Making the mainstream accessible: redefining the game

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Making the Mainstream Accessible
Redefining the Game

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Department of Computer Science
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30th July 2006

1Presentation given as part of a panel session; content and format differ from that delivered.
Outline

Context
  Then
  Now
  Future

Rendering: Defining the User’s Experience
  Signals, Symbols and Earcons
  Auditory Icons and Implicit Accessibility
  User-Centred Flexibility
  Benefits of Multimodality

3D Structure Representation and Modification
  Overview
  Not Just Games

Final Thoughts
  User Survey
  Further Work
  Conclusions
  Acknowledgements

References
This talk concentrates on sight loss but could be applied to other disabilities. Many individuals and some small companies started developing accessible games for disabled people. Suddenly blind people were no longer limited to one genre (Interactive Fiction). Most of the games were conversions of puzzles or classic arcade games. Some developers have been more original. Drawback: Segregation.
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- Most of the games were conversions of puzzles or classic arcade games
- Some developers have been more original
- **Drawback:** Segregation
The Present of Accessible Gaming

Ethos of the AGRIP Project

▶ Provide access to not only mainstream games, but their surrounding online community and development tools
▶ Give people Freedom to use and modify the game, support infrastructure and tools

AudioQuake
▶ An “Accessibility Layer” for Quake (id Software)
▶ A system for playing Internet multiplayer games
▶ A platform for programming modifications
▶ Only possible due to Open Source nature
▶ Provides and promotes inclusion

AGDev and other developments

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The Future of Accessible Gaming

AGRIP Developments

Implicit Accessibility

Level design

Audiogames and Accessible games gain weight in industry

Definition: “accessible games” vs. “audiogames”

John Carmack’s Keynote point

Potential mobile market

Work of IGDA, AudioGames.net, AGDev and others

Education and Games get together

EA and NESTA study on games in education [NESTA and EA, 2005]

Potential to augment existing practises and assist in teaching
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Benefits of Multimodality
Earcons [Brewster, 1994] are used in AudioQuake

Definition:
Structured sounds, often obeying musical conventions, that are designed to alert the user to an object or event. They do not “sound like” their referents.

Time-efficiency

Goal:
Fast-paced gameplay

Sound design techniques used to achieve this

Consistency within referent types

Variations across referent types

Natural reference points embedded in the sounds (as in [Holland et al., 2002])
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But there are other possible rendering styles...
Auditory Icons and Implicit Accessibility

An opposing rendering style

Auditory Icons

Definition: Sounds that map intuitively to the real-world concepts/items they refer to [Mynatt, 1994]

Use of special and spacial effects to separate such sounds from in-game events

Increased fun through immersion

Play is more intuitive due to believable audio atmosphere [Röber and Masuch, 2004]

Information supplied by subtle environmental effects – e.g. wind direction in Shades of Doom [GMA Games, 2001]

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Ideas based on feedback given by users so far

Hybrid rendering schemes, between the above two opposing ones, could be created

Tailoring to specific users’ requirements

“Sound Skins” – Allow choice from predefined sets of earcons and auditory icons for in-game events/objects

Style Selection – Users may choose their preferred rendering style (i.e. explicit vs. implicit) for each major game element

Intelligent Style Selection – Keeping things manageable by allowing the game to determine the best rendering scheme consummate with the user’s preferences, based on current game state
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Certain heuristics are required to ensure that the user receives important information, but is not overloaded

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Generalisation for other users

Similarities exist between designing interfaces for "normal" users in extreme situations and designing interfaces for disabled users in normal situations [Newell and Gregor, 1997]

These techniques could improve the gaming experience for many users, especially those using novel input/output devices (PDAs, etc)

Guidelines could be created (similar to WCAG [Web Accessibility Initiative, 1999]) that enable game designers to create more immersive and entertaining experiences for other users, based on ideas such as these
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The provision of multiple rendering "layers" has further benefits. Some implicit error-correction may be possible [Suhm et al., 2001]. Reinforcement in other modalities of the primary rendering medium (usually graphics) can aid cognition [Röber and Masuch, 2004] and increase immersion and, therefore, enjoyment [Velleman et al., 2004].
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Overview
3D Structure Representation and Modification

- Overview
- Not Just Games
3D environments and Collaborative Virtual Environments (CVEs) are of increasing importance in society. Techniques described in this paper and other literature go a long way to making these accessible. Little work has been done on allowing blind/vision-impaired people to create 3D environments. A preliminary architecture of an adaptable level description and editing system has been developed (see paper for full details).
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Features of the Proposed Approach I

Layering – Separation of rendering and UI from the underlying data structures

- Improves accessibility
- Can improve usability for authors (e.g. programs that can test the created structures for errors may be created independently of any particular authoring environment)
- May lead to novel methods of generating/editing maps (by gamecode, based on gamer's progress through the game/application so far, for example)

Format Standardisation

Awareness & Equality Increase
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- **Format Standardisation**

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Features of the Proposed Approach II

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A major goal of the AGRIP project, as with other literature, is to develop generally applicable techniques to improve the experience for all users. This includes improving accessibility in other areas such as education and the workplace. It is important to ensure such technology is as accessible as possible to as many potential users as possible before it becomes mainstream.

Problems of existing work environment [Brock et al., 2003] in collaborative navigation ([Yang and Olson, 2002]) is an area of ongoing research for AGRIP.
A major goal of the AGRIP project, as with other literature, is to develop generally applicable techniques to improve the experience for all users, improve accessibility in other areas, permeation of game-like technologies in society; education and the workplace, and importance of ensuring such technology is as accessible as possible to as many potential users as possible before it becomes mainstream. Problems of existing work environment [Brock et al., 2003] collaborative navigation ([Yang and Olson, 2002]) is an area of ongoing research for AGRIP.
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Permeation of game-like technologies in society; education and the workplace.

Importance of ensuring such technology is as accessible as possible to as many potential users as possible before it becomes mainstream problems of existing work environment [Brock et al., 2003].
A major goal of the AGRIP project, as with other literature, is to develop generally applicable techniques to improve the experience for all users and to improve accessibility in other areas.

Permeation of game-like technologies in society; education and the workplace.

Importance of ensuring such technology is as accessible as possible to as many potential users as possible before it becomes mainstream.

- problems of existing work environment [Brock et al., 2003]
- collaborative navigation ([Yang and Olson, 2002]) is an area of ongoing research for AGRIP.
Final Thoughts

- User Survey
Final Thoughts

- User Survey
- Further Work
Final Thoughts

- User Survey
- Further Work
- Conclusions
This survey covered 20 users of AudioQuake.
Further Work

- Improve existing techniques
- Generalisation & relation to other current research
- Application to other types of user
- Application to academic and other non-game material
- Increasing inclusion in education
- Accessible map editing extensions
Further Work

- Improve existing techniques
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▶ Improve existing techniques
▶ Generalisation & relation to other current research
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Conclusions

What accessible (and audio) games are

How mainstream (even time-critical) games may be rendered in an accessible way

Different rendering styles and how they may be of use to a wider range of users

Experience gained from other literature, user feedback

Our ideas for future work

Potential benefits for other users and in other areas
Conclusions

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Thanks for listening!
Any Questions?


GMA Games (2001). *Shades of Doom.*


Human computer interfaces for people with disabilities. 

Auditory game authoring.

Multimodal error correction for speech user interfaces. 

3d shooting games, multimodal games, sound games and more working examples of the future of games for the blind. 
*Lecture Notes in Computer Science*, 3118:257–263.