Presentation Overview

- Introduction
- Fun in Video Games
- Distractions to Fun
- SPE in Online Games
- Surveyed Papers
  - XBlast Experiment
  - Game Score Experiment
- Conclusion
Introduction

Fun in Video Games
Distractions to Fun
SPE in Online Games
Surveyed Papers
  XBlast Experiment
  Game Score Experiment
Conclusion
Introduction

Games need to be fun
- Why else would people play games?
- What makes a game fun?

What about immersion?
- So focused you hardly notice you play
- But distractions can break immersion
SPE promotes fun in games

- Design with intent of minimizing distraction

Surveyed papers

- To prove our points
- Distractions do degrade fun

Conclusion

- Now go make fun games
Fun in Video Games

Introduction

Fun in Video Games

Distractions to Fun

SPE in Online Games

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Conclusion
Fun in Video Games

Games are supposed to be fun, right?

- Fun -> Immersion
- Immersion -> Fun

When are games not fun?

- Subjective reasoning
- Too hard to play
- Negative Karma
- **Performance Issues**
Fun in Video Games

Performance Issues
- Game runs slow
- Network lag/delay
- **Cause Distractions**

Effect of Distractions
- “C’mon, load up already!”
- **Break Immersion**
Distractions to Fun

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**Distractions to Fun**

What is a distraction?

- An interruption; an obstacle to concentration

**Immersion**

- Requires steady state of concentration
- No Immersion, No Fun

**Two Kinds of Distractions:**

- External
- Internal
Distractions to Fun

- External Distractions
  - Outside of the computer
  - In the Real World

- Solutions
  - Earphones, private room?
  - No real Control
Distractions to Fun

Internal Distraction
- Inside the computer
- Hardware, Software, Network

Hardware
- Faulty I/O
- Slow client or servers (Delay)
- Solutions? – Buy Upgrades & SPE
Internal Distractions

Software
- Code not optimized
- Too fancy, takes too long to run
- Solutions: Optimize, Redesign & SPE

Network
- End-to-End Delay / Latency
- Packet Loss & Jitter
- Solutions: Upgrade network & SPE

Common Solution: SPE
Want to:
- Minimize distractions
- Run efficiently
- Save money in long run
- Don’t let performance degrade fun

Levels of Distraction
- No Distraction – unnoticeable delay
- Slight Distraction – noticeable delay
- Major Distraction – significant delay
Levels of Distraction

- **No Distraction** – unnoticeable delay
- **Slight Distraction** – noticeable delay
- **Major Distraction** – significant delay

Key Parameters

- End-To-End Delay (Latency)
- Total Delay (System + Network)
- Total Throughput
- Jitter & Packet Loss
Developers:
- Define performance requirements
- Design for the available hardware & network

Levels of Requirements
- **Minimum Requirements**
  - Few Major Distractions, Some Slight Distractions
- **Recommended Requirements**
  - No Major Distractions, Few Slight Distractions
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Conclusion
Resembles Bomberman
Experiment:
- 12 Test Subjects
- representative population
- Test effect of Latency to MOS

Mean Opinion Score (MOS)
- Scale from 1 to 5
- Player perception (game rating)
- 5 = best
Game Rules
- 140s long or lose all lives
- Each player matched with another
- Each player plays three times
- Asked to rate each game on MOS

Control Variable
- Induced Latency
- Expect MOS to decrease for high latency
- Subjects do not know the amount of latency
Results

- MOS does decrease

<table>
<thead>
<tr>
<th>Scenario</th>
<th>latency</th>
<th>Avg. MOS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scenario 1</td>
<td>0ms</td>
<td>3.92</td>
</tr>
<tr>
<td>Scenario 2</td>
<td>250ms</td>
<td>3.12</td>
</tr>
<tr>
<td>Scenario 3</td>
<td>500ms</td>
<td>2.58</td>
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</tbody>
</table>

Telecommunication standards

- 3.5 MOS is “acceptable”
- For XBlast, this means 139ms Latency
Surveyed Papers – Game Score

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Conclusion
Two main contributions:
- New “Game Score” metric (GOS)
- A pair of experiments

Game Opinion Score (GOS)
- Percentage rating
- “How well did you play?”

\[
GOS = \frac{\text{score}}{\text{sum of all player scores}} \times 100
\]

Score: outcome of the game
First Experiment – A Questionnaire

- What players think about latency in games
- Maximum tolerable & acceptable latency
- Posted online around game forums
- 319 Respondents

Results

- Average of 80ms is acceptable
- Above 150ms is untolerable
Second Experiment – Lab Experiment
- Selected 8 players
- Organized into two teams of four
- Test effects of network on MOS & GOS

Network setup:
- One side gets lag
- Other doesn’t
Tests:
- 3 Games: Need for Speed Underground 2, Counter Strike and Unreal Tournament 2004
- Latency vs. MOS & GOS
- Jitter vs. MOS & GOS

Results:
- Latency is a significant indicator of MOS
- Latency – weird effects on GOS
- Jitter is insignificant
Surveyed Papers - Conclusion

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Relationship between Fun & Immersion

- Distractions break Immersion
  - Distractions caused by performance

- Use SPE to keep distractions minimal
  - Set requirements and develop for them

Game should run smoothly now
- But is the game fun? <Future research>
The End

Thanks for listening!

Any Questions?