Empowering Healthcare Professionals to Use Databases: Design and User Study of a Do-it-yourself Tool

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Healthcare Industry and Databases

Databases have received an extra-ordinary acceptance in the healthcare industry. Healthcare domain has a dynamic information environment. Databases in this domain are required to continually evolve based on new information requirements provided by healthcare professionals.

Data-entry Forms

Data-entry forms are the most popular data gathering tool among healthcare professionals. Forms provide a natural abstraction for databases to these users who have no background in databases. Thus, form templates offer the healthcare professionals a powerful mode to author information requirements.

A Do-it-yourself Tool for Database Evolution

I want to collect information related to an allergy injection such as its site, reaction, etc..

How can we empower the healthcare professionals to design and evolve databases based on their knowledge of data-entry forms?

The form design layer offers functionalities based on the common design patterns found in the healthcare forms.

Research Findings: Participants

Rated the tool very high in terms of ease of use and system messages. Felt empowered and accomplished as they completed the tasks. Those who were moderately comfortable with computers drew forms on paper before using the tool. Performed impromptu innovations, e.g., format switching from textbox to dropdown. Easily understood the format semantics but had difficulty distinguishing between a sub-category and a field.

Figure 2. The Dual Layered Database Evolution Tool: Using this tool, users can design forms on their own. The tool automatically translates the form components to appropriate database elements.

Results and Contributions

User Study with Healthcare Professionals

About the Participants

P1, P2, and P3 are very comfortable working with computers. P4 and P5 are moderately comfortable. Each has 1-4 years of work experience.

Task Completion Time in minutes

To ensure a high-quality database, 6 evolution quality dimensions were conceptualized: Normalization, Minimalism, Correctness, Completeness, Persistence and Traceability. The Form Mapping Layer is designed to ensure that the evolved database satisfies these dimensions.

What’s Next?

User study Round 2 with improved training based on the findings in round 1 and revised tasks with advanced features such as units, multi-formats. Mathematical Proof for validating the 6-dimensional quality of the generated database.

References