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The Imitation Game in Games
Distinguishing NPC from Human Player

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Outline

• Background: about DDS
• Conversation-based vs. game-based Turing test
• Loebner Prize vs. BotPrize
• Turing test in board games (chess)
• Turing test in video games (UT2004)
• Player modelling and mimic player types
• The goal of game AI
• When the goals merge, a reversed Turing test in SpyParty
What do we do?

- Ultra High Resolution Laser Scanning
- 3D Digital Modeling
- Computer Animation
- Full Body Motion Capture
- Ambisonic Sound
- Software/App Development
- HCI: haptics, gesture recognition
- Virtual Reality and virtual environments
- SGs for Healthcare / education / heritage

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CultureTECH / Loebner Prize
Derry, N Ireland
Conversation-based vs. Game-based Turing Test

Conversation-based Turing Test

• Imitate human communication (ie. response to interrogation)
• Areas involved
  - NLP
  - Knowledge representation
  - Information retrieval
  - Reasoning
• Conversations are virtually unlimited (unless topics are restricted)
• Engaging with one human interrogator (1 to 1)
• Single-tasking
• Computer tactics:
  - Artificial stupidity, e.g. deliberately introduce common typos
  - Add personality
Game-based Turing test

- Imitate human behaviours in complex gameplay, e.g. weapon choice, actions, motion (in 3D environment) and manipulation of virtual objects (e.g. weapons). More closely related to robotics than conversation-based Turing test
- Areas involved
  - Player modelling
  - Decision making
  - Path finding, motion planning (in 3D space)
  - Reasoning and planning
  - Voice synthesizing
  - NLP
  - Perception (inc. object recognition)
  - Social intelligence
  - Conversational behaviour
Game-based Turing Test

• Less challenging: Limited by the gaming platform, e.g. actions available, will be interesting to carry out Turing test in MMORPG genre
• More challenging: engaging with multiple opponents/teammates (1 to many)
• Multitasking: often in chaotic combat
• Computer tactics
  – Artificial stupidity, e.g. emulating human irrational behaviours
    “People tend to tenaciously pursue specific opponents without regard for optimality. When humans have a grudge, they’ll chase after an enemy even when it’s not in their interests. We can mimic that behaviour.”
  – Add personality (player modelling)
BotPrize

- Participants create NPCs for UT 2004 (a FPS game) that can fool opponents (judges) into thinking it is a human player
- In BotPrize 2012 two teams have passed the human-like play barrier
- Computer gets a rating higher than the ratings of the real humans?
## BotPrize 2012 results

### NPCs

<table>
<thead>
<tr>
<th>bot name</th>
<th>humanness %</th>
</tr>
</thead>
<tbody>
<tr>
<td>MirrorBot</td>
<td>52.2 %</td>
</tr>
<tr>
<td>UT^2</td>
<td>51.9 %</td>
</tr>
<tr>
<td>ICE-CIG2012</td>
<td>36.0 %</td>
</tr>
<tr>
<td>NeuroBot</td>
<td>26.1 %</td>
</tr>
<tr>
<td>GladiatorBot</td>
<td>21.7 %</td>
</tr>
<tr>
<td>AmisBot</td>
<td>16.0 %</td>
</tr>
<tr>
<td>average</td>
<td>34.2 %</td>
</tr>
<tr>
<td>Epic bots</td>
<td>37.8 %</td>
</tr>
</tbody>
</table>

### Human Players

<table>
<thead>
<tr>
<th>player name</th>
<th>humanness %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Samaneh Rastegari</td>
<td>53.3 %</td>
</tr>
<tr>
<td>Craig Speelman</td>
<td>52.2 %</td>
</tr>
<tr>
<td>John Weise</td>
<td>30.8 %</td>
</tr>
<tr>
<td>Chris Holme</td>
<td>26.3 %</td>
</tr>
<tr>
<td>average</td>
<td>41.4 %</td>
</tr>
</tbody>
</table>

Only judgements made by human judges are counted.

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However, not all games involve humanoid character

- How about game-based Turing test in board game or casual games platform?
- The limitation by the platform of 3D video games is removed
- Computer players are virtually unbeatable by humans in chess, poker, and many other games
  - Deep Blue vs. Garry Kasparov (1997)
- Many fans and chess lovers plays online matches, but who are we playing with?
- Has computer passed the Turing Test in these games?
No. The purpose of game AI is

• Not to create *unbeatable* games
• but to create *indistinguishable* computer players (NPCs / bots)
The Turing Test and Chess

• Chess can revealing much more about human beings and their behavior, through the symbolism of the game and the way we play
• It cannot reveal a lot about a bot if not the accuracy of the programmers & software
• So the Turing Test challenge in chess platform is more on player modelling and mimic a specific type of players’ behaviour
DISC Personality Model

Gwaredd Mountain, Technical Director for Climax

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Bartle player models

• Richard Bartle gives a well used profiling system based on a set of game-scenario questions
• Classifies players into four types
  - Explorer, Achiever, Socialiser, Killer
• http://www.gamerdna.com/quizzes/bartle-test-of-gamer-psychology
Mimic the specific player type of human judge (player)

• *Mimic the body language of those you are conversing with, so that you can get closer to them in a non-verbal fashion.* If someone is gesturing a lot, you can join in, while if a person is more reserved, you shouldn't gesture too wildly.

• Build up a model of players through player observation
  - Monitor what human players are doing in the game
    • See what they are doing
    • Understand why they're doing it

• Mimic their player type. e.g. be a socialiser if the human player is a socialiser.
Game-based Turing test

• Shifting of the goal

<table>
<thead>
<tr>
<th>Game-defined goals or self-defined goals</th>
<th>Game-based Turing test</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Pursuing/killing enemies</td>
<td>• Mimic human behaviours, even act irrationally</td>
</tr>
<tr>
<td>• Level up</td>
<td></td>
</tr>
<tr>
<td>• Advance character</td>
<td></td>
</tr>
<tr>
<td>• Access new content</td>
<td></td>
</tr>
<tr>
<td>• Better weapons/outfit</td>
<td></td>
</tr>
<tr>
<td>• Higher place on the League table</td>
<td></td>
</tr>
</tbody>
</table>
Reverse Turing Test

• A formal reverse Turing test follows the same format as a Turing test. Human subjects attempt to imitate the conversational style of a computer program such as ELIZA
SpyParty – a reverse Turing Test in video game

- NPCs imitating human behaviors
- Human imitating NPCs
- sniper vs. spy
  - spy - avoid detection from the sniper, who has a full view of the party
  - sniper - distinguish the spy and kill him
Summary

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- Player modelling and mimic player types
- The goal of game AI
- When the goals merge, a reversed Turing test in SpyParty
Further information

www.gsa.ac.uk/dds

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