Research Tracks

CominLabs days, March 23-24, 2015

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Creation of CominLabs Research Tracks

- 25 research projects in the CominLabs portfolio (>250 researchers involved, >8M€ committed)
- Work is needed to capitalize on the skills developed and allow for cross-fertilization:
  - CominLabs is not a simple means of financing and is not just a concatenation of projects
  - We must show strong and distinctive competencies of CominLabs
  - We need to analyze the transforming and structuring effect of CominLabs
  - We want to prepare for the future in line with the structuring of research and higher education that is taking place in Brittany and Pays de la Loire

CominLabs ongoing projects

- **Security & Privacy**
  - Poseidon
  - SecCloud
  - HaH
  - Kharon
  - HardBlare
- **Connected things**
  - Bowi
  - Pervasive
  - Sherpam
- **Social Web**
  - Descent
  - CominWeb
- **ICT for multimedia and environment**
  - Limah
  - SEACS
- **ICT for health**
  - Neural coding
  - Predictive
  - S3PM
  - Hemisfer
  - Sense
  - Sabre
  - Neural Communication
- **ICT & Energy in networks**
  - EPOC
  - TEPN
  - 3D-Manycores
  - Reliasic
- **ICT for education**
  - COCo
  - 3D-Mooc

CominLabs ongoing projects

- **Security & Privacy**
  - Protection of outsourced or mutualized data and content
  - Comprehensive language-based approach to the definition, analysis and implementation of secure applications developed using Javascript and similar languages
  - Hardware and arithmetic for hyper-elliptic curves cryptography
  - Discovering Android malware with information flow monitoring
  - Hardware and Software Information Flow Control
- **Connected things**
  - Body world interaction, towards an accurate gesture and body movement estimation using very-small and low-power wearable sensor nodes
  - RFID devices for pervasive computing and distributed applications
  - Sensors for health recording and physical activity monitoring
- **Social Web**
  - Plug-based decentralized social network
  - CominLabs collaborative platform with advanced services
- **ICT for multimedia and environment**
  - Linking media in acceptable hypergraphs
  - Stochastic modEl-dAta-Coupled representationS for the analysis, simulation and reconstruction of upper ocean dynamics

ComInLabs ongoing projects

- **ICT for health**
  - Identification of cortical networks from high-resolution EEG: application of the mental information theory
  - Predictive models for patient personalized treatment management
  - Synthesis and simulation of surgical process models
  - Hybrid EEG-MRI and simultaneous neuro-feedback for brain rehabilitation
  - Sparse neural coding & bionic vision system
  - Seizing advances in BCI from high resolution EEG imaging in runtime
  - Neural Communication
- **ICT & Energy in networks**
  - Energy proportional and opportunistic computing systems
  - Energy proportional networks
  - 3D many-core architectures based on optical network on chip
  - Towards next generations of architecture and design flow to perform signal processing applications with unreliable components, case study on GPS architecture
- **ICT for education**
  - ComInOpenCourseware : Leveraging annotations in video-centered pedagogical resources, creating open multimodal content for knowledge diffusion, exploring new techniques for e-learning
  - 3D-massive online open courses, an open library of granular process able 3D contents

Possible implementation

- Appoint a director for each research track
- Role:
  - Lead the community, relying in particular on the members of the CominLabs projects
  - Detect further work to be done
  - Better opening work with the community of human and social scientists when relevant
  - Make the results and skills available, using the tools of CominWeb
- Specific funding for these actions is expected

Experimentation

- Security & Privacy and ICT for Health are presently the strongest tracks we want to experiment:
  - Take advantage of the industry-oriented program established by Région Bretagne on the field of *Security & Privacy*, with strong industrial assets including large companies and a military national lab. The CominLabs research track on *Security & Privacy* could become the “exploratory research department” of that program
  - *ICT for Health* is already an area of excellence in the Bretagne-Nantes territory. The sector is, however, stronger in academic and hospital research than industries. We think this track will benefit from wider skills, not traditional in the ICT4Health community, and could interest large companies
  - Others?