AI-based Interactive Experience Management

Replaying Japan 2014
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Outline

- Problem Formulation
- Our work
- Applications
Problem Formulation

Problem

to develop deeply interactive video games / multimedia training systems

Hypothesis

if you know something about the specific player/trainee
then you can improve their gaming/training experience

Cannot enclose game master with every game/MOOC

need AI

for player-specific gaming/training
Open-world gaming is the current trend. Yet an emotionally engaging story and character development is desired. Dragon Age: Inquisition may not work very well due to player’s control over the story. Character foil which involves PC role-playing is essential.

"This is where the inquisition is a great device for us to use," he said. "When you're in the more open-world parts of the game, you're increasing the renown of the inquisition. You're gathering agents. You're encountering small quests that are more traditional to what we do, but your freedom's really high. When you're reaching the point where your inquisition is strong enough to unlock--essentially what you're doing is then the inquisition itself is able to bring you towards the next part of the critical path. The reason why I think this is so powerful is it allows us to have a strong narrative spine in the core of the game. You can explore, you can gather materials and do crafting, and explore the regions and find this lore, but when
Player/trainee in an immersive multimedia environment

his/her experience is managed dynamically/on-line

by an Al manager

models the player/trainee

uses the model to select the next bit of content

to follow authorial constraints

Al-based experience management
1996 - 2000: Intelligent Training Systems

- Training for damage control aboard naval vessels
  - simultaneous crises, uncertainty, stress, teamwork
- Real-life training: rare, expensive and dangerous
- Need immersive **multimedia training**
- **AI** for:
  - providing instructional feedback to the trainee
2007 - present: Emotion and Culture Modeling

- Emotions need to be modelled procedurally
- mapping from actions to emotion states
- appraisal model of emotions
- resource model of emotions
- EMA + CAB = CEMA
- Now combining CEMA + COR-E
2007 - present: Play-style Modeling

- Model the player’s inclinations
- RPG style
- Select content which is most aligned to with play style
- PaSSAGE
  - shown to increase the player’s fun
Too expensive to manually specify all narrative branches

AI planning:
- domain theory + goals = plans
- use the play-style model to select the best plan

**PAST results:**
- shown to increase perceived agency
2012 - present: + Emotion Modeling

- Several accommodations of player’s actions may be generated by the planner
- select the one to keep the player on an emotion trajectory
- PACE
- iGiselle
iGiselle

end of ballet class

player

PACE

go to a party

socializing with friends

confronting a rival

narrative progression

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iGiselle

- end of ballet class
- confronting a rival
- socializing with friends

narrative progression

player's hope
University of Alberta created video game focuses on Romantic ballet Giselle

Two University of Alberta professors are on piano in creating one of the first video games around ballet.

Using different physical movements to guide the character and no game controller, Giselle will allow gamers to control the ending of the Romantic ballet Giselle.

The original ballet performance features the death of the main character, but "the less-evil" edition will have the death in the original version.
Application #1: Video Games

- On-line: dynamic storytelling to keep the player on an emotion curve
- Off-line: aiding the story designer in exploring the story space
- Procedurally emotional NPCs
NPC Emotions in Video Games
Application #2: Intelligent Training

- Build the training scenario on-the-fly
to keep the trainee on a certain emotion/stress curve

- Emergency room training
- Neonatal intensive care program
  - Vazhkudai “Kumar” Kumaran

Application #3: Online Education

- Massive Open Online Courses (MOOCs)
  - use AI to select the content intelligently, per student
    - model the student’s emotional state (e.g., frustration)
- University of Alberta
  - Jonathan Schaeffer
  - Sean Gouglas
- Stanford University
  - Michael Genesereth

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1: Rules
2: Goals
3: Winning condition
4: Player effort
Summary

Improving gaming/training via:
- AI-based experience management on the fly
  - player/trainee modelling
    - play style
    - emotional state
  - automated planning

Applications
- video games
- medical training
- MOOCs