Socio-psychologic cognition of spatial sound and its application in interactive scenarios

Johanna GAMPE

Motivation and Goals

• implementing the perception and socio-psychological cognition of spatial sound in virtual scenarios
• testing virtual sound and embodied interaction for scenic sound
• extending audio plays by the interlink of narration and interaction
• applying technologies for audio augmented environments and tracking technology to artistic expression

Assumptions

• Issues of spatial sound can be researched by the use of scenic application (localization, perspectives, immersion, environment)
• Aspects of socio-psychology are likely to be incorporated in virtual sound environments and sonic scenarios (back sphere, emotivity, proxemics, modalities of intimacy)
Idea and Preparation

→ **Interlink of narration and interaction**

→ **Split up of a scenario into different dimensions**

- adapting a scene from Nobert Niemanns “Willkommen neue Träume”: four passengers in a train having small talk
- extracting dimensions: actual conversations – thoughts – actions
- re-writing the characters' thoughts: neutral point-of-view
- choosing actions and reactions that allow to understand the whole scenario
Recording and montage

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Sounds
Helene - a resolute woman in the fifties, chatty and demanding
Rudolf - her husband, asthmatic and introverted
Lieutenant - tough with a pronounced military attitude
Lyricist - courteous, curious, inhibited
Narrator - neutral, soft and reticent
Ambiances - Solar Eclipse from Barry Truax + train interior driving
- departing and arriving trains + sibilant sound from Kurt Schwitters' „Ursonate“ + rumbling of thunder
- train-interior-mix from my journey there with people talking
- the same recording but mixing pure train sounds

Mixes
Mix 1 conversation, chaotic order, action sounds (eating, drinking, smoking) and paraverbal sounds (snoring, coughing)
Mix 2 conversation + narrator
Mix 3 ambiances
Scenario description

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Conversation_intro
Action Sounds

sitting down

Lyricist
Helena's Thoughts
Rudolf's Thoughts
Soldier's Thoughts

nodding

Conversation
Narrator
Ambiance

Linear Narration

motion

When moving out of the chair square, the room size changes from small to big.

Conversaion
Linear Narration

Ambiances

Narrator

Sonic Interaction Design
Socio-psychological cognition of spatial sound

Social-psychology ...

- traditions of perception: visual and “frontal” primacy as a scene
- back sphere theory: loss of control and passivity --> emotivity
- proxemics: spacial spheres, connoted by social and cultural habits
- equilibrium theory of intimacy: balancing modalities of intimacy like distance, glance, talking
- body and voice: congruence by paraverbalias, vocalizations, associations, etc.

... and Sound

- back sphere characterized by higher emotivity to outstanding sound
- higher emotivity can be balanced via distance and body attributes:
  - loudness, reverb, attitude of acting

→ dramaturgical ideas, artistic intention, listening attention
→ examples: attitude of narrator, location of thoughts, listening to conversations from different
Intuitive Movements and Tracking

Intuitive movements with internalized course of motion and experiences

→ cues
→ virtual perception (spatial sound) + sensual perception (embodied interaction)

• sitting down
• nodding
Binaural Rendering and Programming

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sound quality - aesthetics - computational power

→ ambisonics order
→ sample rate
→ tracking system

→ spatialized
→ non-spatialized
→ acoustic options

convincing immersion
practicability, mobility, expense

artistic options and freedom

one notebook (macbook pro)
Binaural Rendering and Programming

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Sonic Interaction Design
COST IC0601 SID - STSM 10/2008
Questionaries

Introduction – Test nodding – Installation – Questionary

- spontaneous impression?
- visual aids / chairs?
- localization / thoughts?
- voices / thoughts?
- nodding (as interactive element)?
- exploration / curiosity / main motivation to move on?
- action solely presented by a narrator?
- narrators attitude?
- following narrator?
- experiment with different mixes of ambiances?
- further development of scenario?
- headphones?
- lighting?
- irritations, problems?
Questionaries - evaluation

- impression: captivation, interest, confusion at the beginning
- frame aspects: chairs visual aid, lighting support, headphones rather fine
- thoughts/voices pleasant (6) and exciting (2), but difficulties in localization
- nodding was mainly functioning, but distracting as soon as it didn't work (capturing differences, individual differences, one missing initial test nodding)
- narrator: neutral/pleasant, less exciting but helpful to concentrate on the story
- ambiances: contrast, mostly pleasant/exciting, few difficult/irritating
- problems/irritations: missing transitions (time constraints), system mishes (computational power limits), nodding
- driving motivation: curiosity on different installation levels/overall picture
Résumé

- **socio-psychology of space**: front and back sphere have a different ground tone, the kind of sound is relevant as well as its application, certain aspects of socio-psychology can be transposed into sound and into dramatic technique

- **virtual sound environment**: all components need to work i.e. quality of sound material, transitions, capturing, decor

- **further research**: interaction with virtual characters, directivity not implemented so far, enrichment of the scenario, degree of body implication

- **main conclusions of interactive scenarios**
  - interesting for listener (f.ex. putting together the global picture),
  - artist (f.ex. mixing up realistic sensation and artistic creation) and
  - researcher (f.ex. spatial sound perception can be more easily anchored)
References

**Ambisonics and binaural sound reproduction**


Stefan LEITNER, Alois SONTACCHI, Robert HÖLDRICH: Head position related binaural sound reproduction – the ambisonic approach; Tagungsband der 21. Tonmeistertagung, VDT, Hannover, November 2000
References

Psycho-sociology and Hörspiel


