

EVENTO DE NETWORKING

HEALTHCARE & PHOTONICS

TECNOLOGIAS FOTÓNICAS APLICADAS AL SECTOR HEALTHCARE

26 MARZO/14

09.45h-17.00h
Parc Audiovisual
de Catalunya
Carretera BV-1274,
Km.1, 08225 Terrassa
(Barcelona)



La visión por
computador como
ayuda al
diagnóstico por
imagen

3D Endoscopic Navigation

Jorge Bernal, Débora Gil,
Carles Sánchez, Raúl Alcaide



Project Team

Experts in the design of image processing software for medical applications with more than 10 years of expertise in the field.

3DEN Team



Dr. Debora Gil (CVC-UAB)



Carles Sánchez (CVC-UAB)

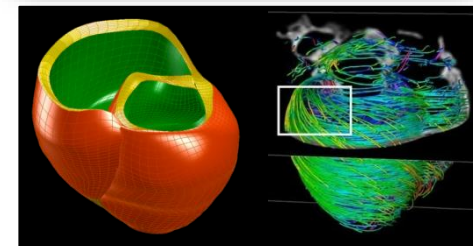
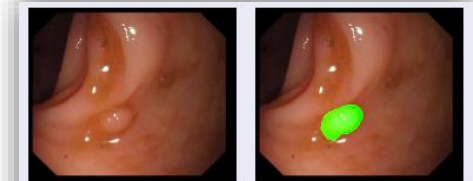
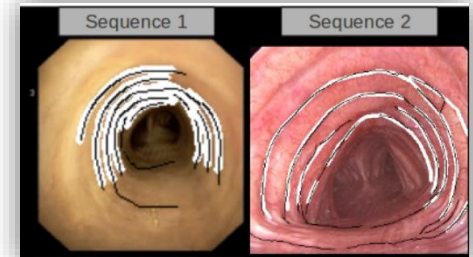


Dr. Jorge Bernal (CVC-UAB)



Raúl Alcaide (CVC)

Clinical partners



Why 3DEN?

There is no available support software which can automatically extract 3D measures and obtain 3D positioning of the device for commercial endoscopes.

✗ Low efficiency and effectiveness in operations:

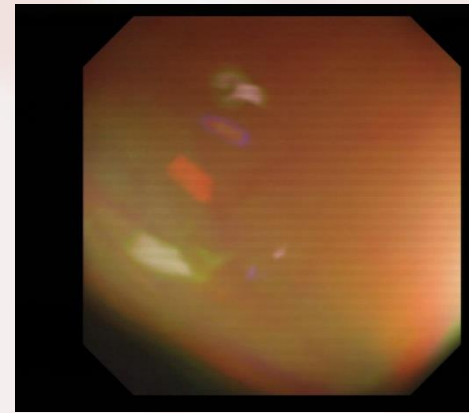
30% of inaccuracy in tracheal implants (500 interventions per year and hospital)

✗ Suboptimal diagnosis:

>6% of polyp loss in colonoscopy (150.000 new cases per year in USA)



What is the size of tracheal obstruction?

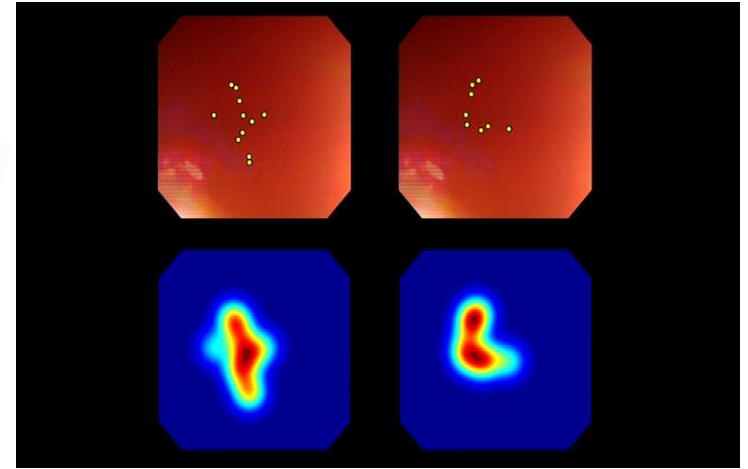
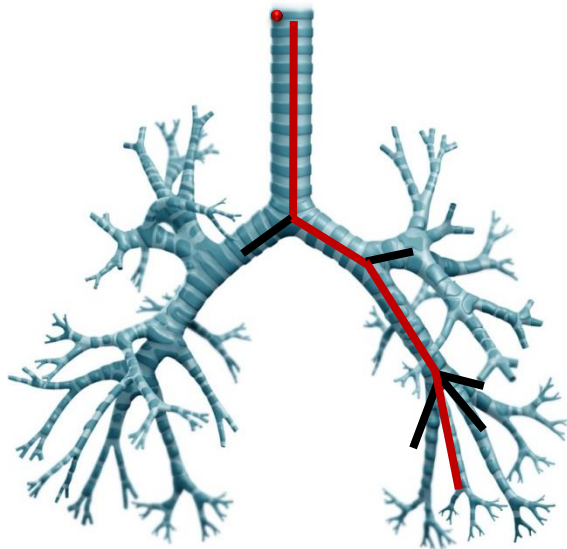


Where is the polyp?

What 3DEN does now

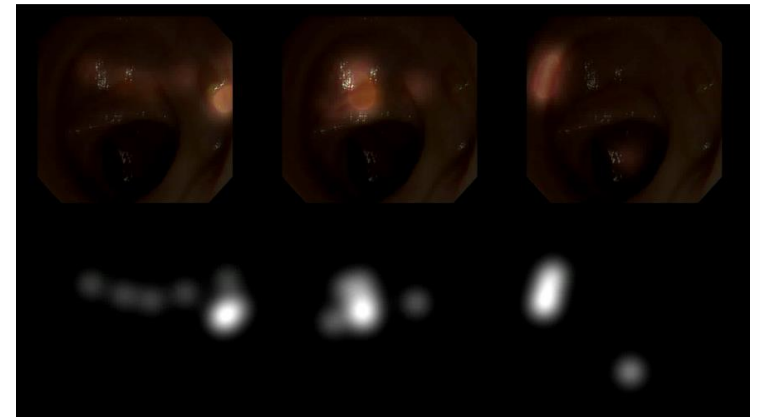


90%
Lumen Detection



80%
Polyp Detection

We look at where physicians look at!



Novices

Experts

Automatic

3DEN

Software package for aiding in the diagnosis and help in planning of endoscopy interventions :

- ✓ Automatic 3D measures acquisition
- ✓ Works under standard protocols and devices
- ✓ Independent of manufacturer and specific device

We offer both a general and customized solution:

	License	Customization	Support and Updates	Consultancy	Customized Training
General product	✓	✗	✓	✗	✗
Customized product	✓	✓	✓	✓	✓

3DEN market

Market segmentation:

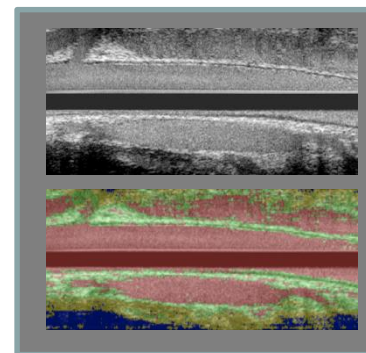
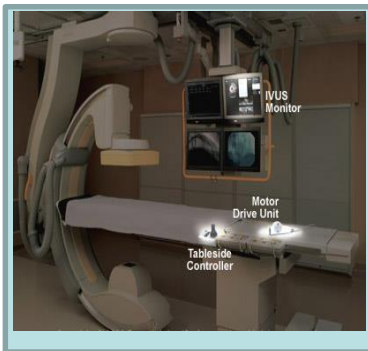
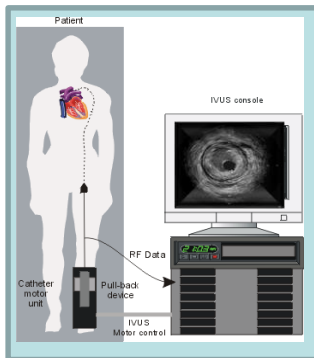
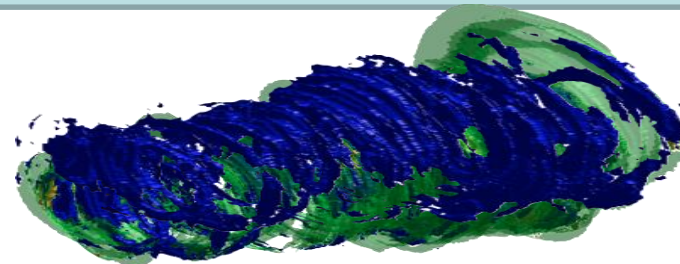
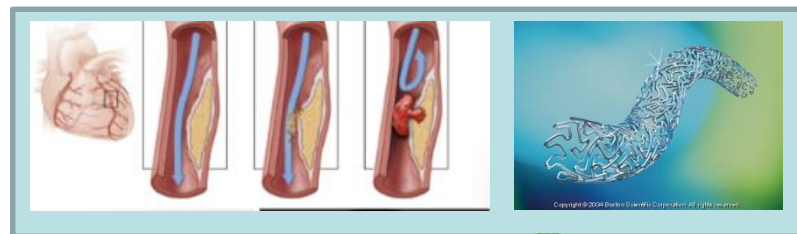
- Public and private healthcare
 - ✓ Decrease in cost per intervention and patient
 - ✓ More than 1.000 endoscopists in Spain.
- Multinational enterprises
 - ✓ Extending functionality
 - ✓ Differential value compared to competitors
 - ✓ Global forecast: 2.2 million active endoscopes in 2014, 23 % annual growth.

ADDITIONAL MATERIAL: MEDICAL IMAGING

Image-guided Atherosclerotic Characterization and Treatment based on IVUS

Scenario:

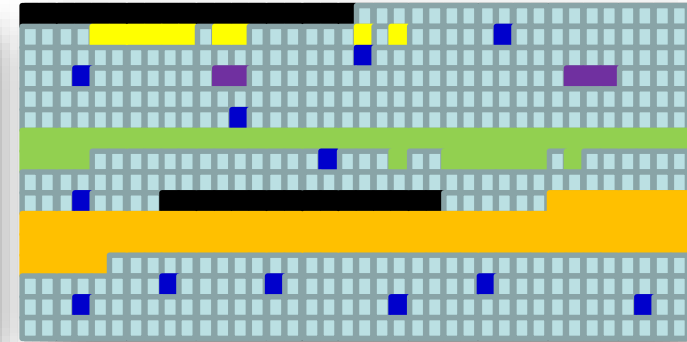
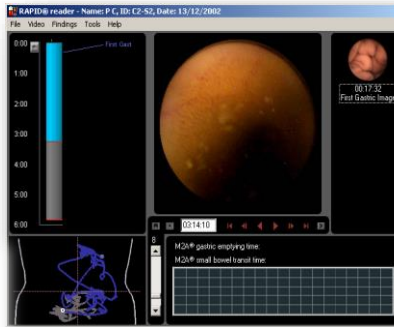
- Atherosclerotic plaque - proper to every one!
- Atherosclerotic plaque is invisible in 30% of angiographies!
- IntraVascular Ultrasound (IVUS) images are unique intraoperative imaging tool to inspect plaque and guide vessel intervention



Results: 3 International patents, 4 Technology transfers, Winner of IVUS segmentation challenge, More than 15 journal articles and 30 conference papers, 6 PhD thesis, International collaboration.

Automatic Intestine Motility Analysis by Wireless Endoscopy

Scenario: One third of people during their life – digestive problems!



Hypothesis: Computer Vision and Machine Learning allow to develop an automatic system for categorization of intestine motility to diagnose digestive diseases

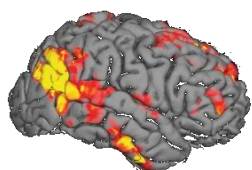
Results:

- A first system for Severe Motility Analysis is currently under validation in 2 USA (Clinica Mayo) and 4 European (Spain, Belgium, Italy, Portugal) Hospitals.
- Another one for Irritable Bowel Syndrome Analysis is in a process of technology transfer.
 - 12 patents in USA, 3 PhD thesis.

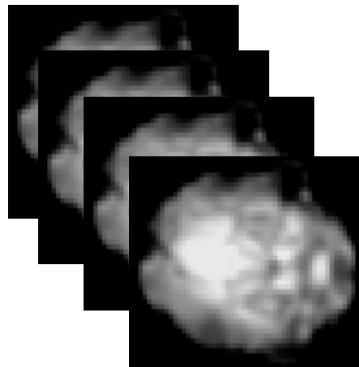
- M2A: 48 hours
- Battery: 6 hours

Neural Activity of Obese People by fMRI

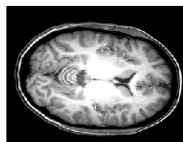
Scenario: Obesity is a major health issue in recent decades for developed countries. There are more deaths due to obesity compared to malnutrition.



fMRI



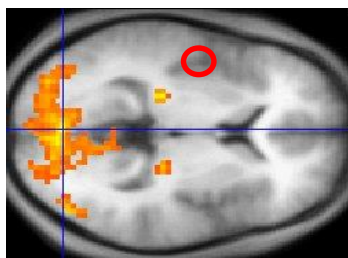
MRI



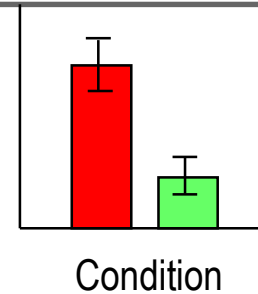
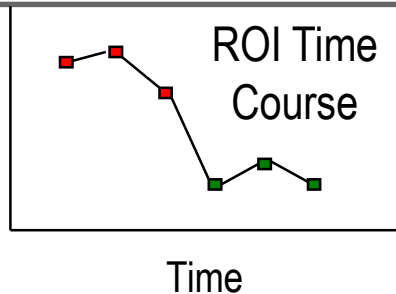
• **Hypothesis:** Functional MRI is a unique tool to analyze the neural activity of patients.

CV allows to address different clinical problems like:

- Image segmentation
- Spatial-temporal analysis
- Computer-aided diagnosis



fMRI
Signal
(% change)





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