Analysis of Information Models for Telemedicine in Patient Centric Perspective

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Agenda

- Introduction
- Information Models
  - FMK
  - MedComKD
  - HL7 CDA /PHMR
  - iCalendar
- Methods and Preliminary Results
- Summary and Future Work
- Q&A
INTRODUCTION (3s)
Introduction

- Patients who make status notes on health have a better understanding of their health.
- For example eDagbogen:
Introduction
Introduction

- Document types, applications, and standards in healthcare scope
  - E.g., SMC, DSCI, HL7 CDA and PHMR
- Generic standards outside a healthcare scope.
  - E.g., iCalendar
Introduction

- For example, for a new telehealth application,
  - how to navigate and search across information and annotate documents, being a patient?
INFORMATION MODELS (3s)
Shared Medicine Card

- **Purpose**
  - Fælles Medicin Kort – Shared Medicine Card (SMC) – a standard embedded in a Danish national service for management of citizens’ medicine;

- **Access**
  - healthcare employees and are specific to formal procedures inside a healthcare scope;

- **Existing Systems**
  - EPR, fmk-online.dk

- **Generic annotation support**
  - No
MedCom Dataset for Chronically Ill

- **Purpose**
  - MedCom Kroniker Dataset – Data Set for Chronically Ill (DSCI) – a national proposal for a standardized exchange of notes on e.g., lab results, diagnosis of long-term patients;

- **Access**
  - patient and care givers and are also specific to formal procedures in a healthcare scope;

- **Existing Systems**
  - KOL
  - Generic annotation support
    - no
HL7 CDA and PHMR

• Purpose:
  • HL7 CDA and (B) PHMR, which are international standards for clinical document exchange

• Access
  • healthcare employees and are specific to formal procedures inside a healthcare scope;
  • patient and care givers and are also specific to formal procedures in a healthcare scope;

• Existing Systems

• Generic annotation support
  • no
PRELIMINARY RESULTS (6s)
Method: XML analysis

- Developers new to telemedicine spend a lot of time on understanding all schemas
- Smaller devices have problems with all the XML and decoding of information
- E.g., to read and annotate some parts of the information
## Results (quantitative)

<table>
<thead>
<tr>
<th>Standards/Terms</th>
<th>SMC</th>
<th>DSCI</th>
<th>HL7CDA</th>
<th>iCalendar</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>#Elm/types</td>
<td>441</td>
<td>128</td>
<td>1526</td>
<td>309</td>
<td>2454</td>
</tr>
<tr>
<td>#XSD modules</td>
<td>600</td>
<td>1</td>
<td>6</td>
<td>9</td>
<td>616</td>
</tr>
</tbody>
</table>
Results

- HL7 is complex with regards to number of terms.
- Over 2454 terms, for use in the service interface.
- Meaningful navigation and search across documents, e.g. a “Surayya” would return a whole document, instead of parts that describe a “Patient”.
- Hence, BNF and equivalence groups
Example
BNF (qualitative)

MedComKD := PersonIDCards| DataNote
PersonIDCards := Citizen| Next-of-Kin| CareGiver
DataNote := Properties| DataSegments*
Properties := Date| Text| ResponsibleOrOrg*| ID
DataSegments := Consent| Diagnosis| Diary| Medication| Care

MedicineCardOverview := Properties| Document
Document := PrescriptionOverview*| MedicineCardOverview
Properties := Status| Actor*| Patient| Consent| Version| ID
Status := Modified| Reviewed| Created| Paused| Suspended
Description of the solution

- Analyses of complex data models on server side
- Create few equivalence groups with major and common information groups
- Use BNF to navigate up and down
- Create new "simple" interface with:
  - equivalence groups.
  - Navigation through ways up and down the BNF and searching
  - Methods for annotating groups.
- Server side translation from data models to proposed interface
Benefits of the solution

- Fast track for enabling telemedicine applications for SMBs
- Possibility to add comments, pictures etc to specific points in across all information models
- New information models/systems can easily be added on server side
- New information models/systems will not result in changes on client side
- Citizen health and empowerment can be improved NOW
Summary and Future Work (1s)
Summary and Future Work

- For example, the structure of Patient may include many attributes, for future use: e.g., HL7 religion attribute.
- Patient structure to evolve/change, with time.
- For example, the middleware based architecture allows new domain models to “attach” and contribute new information e.g., on religion based food preferences.
- Further extend the structure of Patient with a new “religion” attribute.
- In the project we focus on identifying of a sufficient number of groups needed to demonstrate the whole concept of patient centricity.