IMT Mines Alès
École Mines-Télécom

ONIVOA

Research platform

Computational Photography and Augmented Vision

KEYWORDS: Computer Vision, Applied Optics, Image generation, Analysis and Processing, Augmented Vision, Modelling of human visual behaviour, Virtual Reality, Humanoid Robotics

OUR AIMS

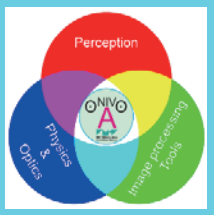
We develop synergies between various skills: digital imaging, computer vision, optics, perception, physics of materials. The aim of this global approach is to use our understanding of the mechanisms implemented in digital imaging, from image acquisition to perception, in order to propose robust and effective methods.

ACTIVITIES

- Computer vision / Cognitive vision
- Lighting (controlled, structured light)
- Modelling and perceptual rendering
- Augmented vision
- Interferometry

SPECIFIC FEATURES

Global approach to spatial, temporal & spectral digital imaging



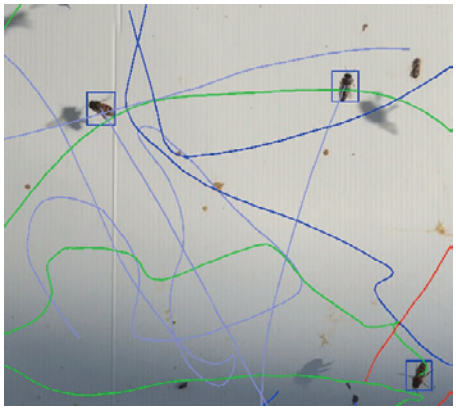
Transdisciplinary team:
IMT, IMT Mines Alès (C2MA, LGEI, LGI2P)

FIELDS OF APPLICATION

- Medicine, rehabilitation
- Robotics
- Risks
- Materials
- Safety & security
- Geomatics

SCIENTIFIC EXPERTISE & KNOWHOW

- Temporal and distributed acquisition
- Medical imaging
- Multispectral imaging (formation, capture, recording, restitution)
- Virtual reality, augmented reality, construction of virtual spaces with perceptual rendering
- Computer vision (filtering, segmentation, monitoring and recognition of objects, 3D perception)
- Characterisation of effect materials
- Functional low vision rehabilitation tools
- Static or drone-mounted optical metrology
- Fast digital imaging (detection of objects, tracking)
- Perspective immersion



Tracking bee movements

Removal of texture

WHAT WE PROVIDE

Research partnerships
Technical and scientific expertise
Transdisciplinary approach
Training

MAIN PARTNERS: Ministry of Culture, Ministry of Defence, ONERA, Mines ParisTech, BASF

Three centers leading cutting-edge research for and with companies.

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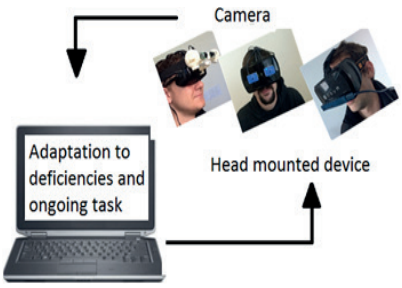
RECENT PROJECTS



AUREVI AUgmented REality for the Visually Impaired

Development of enhanced vision glasses, visual protheses, technical assistance for visually impaired people.
Video cameras film the environment and send the information to an embedded computer (smartphone). The video is processed in real time and displayed on the head mounted device. The image brightness must be kept in the comfort luminance range for each person and it should highlight the information required for moving around (detection of obstacles).The parameters of the software used can be set in function of the visually impaired person's particular visual condition.

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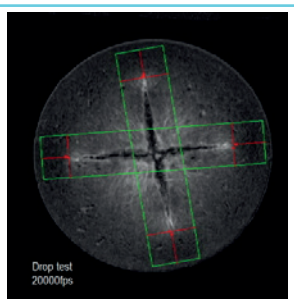


Monitoring of cracks propagation under Impact for a biocomposite plate (20000 fps)

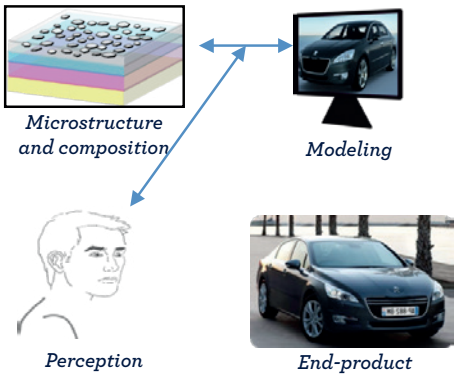
HERMES

Evaluation of the impact strength of synthetically reinforced (glass fibres, carbon) plastic composite materials and naturally reinforced (flax fibres, hemp) biocomposites.

High-speed imaging and image processing applications were used to measure surface strains in real time during a shock and to monitor the cracking and subsequent perforation of composite and biocomposite plates.

Horizon 2020 European Programme

HERMES — ARMINES



LIMA Light Interaction Materials Appearances

The aim of the project is to completely control the visual appearance of materials, controlled and reproduced at different scales of observation, by developing a set of physico-mathematical formulation models. The appearance of a manufacturable material is connected to its physical composition by means of a virtual workshop. Materials are designed virtually in order to reduce environmental costs.

ARMINES — PSA — ELDIM — NAXAGORAS

MAIN EQUIPMENT

- High-speed and/or high-spatial resolution cameras
- Pulsed and continuous wave lasers
- Digital holography and speckle interferometry
- Visible-range spectroradiometer (Minolta CS2000)
- Capture of movement (Mo'Cap)
- Virtual reality headsets (HTC Vive and Razer OSVR)

The IMT Mines Alès research centers
- *C2MA Materials Research Center*
- *LGEI Center of Industrial Environment and Industrial and Natural Risk*
- *LGI2P Center of Computer and Production Engineering*

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You want to develop a project ?

Contact details

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