Ludus Ex Machina

Building A 3D Game Designer That Competes Alongside Humans

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@mtrc
This Talk

• ANGELINA The Game Designer
• Game Jams and Creative Communities
• ANGELINA’s Creative Future
ANGELINA
HTML 5 Arcade Games

Idea: break the design up into distinct phases, and evolve individually.

Rules
Geometry
Layouts

www.gamesbyangelina.org/games
ANGELINA

Flash Platformers

Expanding ANGELINA’s freedom in rulesets.

Beginning to look at creative/theming challenges.

Rules
Geometry
Layouts
Theme

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ANGELINA

Java - Desktop + Android

Much deeper look at mechanic invention

Stepping back from theming issues (temporarily!)

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Unity - A Fresh Start

2.5 million registered developers

350 million Unity Web Player installs

Easy to disseminate

Made for extensibility

Contemporary
ANGELINA
Overview

Predesign
What is this game about?

Coevolutionary Design
Designing the core game components

Postdesign
Export and cleanup
ANGELINA
Predesign

Minigame 
March 2014
DEMAKES

Fishing Game Jam!
MAY 2013
20th - 27th
Make Me A Game About...
ANGELINA

Theme Expansion

Frequency-based word selection

Word Association

Final Theme
ANGELINA

Theme Expansion

Media Acquisition

3D Models
www.tf3dm.com

Fonts
www.dafont.org

Music
www.incompetech.org

SFX
www.freesound.org
ANGELINA

Theme Expansion

Media Acquisition

Zone Map Gen.
Textures

Scenery

Sound Effects

Textures

Scenery

Sound Effects

Textures

Scenery

Sound Effects

Textures

Scenery

Sound Effects

Textures

Scenery

Sound Effects

Textures

Scenery
What does this image make you think of?
Single words are best, of any kind. Thanks everyone! #t93 pic.twitter.com/d8gK7wVS5E
ANGELINA

Theme Expansion

Media Acquisition

Zone Map Gen.

Title + Music

Pun Generation
Now with idioms!

Music selection:
Metaphor Magnet

Emotions for DisCo

Incompetech Database
ANGELINA
Overview

Predesign
What is this game about?

Coevolutionary Design
Designing the core game components

Postdesign
Export and cleanup
Design Phase

As with ANGELINA-3 described in (Cook, Colton, and Pease 2012), ANGELINA is composed of several evolutionary systems that work in tandem to cooperatively evolve a game design. Each evolutionary system has two aspects to its fitness function: internal, objective rules that are considered to be unchanging regardless of the overall game design, and external, subjective rules that take into account what properties the current most fit game design has to adjust its fitness evaluation accordingly. In order to evaluate these subjective rules for a given member of a population, ANGELINA takes the most fit example from every other evolutionary process, combines them together to form a game, and then simulates playing that game in real-time. Currently, this simulation is very basic – ANGELINA will attempt to guide the player object from the starting point to the level exit, if such a path exists, and records any rules which activate (as well as how often they activate) during the course of that simulation. This is used in the evaluation of the we have supplied a stock of behaviours which can be attached to the entities in ANGELINA’s games to form a basic ruleset. These behaviours include providing motion for the entity (such as random walks, or wall following) and adding mechanical rules (such as killing a player, or providing score when collected). Expanding this set with automatically generated code is a point of future work, see (Cook et al. 2013) for details.

Each of these four processes evolve their populations in isolation, according to various fitness criteria, normally expressed as parameters which can be easily varied, so as to give ANGELINA the ability to alter its own fitness functions in the future. Currently, all parameters have been set through experimentation to find values which produce an interesting variety of outputs in such terms as maze style variation (a mix of open spaces as well as some labyrinthine designs too) or level layouts (dense and sparse entity placement, varying approaches to extending the distance between start and exit). The fitness criteria are as follows.

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Creative Communities
Communities

• Rob Saunders’ on social creativity (see Porvoo Autumn School)
• Simon Colton (and others) - the role of perception in assessing creativity
• My own development as a game designer (mirroring ANGELINA's)
Ludum Dare

ANGELINA entered two games to Ludum Dare 28.

*To That Sect*, which included a disclaimer about ANGELINA and a commentary by the software.

*Stretch Bouquet Point* which didn’t mention ANGELINA at all, and included an edited commentary.
To That Sect

This is a game about a disgruntled child. A Founder... Along the way, you must avoid the Tomb as they kill you, and collect the Ship.

Using Google and a tool called Metaphor Magnet, I discovered that people feel charmed by Founder sometimes. So I chose a unnerving piece of music from Kevin Macleod's Incompetech website to complement the game's mood.
Ludum Dare

Hypothesis: People would prefer the game made by ANGELINA, because of a positive bias towards AI/CC in videogames.
Ludum Dare

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<tr>
<th>#</th>
<th>Description</th>
<th>Score</th>
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<td>#551</td>
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</table>
Stop Press: Ludum Dare

Jet Force Gemini

#196  Mood(Jam)  3.46
#262  Audio(Jam)  3.31
#415  Innovation(Jam)  2.90
#494  Humor(Jam)  2.26
#638  Graphics(Jam)  2.62
#711  Overall(Jam)  2.40
#740  Theme(Jam)  1.81
#745  Fun(Jam)  1.90
Ludum Dare 30,31...

- Showing progress seems important - even if it’s a small step forward.
- We’re still on the downward slide - the shine’s coming off the apple.
- The games community are enthusiastic and positive about computational creativity.
Beyond Jams
Future Work For Us

• Community means two-way engagement - ANGELINA should be able to take it, and dish it out.

• Developers are constantly playtesting and searching for feedback. Iterate, iterate, iterate.

• ANGELINA will cease to be a one-pass system.
Future Work For Us

• ANGELINA needs more - more appreciation, more generative power, more funnels and pipes feeding into (and out of) it.

• Metaphor Magnet’s help is just the beginning - collaborations with The Painting Fool and DARCI are potentially looming.

• There’s a pun about preserving ideas and jams but I’m too tired to work it in here.
Thanks

More on games:
  warpdoor.com
  forestambassador.com
  freeindiegam.es

More on ANGELINA:
  www.gamesbyangelina.org

More on everything:
  ccg.doc.gold.ac.uk