



Quantification in Visual Computing

Visions, Challenges, and Activities of the SFB-TRR 161

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About the SFB-TRR 161

Transregional Interdisciplinary
Research Project

Subject of Research:
Quantitative Methods for Visual
Computing

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Forschungsgemeinschaft (DFG)
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Transregio Partners:
University of Stuttgart
University of Konstanz
Ludwig-Maximilians-Universität Munich
Ulm University

Currently 18 research projects

About 50 scientists

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Find out more:

www.sfbtrr161.de



twitter.com/SfbTrr161
visual-computing.org



We are looking for answers to
questions such as...

Does the viewer understand the
information that is contained in
computer-generated images?

How easy are they to be
understood?

How do we have to prepare
image information for different
devices?

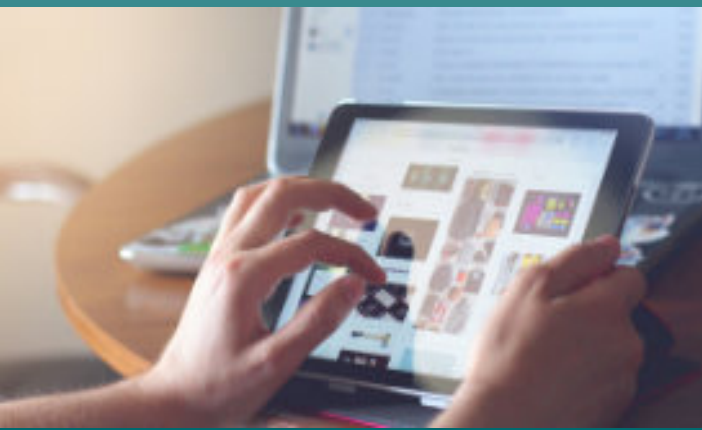
How can we generate new
applications from images?

How can machine learning support
visualization research and practice?

Is there any additional benefit of
new possibilities of interaction?

What impact do virtual
surroundings have on people?

Challenges of Ubiquitous Technology



ubiquitous in our private lives as well as in research and industry. Processing and generating large amounts of data has become pervasive.

Images play an important role in this development. On the one hand, they make it possible to present data in an optimum way, e.g., when results of complex computer calculations can be demonstrated as a film or

picture. On the other hand, we can gain information for new technologies from digital images. For instance, camera systems in modern cars warn drivers about unexpected obstacles and thereby potentially prevent accidents.

Today's society requests quick comprehension of a large amount of data. Thus, computer controlled processing and generating of images and visual information gains more and more importance. The young science of visual computing deals with this challenge.

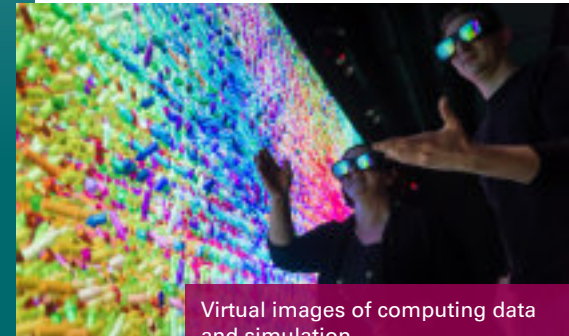
Smartphones take our holiday pictures, send us reminders of upcoming appointments, and help us find the way to a meeting point. Cars are learning to see, computer generated images entertain us in movies and video games, and we view new products online in 3D before we decide to purchase them.

In our daily environment, we see lots of information on displays—on our computer screens and mobile devices, on virtual shop windows as well as huge projection screens. Computer screens have become

Visual Computing in Science, Industry, and Daily Life

Visualization of generated data and simulated computation, virtual maps and tours or visual effects in films and on TV—visual

computing is present in science, industry, and our daily lives. Some of the main topics of the SFB-TRR 161 are:



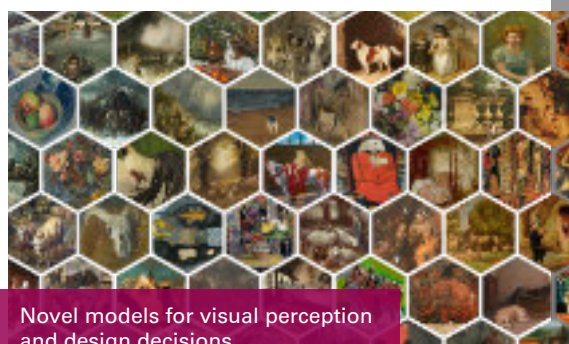
Virtual images of computing data and simulation



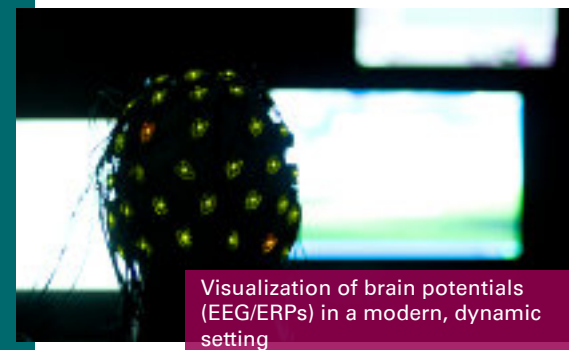
Interactive analysis of data collections or studies



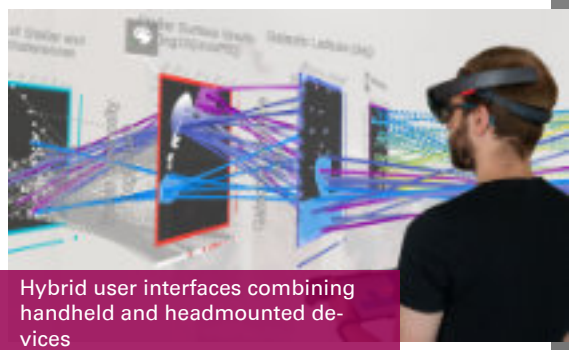
Immersive analytics tools, e.g., for spatial transcriptomics data



Novel models for visual perception and design decisions



Visualization of brain potentials (EEG/ERPs) in a modern, dynamic setting



Hybrid user interfaces combining handheld and headmounted devices

Quantification – Making Quality and Applicability Measurable

In recent years, visual computing has managed to establish its own faculty where computer scientists, engineers, and psychologists develop efficient methods, techniques, and applications.

»So far, an often neglected aspect in visual computing research is quantification. Only quantified methods can be applied effectively. Our research community will close this gap.«

Prof. Dr. Daniel Weiskopf
Spokesperson of the SFB-TRR 161

An often neglected aspect in visual computing research is quantification. Only by using quantification can the methods be applied effectively. Scientists of the SFB-TRR 161

work on determination and measurability of quality and applicability of available methods to adapt them to the requirements of different applications and users.

For this, the SFB-TRR 161...



... performs specific user tests,



... optimizes approaches for interactive visualisation,



... takes physiological measurements,



... analyzes eye-tracking studies,



... explores possibilities of new interaction,



... develops models and algorithms.

What is Visual Computing?

