



FROM VISION TO DECISION



SEMINAR FRIDAY 20.03.2015

PLACE: MedViz Facilities., Møllendalsbakken 7, 5th floor

TIME : 12:00-13:30

SPEAKERS/TITLE

Stefan Bruckner

Title: The IllustraSound Tricorder - Challenges and Perspectives

Sergej Stoppel

Title: "View-Aligned Dynamic Small-Multiples for the Visualization of Multivariate Data in Spatial Context"

Veronika H. Šoltészová

Title: Visibility-Driven Processing of Streamed Volume Data



ABSTRACT

Bruckner

Ultrasonography (US) belongs to the most promising live examination modalities, due to its comparably low costs, patient friendliness, and high speed of acquisition. Unfortunately, the interpretation of US images is challenging and the navigation by the examiner is not fully straightforward. The IllustraSound project originated in 2009, when visualization researchers at UiB's Department of Informatics, together with national as well as international partners and supported by MedViz, teamed up to improve medical communication based on US images by means of advanced visualization technology.

Several important results were achieved, and the project was awarded with the prestigious Dirk Bartz prize for Visual Computing in Medicine by the European Association for Computer Graphics (Eurographics) in 2013. Building on these successes, the grand vision of IllustraSound can be sketched as the hypothetical "IllustraSound Tricorder", an advanced tool that provides anatomical and physiological information in real-time, amounting to a comprehensive next-stage diagnostic tool, and bringing high-quality modern health care closer to the patient. In this talk, I will give a short overview of the major challenges in working towards this goal and provide an outline of current activities in the project.

Stoppel

Quantitative evaluation of time dependent data can be very challenging. Common visualization techniques show either the whole volume in one time step (for example volume rendering) or the user can select a region of interest (ROI) for which a collection of time intensity curves is shown. The first technique neglects the temporal context and the second technique requires the observer to know the ROI beforehand, this technique also holds the danger of overseeing important events, simply because those were not expected to be in the ROI. We propose a technique for quantitative analysis of multivariate data in a spatial context. Our technique should allow an effective quantitative analysis without the lost of spatial context. To do so we propose view aligned small multiples that change their size according to the behavior of the time intensity curves. In this talk I will present the challenges of the project and discuss the technique in detail.

Šoltészová

In real-time acquisition of 4D ultrasound, the raw data is challenging to visualize directly without additional processing. Noise removal and feature detection are common operations, but many methods are too costly to compute over the whole volume when dealing with live streamed data. In this talk, I will explain the visibility-driven processing scheme for handling costly on-the-fly processing of volumetric data in real-time. In contrast to the traditional visualization pipeline, this scheme utilizes a fast computation of the potentially visible subset of voxels which significantly reduces the amount of data required to process. As filtering operations modify the data values which may affect their visibility, our method for visibility-mask generation ensures that the set of elements deemed visible does not change after processing.