AI-based Interactive Experience Management

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Outline

- Problem Formulation
- Our work
- Applications
Problem Formulation

- **Problem**
  - to develop highly 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 instructor with every game/MOOC**
  - need **AI**
  - for **player-specific** gaming/training
Player/trainee in an immersive multimedia environment

his/her experience is managed dynamically/on-line by an AI manager

models the player/trainee

uses the model to select the next bit of content

to follow authorial constraints

AI-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
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
2011 - present: + AI Planning

- 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
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
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

Stanford University
- Michael Genesereth
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