

I0: MIXED INITIATIVE PCG

COMP704: MACHINE LEARNING



MIXED INITIATIVE

- Intersection of AI and HCI
- Systems where both the human user and an AI agent can take **initiative** i.e. decide what to do next
- Moving away from software as a **tool** and towards software as an **assistant**

MIXED INITIATIVE FOR PCG

Content creation tools

PCG

Mixed initiative tools



TANAGRA [SMITH, WHITEHEAD & MATEAS 2010]

- Mixed initiative tool for 2D platformer level design
- Uses planning and constraint solving to fill in the gaps in user-created levels
- Allows for direct manipulation of level pacing through “beats”

- 
- https://youtu.be/JaMr4_nEiYo

SENTIENT SKETCHBOOK [LIAPIS, YANNAKAKIS & TOGELIUS 2013]

- Mixed initiative tool for 2D top-down level design
- User sketches high-level design
- System provides analysis and makes suggestions (using evolutionary algorithms)

- 
- <https://youtu.be/EopIAuFcuJE>

SENTIENT WORLD [LIAPIS, YANNAKAKIS & TOGELIUS 2013]

- Adaptation of Sentient Sketchbook to terrain generation
- User provides a rough sketch, AI agent suggests refinements
- Based on **novelty search**
 - Population-based search algorithm that doesn't try to find the optimum, but tries to find as diverse a population as possible

- 
- <https://youtu.be/hLsnSSYyg-A>

PROCEDURAL PERSONAS FOR SENTIENT SKETCHBOOK [LIAPIS, HOLMGÅRD, YANNAKAKIS, TOGELIUS 2015]

- Procedural personas: AI agents representing archetypal decision making styles
- E.g. monster killer, treasure hunter, speed runner, ...
- Used in Sentient Sketchbook as critics: to evaluate content and make suggestions

- 
- <https://youtu.be/DZxKj7w-osE>

ROPOSSUM [SHAKER, SHAKER & TOGELIUS 2013]

- Mixed initiative tool for puzzle game level design
- AI agent for testing that levels are solvable
- Evolutionary algorithm for generating solvable levels

- 
- 
- <https://youtu.be/FM3v0tbdKrs>

USEFULNESS OF MIXED INITIATIVE

- Can make content creation easier and/or faster
- Can provide ideas to spark creativity
- Can provide tools to assess quality, playability etc
- Gives more control than pure PCG