MobiGuide: an Ubiquitous Knowledge-driven and Context-aware Clinical Guidance System

MobiGuide
Guiding patients anytime everywhere

Arturo González-Ferrer, University of Haifa

Clustering Event:
Ambient Intelligence Advanced Technologies in Support of Healthcare and Assisted Living

September 27th, 2013 (Heraklion, Crete)

Outline

- About MobiGuide
- 5 Objectives
- What we did for the 12-month demo (Sep 2012)
- What we are focusing now

MobiGuide Project (2011-2015)

- **UNIVERSITY OF HAIFA** (HU), Israel
- **BEN-GURION UNIVERSITY OF THE NEGEV** (BGU), Israel
- **UNIVERSITA DEGLI STUDI DI PAVIA** (UNIPV), Italy
- **UNIVERSITEIT TWENTE** (UT), Netherlands
- **TECHNISCHE UNIVERSITAET WIEN** (TUV), Austria
- **MOBIHEALTH BV** (MHBV), Netherlands
- **FONDAZIONE SALVATORE MAUGERI CLINICA DEL LAVORO E DELLA RIABILITAZIONE** (FSM), Italy
- **UNIVERSIDAD POLITECNICA DE MADRID** (UPM), Spain
- **CORPORACIO SANITARIA PARC TAULI DE SABADELL** (CSPT), Spain
- **ATOS SPAIN SA** (ATOS), Spain
- **BEACON TECH LTD** (BTL), Israel
- **ZorgGemak BV (**ZORG), Netherlands
- **ASSOCIACIO DE DIABETICS DE CATALUNYA** (ADC), Spain

www.mobiguide-project.eu

6 universities, 4 companies, 2 hospitals, 1 patients association

clinical domains: GDM (Spanish hospital) and AF (Italian hospital)

Motivation (1)

What do patients and their care providers (CP) want?

- Patients go on with their daily life while being safe
  - Mobile monitoring devices (BAN) and decision-support (DSS) can identify states that require attention
  - DSS is proactive and interactive
- DSS based on current evidence-based clinical GLs
  - System check compliance and outcomes and can suggest modifications for evolving clinical guidelines
- System is secure & available any time, everywhere
  - DSS distributed: main DSS Server + light mobile DSS

Motivation (2)

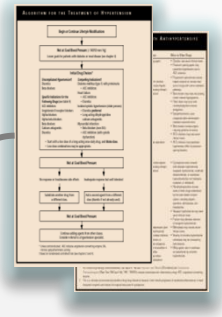
- Automatic decision support is specific to patient data
- Integrated PHR, accessible by CPs & patients
- Decision-support suited to patient's current personal context and changes in technological context
  - What are these contexts? Which are relevant to GLs? Activate predefined guideline plans per relevant context
- Shared decision-making – patients more involved

Mobi-Guide

Continuous guidance for mobile patients

Clinical-guideline guidance

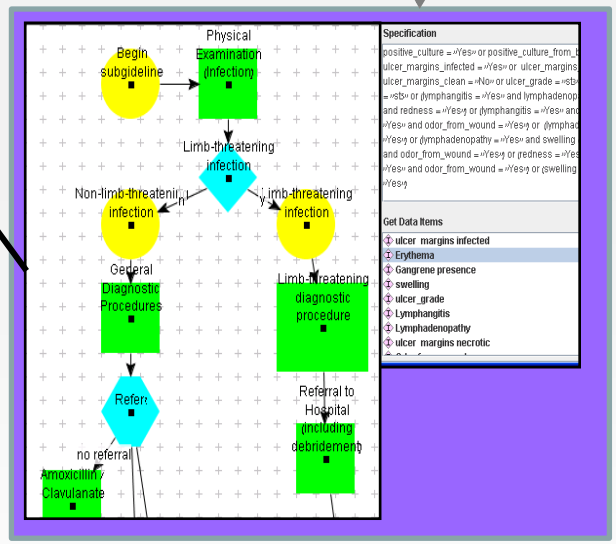
Guideline-based DSSs: any time everywhere



BAN

DSS

Personalized



EMR1

EMR2

PHR

Computer-interpretable guideline (CIG)

Objective 1: involving patients; PGS promotes collaboration of patients and care providers

-Person-
Patients

-Person-
Caregivers

-Person-
Knowledge engineering team

-Person-
System Support team

-Person-
Researchers

User Interfacing

Objective 3: Interoperating with wearable monitoring devices

Patient Data Acquisition (BAN)

Objective 4: Distributed, context-specific DSS

Decision Support

mDSS

Backend DSS

Security & Administration

Objective 2b: security &privacy

Overall Data Collection And Storage (PHR)

Knowledge Collection & Storage

Obj. 2a: PHR semantically integrates patient data from hospital EMRs, sensors &DSS

Objective 5: data analysis for knowledge generation

-system-
EMRs

tient

users

0 components

partners

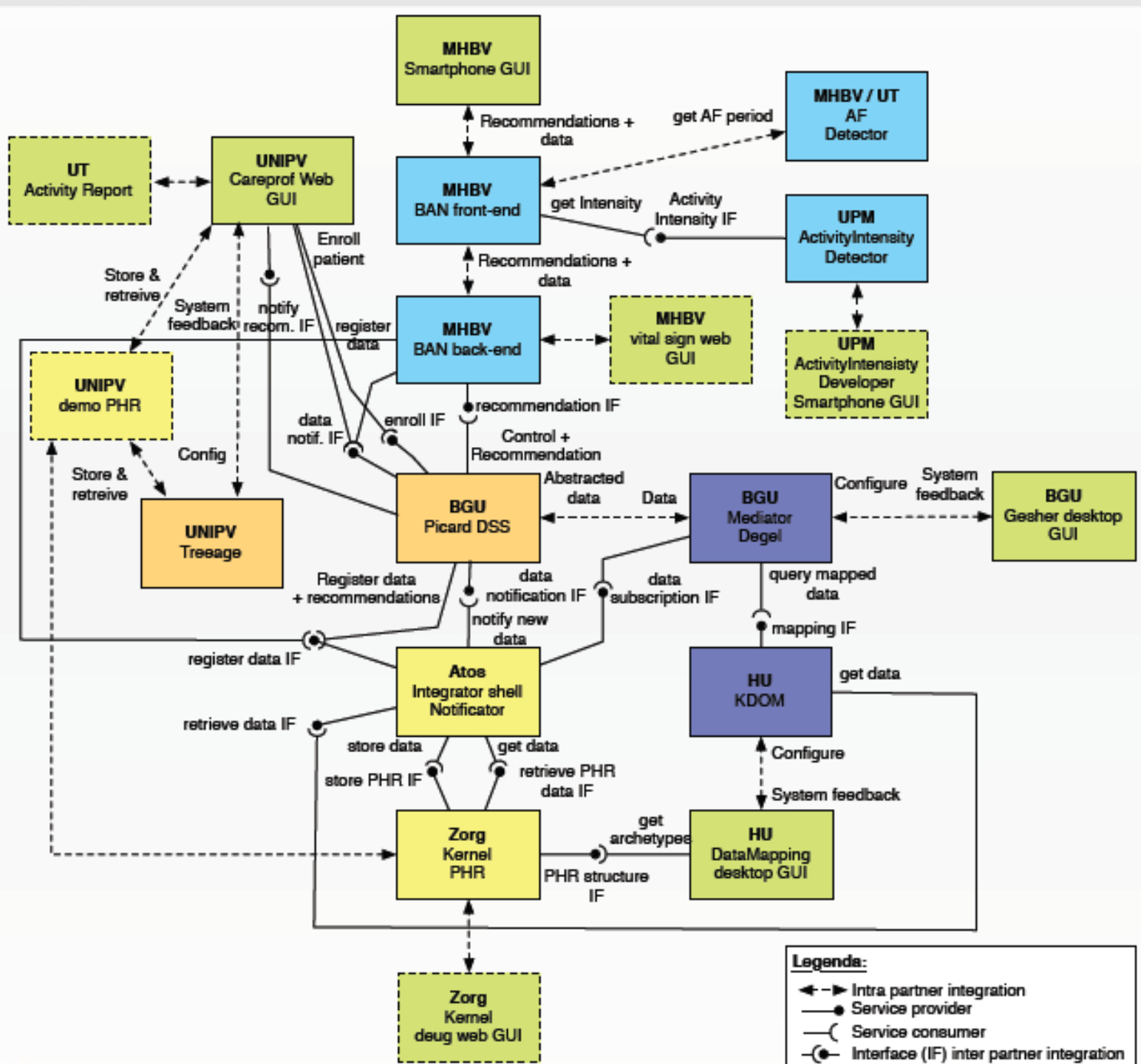
UI

hared DM

SS-PHR-BAN-

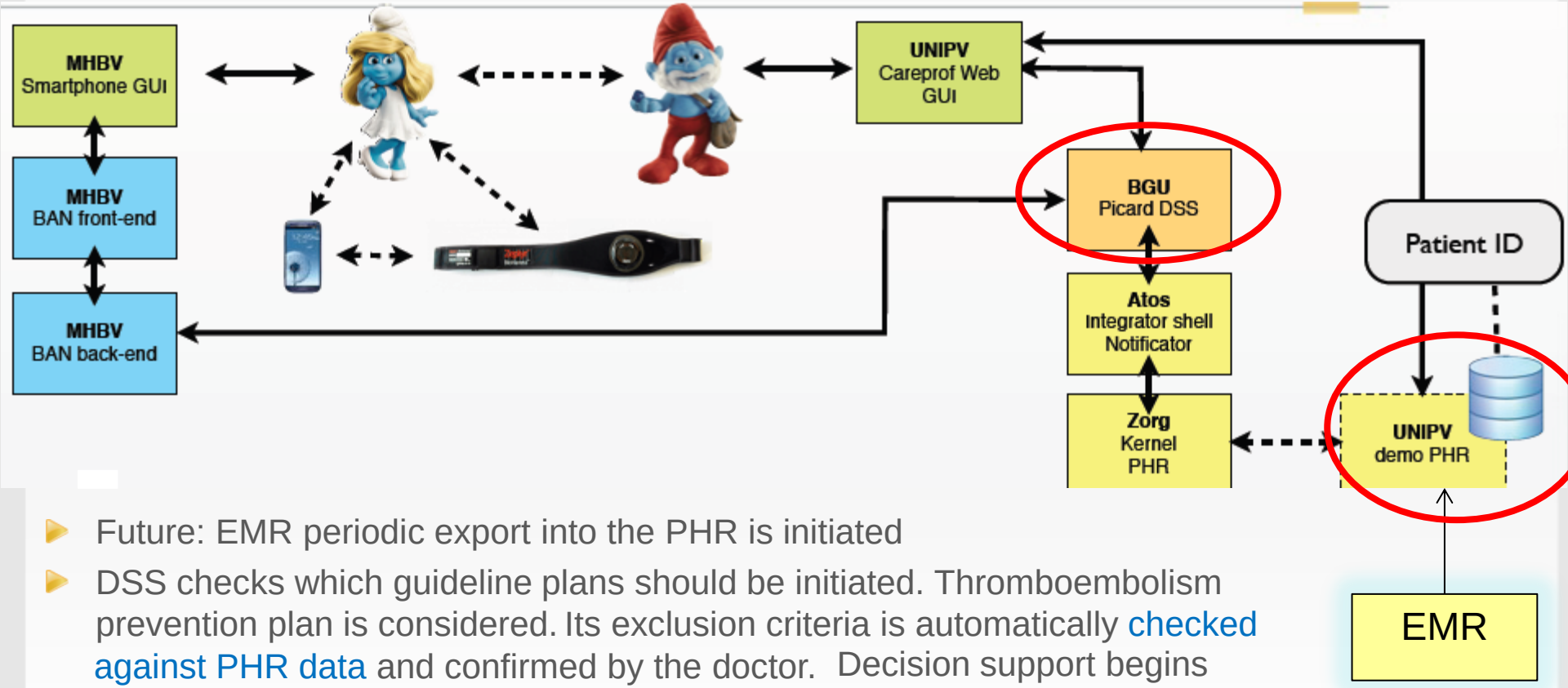
Mediator

ata integration



HelloTallinn scenario – part II

- Maria is a paroxysmal AF diagnosed woman of 48 that regularly visits her cardiologist John. She is hemodynamically stable and her perception of symptoms is acceptable.
- John suggests to Maria to use MG. Maria is given a sensor belt, MG smartphone and pin code to start the MG app on the smartphone. John enrolls Maria to MG via DSS. PHR is initiated.



- Future: EMR periodic export into the PHR is initiated
- DSS checks which guideline plans should be initiated. Thromboembolism prevention plan is considered. Its exclusion criteria is automatically checked against PHR data and confirmed by the doctor. Decision support begins

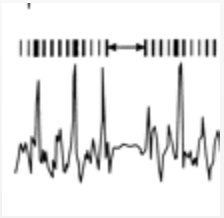
Decision support begins (M12 demo)

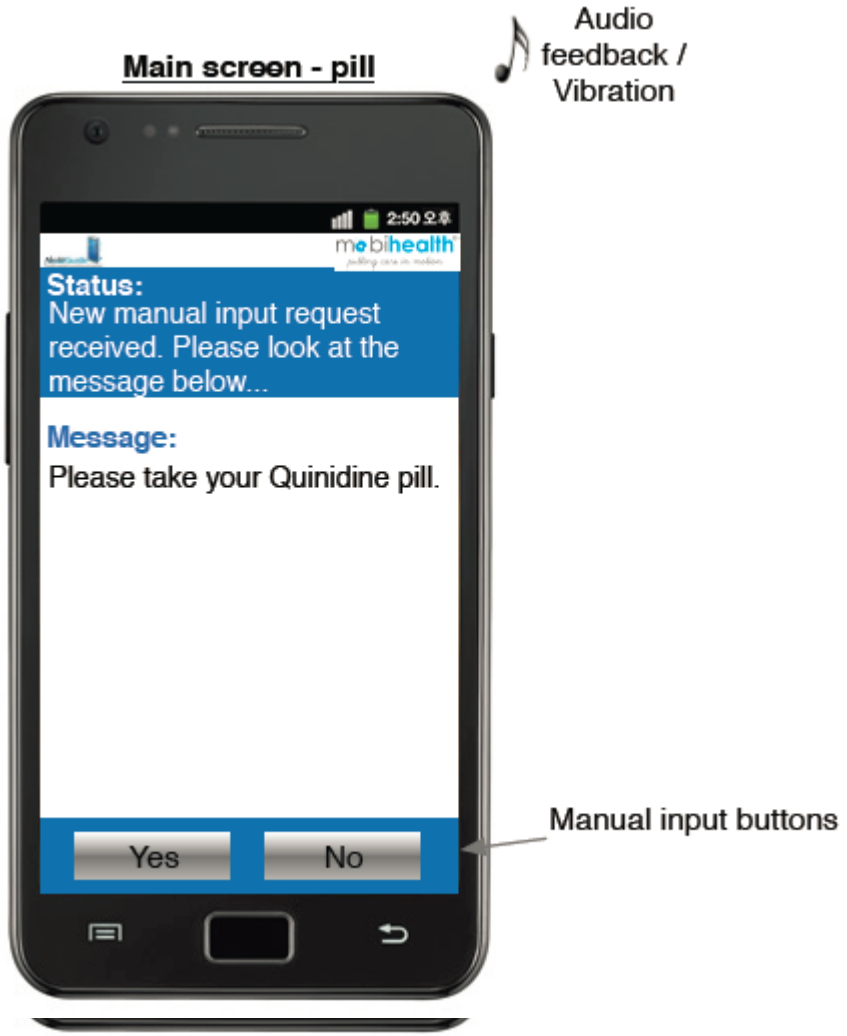
Last year, we have analyzed and demonstrated:

- Shared decision-making for anti-thromboembolism
- “Pill in the pocket” advisory for patterns of AF events
- Advice for heart rate which is too high for current physical activity intensity

Demonstration scenario – part IV

BAN collects ECG data and abstracts it to 1’ sessions. Detected AF sessions stored in PHR.
DSS instructs t-Mediator to monitor for patterns of 2 or more sessions with AF in a period of 10’





Partners collaboration: Review (Brussels)

אוניברסיטת חיפה
University of Haifa

Y2 demo: Hello Pavia (Oct 7-10)

- Gestational diabetes advice on:
  - Blood glucose and ketonuria monitoring
  - Diet compliance
  - Exercise compliance
- Standardized PHR
- CIG Customization & personalization
- DSS distribution & K projection
- Security

Questions?

Thanks!