

SAARA Team

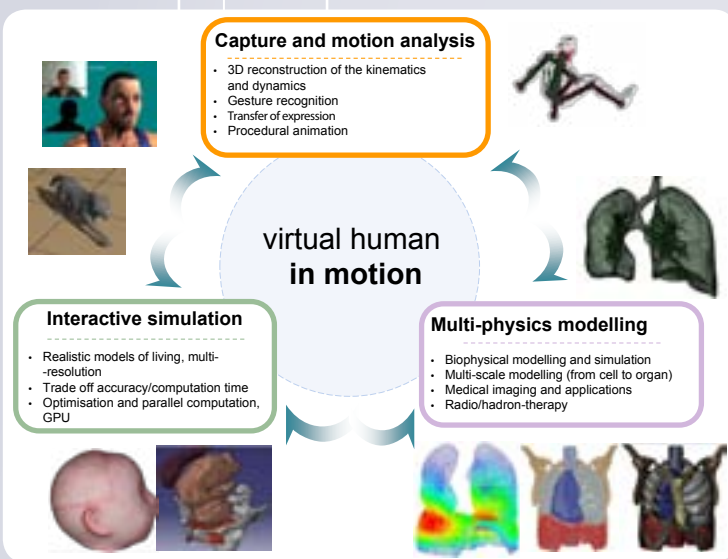
Simulation, Analysis, Animation for Augmented Reality

Laboratoire d'InfoRmatique en Image et Systèmes d'information
LIRIS UMR 5205 CNRS / INSA de Lyon / Université Claude Bernard Lyon 1 / Université Lumière Lyon 2 / Ecole Centrale de Lyon

The research works of the SAARA team is concerned by virtual human modelling. These may involve external body movements (arms and joints, thoracic and abdominal, facial expressions, etc.) or internal movements (respiratory system, parturient pelvic organs interacting with the foetus, etc.).

Three areas are specially studied:

- **Motion capture and movement analysis from video** of body parts
- **Reconstruction, animation and simulation of virtual physiological human**
- **Multiphysics realistic simulation** and shape modelling of **virtual physiological human**



Highlights

- Winner of the "best student paper award" at the CARS'2013 conference
- Organisation of the 18th French Congress RFIA'2012
- Setting up of two software platforms: PlayAll and OASIS
- Scientific coordination of the ETOILE project (2007-2013). Setting up the Rhône-Alpes-Auvergne node of France Hadron
- Founding member of PRIMES Laboratory of Excellence, member of the steering committee

The team

Members

- 2 Professors
- 7 Associate Professors
- 5 PhD students

Defended PhD Thesis

- 2 per year in average

Scientific skills and societal challenges

Scientific skills

- Interactive simulation / animation
- Multiphysics modelling
- Image based modelling
- Motion capture and analysis
- Activity and gesture Recognition
- Medical imaging
- 3D segmentation and reconstruction

Societal challenges

- Improvement of the treatment of lung cancer by photon or charged particles beam
- Online imaging control of ion beam delivery
- Medical simulators for medical gestures learning
- Personal care and home care services for disabled or elderly persons
- Special effects for entertainment and games

Contacts

Coordinator

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Softwares and platforms

- PlayAll: middleware platform for video games, developed in conjunction with industrial and academic partners, within the FUI framework
- OASIS ((in cooperation with R3AM team): teaching and research platform for visualization and interaction in augmented reality environments
- TopoSim (with M2DisCo team): Physical simulation software for deformable objects based on a topological representation

Positioning

International context

- European FP7 project: ENVISION, WP4 (2010-2014)
- European FP7 project: ULICE (2009-2013)
- Collaboration with the Paul Scherrer Institute (PSI) and the Research Centre on heavy ions (GSI)

National context

- Responsible of the ANR-2010 TecSan CIRDO (Intelligence Companion Reacting to the Finger and the Eye) and the MN-2012 SAGA (Simulators for Childbirth Gestures of Learning)
- Organization of a thematic CNRS summer school entitled "Conception of medico-surgical simulators" in 2014
- Animation of the GdR TIC-Health Theme F "Learning and assistance to medico-surgical procedures"
- ETOILE Project "Oncological Treatment Area by European Light Ions"(2002- 2014)

Regional context

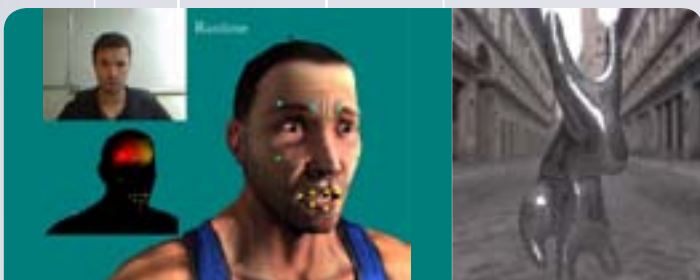
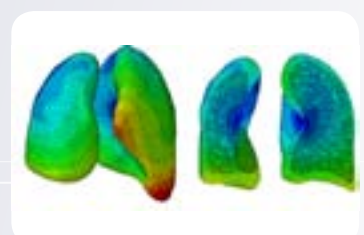
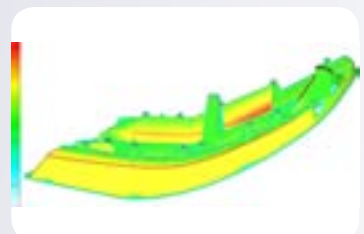
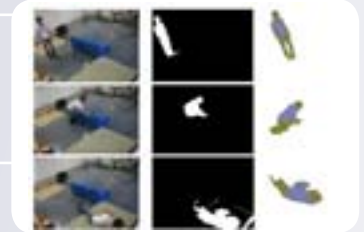
- LIMA projects (Entertainment and Images), GMCAO, SIMED, PRESENCE of the regional cluster ISLE

Industrial partnerships

- digital entertainment competitiveness clusters (Imaginove, Cap Digital)
- Core Technology, DOSIsoft, Ex Nihilo, Technosens, Darkworks, White Birds Production, Spir-Ops, Kylotonn, Smack Down Production, Bouygues Telecom, TS Media, Kurio, Nukeygara
- Hospitals: George Pompidou (Paris), Salpêtrière (Paris), Léon Bérard (Lyon), Édouard Herriot (Lyon), Saint Vincent de Paul (Paris), Christie Hospital (Manchester), San Juan de Dios (Santiago)...

International relationships

- Algeria, Bangladesh, Canada, Chile, Korea, UK, USA, India, Switzerland, Germany



International journals and conferences

- Pattern Recognition Letters, Pattern Recognition
- IEEE Transactions on BioMedical Engineering
- Computer Animation and Virtual Worlds
- International Conference on Computer Vision (ICCV)
- European Conference on Computer Vision (ECCV)
- International Conference on Pattern Recognition (ICPR)
- Computed Assisted Radiology & Surgery (CARS)
- Virtual Reality Interactions & Physical Simulations (VriPhys)
- Computer Graphics, Visualization & Computer Vision (WSCG)
- Symposium on Computer Animation (SCA)
- IEEE Engineering in Medicine and Biology (EMBC)