KITE: towards a Knowledge-Intensive and Technology-enhanced patient Emergency Management

A new project idea

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Context

• Patients experiencing a medical emergency normally taken to the closest hospital structure
  – insufficiently equipped

• Tasks & issues:
  – Stabilization
    • actual stabilization process may be suboptimal
  – Transportation to hub
    • monitoring data are neither automatically recorded nor sent to hub
    • data maintenance is missing
Objectives

• Overcome geographical, technological and logistic limitations
• Provide citizens with a reliable e-health support
• To achieve a much higher quality of service in case of a medical emergency
Stabilization task

• Process mining to learn actual process
• Process comparison to assess actual process quality
  – Clinical guidelines
  – Hub process
• Knowledge intensive:
  – Domain knowledge
  – Temporal information

• Design a network infrastructure to connect small hospitals to hub
  – mobile technology
Transportation task

• Huge amount of collected information
• Users with a mobile low-bandwidth connection
  – data compression techniques
  – Mobile Cloud Computing: cloud computing for data storage in combination with the usage of mobile devices
    • interface of the commercial monitoring instruments of the ambulance with a mobile device
    • to send/receive data in real time
Transportation task

- Time series data summarization and interpretation
- Real time (remote) supervision
- Temporal Abstraction
  - qualitative summarization strategy
  - based on domain knowledge
  - clear mapping between original and abstracted data
Data maintenance and a-posteriori analysis

• Database of previous cases
  – off-line problem solving
  – a-posteriori evaluation of specific situations
  – experiential knowledge management over time

• Data are highly dimensional
  – efficient retrieval techniques
  – flexible querying
Methodologies & Technologies

• To be adopted in the project
• (In part) exploited in previous projects
  – Progetto Regione Piemonte - Polo Innovazione ICT - 2010-2012 - Ricerca e Sviluppo Sperimentale di un Sistema per il Controllo a Distanza di Aree Sensibili e Protette, Finalizzato all'Erogazione di Servizi Innovativi Orientati al Monitoraggio Cognitivo ed Attuativo di Politiche Ambientali (MASP)

• To be offered for collaboration in other project ideas
  – Process mining & process comparison
  – Data summarization and interpretation
  – Data maintenance and retrieval
  – Real time data transmission and remote supervision
Bibliography

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• S. Montani, G. Leonardi, Retrieval and clustering for supporting business process adjustment and analysis, Information Systems 40 (2014) 128-141
• S. Montani, G. Leonardi, A. Bottrighi, L. Portinale, P. Terenziani, Supporting flexible, efficient and user-interpretable retrieval of similar time series, IEEE Transactions on Knowledge and Data Engineering 25 (3): 677-689 (2013)