DELOS

Network of Excellence on Digital Libraries

Task 1.7 Integration of Data Stream Management into an eHealth Digital Library

Heiko Schuldt

University of Basel, Switzerland
UMIT, Hall in Tyrol, Austria

T1.7 Task Overview

T1.7 Partners

- University of Athens (GR)
- ETH Zürich (CH)
- UMIT (AT)
- (University of Basel, CH)

Task Description ...

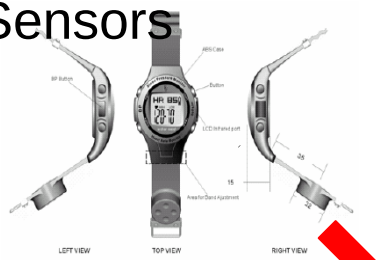
- Continuous data streams generated by (wearable) sensors have to be processed online in order to detect critical situations.
- Combination of stream operators with traditional discrete (web) services for integration of stream data in electronic health records

Task activities address the following issues:

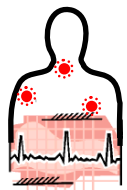
- Survey on use cases from tele-monitoring applications containing the combination of stream operators and web services.
- Specification and implementation of dedicated operators (e.g., search operators for data streams, join operators for different streams)

Typical Health Monitoring Setting

Sensors



Patient

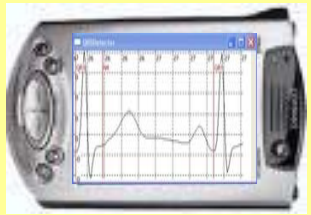


Data generation

Reliable Infrastructure for continuous streams of data

Bluetooth

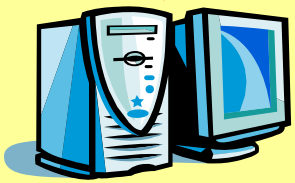
Mobile Device (PDA, cell phone)



Pre-processing, filtering, local storage

Wireless LAN

Home PC



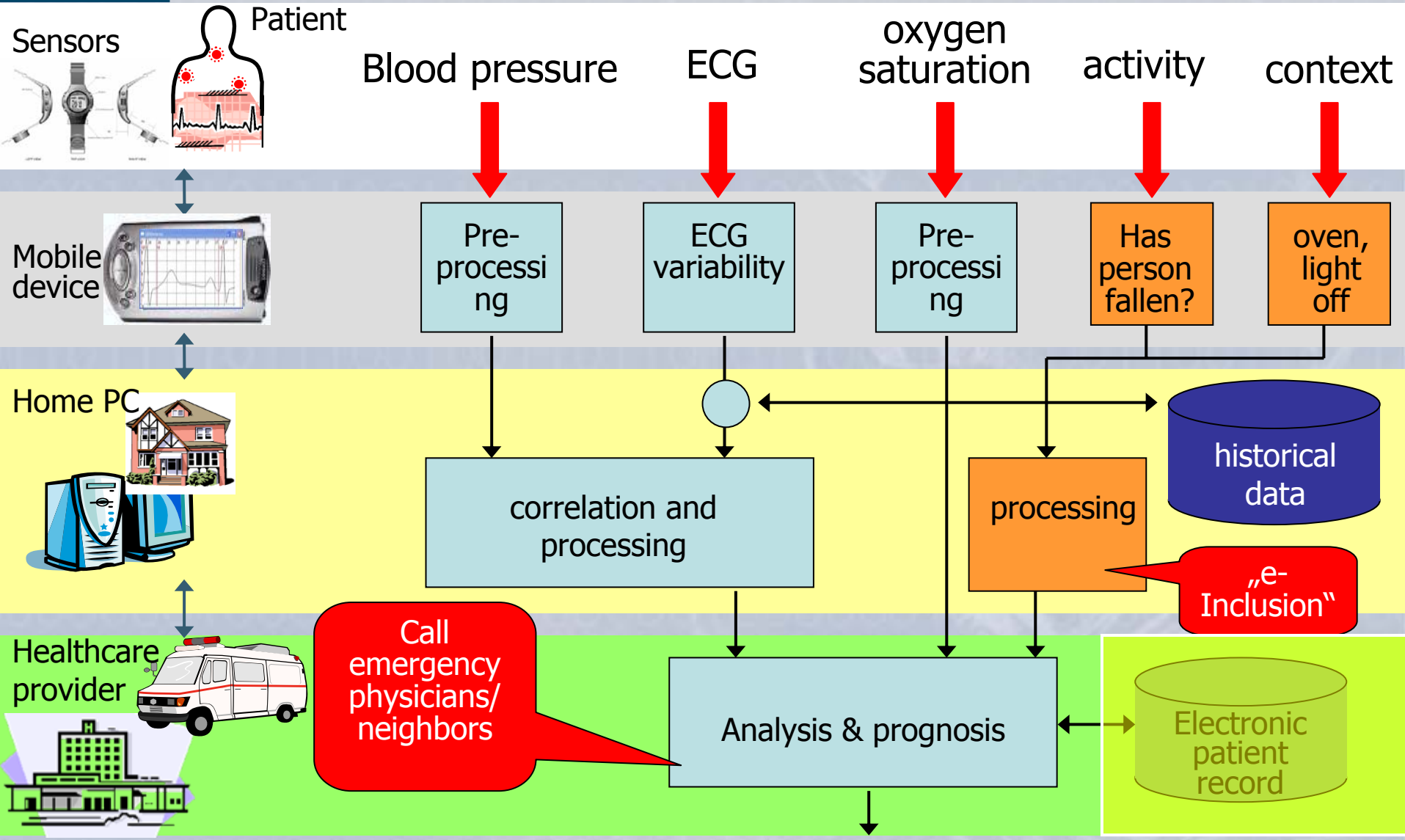
processing, local storage, user interface

Internet, GPRS

Healthcare organization

analysis, processing, archiving

Sample Telemonitoring Application



... Task Description

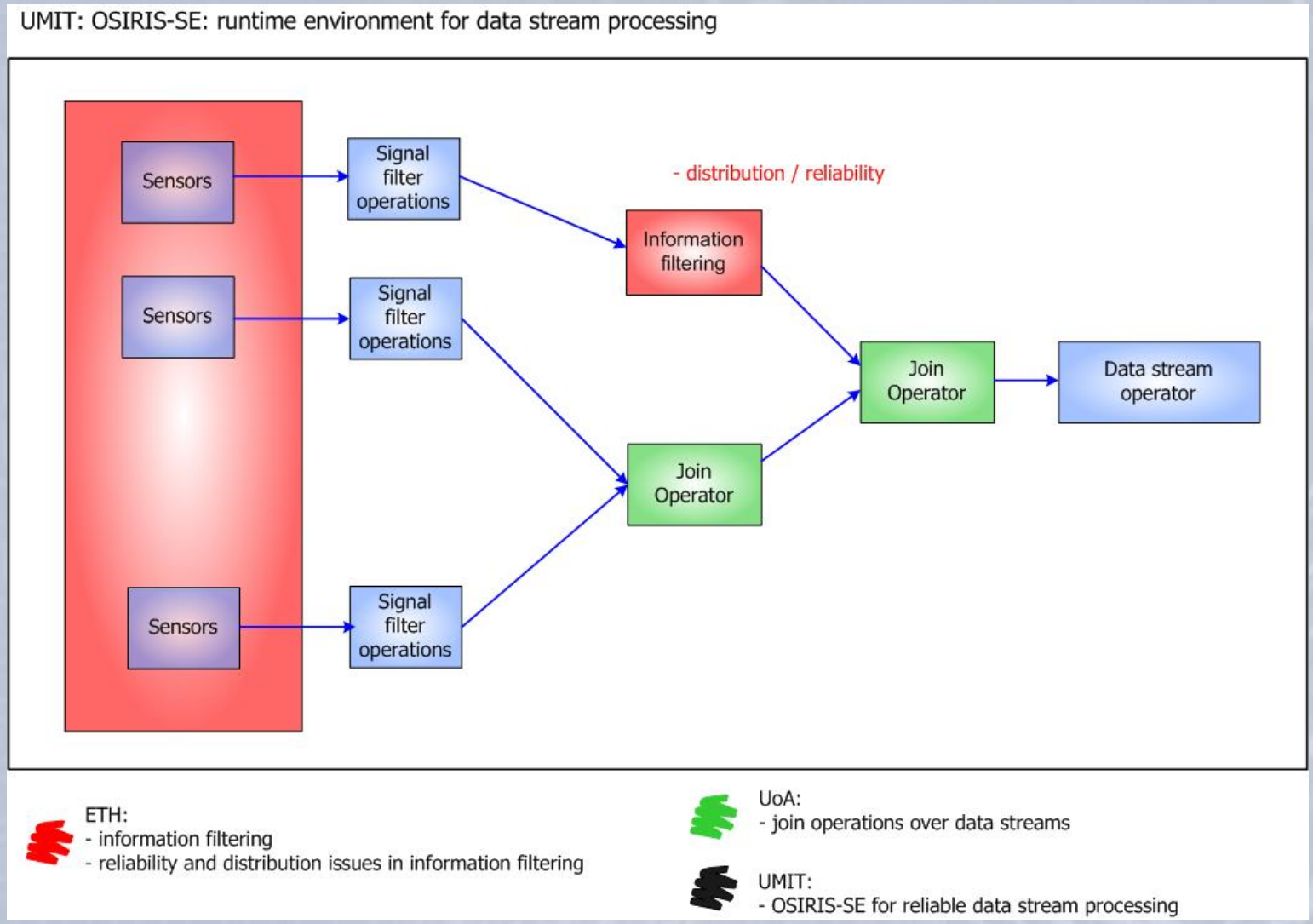
Goals:

- identify, design and build demonstrators for data stream operators, i.e. for streaming data generated by different types of sensors (e.g. jointly considering oxygen saturation, ECG signals, and blood pressure).
- Implementation of appropriate web services to process and store the results and aggregates of stream operators.
- Combination in an infrastructure for stream processing in healthcare,

Results

- Integration of Data Stream Management: Prototype implementation of an infrastructure for combining stream processing supporting the integration of stream operators and web services.

A Telemonitoring Infrastructure



Proposed New Activities

Personalization of operators and stream processes:

- Different sensor measurements should be interpreted differently for different patients
  - e.g., high blood pressure might be OK for an athlete while engaging in strenuous training but not for a patient that has already suffered a heart attack (indication of hypertension)

Persistent Storage of (aggregated) stream data:

- Various telemonitoring applications require the comparison of current stream data to historic data.
  - E.g., when changes to the diurnal biorhythm have to be detected (required for monitoring patients with cognitive disabilities)
- Historic stream data has to be made available, for instance by aggregating and persistently storing historic stream data while taking into account the accuracy needed