Wearable and Portable Nano and Micro Technologies for Personalized Health

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Introduction

Modern 21st century healthcare aims at involving citizen and health professionals entitling citizens to take over more responsibility for their own health status. Mainly new technologies like, e.g., the Internet, mobile phones, sensors, actuators, and networks enable citizens to become active partners in healthcare processes.

There is an ongoing personalization of mobile health service provision including the application of portable devices and sensors/actuator networks stipulating the new personal health approach offering real chances for providing/practicing high quality wireless personalized shared care.

Approaches from other domains like investigating the localization of bottle necks in oil pipelines could be transferred into the field of medical investigations inside humans finding respective blood-stop in vessels. It's far from being just science fiction; it's becoming reality.

Aims and Objectives

Wearable micro and nano-systems and technologies for personalized health as well as the related portable devices (cards, tokens, mobile phones, smart devices, sensors, actuators, etc.) are considered first line communication tools holding medical and clinical data and helping to improve:

1. Identification and personalization management for access control, insurance, reimbursement and entitlement;
2. Security, privacy and trustworthiness of personal health services delivery by allowing advanced standardized privilege management and access control measures;
3. Availability of, and accessibility to, information on personal health services as well as on personal healthcare data enabling better health provision;
4. Secure and reliable access to vital signs in routine use as well as in case of emergency;
5. Application of technical solutions like nano-sensors in networks as small as they will not harm the human body, and
6. Quality of care provision by providing stakeholders with up-to-date portable devices allowing access to personal health data from everywhere anytime.

Seminar Method

The application of state-of-the-art and new developed nano and micro technology for the provision of personal and personalized health services as well as the application of existing methods, algorithms, and techniques to the domain of healthcare and welfare requires an intensive dialogue between experts of the various domains, medical users, patients, and citizens along with the provision of up-to-date information.

The workshop presents the paradigm shift from cards to personal devices including sensors, and takes many different views on the subject. It presents current and future health service and management scenarios for providing personalized care and addresses wireless technology in areas like health care, welfare, and transportation.

Related scenarios and their application into the personal health services delivery will address practical terms of usage.

Fig.1 -

Fig.2 –

Fig.3 –

Fig.4 –

Seminar Speakers

Peter Pharow (Magdeburg, Germany): "Introduction to the seminar"

Pekka Ruotsalainen (Helsinki, Finland): "The intelligent chip - adviser towards health support for the wireless patient"

Tomas Trpisovsky (Prague, Czech Republic): "NFC: Near Field Communication mobile phones as enabler for wireless health services"

Françoise Petersen (Sophia Antipolis, France): "A Standard for Personalized eHealth Services"

Asbjørn Hovstø (Oslo, Norway): "Intelligent transport including support for sensor networks"

Fritz Meier (Nuremberg, Germany): "Sensor networks for optimization of blood bag logistics in hospitals"

Qiang Pan (Shanghai, China): "Collaborative Information Processing in Sensor Networks"

Networking Approach

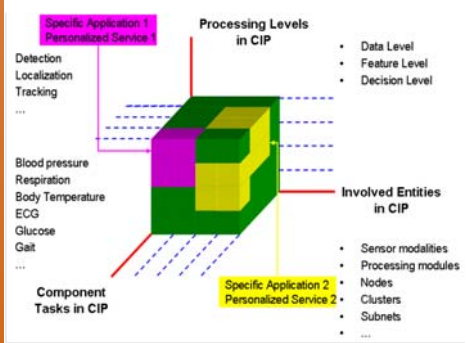

Fig.5 -

Topics and Questions

The seminar addresses the following topics and questions allowing the attendees to compare their national strategies and their own experiences with those of the presenters:

1. Who represents the driving forces for the paradigm shift towards wireless and device-based personal health service provision?
2. Can such devices be used for seamlessly providing identity management, personalization, health data including vital signs, health information, and access to related wireless personal health services?
3. What are the existing and new requirements arising from adopting and adapting solutions from other domains?
4. How could the approach of industrial investigation of oil and gas pipeline to find holes and flow-stop, and the localization of dangerous bottle necks be transferred into the medical field?
5. How can nano technology properly be applied to investigate human beings to, e.g., finding threatening vessel blood-stop?
6. Can such personal devices incorporate the advantages of nowadays cards and chips?
7. Can security, safety, and privacy be guaranteed while applying such devices to humans?
8. What are the key science and technology trends in a future personalized healthcare?
9. How can health management scenarios benefit from sensors, actuators and device networks?

Conclusion

The pHealth 2009 seminar on the application of nano and micro technology to personalized health service provision **aims** at identifying criteria and success factors determining the application of personalized portable devices (PPD), sensors, and actuators in a wireless healthcare and welfare network.

The recently established paradigm shifts to **wireless health devices**, the citizen's confidence in, and acceptance of, the underlying technologies.

The seminar presentations mainly base on the **experience** of the presenters in national, European and international projects and related standardization activities as well as in existing and emerging routine implementations of nano and micro technology in the domain of personal health service provision.

Despite of amazing supportive technical tools now available, the **human factor** and **face to face** communication remain a must in health care …

Acknowledgements

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