

TabletERD: A Tablet PC Application for Database Design

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ABSTRACT

The software development process would benefit from CASE tools built on the Tablet PC technology. We developed a Tablet PC application called TabletERD that supports the database design process, and assists database designers in drawing entity relationships diagrams (ERD) and generating associated SQL and XML code, and data dictionaries. TabletERD is currently tested by students of a database design course.

Categories and Subject Descriptors: D.2.2. Design tools and techniques.

General Terms: Design

Keywords: CASE Tool, Database Design, Entity Relationship Diagram, Tablet PC.

1. MOTIVATIONS

Tablet PCs are laptop PCs enhanced with a touchscreen designed to interact with a stylus. They can be used in the same type of setting as the laptop or while standing up, which increases mobility. One can use the stylus as a mouse, draw directly on the screen, or handwrite and use the built-in handwriting recognition feature.

Instructors are very interested in the use of the Tablet PC to enhance lecture delivery and support active-learning class experiences [1]. Some popular Tablet PC applications for instructors are the ink-enabled version of Microsoft Windows Office, Microsoft Windows Journal for note taking, Classroom Presenter [<http://www.cs.washington.edu/education/dl/presenter/>] and DyKnow [<http://www.dyknow.com/>] for interactive lecture delivery. Students are more interested in “PowerToys” software [<http://www.microsoft.com/windowsxp/tabletpc/>], fun game, art, and multimedia Tablet PC applications.

There is a significant market for the development of Tablet PC Computer Aided Software Engineering (CASE) tools because of the Tablet PC drawing, handwriting and mobility capabilities. There are currently very few Tablet PC CASE tools on the market. Existing proprietary tools such as TabletUML [<http://www.tabletuml.com/>] and IdeogramicUML [<http://www.ideogramic.com/>] are modeling tools supporting the standardized UML notations for most popular UML diagrams (e.g. use case, class, activity, sequence and state diagrams). They provided a means to save the diagrams as HTML pages or images, and reverse engineer existing code (but they do not generate code). DENIM [<http://dub.washington.edu/denim/>] is a web site design CASE tool.

We decided to target the database design phase of the software

engineering process and develop a Tablet PC application called TabletERD.

2. DATABASE DESIGN AND TabletERD

Database design focuses on the specification of the database schema. It is based on the design of an Entity Relational diagram (ERD) [2], a high-level graphical view of the data and how they are related. An ERD is viewed as a set of *entity types* (with their *roles*), *relationship types* (with their *cardinalities*), and *attributes* of entity and relationship types (including *key* attributes). ERDs are then transformed into a set of relations and SQL tables. Additionally, the normalization theory provides a mechanism for analyzing and refining the relational schema produced by an ERD design.

TabletERD is a CASE tool developed in Java that supports the drawing of ERDs and takes full advantage of the features of the Tablet PC. It can also be used on a regular laptop PC using the drag and drop feature. When drawing an ERD in TabletERD the entity types (rectangle) and relationship types (lines) are recognized. Attributes are added as properties of the entity and relationship types. TabletERD generates XML and SQL code (MySQL, Oracle and DB2 code conform to SQL99), and documentation such as the data dictionary in HTML. ERDs can be viewed at different levels of abstraction within the tool: abstract or detail. The workspace is augmented by a navigator and by an undo/redo feature to help the user work more efficiently.

3. FUTURE PLANS

TabletERD is currently tested by volunteer students in a database design course. We are documenting the students’ perception of the enjoyment and effectiveness of using TabletERD to assist them with learning database design.

We plan to extend the features of TabletERD by introducing best practice design tips for the user based on the normalization theory. This application may be also the starting point of more interest in ink-enabled applications in the Java community.

ACKNOWLEDGMENTS

This work was supported by a Microsoft Tablet PC Research grant award.

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