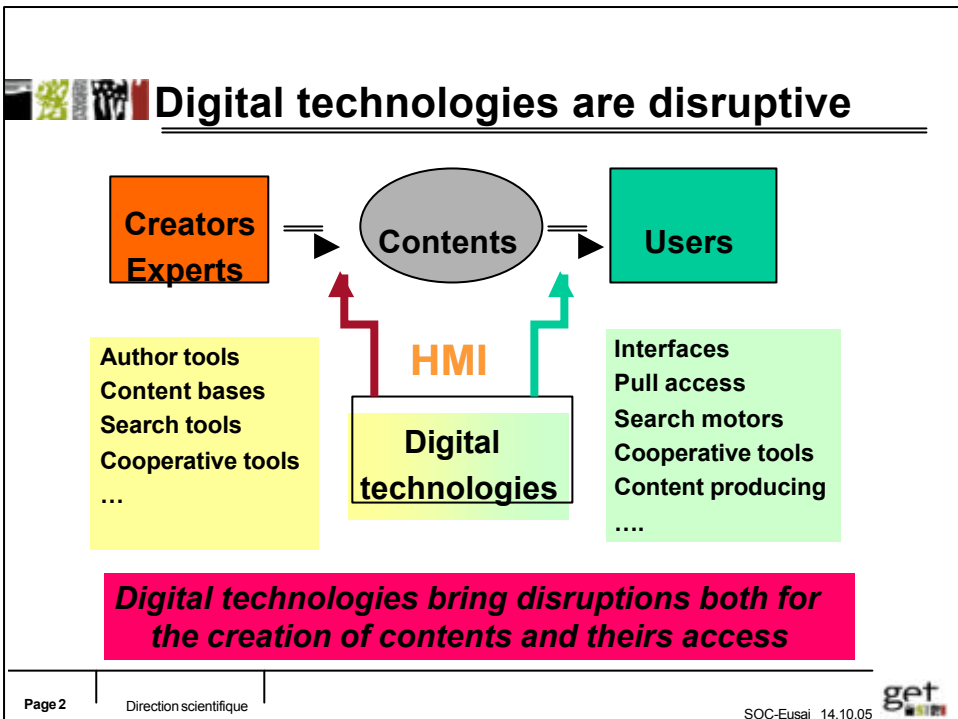Enseignement et Recherche au service de la Société de l'Information

Ambient functionality : human interfaces for the digital life

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Digital technologies are disruptive

Creators Experts → **Contents** → **Users**

HMI

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

get

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**
  - 2 D 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.

Three research tracks for the future

■ 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-R
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

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