

Internes Kolloquium

Am Montag, dem 18 April 2011, um 16:15 Uhr hält

Dipl.-Inform. Niels Henze

im Rahmen ihrer beabsichtigten Dissertation einen Vortrag mit dem Titel

Camera-based Mobile Interaction with Physical Objects

Der Vortrag findet im OFFIS, Escherweg 2, Konferenzraum F02 statt.

Abstract

Digital information and mobile devices became an integral part of our daily life. With smartphones almost any digital media is accessible at any time and any place. At the same time physical media like posters and printed photos remain present and relevant. However, a seamless connection of physical media and related digital services would be helpful in many situations. For example, film posters that advertise movies could offer a link to movie trailers, user generated reviews and background information.

Today, first solutions exist that use mobile camera phones to bridge the physical and the digital: the image from a mobile phones' build-in camera is used as an input channel to recognize physical objects and determine according content. E.g. a user takes a photo of a film poster with a smartphone, the photo is analyzed using object recognition algorithms, and the user receives a list of related services. While the computer vision problem is partially solved, comprehensive studies and solutions for a seamless interaction are missing.

This thesis investigates the interaction design of mobile applications that enables to receive information related to physical objects. The methodical approach is substantiated in controlled experiments and other empirical studies. Interactive prototypes are designed, implemented, and evaluated. Using experiments camera-based interaction techniques are analyzed. It is shown that they can be more efficient and are preferred compared to manual techniques. It is further shown that handheld Augmented Reality (AR) where the phone's camera image is enriched with additional information and displayed on the phone's screen is superior compared to other camera-based techniques. Using participatory studies the design space of handheld AR user interfaces is explored. Evaluations of the designed interfaces show how information and input controls should be arranged. Visualizations techniques for handheld AR that highlight nearby objects are investigated. Existing visualizations techniques for digital maps are compared in public experiments. Based on the results the visualization is adapted for handheld AR. It is shown that this visualization improves the users' performance and that an arrow-based visualization is more usable than a mini-map.

The result of this thesis is a structured investigation of mobile camera-based interaction techniques. It is not only demonstrated that camera-based interaction, and in particular handheld AR, can be superior but it is also supports interaction designers by investigating important design decisions. As the human factor causes requirements for the computer vision algorithms this thesis also provide input for the refinement of computer vision algorithms for camera-based mobile interaction.

Betreuerin: Prof. Dr. Susanne Boll