Lecture 5: Interactivity

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Listen → Think → Speak

• Coined by Chris Crawford
• Conversation is fundamentally interactive

• Listen:
  – Pays attention
  – Assembles input into a coherent whole

• Think:
  – Considers, contemplates, cogitates
  – Develops a response

• Speak:
  – Expresses that response
  – Formulates the words and speaks them
Listen ➔ Think ➔ Speak

• *Games automate interactivity*

• Listen:
  – Give the player the opportunity to say anything relevant to the situation

• Think:
  – Come up with interesting and relevant reactions to the player’s input

• Speak:
  – Express it’s reaction clearly
def tick():
    inputs = get_inputs()
    # has user pressed keys/moved mouse/etc?
    state = update_game_state(inputs, state)
    # based on inputs and prev game state
    # move objects around, change score, etc.
    render(state)
    # display updated world to player
Listening: Give player opportunity to say anything *relevant* to the situation
Listen → Think → Speak loop examples
Process Intensity

• Process intensity - term coined by Chris Crawford

• Refers to the “crunch per bit” ratio
  – How much processing does the computer do on the data?

• Instantial vs. procedural elements

• Instantial assets – data displayed by computer
  – Sound files
  – Bitmaps
  – Text
  – Animations
  – ...

Campus map

Info about a 3D model

Teams
Go outside and take pictures of buildings.

Capture flags for your team and conquer buildings.

Look for flags on the map.

Add pictures to flags.

Computer vision algorithms.
Structure from Motion (SfM):
Photos $\rightarrow$ 3D models
Feedback for an accepted photo

1058 new points!

Players only earn points for taking useful photos
PhotoCity

• Crowdsourced photography game with really high process intensity
  – State of the art computer vision algorithms
  – Cluster of machines processing thousands of player photos
  – Listen→Think→Speak
  – Players hit the limit of the technology
    • Wanted to Speak more than we could Listen to
Process Intensity

• Simulation games focus on *process*

• Instantial assets are still a huge part of most games
Computational Opacity

• The meaning of instantial assets are opaque to code
  – Example: code that triggers video clips can’t reason about or manipulate the meaning of the clips

• This opacity limits the code’s ability to resequence these assets in meaningful and interesting ways
  – Assets must be designed for sequencibility or...
  – Assets must be “opened-up” to the code
Instantial assets aren’t bad...
Instantial assets aren’t bad...

- But we don’t know how to procedurally generate rich instantial assets
  - This can quickly become an AI complete problem
  - Purely procedural work may be overly abstract

- Need to appropriately balance the use of instantial assets and procedurality
  - Develop strategies for manipulation of instantial assets
Proceduralization of Instantial Assets

- Graphics: Raster images $\rightarrow$ rendered scenes

- Text/story?
  - Still have to hand-author a lot of this. When will we have more procedural solutions?
Which bits are crunched?

- Wardrip-Fruin distinguishes between process intensive display of static data vs. behavioral process intensity

- Contemporary games contain many more assets than games 20 years ago

- Much of the computational effort may be spent on displaying this data

- But does this count as an increase in process intensity?
  - And are possibilities for interaction being increased?
Computer Animation Research

• 5 years ago: motion controllers
  – procedurally animating realistic characters seemed important for games and movies
Computer Animation Research

• Now: motion capture all the way
  – Moved backwards from process → data
VR means more process intensity for graphics, not AI/behavioral processes
Design challenge: Harness increased process intensity to support meaningful interaction
Two analytic frameworks for talking about interactivity in games

• Laurel (1986, 1992): Aristotelian theory of interactive drama
  – Structural – what are the “pieces” of an interactive dramatic experience?

• Murray (1998): the pleasures of interactive story
  – Experiential – what does an interactive story feel like?
Laurel’s treatment of Aristotle

Dramatic properties
- Enactment
- Identification
- Intensity
- Catharsis
- Closure

Structure
- Action (plot)
- Character
- Thought
- Language (Diction)
- Pattern
- Enactment (Spectacle)

Material Cause
Inferred Formal Cause
Murray’s experiential categories

• Immersion
  – Engagement; acceptance of internal logic

• Transformation
  – Masquerade; variety; personal transformation

• Agency
  – Action with effects relating to player intention
Combine agency with Aristotelian categories

• Agency chosen as primary
  – Immersion - engagement and identification
  – Transformation - change in the protagonist
  – Agency – not implicit in Aristotelian categories

• How does the category of agency relate to the Aristotelian categories
Maximize agency when *material and plot constraints are balanced*
Classic adventure game

Plot Constraints

Action (plot)

Player character

Materials for action

Thought

Language (Diction)

Pattern

Enactment (Spectacle)
Modern storygame (RPG and openworld)

Plot Constraints

- Action (plot)
- Thought
- Language (Diction)
- Pattern
- Enactment (Spectacle)

Material for action

Player character
Example: Classic FPS

A player will experience agency when there is a balance between the material and formal constraints.
- Mateas (A Preliminary Poetics for Interactive Drama and Games)
Reading for next class

• Required:
  – Expressive Processing Chapter 2: The Eliza Effect
  – Moylneux’s talk on Kinect/Natal/Milo virtual character
    • https://www.ted.com/talks/peter_molyneux_demos_milo_the_virtual_boy

• Recommended:
  – How Milo Met Kate
  – Mateas’s A Preliminary Poetics For Interactive Drama and Games