LCC 3710
Principles of Interaction Design

Week 03

Class agenda:
- Presentation/discussion of readings
- Multimedia authoring
- Interactive cinema
- Group exercise

Readings


Multimedia is a broad term
- Systems that support the use of different media types to convey information, such as text, audio, still images and video
- Is multimedia necessarily digital?

Multimedia authoring & interaction
- Interactive storytelling – authoring & interaction

multimedia authoring: a quick summary

multimedia authoring
- Multimedia systems try to engage the user in exploring an information space
- Multimedia authoring involves making the choice of what to present to the user

visualization

Different ways to present the information

1-D linear data - text, source code, word index
2-D map data - floor plan, office layout
3-D world - molecules, schematics, ...
temporal data - 1-D (start, finish)
multi-dimensional data - n-dimensional (information) space
tree data - hierarchical
network data - graph structure

Finding suitable paradigms for presenting these structures to the user

E.g. fully interactive, purely narrative, or combinations
Rhetoric is the (ancient) art of convincing others
It finds a new incarnation in persuasive technologies
Multimedia systems need to be convincing and compelling

Purposes of persuasion:
- Induce audience to take some action
- Educate the audience
- Provide an experience for the audience

Are the "new media" really new?
There is a mutual influence of media on each other
Each new medium refers to a past one or to itself in a previous phase
  E.g. realism of virtual reality can be understood when we appreciate linear perspective. Other examples?

Two forces at play within a medium:
  Immediacy: a tendency toward transparent immersion (the medium itself is forgotten)
  Hypermediacy: the presence of referential context (the medium becomes the subject of attention)

The networked multimedia computer seems to remediate all other media...
  "...merging of previously disparate technologies of communication and representation into a single medium"
  (Murray, Hamlet on the Holodeck, p.27)

Two key properties determine the interactive nature of computer entertainment applications:
  procedural – have rules of behavior
  participatory – offer agency

Two key properties determine their immersive quality:
  spatial – navigable using spatial metaphors
  encyclopedic – have (partial) information closure
**developing an expressive medium**

Stage 1:
A new medium is invented through advances in technology

Stage 2:
An expressive language is defined through experimentation, an understanding of past conventions, and a vision for the future

Stage 3:
As the medium matures and stabilizes, the tools for working within it become increasingly accessible, allowing both professional and amateur artists across the world to tell new kinds of stories

**towards interactive stories**

Storytelling has evolved to fit each new medium

Non-linear stories were pushing the bounds of inherently linear media, there are many early examples (Talmud, works of the oulipo)

The computer provided a medium that could fully support non-linearity & interactivity in stories

But two things needed to happen for interactive cinema to be born:
1. The computer needed a graphical interface and non-linear access to narrative images (e.g. optical video-disc)
2. Someone had to ask the question: “What do computers have to do with video?”

**the birth of interactive cinema**

1978 : Architecture Machine group’s Aspen Movie Map
1985 : MIT Media Lab founded
1983+ : Optical videodiscs, Macintosh, Hypercard
    Ricky Leacock & Glorianna Davenport create early interactive narrative works at the Media Lab
1987 : Interactive Cinema group founded by Glorianna Davenport

“Interactive Cinema reflects the longing of cinema to become something new, something more complex, and something more personal, as if in conversation with an audience.”

Nicholas Negroponte’s “Teething Rings”

**the storytelling system**

Glorianna Davenport, founder, Interactive Cinema 1987

1978 : Architecture Machine group’s Aspen Movie Map
1985 : MIT Media Lab founded
1983+ : Optical videodiscs, Macintosh, Hypercard
    Ricky Leacock & Glorianna Davenport create early interactive narrative works at the Media Lab
1987 : Interactive Cinema group founded by Glorianna Davenport

“Interactive Cinema reflects the longing of cinema to become something new, something more complex, and something more personal, as if in conversation with an audience.”

Nicholas Negroponte’s “Teething Rings”

Glorianna Davenport, founder, Interactive Cinema 1987
part i: the teller

How can the computer be used to help with the story creation process?

- Digital video and story editing systems
- Automatic compiling of narratives from story models and content
- Large databases of story content and the problem of annotation
- Some examples...

constraint-based editing

- Need to access and manipulate the material in large multimedia content databases
- Automatically generate narrative sequences that conform to simple constraints of character emphasis, length, pacing, and chronology (e.g., length = 3 min, emphasize character "Tom", quick pace)
- Database queries would return a fully edited cinematically coherent sequence
- Demonstrated the importance of coming up with a narrative model, and the need to annotate the video sequences in the database

researchers

Benjamin Rubin, Glorianna Davenport
Takes a specific story model as input and applies it to a supplied database of logged video in order to create a video story.

**Story framework library:**
- General story models (commonly used story types, e.g. conflict-resolution process)
- Specific story interactions (e.g. a conversation)

**Concept of “story blocks” and “story lines”:**
- Blocks are pieces of story described by a title, ideal duration, duration delta, pacing, keywords (character, location, etc.)
- Story lines set up inter-block dependencies by relating keywords between the blocks, allowing creation of sub-plots

**Home video scrapbook**
- HyperCard interface
- Clip-based annotation system
- “Story models” for typical topics (e.g. child growing up)
- Compiles short video sequences based on the story models and user search criteria

**Stratagraph**
- System to annotate an anthropologist’s video notebook
- Addresses the problem of clip-based annotation, i.e. values might change over time in a single clip
- Rather than segmenting the clips into even smaller ones (increases the annotation overhead), Stratagraph uses stream-based annotation, essentially labeling every frame with its content

**Video Streamer**
- Visualization tool that uses the z-axis of the screen to represent a sequence of video over time
- Intuitive tool that helps videographers quickly scan through video to find the salient points
What are interactive stories?

Interactive narrative structures
Multi-variant, multi-threaded movies
Real-time computational narrative engines
Some examples…

DMO: the digital micromovie orchestrator
- Narrative engine for the playout of multi-variant movies
- Could sequence content in real-time based on user preferences
- Presented few ways to interact (select pacing or rating, and rewind)

Used in the piece "An Endless Conversation"
- Database of questions and answers
- Layered filters used to create a "turn-taking" conversation between two characters

Researchers
Mark Halliday, Glorianna Davenport

LogBoy + FilterGirl (1994)

Ryan Evans evolved the DMO into a new set of complementary annotation and story structure tools

Interactive movie makers could annotate content and create a set of rule-based algorithms for story
- LogBoy is a Graphical logging module
- FilterGirl is a real-time rule-based shot selection system that uses the descriptions logged using LogBoy to build sequences based on viewer preferences

Evans called the new form a "multi-variant movie"
- Moviemakers can encode knowledge about the story they are trying to tell and the ways it can be changed for multi-variant playout

Researchers
Ryan Evans, Mark Halliday, Scott Higgins, David Kung, Glorianna Davenport

Contour + Dexter (1996)

Continuity engine for dynamic evolving documentaries
- Uses a spreading activation network of weighted nodes
- Keyword annotation for clips in the content database

Dexter presented a web-based interface for the documentary piece Jerome S. Wiesner, 1915-1994: A Random Walk through the 20th Century

Researchers
Michael Murtaugh, Glorianna Davenport
part iii: the audience

What is the audience's role in interactive stories?

- Passive reception vs. active participation
- Collaboration between viewers
- Distributed communities
- Some examples...

lurker

Goal was to create a real-time story played out over the World Wide Web in which the primary mode of interaction would be the exchange of email among live players and fictional characters

- Encouraged communication and cooperation among widely dispersed participants
- Story playout took 5 days
- Users needed to work together to solve sub-problems before the mystery could be concluded
- Tried using an automated mode and a mode which had a game master
- When they were done, participants could modify the story and put it back on the Internet in a new form (iterative story cycles, new audiences and experiences)

researchers

lee morgenroth, richard lachman, gloriana davenport

dream machine

Narrative experiences that are distributed, collaborative and immersive

- Explored issues about responsive cinema and co-construction in casual architectural space
- Role of the audience moving from the passive-receptive to the active-participatory narrative engagement
- Core idea was to inter-connect public space happenings with a virtual narrative space
- Users can share their interpretation of the narrative in an online diary

researchers

gloriana davenport, stefan agamanolis, freedom baird, barbara barry, brian bradley, joe paradiso, arjan schutte, flavia sparacino

part iv: what now?

Teller/audience come together – idea of co-construction

- Shareable media systems
- Improvisational systems
- Mobile storytelling applications
- Stories return to the physical environment
- Some examples...
part iv.1 : shareable stories

Need for coherent structures that will facilitate distributed collaboration and communication between filmmakers, storytellers, artists and audiences

Focuses on three main areas:
- Infrastructure
- Interface
- Community building

part iv.2 : improvisational stories

Applying improvisational models to digital media

New ways of creating, browsing and sharing content
- Audio, Video, Text, Data

individeo (2001)

Collaborative video-based storytelling on the web
- Visual interface for online editing and sharing of video sequences
- Exchange of ideas and feedback among collaborators

researchers
- Benjamin Rubin, Glorianna Davenport

emonic environment (2001-present)

A multi-user system for improvisation and composition with audio, video, and text
- Evolutionary laws and user input cause audiovisual patterns to evolve and produce music and/or visuals on the fly
- Users interact with the system through a variety of input interfaces and environments including a screen-based interface, physical controllers, cellphones and room-sized environments

researchers
- Paul Nemirovsky, Glorianna Davenport, Rebecca Luger-Guillaume, Richard Watson
**part iv.3 : mobile stories**

Mobile technologies afford a new type of storytelling

- PDAs, cellphones, camera phones
- Real-time location-based content delivery
- Media sharing between mobile users

**m-views** *(2001-present)*

Explores the coupling of the user's actual environment with the story world through location-aware content delivery

The M-Views media system is built for both creating and deploying mobile cinema

- The platform includes an iPaq based PDA, a GPS receiver, an 802.11b wireless card and software agents
- M-Studio is a story scripting system and authoring tool that allows users to develop space-time story relationships with visual simulation and feedback

Used for the production of "Another Alice"

- Murder mystery on the MIT campus
- Viewer can follow characters to solve the mystery

**researchers**

pengkai pan, glorianna davenport, david crow, lily kam, carly kastner

---

**moblogging + movits** *(2003-present)*

Movits aims to make the exchanging, sharing and publishing of phone captured media to online video weblogs more integrated, evolving and fun

Multimedia messaging from cellphones with images, video, audio and text

- Provide modifiable presentation templates for moblogging and media sharing
- Create evolving story threads that can be shared between phones and also posted on video weblogs

**researchers**

aisling kelliher, glorianna davenport

---

**part iv.4 : tangible stories**

Bringing stories back to the physical environment by coupling tangible interfaces with interactive storytelling

Objects, surfaces, spaces

New technologies for sensing and tracking objects

Bridging the gap between the worlds of bits and atoms in digital storytelling
flights of fantasy
(2001)

Interactive installation at the Decordova Museum
- Visitors assemble story sequences using a sliding blocks interface with an iconic language
- Large database of content that tells stories about a specific set of characters and locations

researchers
barbara barry, win burleson, david crow, glorianna davenport, aisling kelliher, ali mazalek, paul nemirovsky, isaac rosmarin, james seo, arnan sipitakiat

tvviews playtable
(2001-present)

Tangible computer interfaces can bring people together around story exploration in the same way that board games bring friends and families together around game-play
- Design an interface that can sit in social and living spaces rather than in offices on desks
- Multiple users around one interface
- Face-to-face social interactions

researchers
all mazalek, glorianna davenport


tangible viewpoints
(2001-02)

 Storytelling engine for multi-viewpoint stories on the TVViews playtable
- Physical pawns used as tangible embodiments of the character viewpoints in a story
- Story segments appear as thumbnails clustered around the pawns, fading in and out as viewers move forward through the story
- A spreading activation network is combined with a rule-based storytelling engine
- Allows the system to adapt to viewer preferences while still providing a coherent overall narrative

researchers
all mazalek, glorianna davenport


tangible spatial narratives
(2002-present)

Creating narrative landscapes in a physical form on the TVViews playtable
- Allows audiences to collectively reflect upon and navigate complex spatially structured and multi-viewpoint stories
- Visual landscapes are displayed on the interaction surface, providing a spatial framework for the overall story and the perspectives and narrative threads emerge as the story unfolds

researchers
all mazalek, glorianna davenport
Character-driven stories: create the setting and the characters and allow the story and plot to emerge

1. Four locations: a city square with a hotel, apartment, park, and café

2. Create a character:
   - Name, age, gender, occupation, hobbies, life goals?
   - What they did yesterday, what is their goal for today?
   - Where from the four locations are they at 8am?
   - Where from the four locations are they at noon?
   - Where from the four locations are they at 4pm?

3. Break into groups of three or four and use your characters to build a story idea

4. Present your story to the class

5. Group discussion: how to add interactivity?