presentation)
• Mark is 100% coursework
• Marking is per person pro-rata by time and
  – 60% assignments and 40% c/w
• We expect ≡ 1 day’s work (9-6, solid) each week
• Clashes with any other courses?
Week 2, A Groups

• Marr Hildreth Edges
• Canny Edges
• Susan Edges
• (Basic) Morphology
• Force Field Transform
• Mode filter
• Median and Adaptive Median
• Non local means filtering
• Optimal thresholding
Week 3, B Groups

• Anisotropic Diffusion
• Bilateral Filtering
• Phase Congruency
• SIFT and SURF (comparison please!)
• HoG
• BRIEF; FREAK; GIST; or LOCKY operators
• Velocity HT
• Generalised HT
• Viola Jones Face Detector (Haar Wavelets)
Week 4, A Groups

- Active Contours (Greedy)
- Kass Snake
- Symmetry
- Active Shape Models
- Active Contour Without Edges
- Optical flow (differential and correlation)
- Invariant HT
- Superpixels
Week 5, B Groups

- Invariant Fourier Descriptors
- Elliptic Fourier Descriptors
- Invariant Moments
- Tchebichef, Krawchouk or Fourier Moments
- High order invariants
- GLDM for texture
- Fourier and Gabor for texture
- Region growing with edge detection
- LBP for texture
Week 6, A Groups

- Ordinal measures for texture
- Extended LBP
- SGF for texture
- Moving-edge detection by heat flow
- Object detection by light analogy
- Object detection by water flow
- Camera Calibration (Intrinsics)
- Shape from Shading
Week 6, B Groups

• K-Nearest Neighbour
• Support Vector Machines (idiots guide thereto)
• Distance measures
• Medial Axis transform
• Feature subset selection
• Deep neural networks
• K means clustering
• Multi-dimensional scaling
Example presentation...