Enseignement et Recherche au service de la Société de l'Information

Ambient functionality: human interfaces for the digital life

Digital technologies are disruptive

- Creators
  - Experts
- Contents
- Users
- Digital technologies
  - Author tools
  - Content bases
  - Search tools
  - Cooperative tools
- Interfaces
  - Pull access
  - Search motors
  - Cooperative tools
  - Content producing

Digital technologies bring disruptions both for the creation of contents and theirs access
The first enabling ambient functionalities

- **Radio wave communication**
  - Mobility: “to bring the network to the users”
  - Terminal: “to create the personal terminal concept”
  - M to M: “to introduce wirefree machine to machine communication”

- **Graphic interfaces**
  - 2D graphic display (Visual)
  - Text Page metaphor (Semantic)
  - 2D Graphic document (2D Motion)

Five new ambient key functionalities

- **Hand free interfaces**
  - Vocal and 3D motion

- **Virtual environment**
  - Sensorial and perceptive remote action and remote sensing

- **Affective interfaces**
  - Sensing and adaptive behavior, learning capabilities

- **Assistantship**
  - Reasoning, communication, cooperation, and knowledge management capabilities

- **Ambient interfaces management**
  - Interoperability, autonomous network, multisource
Key technologies and systems issues

- Information and knowledge management
  - Semantics,
  - Meta data
  - Ontology,
- Intelligent agents
  - Reasoning
  - Learning
  - Communication
- Communication and cooperation interfaces & process
  - Identity and rights checking
  - Identification and filtering in multisource environment
  - Sensors and actuators networks
- Ergonomic displays and controls
  - Electronic paper,
  - voice and motion control...

Disruptive innovations and markets

- Education
  - Adaptive training and cooperative tools and seamless school to home work environment
- Trade and tourism
  - Combination of physical, enriched, and virtual visits
- Communication bubble
  - Always on, “home, transport, office” seamless communication bubble
- Communities
  - Remote, autonomous network
Disruptive innovations and markets

- **Civil Security and risk management**
  - A global system to enhance civil security: image, localization, crisis management...

- **Entertainment and communication**
  - Content bases, terminal free, 3D, visio conference...

- **Art and creation.**
  - Digital creation, 3D image and sound, motion,

Three research tracks for the future

- **Communication & knowledge engineering**
  - The eighties and nineties have been mainly devoted to information engineering
  
  - The explosion of digital contents today
    - stress the need for powerful knowledge engineering methods and tools:
      - mining, research, navigation engines
  
  - The next challenges are in
    - Ambient communication understanding and facilitation
    - Knowledge and information environment adapted to ambient communication.
Three research tracks for the future

- **Human centred communication networks**
  - Due to
    - The arising complexity of networks management
    - The square complexity of flexible, remote, autonomous networks management
    - The increasing complexity of interoperability between various and heterogeneous access networks, flows of data, interacting services.
  - The management of networks needs to split and reverse between
    - “Always onable” communication facilities management
    - Distributed management of personal, community, or open access, communication processes.

- **Understand and design the communication and knowledge society.**
  - Invariance and disruption
    - Intermediation is the core of the human society process
    - Digital technologies boost intermediation and create conditions of disruption
  - We need
    - To develop new sectors of “human and society sciences and techniques”
      - New intermediated relationships and sociological structures
      - Intermediated multimedia culture
      - Digital understanding and training of world and society
As a conclusion

**Digital technologies → New ambient functionalities**

- Agents
- Display
- Cooperation
- Sensor networks
- Knowledge
- Multisource
- Identity

**Key technologies**

**New functionalities → New markets & human activities**

- C-Bubble
- D-Training
- Enriched
- Crisis-M
- R-autonomous
- 3D-Visio
- D-3D Creation

**Key usage features**

**New human activities → New research fields**

- Communication & Knowledge
- Digital Life
- C-Process centred
- Intermediated culture

**Key research tracks**