The Paris Saclay RIF

Topics:

- Healthcare Robotics: assistive, medical and rehabilitation robotics
- Co-working for manufacturing applications: cobotics, collaborative robotics, human extension
- Tele-robotic for hazardous environment

Hosted by the CEA, the French Alternative Energies and Atomic Energy Commission
RIF location: Digitéo Moulon

Paris – 35 km
RIF location: Nano-Innov

- Test of robotic application in real condition
- Fusion of heterogeneous sensors
- Comprehension of the activity of a person from distributed information
Applications in Virtual Reality or Mixed Reality

- Virtual Prototyping
- Ergonomy study
- Maintenance in mixed reality
- Training to dexterous gesture
- Robotic / Cobotic simulation

Digital mock-up and/or real parts

(Interactive) Multi-physics Simulation

- Multibody systems
- Rigid/deformable objects
- Sliding/rubbing contacts

Digital Human

Biomechanical digital human
Contacts with the environment

Interactive Simulation
INTERACTIVE SIMULATION

X-Fitting

Virtual Prototyping

Wiper motor insertion (narrow space, multiple contacts)

X-Robotics

Complex scene (25x10x10m AND 2mm précision)

Haptics real-time (1 kHz)

X-Ergonomics

Ergonomy study

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Human gesture assistance to reduce musculoskeletal disorders

- Human: skills and intelligence
- Robot: Force, stiffness

 Technologies:

- Force control
- Safe interaction
- Weight balancing
- Force amplification
- Digital human with ergonomic simulation

Interactive simulation without help of the cobot

Interactive simulation with the help of the cobot

Real test of the Cobot
COBOMANIP
ASSISTANCE TO LOAD HANDLING

- Force control
- Safe interaction
- Weight balancing
- Virtual guides
SKILLS: SURGICAL TRAINING

- integrated mobile platform
- Co-localized multimodal feedback (visuo-haptic, audio-tactile)
- advanced haptic interface (unique capabilities in terms of workspace, 6dof force, stiffness, transparency)
- active prop (increased bandwidth)

Example of application in maxillo-facial SURGERY
→ Real time simulation of bone drilling
ABLE: AN EXOSKELETON FOR THE UPPER MEMBER

Technology based on screw-cable actuator, high transparency and intuitive use, up to 7dof

In rehabilitation exercises with hybrid control laws with accurate management of forces in driving or resisting mode

In the industry, as a cobot for force compensation

In tele-robotic or interactive simulation as an haptic interface
ROBOTICALLY ASSISTED SURGERY

- Patient’s movement compensation (ex. breathing)
- Tool guidance
- Weight and friction active minimization
- Protection of organs (‘safe’ zones)

Technologies:
- Brushless actuators and optimized electronics
  - High force capacity (40N)
  - High stiffness (x10, 40N/mm)
- Patented uni-directional auto-blocking system
  - High security

ANR Surgicobot
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EXAMPLE OF WHAT CAN BE AN ACCESS TO THE RIF PARIS SACLAY
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