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TOPICS: eBooks, Understanding Content, Metadata (DAML, RDF), SVG, Ontologies

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Title of this paper:

Electronic Book That Understands Its Own Contents

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Electronic Book Contents

Tutorials have been delivered since antiquity in the form of aural storytelling.

- Digital sound recording can provide such an aural tradition to accompany computerized textual information and computer-based graphics.
- Digitally recorded sound tutorials can capture the sonance and modulation of human speakers.

Digital Sound Tutorials

- Almost all computer generated synthetic speech leaves much to be desired as a vehicle for delivering any but rather brief passages of speech
- Computer generated synthetic speech has no prosody or cadence compared to human speech, and is therefore boring to listen to.
- Text-to-speech software is improving and will replace prerecorded human narration.

More on Digital Sound Tutorials

- Presently it is beyond the capabilities of computers to understand unconstrained natural spoken language, and so we move on to text and graphics media. No attempt will be made to understand spoken content.

Text as Tutorial Medium

- text produced by people skilled at crafting tutorials can be generated using word-processing software and by SGML and XML/CSS XSL-FO, to make it organized and attractive to the eye.
- Traditionally text was on paper, designed only for the human eye.
- The organization / layout of the text, as well as its appearance, is important on the printed page. The eye of the reader will tire if the text is too fancy and too cluttered. The best layout scheme for a given font and book content is often a matter of experience.

Electronic Text

- Electronic representations of textual content allow obvious things that could not be done with paper:
- such as displaying in a font, size and color chosen by the reader (not the publisher).
- It also allows for the reader to specify HIS choice of flow / layout, and the material can be reflowed and or the layout changed to suit the vision or tastes of the reader.

Electronic Text also

- Electronic representations of text allow animation of the text, fades and other visual and spatial transformations. These of course are just eye candy and are counterproductive for serious education.

Hidden Text

- An important capability of electronic text is that it can be hidden. Metadata, data about the contents of a document, can be purposely not displayed to human (eyes) consumer but read by a program.
- XML data, SVG and its metadata, MathML, XML Topic Maps, all these are text.
- If read by programs instead of eyeballs they can inform those programs. Properties and features of content can be held in embedded metadata.

Graphics and Visuals

- Ever since the days of parchment and later, paper, there have been line drawings and artwork in works designed to be consumed by the human eye.
- Woodcuts permitted complicated scenes to be placed amongst printed or even hand -written pages.
- Photographic processes allowed pictures to be placed on pages, improving on woodcuts and other manually produced scenes.

Modern Printing Technology

- has plates which can be used to make pages, and of course there are electronic means to place “ink”, “toner” etc onto paper.
- These electronic means can represent lines,curves, two dimensional shapes, and entire pictures.
- The resulting graphics and visuals are fixed on the paper. Also the paper is not interactive.

Electronic Presentation

- Text, diagrams and pictures can be presented to the eye via electronic means, via the personal computer screen or laptop screen. There are even book and tablet sized “electronic books” available.
- When a computer screen is used there is high resolution and a powerful processor with memory available.
- Presently, electronic books have feeble processors, effectively no (“working”) memory and not particularly high resolution screens.

Understanding & Looking-Up

- A database or file lookup is not understanding.
- String matching or pattern matching is not understanding.
- Lookup and matching generally are considered to be at the pre-understanding level.

Elementary Understanding

- occurs when content in the book or tutorial, such as a sentence “The box was green.” is read by a (software based) processor and transformed into a data structure/representation which can be queried as in, “what color was the box?”
- Furthermore, a glimmer of understanding exists when the system realizes that all objects, such as boxes, have attributes, features, properties.
- Physical things have certain physical attributes, like size, shape, color, possibly changes such as location or brightness.

Tutorial Expression

- When the text components of a tutorial are represented using XML, SVG, CSS XSL-FO, MathML and other such technologies it is possible to do much more with the text than simply present it to the eye in a pretty way.

Tags and metadata

- Tags and metadata can provide extra information about the material contained in the text.
- Programs are able to perform many different and useful functions with the text by virtue of the markup and the metadata.

Own Contents

- Since it is a computer we talking about all of the contents are in the form of files on hard disk.
- Colloquially, the “contents” of the electronic book are the ideas, concepts represented by means of the text, diagrams, pictures, “sound” stored in those disk files.

Own Contents continued

- The computer file directory information obtained from the operating system is thus not what we mean by “contents”, nor are the byte sequences which comprise the files of “actual text/diagrams/pictures”.
- The contents are thus what we would call “conceptual referents”, the mentations generated in a human mind as a result of seeing the words, diagrams, pictures.

Diagram Understanding

- A certain degree of diagram understanding is possible using the following techniques:
- structural/spatial component analysis
- picture grammars
- topic maps with specific diagram component references (as topics).

WROX Professional XML Meta Data

- David Dodds described actual code for understanding an example diagram in the WROX book mentioned above.
- A combination of SVG, XML, RDF, RDF Schema, and UKL was used there.
- Logical inference was included in the processing, antecedents (“rules”) specified using XML technologies.

Narrative Text Understanding

- tutorial text or technical report text in the ebook can be input to software which performs certain kinds of language interpretation processing (LIP).
- LIP is presently able to perform certain ranges of text understanding such as locating “actors” and answering questions about what they did or what changes were effected ; locating things/objects described and reporting some or all of their

Text Understanding and Plan Understanding

- Example “John put the green box on the table. ”A question such as “Where in the room was the colored thing?”, would result in “The green box is on the table.”
- A combination of text understanding and plan understanding software is used here.

Want to get the data files?

- If you wish to get a copy of the data files that go with this set of slides then send an email to drdodds42@hotmail.com. Be sure to give the name of the slide set (this set is called “Electronic Book That Understands Its Own Contents”. OP2002) You may need to have a copy of the data files in order to understand what the slides are talking about.