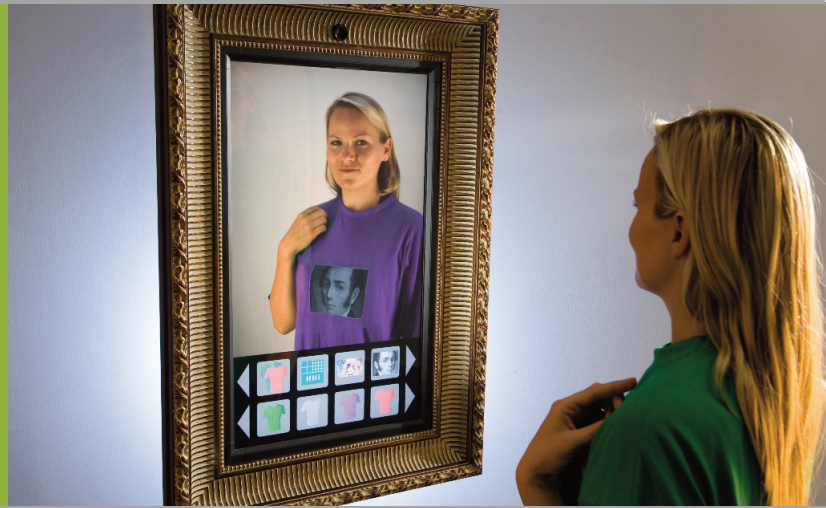# ≡ Fraunhofer
Heinrich Hertz Institute

The Virtual Mirror

Augmented Reality Applications

The Fraunhofer Heinrich Hertz Institute's Virtual Mirror enhances visualization of customized consumer articles like clothes, shoes, jewelry, etc. Instead of viewing yourself in a real mirror, highly sophisticated 2D and 3D image processing techniques are now used to visualize the look of new products without any need to actually put them on. A camera captures the real world and outputs the mirrored images onto a large display which replaces a real mirror. Your movements are tracked in real-time and the computer graphics models of the consumer articles are augmented in the video so that you really seem to be wearing the virtual objects.

Germany
Land of Ideas

Selected Landmark 2009

Technical Background

The Virtual Mirror framework of the Fraunhofer Heinrich Hertz Institute uses high-end augmented reality techniques that combine real video content with computer-generated material in real-time. The concept of a mirror realizes augmentation without the customer needing to wear glasses. No additional equipment has to be used as you can just step into the application and move freely like in front of a real mirror. This significantly enhances acceptability and immersiveness while also reducing the effort needed for supervising such an application. Since computer graphics models of the objects are exploited, individual customizations can easily be performed and checked for appearance. It also means that a broad palette of different products can effectively be tried on without any need for continual dressing and undressing. Possible applications of the system are visualization of customized shoes, clothes, jewelry, glasses or hairstyles. In marked contrast to existing approaches, the system works three-dimensionally and shows all virtual equipment from the correct viewing angle and pose. Output is not restricted to a fixed frontal view as in other 2D systems, giving users a much more vivid feeling of being in a real environment.

Challenges

- Combination of real and virtual parts in one world

- Visualization and augmentation of personalized objects, rigid and/or deformable

- Motion, deformation and illumination recovery

- Real-time capability

Benefits

- Augmented reality visualization without glasses or other technical aids

- Sophisticated image processing and tracking techniques allow real-time experience

- Simple hardware architecture for greater reliability

- Visualization and customization of virtual products in real environments

Image Processing

www.hhi.fraunhofer.de/ip

Visualization and augmentation of clothes in real-time.

Awards and References

- Germany Land of Ideas, Selected Landmark 2009

- Kiosk Europe 2009, Virtual Mirror – The most innovative product displayed at the fair

- Adidas-Shop Paris, visualization of shoes

Competencies

The Computer Vision & Graphics group works on enhanced algorithms and software implementation in the field of 3D image and video processing

- Face analysis and animation

- 3D rigid and flexible object tracking

- 3D reconstruction

- Virtual and augmented reality

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