

Practical Illustration of Text: Customized Search, View Selection, and Annotation

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Abstract

This poster presents concepts to support authors illustrating their texts. We introduce a system which smoothly integrates the search and adaptation of appropriate illustrations into target documents. It enables the author to search for images and 3D models. To effectively support the context of the document, the view and label layout of the retrieved 3D models can be semi-automatically adjusted. Further on, we explicitly store the label layout in conjunction with the adapted illustrations. Since this information reflects the semantic and pragmatic content of illustrations, it eases the retrieval, reuse, and adaptation of illustrations in multimedia databases.

1 Introduction

Authors are often confronted with the challenging task to find appropriate images to illustrate their texts. Even if multimedia databases contain ready-made illustrations, their retrieval and adaptation to contextual requirements of the text is intricate and time consuming.

Our approach integrates multimedia retrieval techniques within text authoring tools. By selecting text segments, authors can directly define queries for information retrieval systems. Subsequently, the original documents are enhanced with user-selected illustrations as well as automatically generated figure captions and references to these figures (Götze et al. 2005).

For some application domains those multimedia databases also contain many computer generated images (e.g., charts, flow diagrams, renditions of surface or volumetric 3D models). Therefore, a visualization component within our system supports the adaptation of computer-generated renditions to contextual requirements. Illustrators can interactively select appropriate views and specify textual annotations for visual objects while adaptable real-time algorithms determine a label layout automatically.

2 Illustration Authoring

Due to the availability of comprehensive multimedia databases and content-based retrieval techniques, the text illustration process has shifted from content creation to search with respect to communicative goals. The strategies of experienced practitioners as well as their advantages and disadvantages have been described by a journalist (Markkula 1998). This paper adopts this process for illustrations which are created from 3D models and presents concepts to support the adaptation of retrieval results. Therefore, it incorporates multimedia retrieval techniques, interactive illustration techniques for digital documents, and annotation layout algorithms for 2D and 3D objects.

Our approach extends the SearchIllustrator concept (Götze et al. 2005) that employs information retrieval techniques on multimedia databases or WWW to interactively illustrate texts. Therefore, keywords from user-selected text segments to be illustrated are extracted which invokes a search engine for the retrieval of static images and 3D models. Subsequently one of the search results can be chosen and directly integrated into the text document.

The adaptation of retrieved visual material to new contextual requirements comprises their (re)composition and the enhancement with additional information. The determination of an appropriate viewing direction for a 3D scene or the selection of a display window for a 2D illustration involves semantic, pragmatic, and aesthetic considerations which should be done by a human expert.

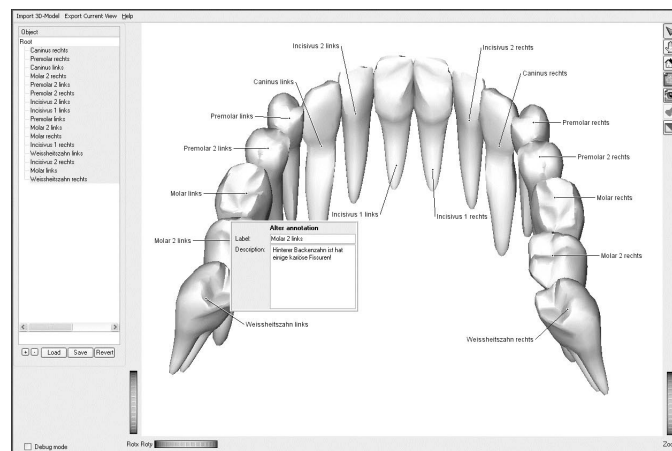


Figure 1: Interactive view selection and annotation of 3D models

We integrated a concept for automatic label layout (Götzelmann et al. 2005) to support the author by selecting an appropriate viewing direction, rendering style and annotations for 3D models. The author of the text should be supported, but not constrained by the system, while adjusting the illustrations. Thus, despite this approach determines an appealing label layout in real time, we implemented the possibility to simply manually alter the label placements

via Drag & Drop functionality. Additionally the label texts can be edited (see Fig. 1) and the author can choose different photorealistic and non-photorealistic renditions, depending on the user's needs and the communicative goal.

Finally, to enable the author to change the label layout at a later date, we store the chosen 2D representation of the illustration with its additional information in a vector graphics format. Beside that the labeling texts in the resulting images are stored in an explicit representation. Since they provide information about the semantic content of the illustration, they can be used to bridge the semantic gap and thus, enhance the performance of content-based retrieval techniques.

3 Conclusion and Future Work

In this poster, we introduced a novel concept to support the interactive illustration of texts with content-based search strategies in multimedia databases. The main contributions are: (i) We proposed a new kind of interactive documents by retaining the rendering parameters for computer-generated projections so that readers can directly access 3D visualizations of complex spatial configurations. (ii) The definition of textual annotations for visual objects and their appealing and frame-coherent presentation in interactive 3D visualizations and 2D illustrations is a central element of the adaptation of predefined visual materials to contextual requirements. Our approach considers label layouts as an inherent description of the semantic and pragmatic content of illustrations. Therefore, their explicit representation eases content-based retrieval techniques and the reuse and adaptation of images. (iii) We implemented an experimental application which offers all basic functionalities.

We plan a user study to evaluate our system. Some tests could compare the effectivity of unchanged illustrations found in the WWW with those which were adapted via our system. Another test could reveal the time efficiency of our integrated approach compared with a manual search and adaptation of appropriate illustrations.

References

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