Future Internet Assembly
When Infrastructure Meets the User

Innovative ICT platform for emerging eHealth services. Towards overcoming technical and social barriers and solving grand challenges in medicine

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Supported by a grant from Iceland, Liechtenstein and Norway through the EEA Financial Mechanism
• For many years scientific innovation has been a driving force of a real progress

• Advanced ICT infrastructures (eInfrastructure) ensured a proof of concept for many new ideas and enabled the development and deployment of emergent products and technologies

• Nowadays, the progress in health is only possible where ICT methods and resources will be integrated on a full-scale towards eHealth
ICT for Health Grand Challenges

Integration with ICT

eHEALTH

eINFRASTRUCTURE

eHealth LivingLab Platform

FUTURE INTERNET

HEALTH GRAND CHALLENGES

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eHealth Grand Challenges

- Grand Challenges
  - Understanding and eradicating disease, drug discovery
  - Common diagnosis and information space for patient-centered health services
  - Standards and interoperability in telemedicine
  - Methods in medical training and qualifying

- Barriers in eHealth development
Understanding and eradicating disease, drug discovery

Interdisciplinary research at high complexity level

Global approach

Integration with NG ICT systems

eHealth Grand Challenges

Broadband Networks
Advanced Visualization
Intelligent Simulators
Grid/Cloud computing
Virtual Labs
Prediction Machines
Semantic Databases

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Common diagnosis and information space for patient-centered health services

- Data stored from different diagnosis devices
- EHRs integrated with digital images
- Complete history of medical examinations
- Research and searching
- Secure data environment
- Data availability for diverse processes
- Remote access to individual data
- Continuous monitoring of parameters
eHealth Grand Challenges

Standards and interoperability in telemedicine

Common standards

Interoperability between medical devices

Sharing information and services btw medical personel, hospitals and patients

Better teleconsultation process

Multimedia information carried and available regardless the location

Virtual Labs

Knowledge basis

Digital libraries with disease models, biotypes

Semantic interoperability of integrated services
eHealth Grand Challenges

Methods in medical training and qualifying

- Improved contact with mentors
- Better knowledge transfer
- Skills improvement with experimental knowledge
- Content available for searching and research

- Advanced visualization
- Simulations
- Experimental knowledge in virtual world
- Digital libraries
- Telementoring
- Virtual body representation
- Workflows
- Databases
- Models
- Data streams from real devices
- Searching mechanisms
ICT for Health Grand Challenges

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Future Internet Puzzle

**Internet by and for People**
- Virtual communities
- Social networks
- Web 3.0, semantic technologies, knowledge exchange, processing and generation

**Internet of Things**
- Sensors
- RFID
- Smart objects embedded for automated coordinated activities
- Connectivity and accessibility of everything

**Internet of Services**
- Service oriented computing
- Resources as services
- Contextualized, proactive and personalized access to services

**Contents and Knowledge**
- High-quality content
- Distributed knowledge
- Content semantics
- Intellectual activity
- Mechanisms for knowledge dissemination
- Multimedia communication (4k, 3D videos)

**Technology Platform**
- Connectivity and accessibility of everything
- Service orchestration
- Semantic interoperability
- Resources as services
- Service oriented computing
• The development and deployment of new systems and solutions overcoming barriers in Health is possible when eInfrastructures meet users through V/L - laboratories of Core Platform

• Solution might be global due to the fact that components of eInfrastructure for Science are available in different parts of the world
  – eInfrastructure (Europe)
  – Cyberinfrastructure (US)
  – Cyber-Science Infrastructure (Japan)
FUTURE INTERNET CHALLENGES

COMMUNICATION CHALLENGES
- End to end broadband
- Network access any time and anywhere
- Internet of things access
- Quality of service (e2e)
- Security and privacy
- Reliability (with SLA)
- Green communication technologies

Information/system challenges
- Information, intelligent services, knowledge services
- Personalization and privacy, data security
- Any provider of services and content
- Simple, intuitive interfaces
- Interaction with objects: voice, gesture, touch
- New devices (e.g. robots)
- New reach content and media (e.g. 3D, 8K, holograms)
- VR and AI applications broadly used
- Green IT

REFERENCE LABORATORY

Laboratory infrastructure
- Set of heterogeneous systems like HIS, RIS, PACS
- Workspace „Interoperability and usability”
- The room „Patient’s environment”

Research examples
- Proof of concept for advanced scenarios and for telemedicine applications
- Research on new methods of diagnosis support and procedures of treatment
- Research on interoperability of tools and systems used in medicine
- R&D for ambient assisted living
• The concept of integrated eHealth Living Lab can be generalized for other regions who have already been involved in the development of new global eInfrastructure

• Many new applications may be ported to this platform
Thank you

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