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Project Description

The main research question in this project is how to develop IT support for diagnostic and decision-making processes based on large and complex imaging data. The approach is based on developing novel graphics, visualization, and interaction methods for the exploration of imaging data and the use of storytelling as a means of visual data communication is a key element of the project.

Big Data Visualization

To help scientists understand and explore data through visual representation, intuitive visualization methods that can easily reveal relevant structures and improve the interactive procedure of filtering and analysis will be developed and used. In view of our primary use case (radiology) where data sets increasingly comprise volumetric scans (CT, MRI, PET), we need to include 3D image data in our approach.

Human-Computer Interaction

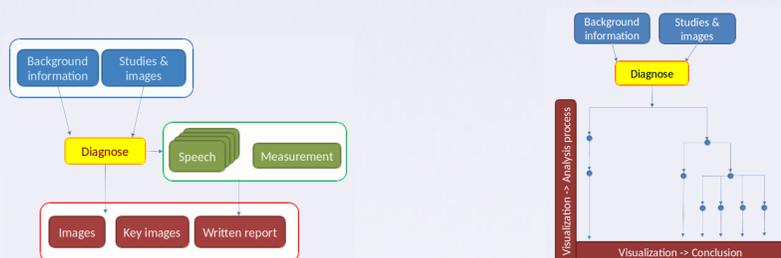
The analysis of large imaging data includes several types of interaction: analysis, diagnosis and decision making that may lead to follow-up actions. In all these processes, both large-scale and precise interactions with the data are required. Thus, new touch-based techniques have recently been investigated for this purpose [1].



3D visualization exploration widgets that allow users to control the view in 7 degrees of freedom.

Visual Storytelling

Visual storytelling is not only a good way to present data, but also an effective way for another person to pick up the findings and information which is crucial in collaborative and decision-making settings such as healthcare. Storytelling may include several kinds of information and ties these into a visual story, creating a connection between the images and the conclusions to be drawn from the data [2]. Using the CLUE model, an initial story can be edited through *authoring*, creating different branches and a back-link from the *presentation* to the *exploration* stage, which allows users to reproduce the findings and to make new discoveries [3].



The diagnosis process in healthcare based on the traditional workflow (left) and the visual storytelling approach (right).

References

- [1] L. Yu, P. Svetachov, P. Isenberg, M. H. Everts, and T. Isenberg. FI3D: Direct-touch interaction for the exploration of 3D scientific visualization spaces. *IEEE Transactions on Visualization and Computer Graphics*, 16(6):1613-1622, Nov./Dec. 2010.
- [2] B. Lee, N.H. Riche, P. Isenberg, S. Carpendale: *More Than Telling a Story: Transforming Data into Visually Shared Stories*. *IEEE Comp. Graph. and Applications*, 2015.
- [3] S. Gratzl, A. Lex, N. Gehlenborg, N. Cosgrove, M. Streit: *From Visual Exploration to Storytelling and Back Again*. *Comput. Graph. Forum* 35(3): 491-500, 2016.

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ViStory



Provenance