Is this the real thing?
Realism and fun in computer games

Maic Masuch
Games Group
University of Magdeburg
Outline

- Introduction
- The Development of Game Development
- Immersion and Realism
- Realism in Computer Games
- Realism and Fun
1

Motivation
In the early days of digital games
- Games are straightforward, simple and easy manageable applications
- Created by a single programmer (inclusive game design, game audio, graphics etc.)
- Games run on specialized, expensive and somehow mystic hardware
- Users are an insignificant niche of society
- There is no market
Digital Games – The Present

- Nowadays
  - Games are complex, interactive multimedia-systems
  - Developed by large teams
  - Investment of several dozen million
  - Global market volume approx. 31 billion US$
  - Many new platforms and formats
  - Games mature to an academic research subject
  - Intense discussion about the effects of playing games
Digital Games – The Future

- Tomorrow
  - Top games evolve to pervasive entertainment-environments
  - Highly complex persistent real-time-systems
  - Development teams of 100-200 developers, 3 years development, highly skilled specialists
  - Investment per title 25-50++ Million US$
  - Market forecast (DFC): 42 Billion US$ in 2010
  - Games on par with traditional media types, a legitimate academic subject
The Development of Game Development
Average Budget Development of AAA-Titles (Order Of Magnitude)

- PS3, xbox360
- PS2, xbox, Gamecube
- NES, Genesis

Budget in million US$
Rise of Development Costs

Consequences:

- Publishers produce fewer titles
- Risk must be minimized
- Production value must be increased
- Each title must sell more units
Game Engines

- Audio
- Graphics
- Controls
- Network
- Main Loop
  - Timer
  - Event-Handler
  - Dynamic Game-Data
- Simulation
  - AI
  - Physics
- Static Game-Data

Output

Input
Production efforts for typical games

- Efforts in production (descending order)
  - Asset generation
  - Engine programming
  - Level/mission scripting
  - Project management

- Main reason for the rise of costs:

  **Strive for Realism**
Immersion and Realism
Immersion in Games

- Immersion in virtual environments
  - Presence
  - linked to realism
- “Willing suspension of disbelief”
- Different aspects
  - Perceptual immersion
  - Narrative immersion
- Extremely important for enjoyable gameplay:
  persistent immersion in game context
Games vs. other Applications

The *games context* is fragile

- **User Mode**
  - You know you are using a computer
  - You are aware of the user environment

- **Player Mode**
  - You are not aware of the computer
  - You do not perceive your environment

- extremely important not to interrupt game context
  e.g. error control
Riven

insert Riven-CD-ROM 2

OK
cancel
Realism in Computer Games

- Game context lost – illusion destroyed
- Realism in the games world representation
  - graphical
  - auditory
  - interaction
  - physical simulation
  - NPC behavior
  - storytelling
4

Realism in Computer Games
Character Animation
Does realism provide more fun (or more sales)?

Doom III

Super Mario: Yoshi's Island
A photorealism debate …

Gamasutra Opinion Column November 1, 2006:

Is Photorealism In Games The Right Direction?

"Making game content look as real as possible has always been a popular pursuit in the video game industry. With the dawn of a new hardware cycle upon us, we are able advance another step towards this goal. At the end of the day though, after all the time, money, and hard work, are the results worth the cost? Is 'realer' really 'better'?

Red Jade Studios CG art manager Jeremy Price
... that is not so new.

„The animation doesn’t have to be realistic – it has to be believable“

Walt Disney
Non-Photorealistic Rendering
- Variety of graphical artistic styles
- Allows deviation in color, form, detail, style …
- Abstract from the real world
- Useable for artistic expression or story enhancement (emotions, atmosphere…)
- Creates something different, seizes the imperfection

Loco Roco, XIII
Cartoon/Cel-Shading in 2D/2½D

Day of The Tentacle, Monkey Island 3, Broken Sword, Runaway
Cartoon/Cel-Shading in 3D

Monkey Island 4, Cel Damage, Stupid Invaders, Team Fortress 2
More Innovative Styles

- Oil painting – own engine
- Pen-and-Ink-Hatching – own engine
- B/W – own engine
- Okami
- NPR Quake
Intuitive Interfaces
Innovative Sound

Left 135° azimuth
Up 36° elevation
Left Ear

Relative level (dB)

Frequency (Hz)

Left 45° azimuth
Up 36° elevation
Left Ear

Relative level (dB)

Frequency (Hz)

Measured positions 1-4

Desired Position

Interpolation algorithm

Head Tracking Device

FIR filter #1

Left

FIR filter #2

Right

position data

measured impulse response pairs

Input

0
Physical Simulation
More realism can provide more fun …
Artificial Intelligence
Artificial Intelligence

- Turing Test for NPCs
  - Distinguish between players and an autonomous agents
- Prior to unrealistic we need realistic behavior
  - Goal-driven behavior
  - Appropriate reaction (esp. in new situations)
  - Adaptation to player’s behavior (learning, memory)
  - Teamplay (task sharing, specialization, coordination)
  - Individual personality (emotions, irrational behavior, mistakes)
  - Natural dialog
Interactive Storytelling

FAHRENHEIT
How To Tell a Good Story?

Guys! **Game Master** is a time honored traditional term. I won’t give it up without a fight!

Or perhaps **Game Custodian**?

I like **Trustee**! It denotes responsibility without suggesting authority.
Beyond Fixed Structures

- Games and stories do not translate to each other like novels and movies
  - Many overlapping approaches in interactive storytelling
  - These differ in design paradigms and technical solutions

<table>
<thead>
<tr>
<th></th>
<th>Starting point</th>
<th>Possible implementation strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>author-based</td>
<td>goal of the author/designer</td>
<td>plan-based</td>
</tr>
<tr>
<td>story-based</td>
<td>structure of the story</td>
<td>grammar based</td>
</tr>
<tr>
<td>character-based</td>
<td>character</td>
<td>distributed planning</td>
</tr>
</tbody>
</table>

- Important: *How* a story is told, not what story
The Future?

Further advances in believability

- Different styles (graphics and game play)
- Non-visual games
- New interaction metaphors, deeper immersion
- More ‘natural’ AI behavior
- Elaborate storytelling, esp. emotional narration
Realism and Fun
Gameplay and Fun

- Where is the fun? Read between the lines!
- A good game comes along with good gameplay
- **Rollings/Adams:**
  
  “The concept of gameplay is extremely difficult to define. [...] there is no single entity that we can point to and say, ‘There! That's the gameplay.’”

- **Sid Meier:**
  
  “Gameplay is a series of interesting choices.”
How to Design for Fun?

- Good gameplay emerges from the interface, rules and game mechanics
  - It is a result of good game design
  - All components of an engine must complement each other
  - All aspects of game design, art, and software must harmonize

- Fun results from many aspects
  - Mastering challenges
  - Receiving rewards
    - Global rewards (winning the game or a level)
    - Small rewards (obtaining information or items, seeing graphics)
    - Social rewards (high score entry, player status)
Flow of Gameplay

- Challenges vs. Abilities
- Flow
- Frustration
- Boredom

Optimal gameplay corridor
Research: Evaluation of User Interaction in Edutainment Environments

- Interdisciplinary cooperation
- Runtime-environment
  - Various scenarios possible
  - Interactions-log
  - Camera recording
  - Biometric data
  - Replay-possibility
- Bio-data
  - Heart rate/pulse
  - Skin conductance
  - EEG
  - Gaze detection
  - Facial expressions (work in progress)
  - Speech (work in progress)
Some Results

- An informal user study
  - Subjects played various C&C Generals scenarios
  - User rated own flow state
  - Bio data seems to correspond flow

- Future Work
  - Identification of relevant bio-data
  - “Automatic” classification of emotional states
  - Integration of contextual knowledge of the 3D scene
  - Correlation between flow and fun
What is Fun?

- It's when people have a good time
Thank you for your attention!
games.cs.uni-magdeburg.de
masuch@isg.cs.uni-magdeburg.de