

Gaze Awareness in Augmented Reality Teleconferencing

Diploma thesis presentation

Michael Siggelkow

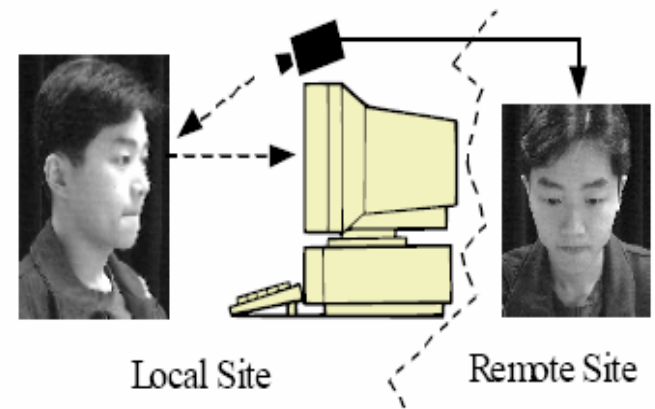
Michael.Siggelkow@mytum.de

Outline

- Problem Description
- Related Work
- Gaze Awareness in AR Teleconferencing
- User Study
- Results

Problem Description

- Hard to provide eyecontact in desktop video conferences
- How to convey gaze awareness?
- How to work on a object together?



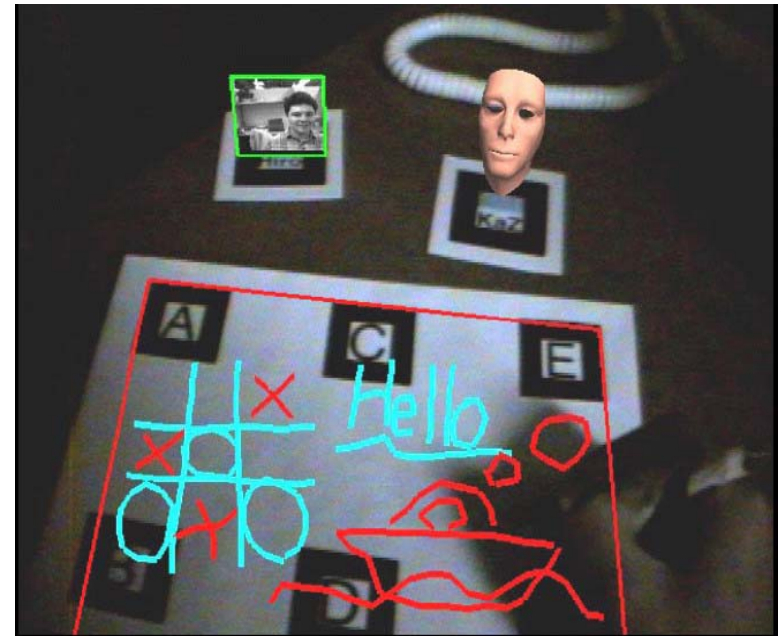
Related Work

- Hydra
 - special console equipped with camera, screen, microphone and speaker for every user
 - disadvantage: high network load



Related Work

- AR Conferencing - HITLab (Washington)
 - projecting video stream on markers
 - cropping the background
 - shared whiteboard



Related Work

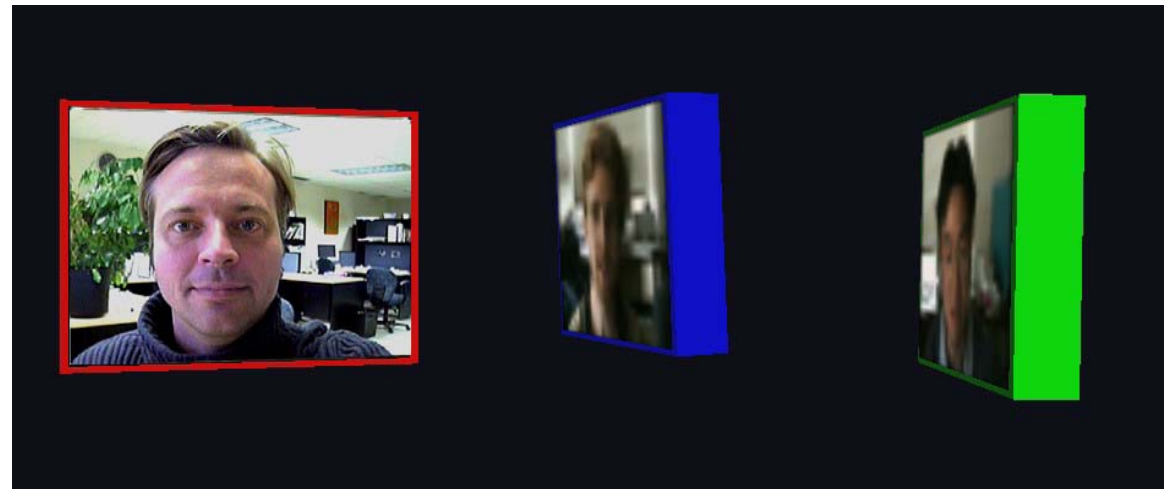
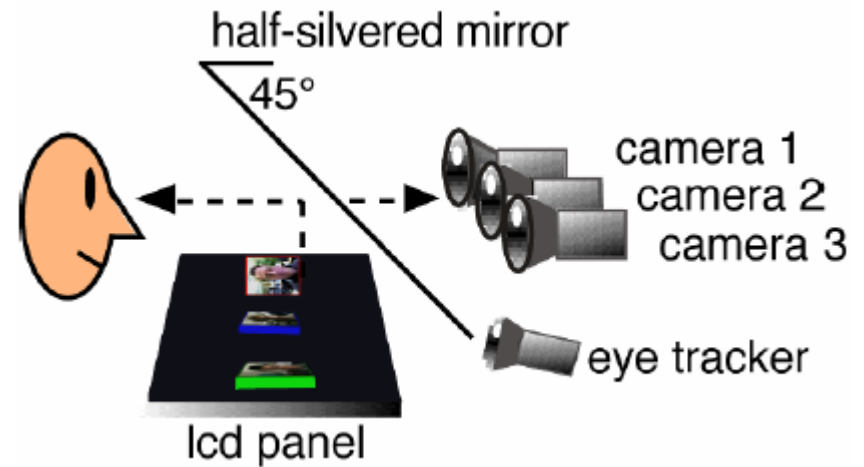
- Studierstube
 - enhancing desktop video conferencing
 - sending marker pose synchronous to video stream



Related Work

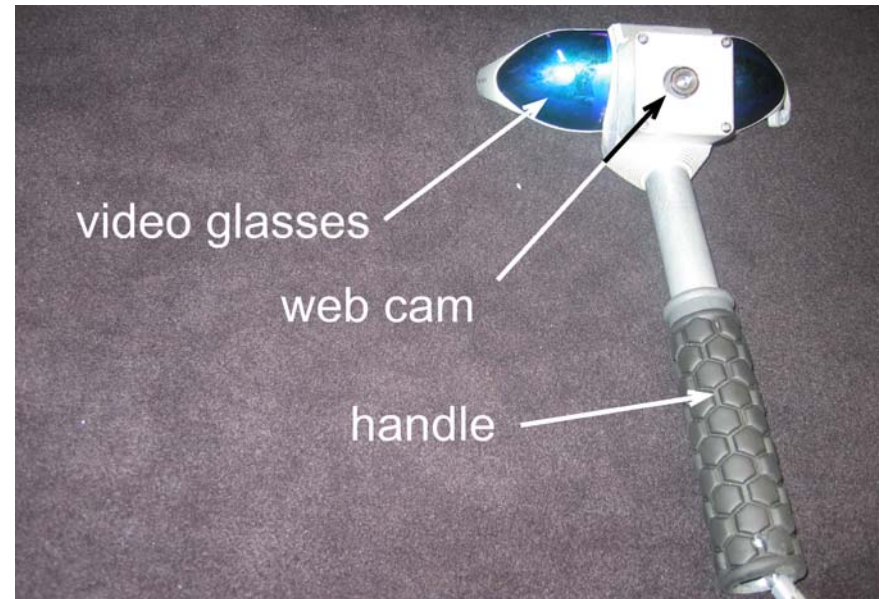
- GAZE-II

- special video tunnel
- rotating video images
- decreases quality of video stream when rotated



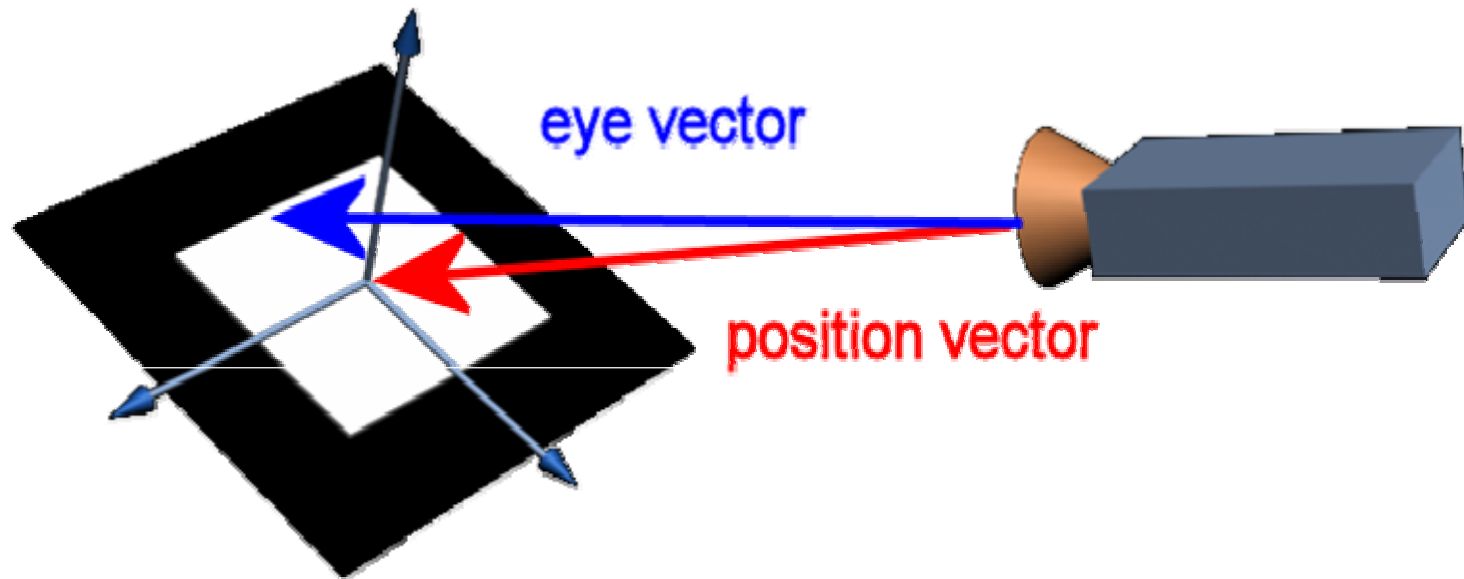
Gaze Awareness in AR Conferencing

- Desktop conferencing application – “round table”
- Avatars representing the remote participants in the familiar workspace
- Capturing the users gaze and rotate the avatar accordingly
- Shared workspace
- Handheld display as input and output device



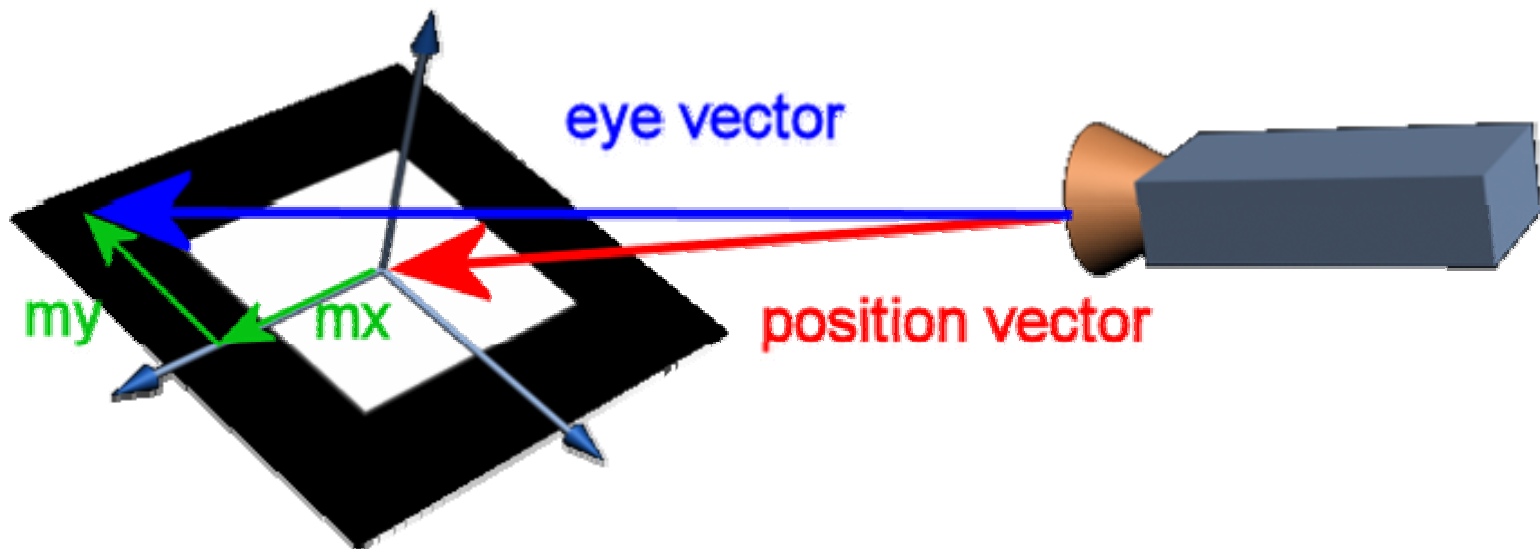
Gaze Awareness in AR Conferencing

- Abstract gaze capturing
 - not head turning but „Who looks at whom?“
 - test if the eye vector points in an area around the middle of the marker



Gaze Awareness in AR Conferencing

- Gaze on a shared workspace
 - calculating the point where users are looking
 - displaying arrows directed from the avatars



Gaze Awareness in AR Conferencing

- Setup with three users
- City map loaded on the shared workspace



Gaze Awareness in AR Teleconferencing

- Timeout of gaze
 - fade avatar transparent
- Feedback for user
 - background highlighting when avatar is in gaze



User Study

- Setup:
 - groups of three users
 - city map with 10 sightseeing spots
 - sheet of paper with description of the spots
 - participants separated by curtains but same room
- Task:
 - the group has to agree on a tour with 5 spots



User Study

- Conditions
 - no avatar rotation, no arrows
 - avatar rotation and no arrows
 - avatar rotation and arrows
- Random order of the conditions
- Questionnaire after every condition
 - for every hypothesis about 3 questions
 - evaluation with ANOVA

Results

- Hypotheses accepted:
 - increased awareness
 - higher user satisfaction
- Observation
 - faster decision making or more detailed discussion
 - most of the time users only looked at the shared workspace
 - users liked pointing with their gaze

Thank you for your attention!

Questions?