Solutions based on photonics for the food industry

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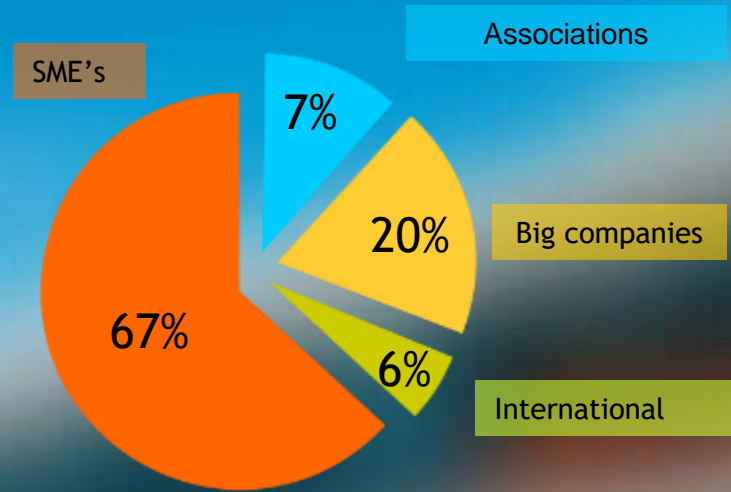

Wednesday, 16 December 2020, 15:00 CET
EPIC Online Meeting on Photonics for the Food and Beverage Industry

What is AINIA?

+1.600 Companies

PRIORITY LINES

- Food & Health
- Food quality & Safety
- Design and Industrial Production
- Sustainability, environment
- Consumer

SME's

Associations

7%

20% Big companies

67%

6%

International

R&D
210
Projects

Analysis
230K
Assays

ALTEX
500
Tons

Training
1.014
Hours

Consumer
212
Studies

220
Professional staff

What we do with Photonic Technologies?

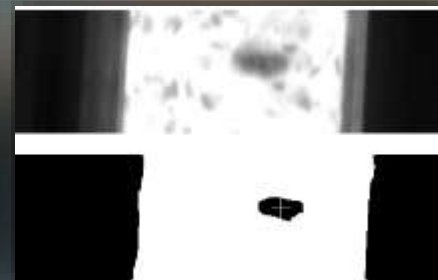Development of solutions in automation and optimization of processes if food industry by means of:
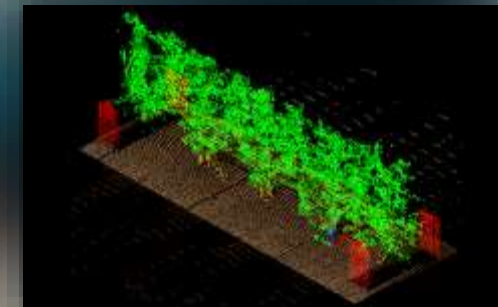
1. Application of photonic sensors able to see or measure food properties

2. Automation & robotization of complex processes integrating photonic sensors

3. Application of Artificial Intelligence in the photonic data (Decision Support Systems)
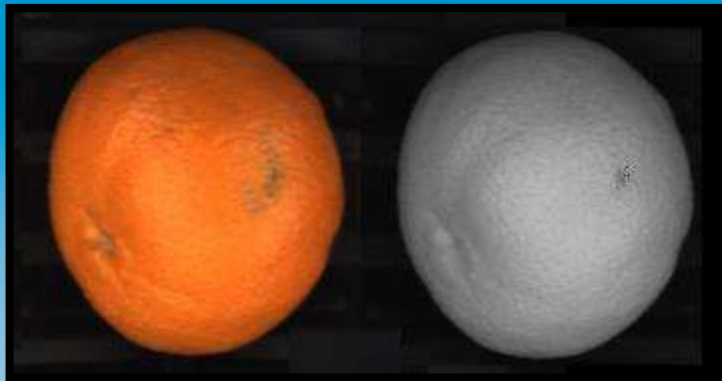
Advanced vision & applications

Image sensors able to detect properties that can not be detected by human eyes combined with advanced techniques in image processing (MIA, ML...)

1. Fluorescence

2. NIR imaging

3. Laser vision: 3D, LIDAR, ToF

4. Multispectral vision
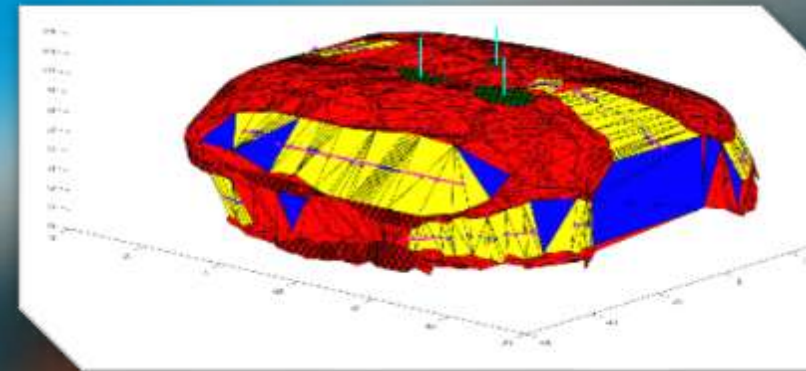
5. Thermography

6. Terahertz

Applications & success stories

Fruit sorting machinery based in shape, colour and defects in real time (12 fruits/second/line)

Visible   Infrared

3D model

Multispectral imaging

3D imaging

Applications & success stories

Mussel sorting based in multispectral imaging with automated rejection of defects and contaminants

CE

Color

Size

Applications & success stories

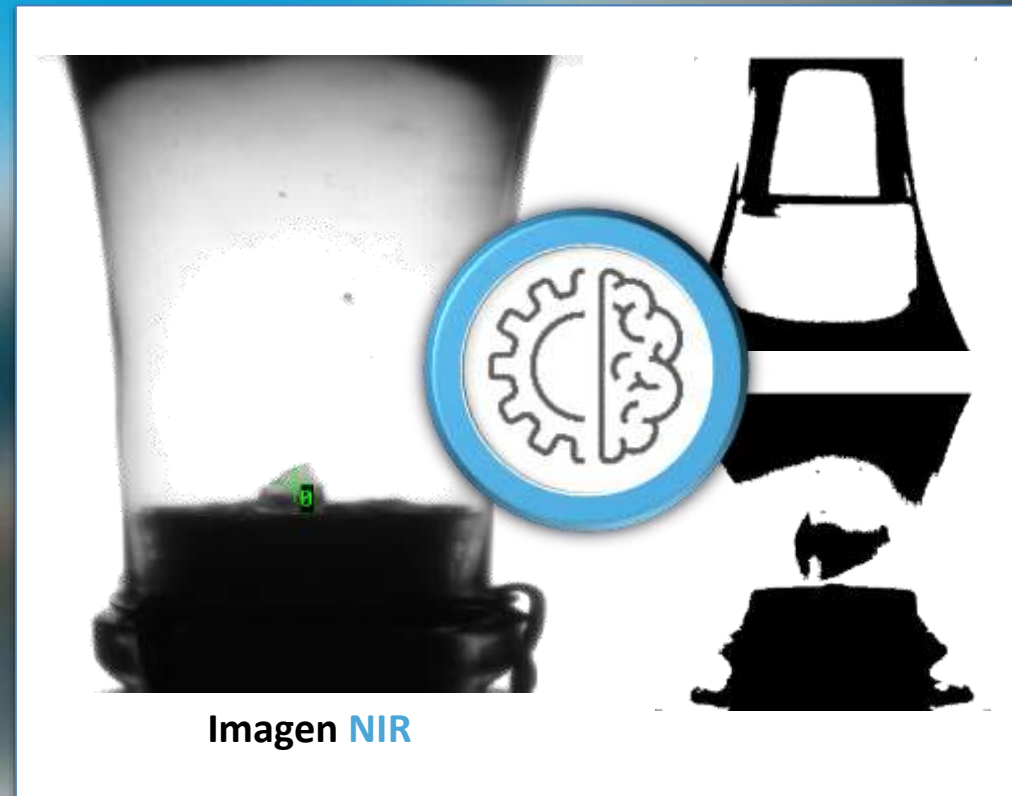FOREIGN BODY DETECTION IN FILLED BOTTLES OF CAVA / WINE

Imagen NIR

Visión Avanzada

Applications & success stories

SEALED PACKAGES INSPECTION

Visible

Imagen Térmica

PATENTED
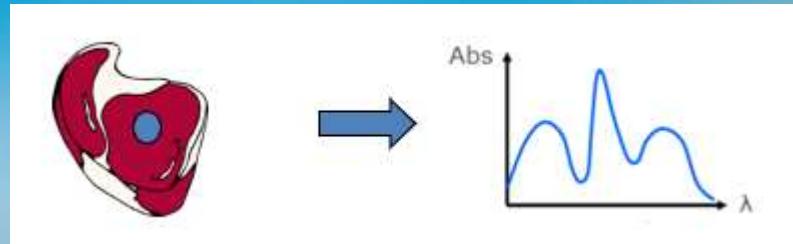
TERMOSCAN

Detection of defects in fresh food packaged in modified atmosphere to preserve its quality an safety inspecting the 100% of the products

Spectroscopy line & applications

Measurement of the interaction between infrared light and food to identify chemical compounds or its concentration:

1. Conventional spectroscopy: application of microspectrometers in quality control, process optimization or waste reduction.

2. Chemical imaging or hyperspectral vision : technology that combines the advantages of machine vision and spectroscopy. It allows to obtain the spectral fingerprint of each point of the sample and measure its composition to optimize the process, classify the product depending on its quality or detect contaminants.
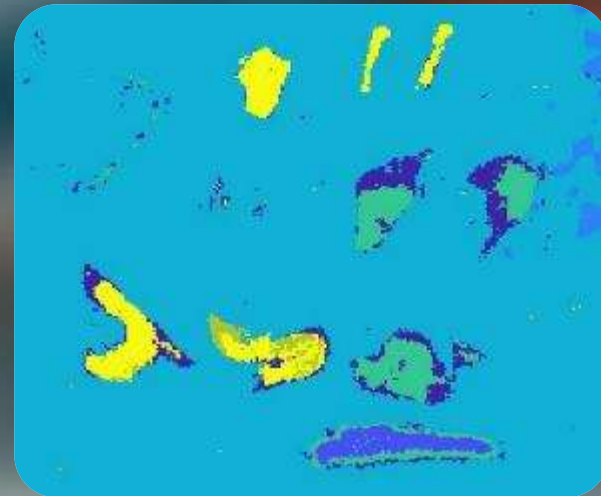
Applications & success stories

Foreign body detection in nuts

System based in hyperspectral vision to detect and reject automatically contaminants (insects, pests, plastics…)

Capability: 2 tones/hour

Rate: 400 fps, 1.6 mm/px

Applications & success stories

Internal quality inspection

Measurement of internal quality (ripeness, internal defects) fruit to fruit in real time by means of low cost spectroscopy.

Applications & success stories

Measurement of internal quality in bakery, meat, fish...

- Moisture measurement

- Fat content

- Analysis in real time of 100% of production

- Feedback to optimize the process
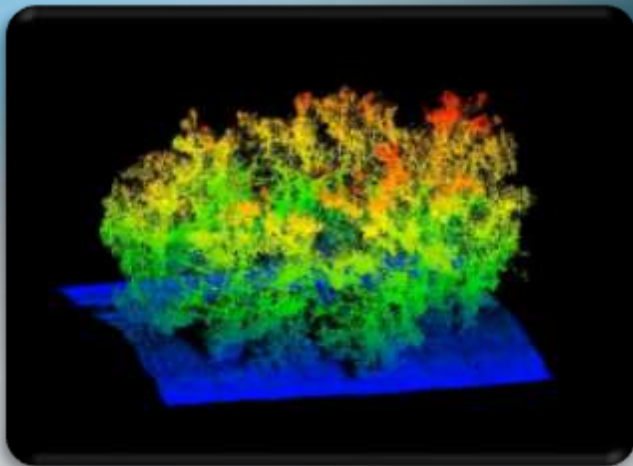
Precision Farming

Platform that combines different photonic technologies (hyperspectral, LIDAR, thermography) with mobile robots (AGVs) and RPAS (drones).

Applications:
- Water stress
- Production (fruit load and ripeness)
- Harvest planning
- Pest and disease detection
- Optimization of watering and phytosanitary treatments

What can we do for/with EPIC partners?

- Collaboration based on our experience in photonic technologies (Machine Vision, Spectroscopy or Hyperspectral Imaging)

- Test and validate new sensors and applications

- Transfer new technologies and developments to the Food, Beverage and Packaging sectors in Spain through our networks of clients.

- Collaborate as a partner in European Projects

Big challenges in Food Industry

- Measurement on complex processes in real time inside reactors (composition, viscosity, particle size, etc)

- Detection of foreign bodies of low density in food

- Detection of food pathogens with fast and non destructive techniques

Conclusions

- Automation and Artificial Intelligence are powerful tools

- To take decisions, we need accurate information about products and processes

- Photonics is a key technology to improve food quality, safety and production

- Consumers need to know more and more information about what they eat

- There are some challenges not solved with current technologies

- Co-operation is crucial to have a competitive Market in Europe

Thanks for your attention
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