

Introduction to Image Processing

Course syllabus
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1 Syllabus

Important Stuff

Approximate Schedule

Textbooks

Prerequisites

2 Introduction to DIP

What is a digital image?

Application examples



Important Stuff

Assessment

- ▶ Mid-semester exam at the beginning of November (30 %)
- ▶ Final exam at the end of the module (50 %)
- ▶ Project with viva (20 %)



Approximate Schedule

Topic — Load

1. Digital image fundamentals (2h)
2. Image enhancement in the spatial domain (3h)
3. Spatial filtering (3h)
4. Filtering in the frequency domain (3h)
5. Restoration (2h)
6. Introduction to the wavelet analysis (2h)
7. Color space (2h)
8. Mathematical morphology (2h)
9. Image segmentation (6h)



Approximate Schedule

Additionally ...

- ▶ 2 practises of 2h
- ▶ 2 practises of 3h
- ▶ Project in team



Approximate Schedule

Topic — Load

- ▶ **R. Gonzales & R. Woods**, “Digital Image Processing”
- ▶ **J. S. Lim**, “Two Dimensional Signal and Image Processing”
- ▶ **J. Russ**, “The Image Processing Handbook”
- ▶ **W. K. Pratt**, “Digital Image Processing”



Prerequisites

Requirements

- ▶ Do you have a notebook?



Prerequisites

Requirements

- ▶ Do you have a notebook?
- ▶ Do you have a linux distribution installed?



Prerequisites

Requirements

- ▶ Do you have a notebook?
 - ▶ Do you have a linux distribution installed?
- Install one!!! <http://www.ubuntu.com>





Prerequisites

Requirements

- ▶ Do you have a notebook?
- ▶ Do you have a linux distribution installed?
→ Install one!!! <http://www.ubuntu.com>
- ▶ Did you ever use python?





Prerequisites

Requirements

- ▶ Do you have a notebook?
- ▶ Do you have a linux distribution installed?
→ Install one!!! <http://www.ubuntu.com>
- ▶ Did you ever use python?
→ Install it!!! <http://continuum.io/downloads>





Prerequisites

Requirements

- ▶ Do you have a notebook?
- ▶ Do you have a linux distribution installed?
→ Install one!!! <http://www.ubuntu.com>
- ▶ Did you ever use python?
→ Install it!!! <http://continuum.io/downloads>
- ▶ Did you ever use GitHub?



Anaconda



Prerequisites

Requirements

- ▶ Do you have a notebook?
- ▶ Do you have a linux distribution installed?
→ Install one!!! <http://www.ubuntu.com>
- ▶ Did you ever use python?
→ Install it!!! <http://continuum.io/downloads>
- ▶ Did you ever use GitHub?
→ Start now!!! <https://github.com>
- ▶ <https://github.com/ViBOT-Erasmus/B31XB-IIP-Syllabus>



ubuntu



Anaconda



Introduction to DIP What is a digital image?

Type of digital images

- ▶ Photographs

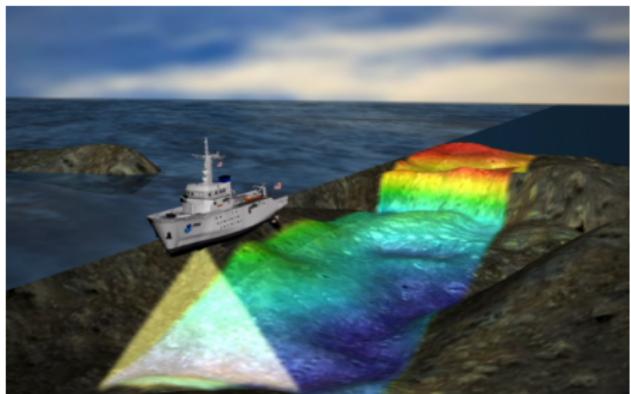




Introduction to DIP What is a digital image?

Type of digital images

- ▶ Photographs
- ▶ Sonars

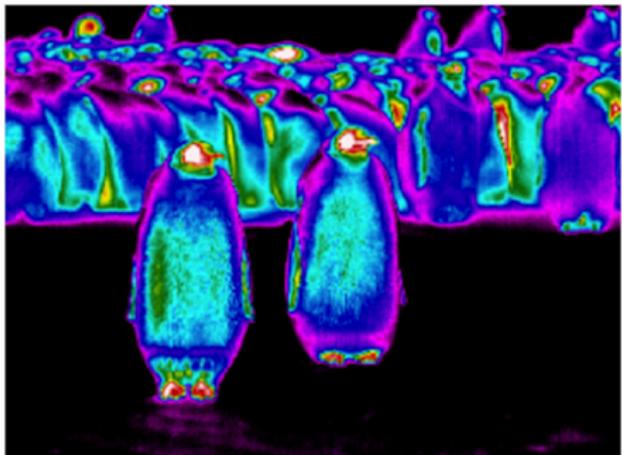




Introduction to DIP What is a digital image?

Type of digital images

- ▶ Photographs
- ▶ Sonars
- ▶ Infrared cameras





Introduction to DIP What is a digital image?

Type of digital images

- ▶ Photographs
- ▶ Sonars
- ▶ Infrared cameras
- ▶ Ultrasound

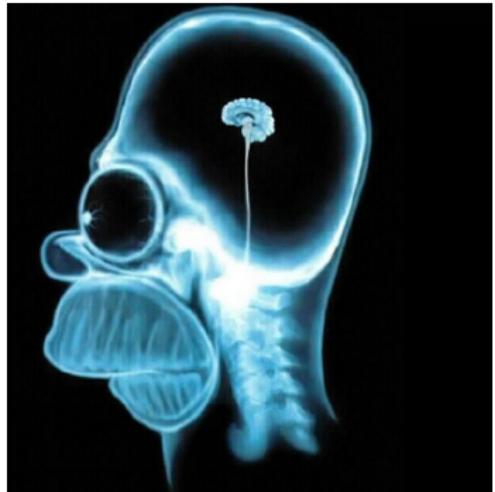




Introduction to DIP What is a digital image?

Type of digital images

- ▶ Photographs
- ▶ Sonars
- ▶ Infrared cameras
- ▶ Ultrasound
- ▶ X-rays

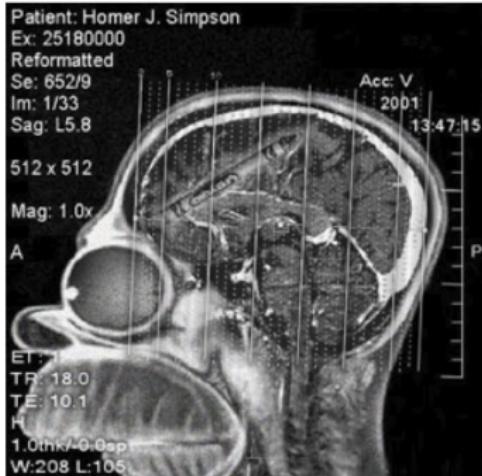




Introduction to DIP What is a digital image?

Type of digital images

- ▶ Photographs
- ▶ Sonars
- ▶ Infrared cameras
- ▶ Ultrasound
- ▶ X-rays
- ▶ Magnetic resonance imaging

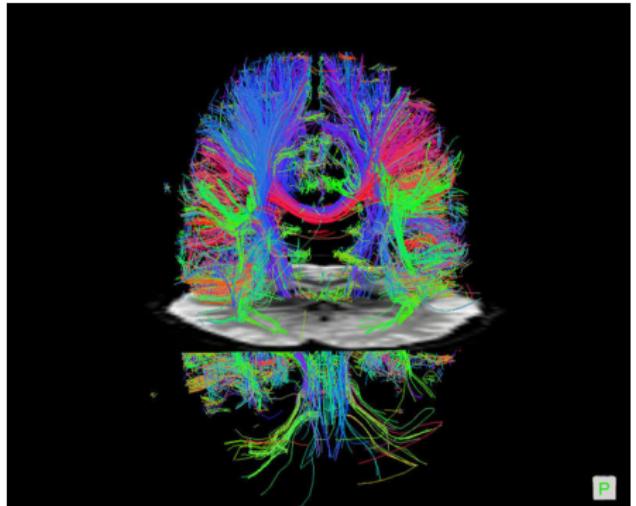




Introduction to DIP

Applications

- ▶ Biomedical

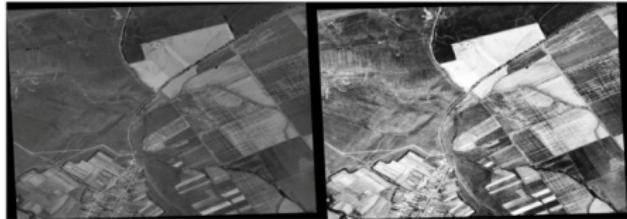




Introduction to DIP

Applications

- ▶ Biomedical
- ▶ Cartography

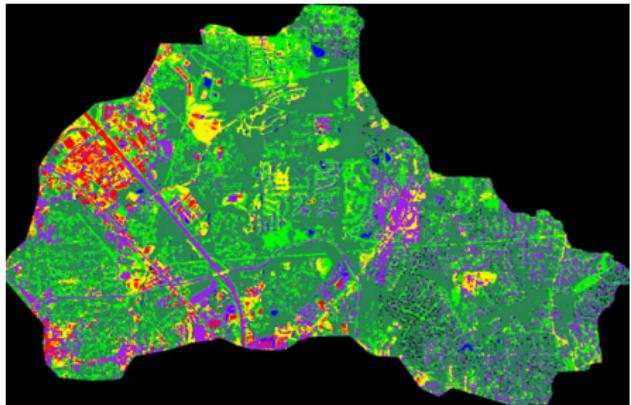




Introduction to DIP

Applications

- ▶ Biomedical
- ▶ Cartography
- ▶ Land monitoring





Introduction to DIP

Applications

- ▶ Biomedical
- ▶ Cartography
- ▶ Land monitoring
- ▶ Inspection





Introduction to DIP

Applications

- ▶ Biomedical
- ▶ Cartography
- ▶ Land monitoring
- ▶ Inspection
- ▶ Surveillance





Introduction to DIP

Applications

- ▶ Biomedical
- ▶ Cartography
- ▶ Land monitoring
- ▶ Inspection
- ▶ Surveillance
- ▶ Biometrics





Introduction to DIP

Applications

- ▶ Biomedical
- ▶ Cartography
- ▶ Land monitoring
- ▶ Inspection
- ▶ Surveillance
- ▶ Biometrics
- ▶ Enhanced visualisation





Introduction to DIP

Applications

- ▶ Biomedical
- ▶ Cartography
- ▶ Land monitoring
- ▶ Inspection
- ▶ Surveillance
- ▶ Biometrics
- ▶ Enhanced visualisation
- ▶ Content-based image retrieval

