

Centre for Image Processing & Analysis

Biomedical
Computer
Vision

Surface/Organ/
Cell/SubCell

Vision
Systems
Group

Machine Vision

Industrial &
Agricultural

Traditional
Computer
Vision

wellcome trust



ENTERPRISE IRELAND

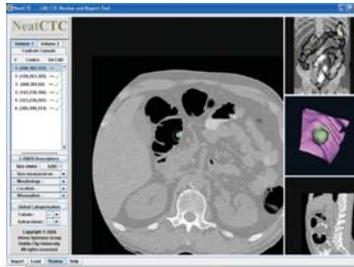
Irish cancer society
the national charity for cancer care

Mater Misericordiae Hospital
Gracia Street, Dublin 2, Ireland

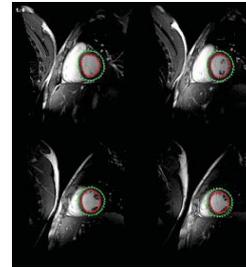


embark initiative
Innovating in People and Ideas

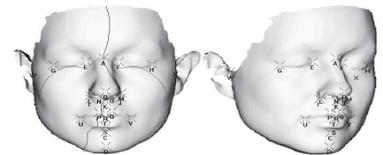
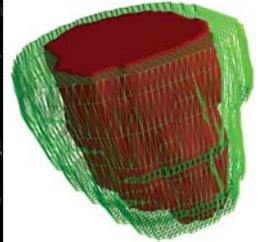
THE NATIONAL BIOPHOTONICS & IMAGING PLATFORM IRELAND
NBIPI



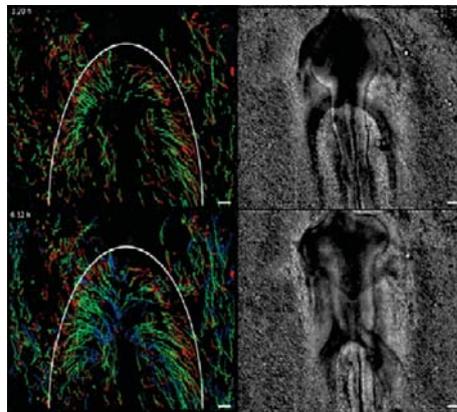
Computer Aided Diagnosis
for CT Colonography



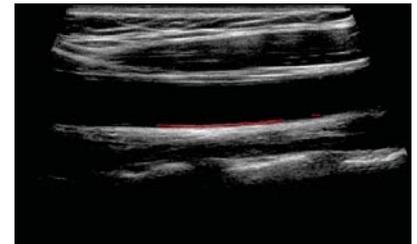
Identification of myocardial interfaces
in cardiac MR data



3D face analysis / Morphometrics

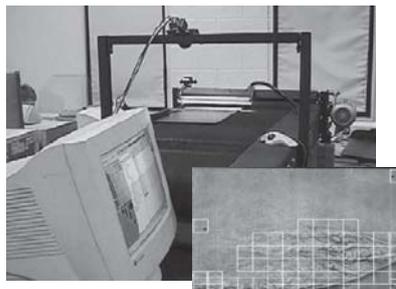


Cellular tracking/organ formation in 2D
time-lapse data

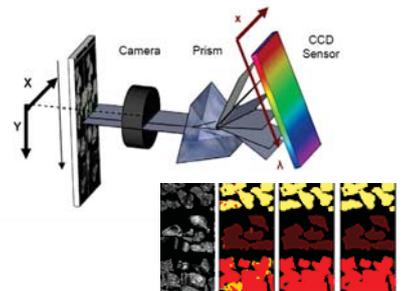


Carotid artery analysis in ultrasound data

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Machine vision system for automatic
grading of painted slates



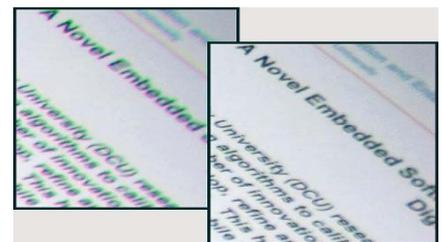
Machine vision system for hyperspectral
sorting of non-ferrous materials



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JALIKO

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Calibration and removal of chromatic aberrations in digital images

Modules

Image Processing & Analysis

Most people are familiar with the concept of processing an image to improve its quality or the use of image analysis software tools to make basic measurements; but what are the ideas behind such solutions and why is knowledge of these concepts important in developing successful computer vision applications? This module (**NFQ Level: 8, ECTS Credits: 7.5**) will answer these questions by focusing on both the theoretical, mathematical and practical issues associated with a wide range of computer vision solutions. Such solutions relate to the fields of image processing and analysis, industrial/machine vision, video data processing, biomedical engineering, imaging science, sensor technology, multimedia and enhanced reality systems. It will concentrate on developing the fundamentals necessary to design, develop and understand a wide range of basic imaging processing (image to image), image analysis (image to feature), image classification (feature to decision), performance characterisation (data to quantitative performance indicators) and computer vision (image to interpretation) solutions. All solutions have limitations and a key element of this module is to focus on how to approach the design, testing and evaluation of successful computer vision applications within an engineering framework. This module will make extensive use of an image analysis development environment to reinforce all the issues covers during the lectures.

- course outline
- introduction
- matlab for image processing and analysis
- basic ipa techniques
- file formats and imaging modalities
- additional ipa techniques
- mathematical morphology (introduction)
- transforms
- classification (introduction)
- colour (introduction)
- texture (introduction)
- interest_point_detection (introduction)
- performance characterization and ethics
- tutorials / worked examples

Computer Vision

The focus of this module (**NFQ Level: 9, ECTS Credits: 7.5**) is to produce graduates with a deeper theoretical understanding of the issues that underpin computer vision. It will build on the basic concepts with a view to delving deeper into core Image Processing and Analysis and computer vision topics. In addition it will introduce a range of advanced techniques and methodologies current in computer vision research. This module is primarily aimed at those who aim to undertake research in computer vision or require a deeper understanding of the subject to address commercial computer vision development. Computer vision applications span a wide range of disciplines including industrial/machine vision, video data processing, biomedical engineering, healthcare, astronomy, imaging science, sensor technology, multimedia and enhanced reality systems.

- course outline
- introduction
- optics, lighting & sensors
- morphology (advanced)
- eigenimages
- interest point detection (advanced)
- noise reduction
- active contours
- active shape models
- classification (advanced)
- machine/deep learning
- feature descriptors
- colour (advanced)
- texture (advanced)
- 3D imaging
- motion
- wavelets