Ambient Support Systems and Platforms for Health Self-management and Well-being

Panel on GLOBAL HEALTH / AMBIENT

Nice, France

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Moderator

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- Hassan Khachfe
  Lebanese International University, Lebanon
- Youna Jung
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- Tom Ruette
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Panelist

Hassan Khachfe

Lebanese International University

Lebanon

"Enhanced Home-Based Medical Care Services Through Mobile Technology"

Enhanced Home-Based Medical Care Services Through Mobile Technology

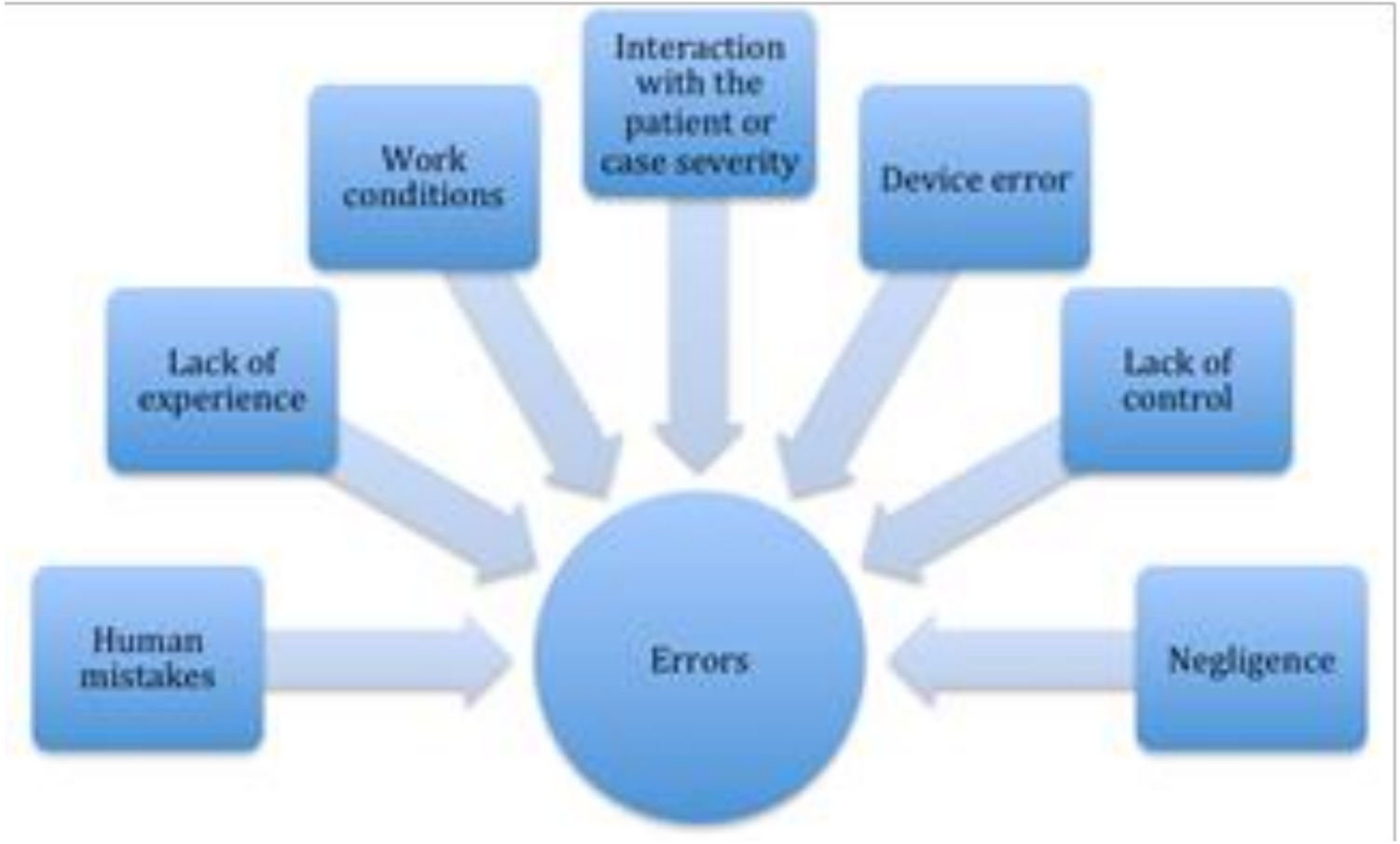
Prof. Hassan M. Khachfe, Ph.D.

Director, Center for Quality Assurance, Institutional Assessment, & Scientific Research (QAIASR)

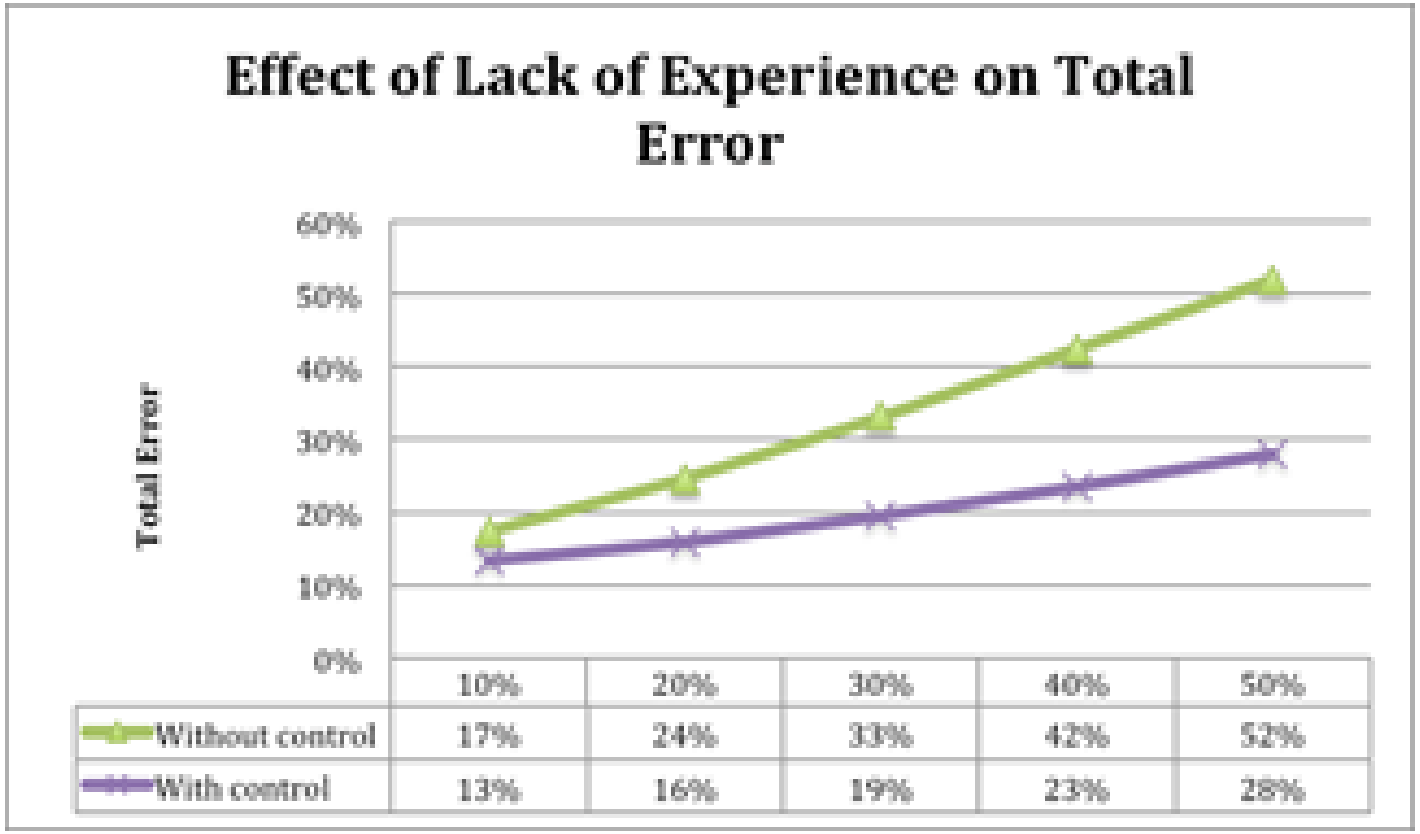
Lebanese International University

Beirut - Lebanon

Roots of error

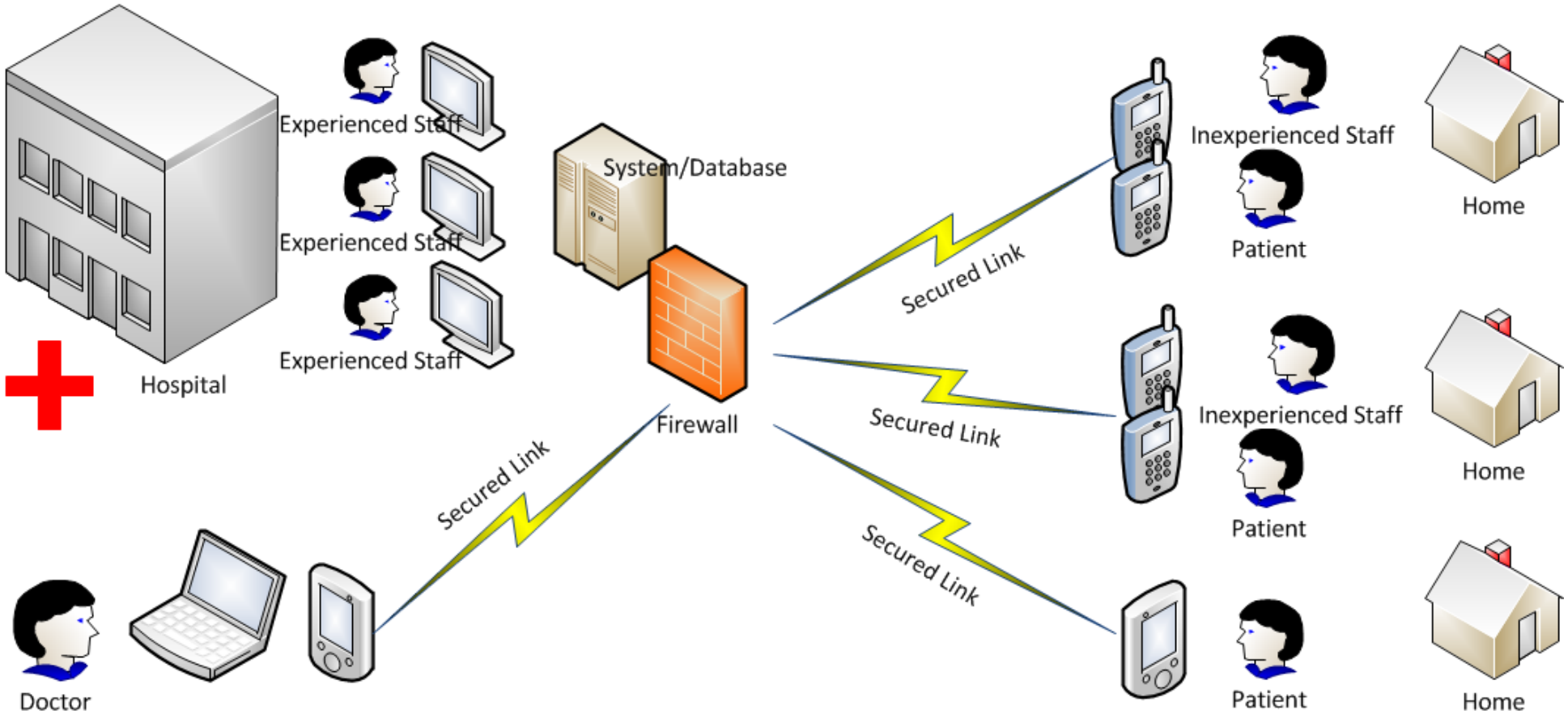


Effect of staff experience

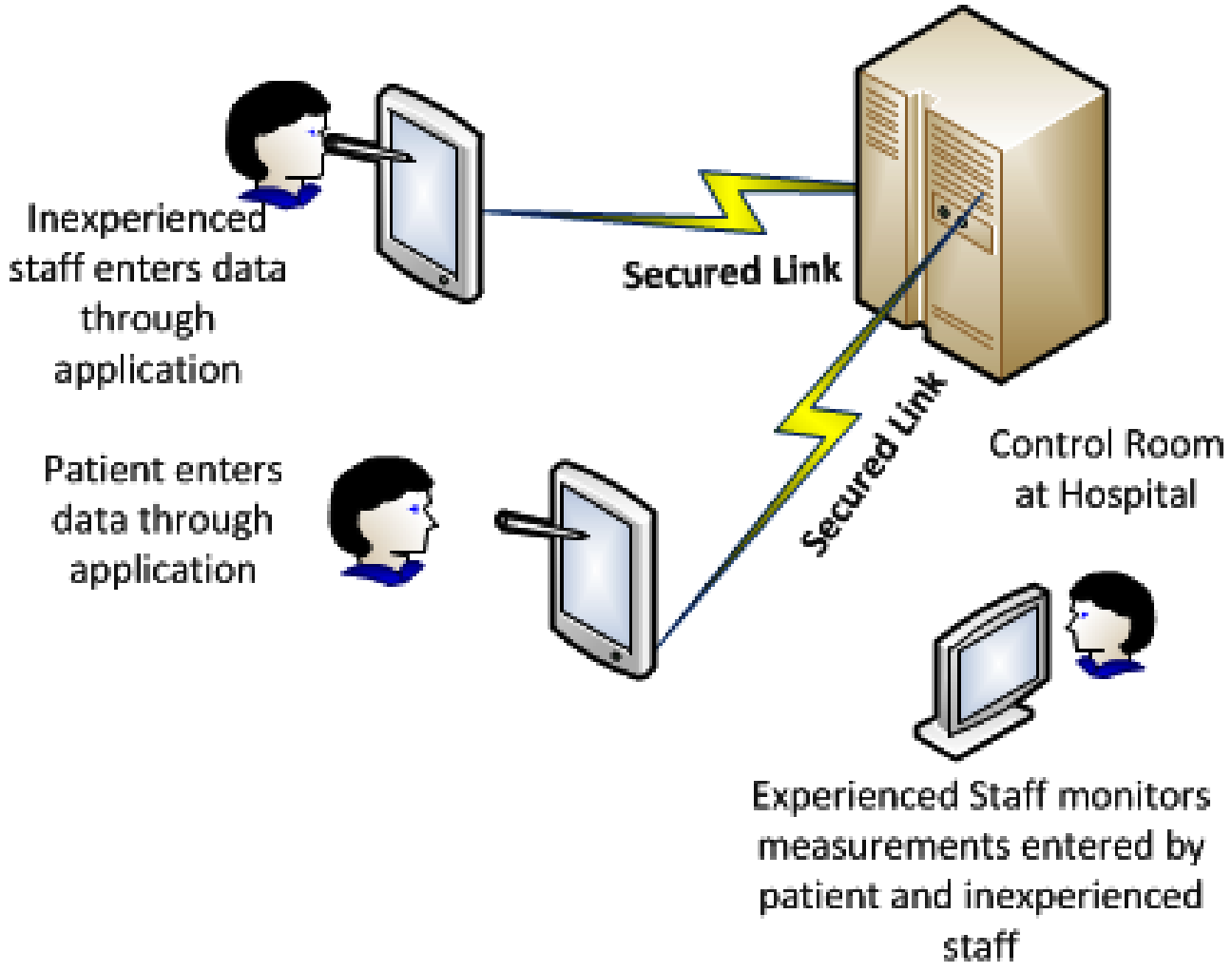


Influence on treatment

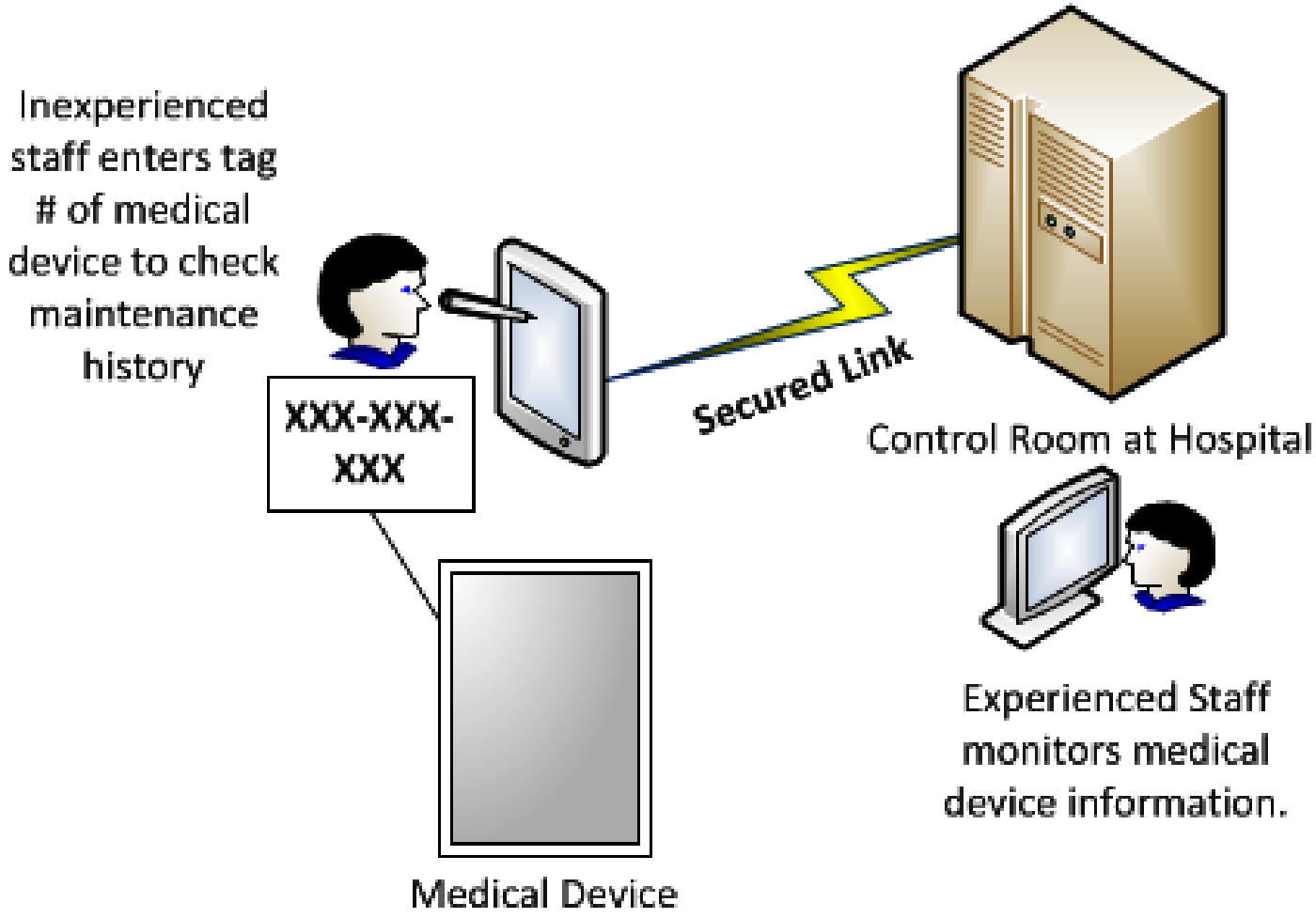
Home-based care system



Communication



Maintenance tracking



Summary

- Model enhances the home-based care service in a rapid and non-expensive manner
- Preliminary implementation of the system involved the collection of data comprising vital signs (body temperature, blood pressure, pulse rate), blood glucose, general appearance, and – in limited cases – urination frequency and volume
- Data produced seed information that was further used to extrapolate into more quasi-real settings
- Raw data is in complete accord with the proposed model based on the simulation data

Panelist

Youna Jung

Virginia Military Institute

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“Privacy-Preserving Online Monitoring Framework for e-Health Applications”

Privacy-Preserving Online Monitoring Framework for e-Health Applications

Youna Jung
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Online Monitoring

- An essential technique to evaluate and enhance the performance of online applications
  - ✓ help the online service providers improve the usability of their applications
    - – by collecting and analyzing user/usage data

- Three different approaches
  1) Log file analysis (Server side)
  2) Proxy-based monitoring (Between a server and clients)
  3) Use of monitoring scripts (Client side)

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Script-based Online Monitoring

- Enable the tracking and recording of user characteristics, data entered, and actions.
  - ✓ *e.g.) mouse clicks*, *frequency of use*, *time spent in a particular page*, *media viewed*, *page navigation sequences*, *content entered into a textbox*, *location information*, *whether a mobile device is being used*, and etc.

- Advantages
  1) requires less time and effort to collect and analyze user/usage data
     - e.g.) *Google Analytics* and *Adobe Analytics*
  2) widely used in a variety of online application areas
     - e.g.) e-commerce, information retrieval, e-health, and etc.

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e-Health

> "*e-health is an emerging field at the intersection of medical informatics, public health and business, referring to health services and information delivered or enhanced through the Internet and related technologies.*"
>
> - Eysenbach [9]

- An umbrella term that includes a variety of online healthcare applications and systems that use information technologies
  - ✓ Electronic data management
  - ✓ Information Retrieval
  - ✓ Data Mining
  - ✓ Rich interaction skills
  - ✓ etc.

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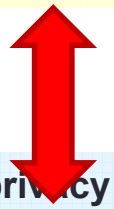
e-Health Applications

- Application Domains
  - ✓ Online healthcare education [10]
  - ✓ Healthcare research [11]
  - ✓ Healthcare interventions
  - ✓ Disease prevention and self-management
  - ✓ Health promotion [13]
- Major Functionalities
  - ✓ Self-assessment or self-profiling
    - to recognize individuals' health-related status
    - → provide personalized healthcare services
  - ✓ Continuous communication with patients/users using interactive tools
    - e.g.) online trackers
  - ✓ Wide dissemination of information related to health and safety

Detailed monitoring is critical
- to provide personalized healthcare services
- to confirm that e-health apps are used correctly

← Need to collect detailed, and often identifiable, user data including health information.



Protection of user privacy is critical
- e-health applications often deal with very sensitive private data, including health status, medical records, and family health histories.

→ Control over the sharing of this information is of the utmost importance and urgency

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e-Health Applications

- Challenges

*How can we simultaneously achieve these two important yet opposing goals -- **monitoring identifiable user data** while **protecting user privacy**.*

How can we define the level of disclosure of private data that is essentially required for patient treatments?

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Requirements

- Strict verification and enforcement of user policies
  - ✓ Online monitoring services that are aware of user policies rather than application policies
  - ✓ Verification methods to ensure that an application complies with policies mutually agreed by providers and users on user side
  - ✓ Enforcement methods to protect user privacy on user side
- Easy-to-use tools
  - ✓ User-friendly interfaces to intuitively specify privacy policies
  - ✓ Support in generating privacy policies for e-health applications
  - ✓ Support in converting existing e-health applications to monitorable applications

PPoM Framework

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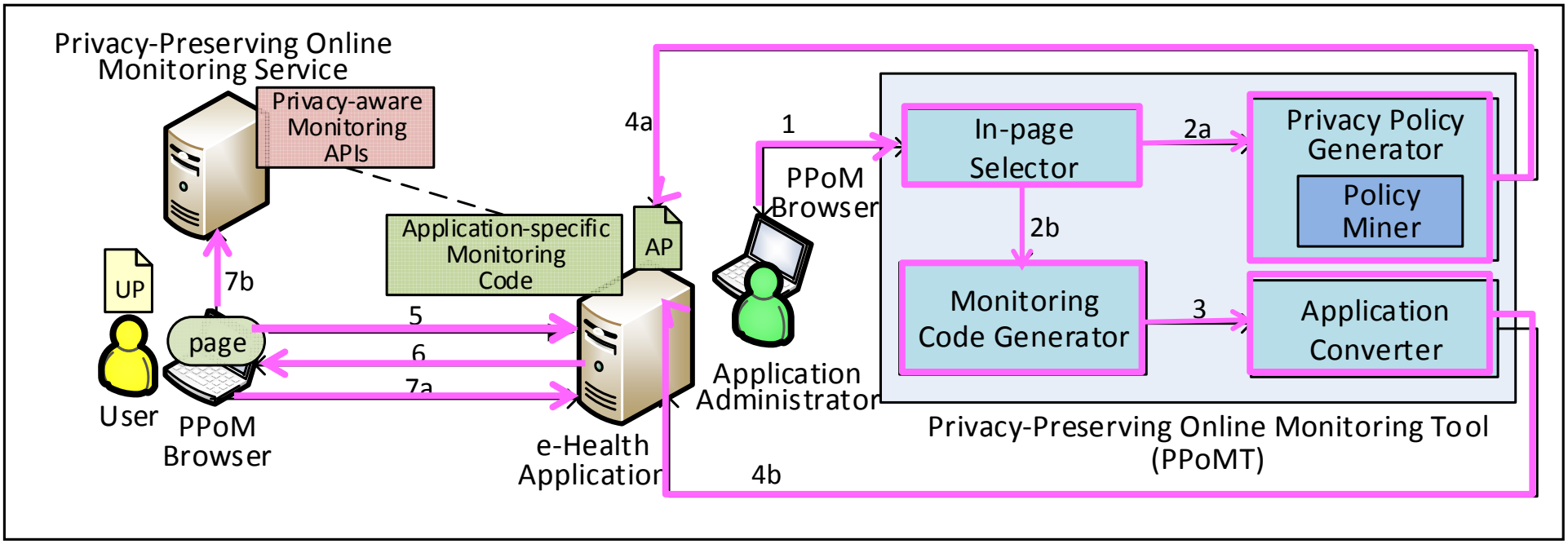
PPoM Framework

- Architecture



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Panelist

Tom Ruette

Sirris

Belgium

“Current ICT in Health and Wellbeing projects @ SIRRIS Data Innovation”

Current ICT in Health and Wellbeing projects @ SIRRIS Data Innovation

With-Me

- People's **adherence** to healthier behaviour will improve by using **persuasive** electronic services.
- With-Me ensures continuity of **personalised assistance** from lifestyle improvement to prevention and care.

- Artemis IA
- www.with-me-project.eu

CareWare

- The health domain will have **personalised**, simple-to-use and technologically advanced solutions, which combine **real-time data** from various sources and advanced **wearable** smart **sensors**.
- To develop and leverage novel unobtrusive cyber physical systems for monitoring and advancing personal health and wellbeing.

- ITEA 3
- www.itea3.org/project/careware.html

SMARTpro

- Stimulate the **collaboration** across the ICT, electronic and textile sectors and confection companies in (home) care and medical markets
- Advance on issues of **knowledge** on smart textiles, wearable intelligence and communication possibilities.

- Regional funding (IWT)
- www.smart-pro.eu

Panelist

George Margetis

Institute of Computer Science,
Foundation for Research and Technology
- Hellas (FORTH)

Greece

“Ambient Technologies for Well-being and Quality of Life“

Ambient technologies for well-being and quality of life

George Margetis

Institute of Computer Science
Foundation for Research and Technology - HELLAS

Improving quality of life through AmI

- Ambient Intelligence and distributed sensors environments are expected to have a significant impact on the daily lives of everyone
  - Especially people belonging to vulnerable groups, such as the elderly, patients, and people with disabilities

- Project "*Quality of Life - Development of advanced technologies to improve the quality of life through the provision of home medical monitoring and facilitation of daily activities*"

- An integrated multidisciplinary approach of three FORTH's Institutes
  - aims to develop new methods and technologies to improve the quality of life of people interacting in smart environments

Objectives

- Data collection and analysis
  - characteristics and requirements of elderly patients
  - to support their daily activities in smart environments
- Study and development of
  - medical treatment protocols for reduced duration of hospitalization, and monitoring / support at home
  - monitoring through intelligent technologies
- Creation of intelligent environments
  - to support and improve everyday life hospitalization, including "smart materials" and advanced sensor technologies
- Design, implementation and pilot operation in an integrated intelligent environment
  - prototype systems and services to support the improvement of quality of life
  - user – friendly systems for health monitoring at home
  - assistance systems for simple daily activities for seniors.

User requirements

- Patients
  - Questionnaire survey involving recently hospitalized post-stroke patients and elderly was conducted in Spring 2014
    - University General Hospital of Heraklion and "Talos" Centre of Open Protection for the Elderly in the Municipality of Heraklion
  - Results
    - Unobtrusive monitoring through portable or wearable devices with sensors
    - The majority of the participants disagreed regarding recording their medical data on a daily basis
    - Most of participants would like to have a physical exercise programme proposed for them to follow and would use a medicine reminder - monitoring application
    - Everyone agreed that their doctor should be contacted if needed
- Medical personnel
  - Interviews with six cardiologists during the same period
  - Results
    - everyone agreed that the monitoring plan should be prepared in collaboration with the patient
    - 83.3% prefer to select patients at discharge from the hospital and would use an electronic communication platform with their patients

Medical treatment protocols & services

Services for patients

- Implementation of an accessible and user friendly system of patient monitoring

Central patient monitoring system

- receives the data sent by patients, processes it and provides visual reports for the doctors and medical personnel
- make initial estimates based on the signals and data received by the monitoring devices, automatically creating alerts to that are set depending on the clinical situation of each patient
- provides a care plan system that allows the development of individualized plans for each patient, including medications, diet, exercise, medical examinations

Medical Team Platform

- access to the full list of patients' notifications and their electronic health record
- communication facilities with the patient (either by phone or messaging service)
- facilities to communicate with other team members regarding patients' issues and requests
- an emergency audible and text notification to an emergency medical monitoring team