



360° interactive storytelling

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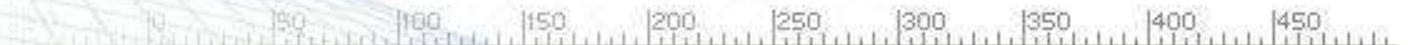
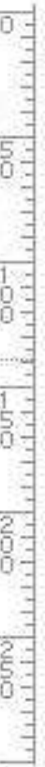
27th September 2012

University of Glasgow

Overview

1. Introduction
2. History of panoramas
3. Interactivity and narrative
4. How to record 360° films?
5. How to view 360° films?
6. Examples of 360° films
7. Conclusion

1. Introduction



Karol Kwiatek

ART

Since 2007 – PhD studies - Plymouth University (UK)

TECHNOLOGY

2004-2005 – Dresden University of Technology (GER)

2000-2004 – University of Science and Technology (PL)

MSc in Photogrammetry and Remote Sensing

BUSINESS

19 websites published (since 1997)

3 business awards

4 virtual tours published on CDs/DVDs



**Best Student
Paper Award (2009)**



**Postgraduate Research
Student of the Year 2010**



**Business Ideas Challenge
Creative Award
and First Place (2008)**



**Microentrepreneur
of the Year 2006
(Poland)**



PhD thesis

A critical practice-based exploration of interactive panoramas' role in helping to preserve cultural memory

communicative memory

still-living past such that one person could share experiences of people or events with others

conversation

Assmann (1995)



cultural memory

memory of events and people who are still remembered by local communities; this memory is cultivated through commemorations, festivals or artifacts

festivals, artifacts

Assmann (2011)



public memory

body of beliefs and ideas about the past that help a public or society understand both its past and its present, and, by implications, its future

monuments, remembrance days

Bodnar (1994)



Cultural memory

Preservation

Panorama?



10 150 100 150 200 250 300 350 400 450

2. History of panoramas

- Painted panoramas
- Photographic panoramas
- Cinematographic panoramas
- Digital, interactive panoramas
- Video panoramas

History of panoramas

Prehistoric cave paintings



How to present distant locations or past events?

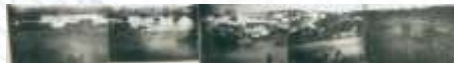
Baroque ceiling panoramas



How to maximise the realism and create the illusion of depicted places?



Painted panoramas



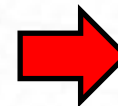
Photographic panoramas



Cinematographic panoramas



Digital panoramas



Rotundas



'Digital rotundas'
and panoramic viewers

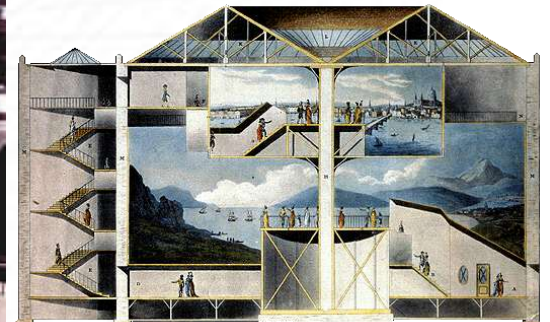
(Griffiths, 2008)

(Grau, 2003)

(Oettermann, 1997)

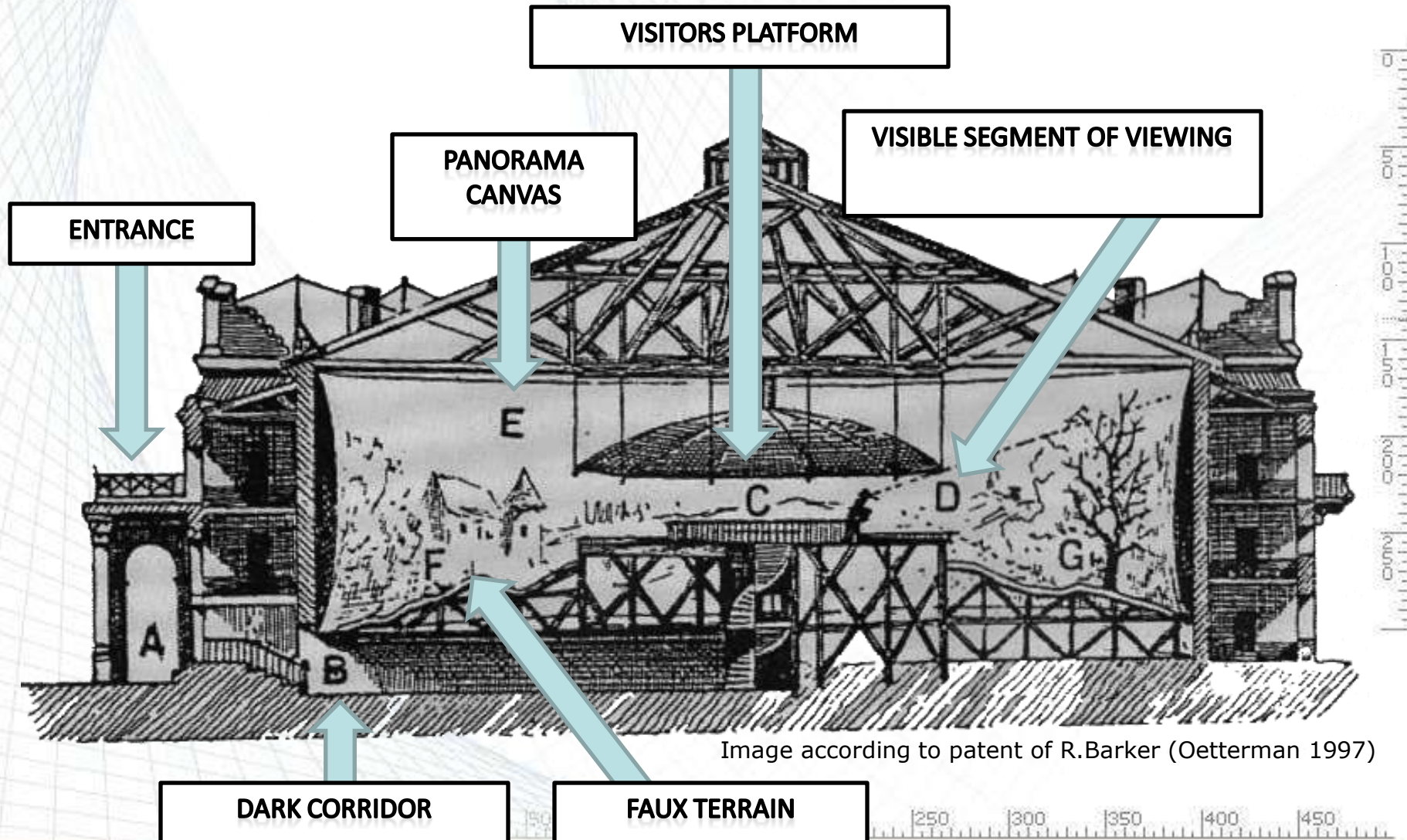
Painted panorama

- A term was created for a 360° image view that was applied to artistic works painted on the internal face of large scale cylinders
- **Robert Barker** (1739-1806) patented his invention in **1787**



Edinburgh

Rotunda and painted panorama



Rotunda and painted panorama

Mesdag
Panorama

You Tube

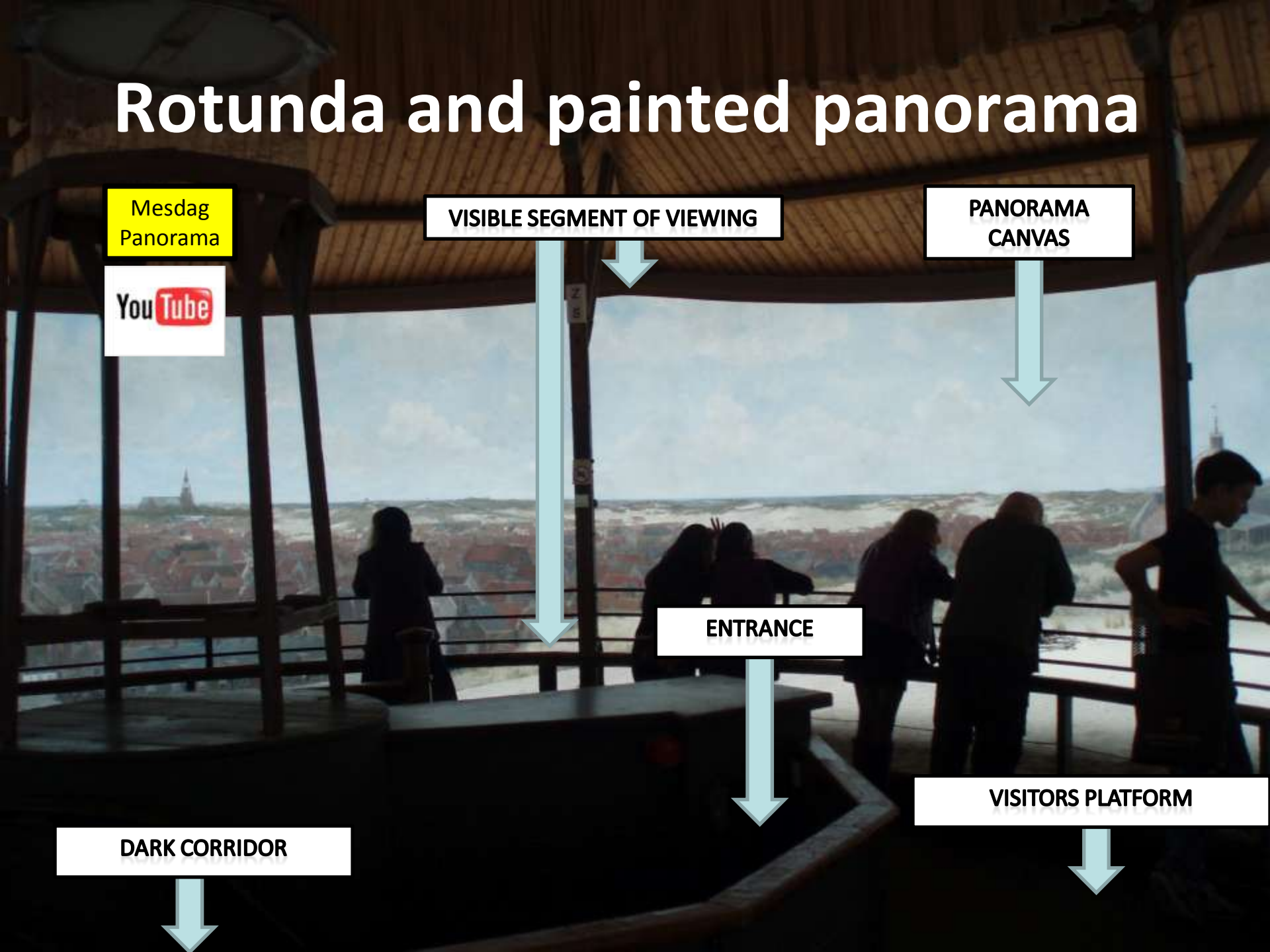
VISIBLE SEGMENT OF VIEWING

PANORAMA
CANVAS

ENTRANCE

VISITORS PLATFORM

DARK CORRIDOR



Photographic panorama



Hiroshima after the Atomic Bomb (October 1945)

Photographic panoramas



Digital panoramas

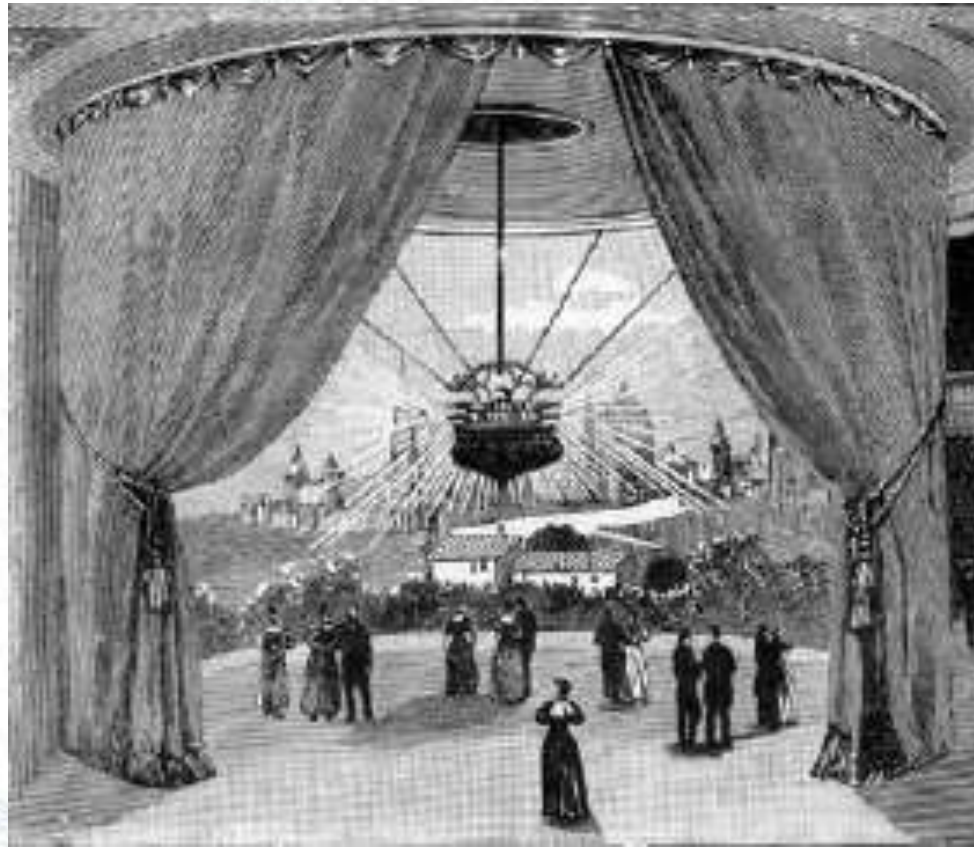
QTVR panoramas

Stitching techniques



Cinematographic panoramas

16 slides
were switched
simultaneously,
creating the
illusion of
movement for the
viewers.



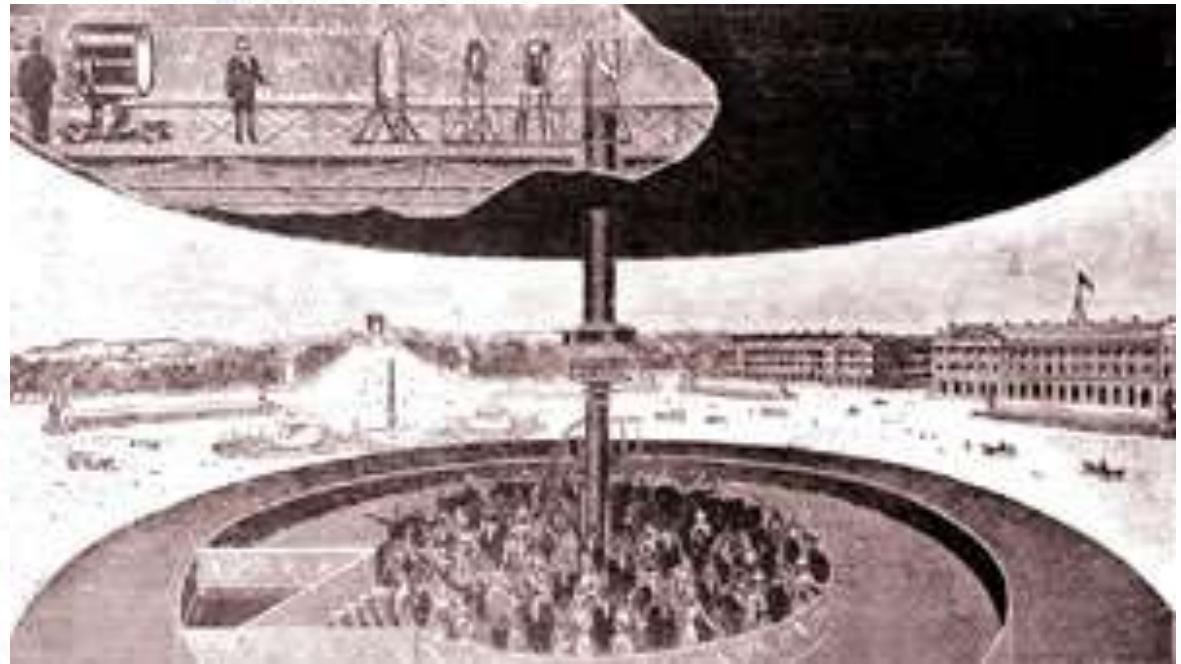
Stereopticon (1894)

Charles Chase – Chicago

Cinematographic panoramas

Screen:
21 metres in
circumference
and six metres
high

360 degree
panoramic
projector which
used 70mm film



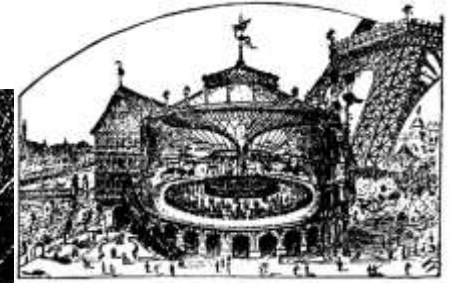
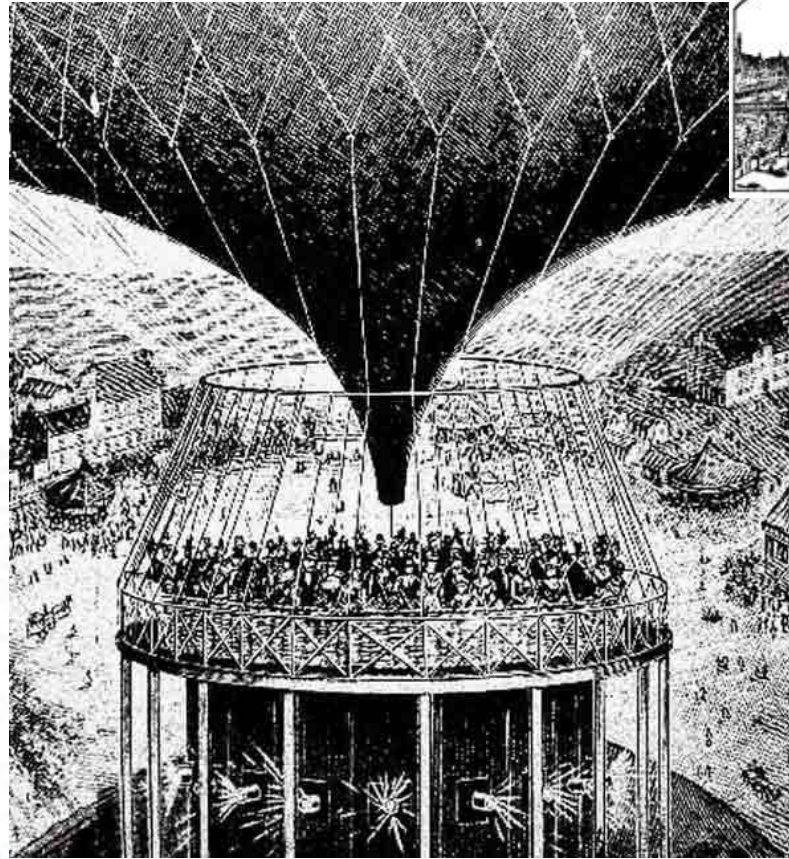
Photorama (1900)

Auguste and Louis Lumière - Paris

Cinematographic panoramas



Ten
synchronised
cameras
arranged in a
circle filmed a
balloon ascent
from the
balloon basket



Cinéorama (1900)

Raoul Grimoin-Sanson- Paris

Cinematographic panoramas



11 synchronised
cameras
arranged in a
circle

Circarama (mid 1950s)

Walt Disney's engineers



Historical cinematographic panoramas

Moscow

2x11
synchronised
cameras
arranged in a
circle



Circular Kinopanorama (late 1950s)

400 450

Historical cinematographic panoramas

Switzerland

For 16 years,
'Impressions of
Switzerland'
were displayed

No narrative



Swissorama(1984-2001)

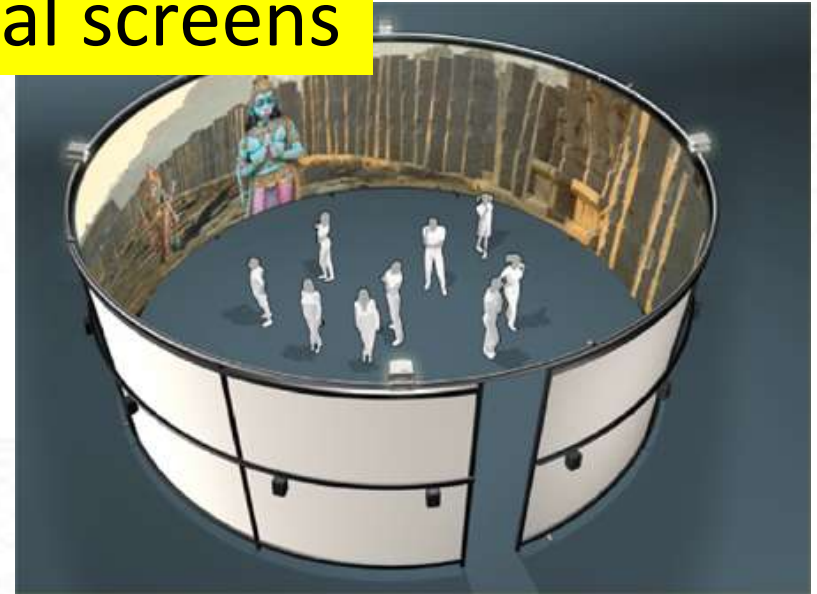
Contemporary cinematographic panoramas

Cylindrical screens



Demonstrator 1

9 metres in diameter
3x5metres window
1 projector – motorized platform



Demonstrator 2

12 metres in diameter
12 projectors
26 channel spatial audio

Interactive panoramas

Digital panoramas

Stories?

cyclomedia

NORC
see. look. explore.

Google
Street View

360
cities

THE WORLD IN VIRTUAL REALITY

Digital panoramas

Not interactive

Digital panoramas



Little planet projection



Still and video panoramas

Still panoramas

Digital panoramas



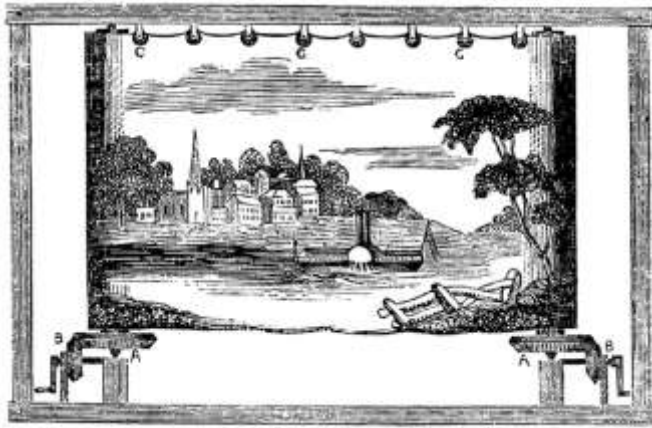
DSLR + panoramic head

Video panoramas

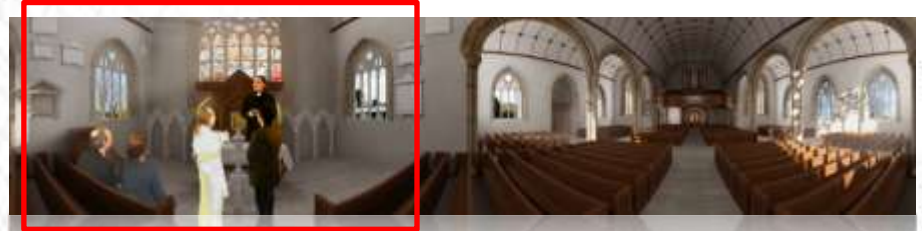


e.g. Ladybug2 or Ladybug3

Integration of panoramas and narratives



Moving panorama (1855)



Panoramic viewer (computer screen)

- Pre-cinema entertainment
- Stories presented by a narrator
- The audience heard accompanying music which was played on a piano

3. Interactivity and narrative

- Narrative
- Interactivity
- Spatial interactive narratives and traversing
- Interactive narrative
- Panoramic interactive narratives

Narrative



“a chain of events that are situated in time and space” (Lothe, 2000)



Narratives:

- allow us to **share our experience** with each other
- allow us to see how different cultures and people **respond to different situations**
- are important tool for helping children **initialise the values and conventions**
- help us develop **understanding of situations** we will never have the chance to experience personally
- are **inspirations for our choices**
- expose us to **possible futures** that we might otherwise not imagine
- give us windows into **options** that we might not consider, because we never even knew about them

Interactivity

- ‘cyclic process between two or more active agents in which each agent alternately listens, thinks and speaks’



One of the agents is a computer keyboard or a mouse that listens to the user's commands and passes them to the computer

Interactivity

- ‘**Extractive**’ model of interaction (**hypertextual navigation**) and ‘**Immersive**’ model of interaction (**navigating a space**) (Lunenfeld 1993)
- Ability to **discover** the environment and ability to **change** it (Ryan 2001)

Types of interactivity

1) 'reactive interaction'



which **does not require much action** from the user.

This is very simple and low level interaction similar to controlling a TV using a remote control

-



Types of interactivity

3) 'user's involvement in a productive action that leaves a durable mark'

(Ryan 2001)



You decide:

Theory

Activity

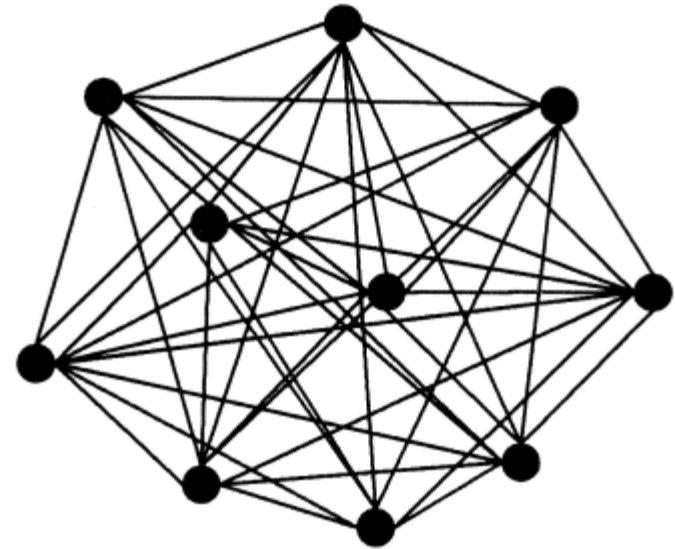


Kinoautomat (1967)

2) 'random selection among many alternatives'

Branching story graphs (1)

- The complete graph
 - Paths are bidirectional
 - Reader has total freedom of navigation
 - Practically impossible to guarantee narrative coherence

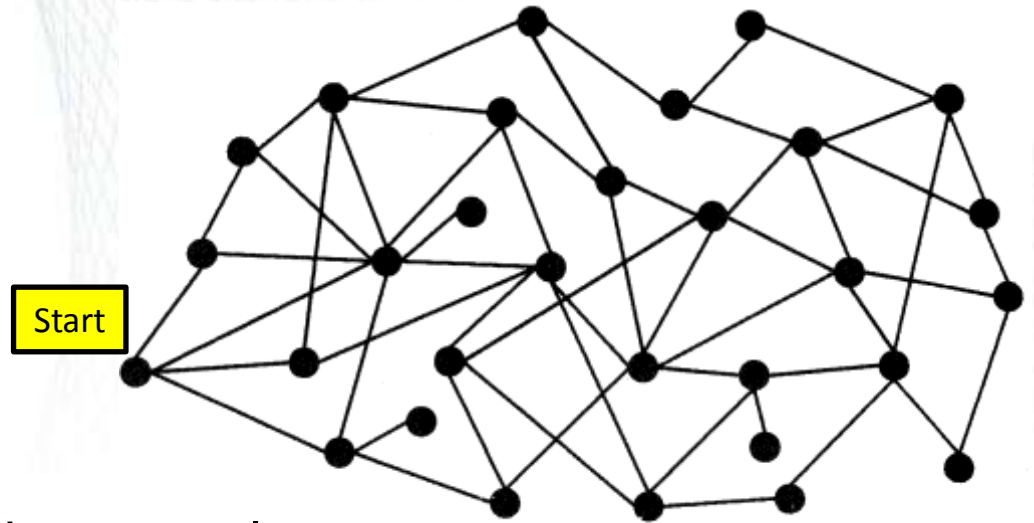


Example: Marc Saporta's *Composition No 1*



Branching story graphs (2)

- The Network

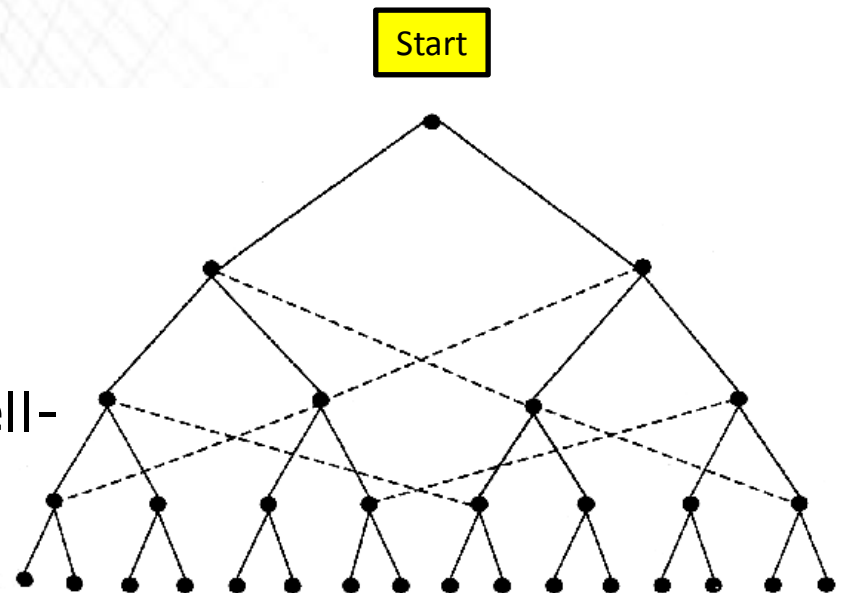


- Paths can be uni- or bidirectional
- The network allows circuits
- System cannot control the duration
- Narrative continuity can be guaranteed only on the local level

Branching story graphs (3)

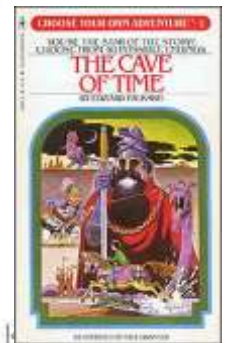
- The Tree

- Paths are unidirectional (from top to bottom)
- Every traversal produces a well-formed plot
- No circuits
- No return to the decision point
- Well formed story is not guaranteed



Example: *Choose Your Own Adventures*

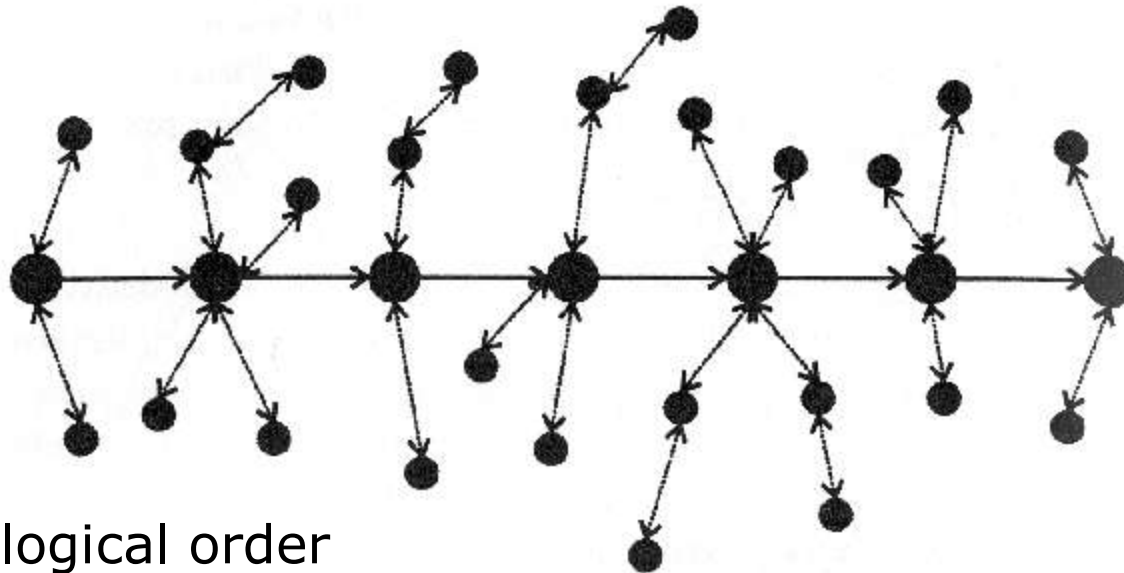
<http://www.survivetheoutbreak.com/>



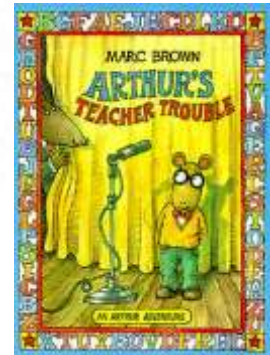
(Ryan 2001)

Branching story graphs (4)

- The Vector with Side Branches

[Guided tour](#)[Hidden surprises](#)

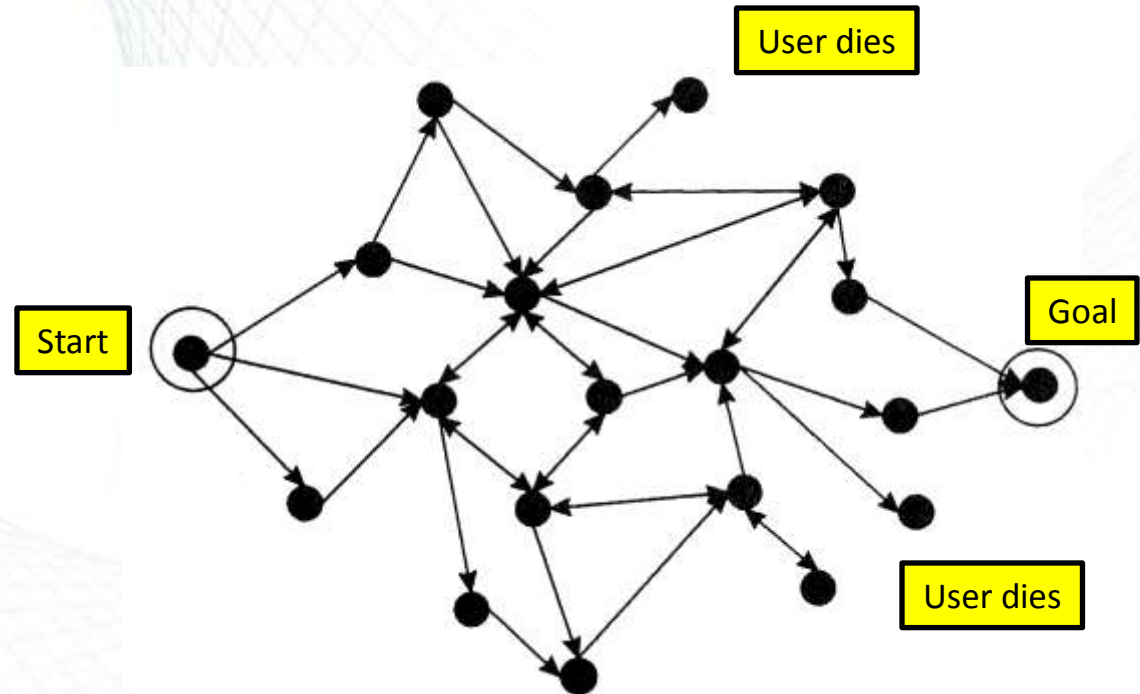
Example: *Arthur's Teacher Troubles*



- Chronological order
- Take short side trips to roadside attractions
- Within each module you can choose your own path

Branching story graphs (5)

- The Maze

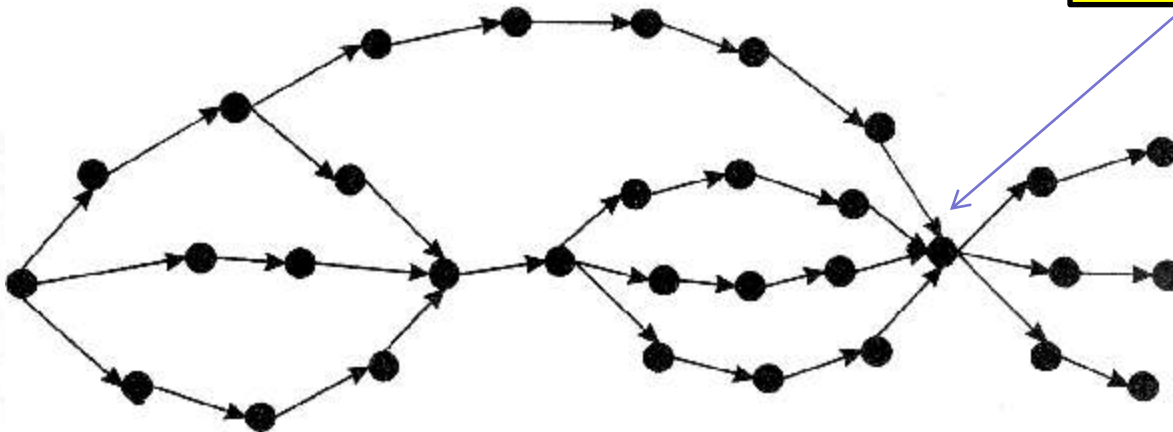


- Many variations
- Plots with happy endings
- Plots with tragic ending

Adventure games

Branching story graphs (6)

- The Directed Network, or Flow Chart



Same ending

Different endings

- Progression of chronological sequence
- The user is granted some freedom

Example: *The French Lieutenant's Woman*



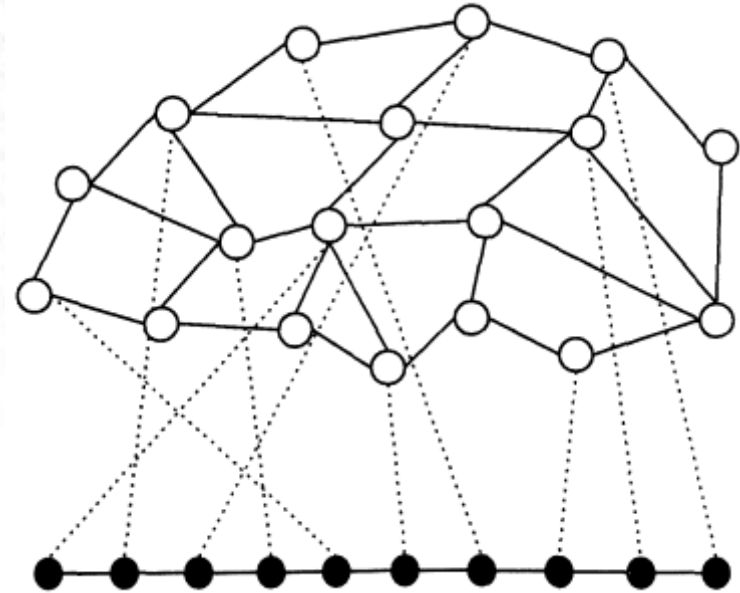
(Ryan 2001)

Branching story graphs (7)

- The Hidden Story

Spatial path of reader's investigation

Temporal sequence of events to be elucidated



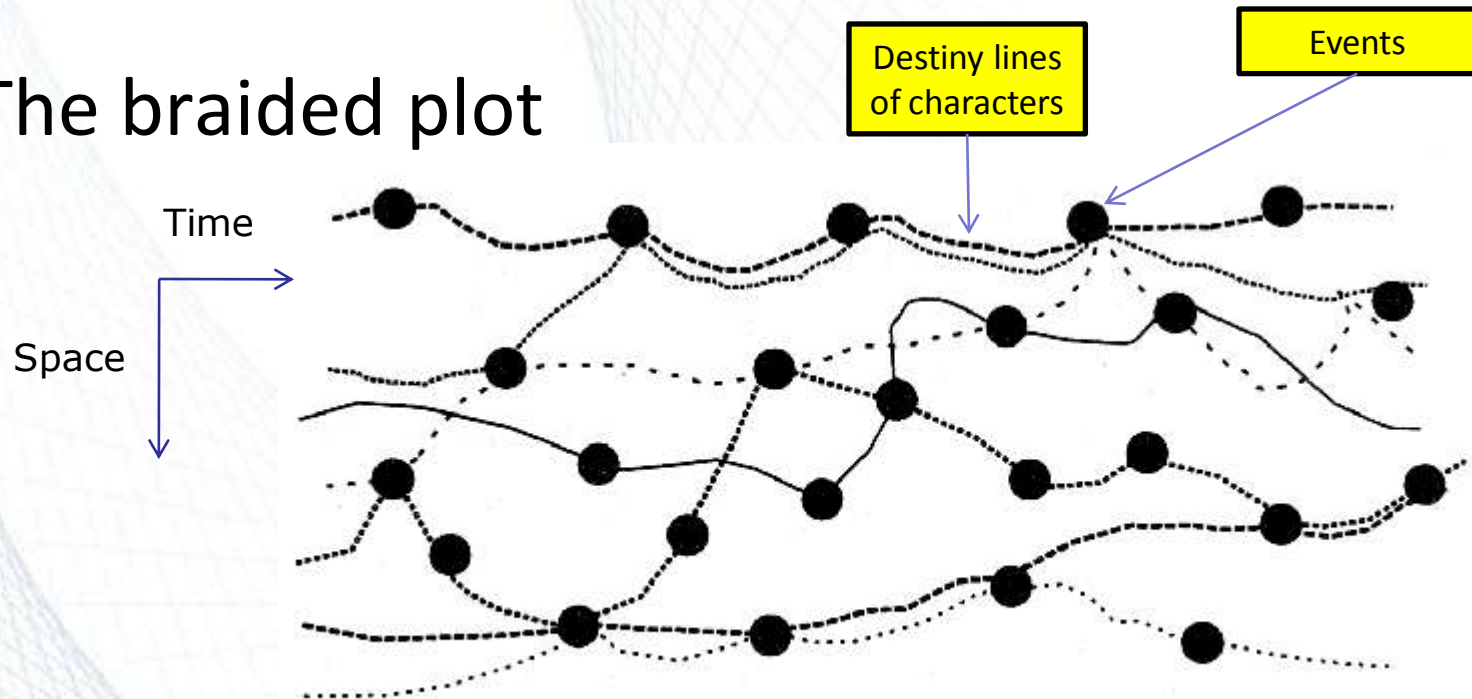
- Interactive mystery stories
- Two narrative levels: at the bottom, the fixed, linear story; on top: the network of choices
- Narrative is written by the actions and movements performed by the player



Example: *Myst*

Branching story graphs (8)

- The braided plot

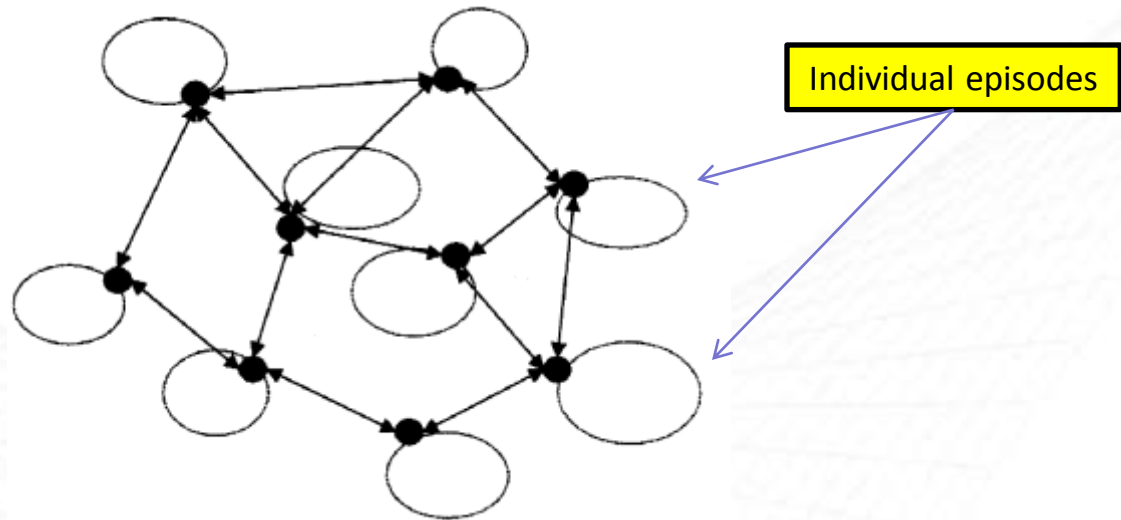


- Simultaneous events are vertically aligned
- Events that take place in the same location occupy the same horizontal coordinate

Example: *The Lurker Files* by M. Ceratini
(a campus-life mystery)

Branching story graphs (9)

- Action Space, Epic Wandering, and Story-World



- The user is free to take any road, but when he/she reaches a site, the system takes control

Example: *Hypercafe* by G. Landow
(a campus-life mystery)

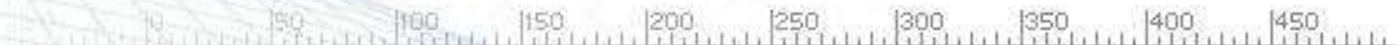
Man with a Movie Camera (1929)

vs

Discover Krakow (2009)

Man with a Movie Camera (1929)

- an experimental 1929 silent documentary film, with no story and no actors, by Russian director **Dziga Vertov**
- presents urban life in Odessa and other Soviet cities
- presents a range of cinematic techniques that Vertov invented, deployed or developed, such as fast motion, slow motion, freeze frames, jump cuts, split screens, stop motion animations and a self-reflexive style



Discover Krakow (2009)

- panoramic film recorded on a horse carriage in Krakow
- **Krakow** in Poland:
 - My hometown
 - The second biggest city in Poland
 - "The city of 100 churches"
 - The capital of Poland till 1596 (now Warsaw is the capital)
 - **UNESCO World Heritage Site** from 1978



Man with a Movie Camera vs Discover Krakow

Task:

Please find similarities and differences between these two films.



Watch



Watch

Man with a Movie Camera vs Discover Krakow

Task:

Please find similarities between these two films.



Man with a Movie Camera vs Discover Krakow

Similarities:

- exploration of the potential of the cameras
- no screenplay
- no actors
- live of ordinary people in a city
- lack of a production team
- no dialogues
- low budget
- exploration of vehicles that enable moving the camera
- silent movies (cameras do not record audio)
- recording of the 'making of the film'
-



Man with a Movie Camera vs Discover Krakow

Task:

Please find differences between these two films.



Man with a Movie Camera vs Discover Krakow

Differences:

Man with a Movie Camera

- 1929
- black and white
- limited field of view
- output: cinema
- ...



Discover Krakow

- 2009
- colourful
- 360° field of view
- output: Internet/immersive screen
- ...



Interactive narrative

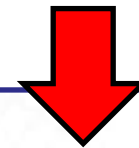
Form of art, research and entertainment which links interactivity, visual art and traditional narratives.

Traditional narrative

- preconstructed
- linear plot
- author/writer is sole creator
- experienced passively
- usually one unchangeable ending

Interactive narrative

- not fixed in advance
- non-linear
- the user creates the story
- experienced actively
- different outcomes are possible



Panoramas?

Interactive storytelling

Approaches to interactive narratives:

(Brown, Barker & Del Favero, 2011)

- **polychronic narrative** - re-sequencing narrative events;



Place Hampi

<http://www.place-hampi.museum>

- **transcriptive narrative** - re-assembling data
(e.g. assembly of unrelated data into a narrative);



T_Visionarium

<http://www.icinema.unsw.edu.au/projects/scenario/project-overview/>

- **co-evolutionary narrative** - narrative as a shared autonomy; narrative can emerge and evolve and these processes depend on the relationship between the user and the digital agent.



Scenario

<http://www.icinema.unsw.edu.au/projects/scenario/project-overview/>



Interactive narrative

'time-based representation of character and action in which a reader can affect, choose, or change the plot ' (Meadows 2003)

Time-based
representation of
events

'formulation of old media practices - embodied by the narrative conventions [...] reapplied in the context of new media, with the user positioned as interpreting a meaningful narrative via the **navigation of largely pre-scripted paths through data**'
(Brown, Barker & Del Favero, 2011).

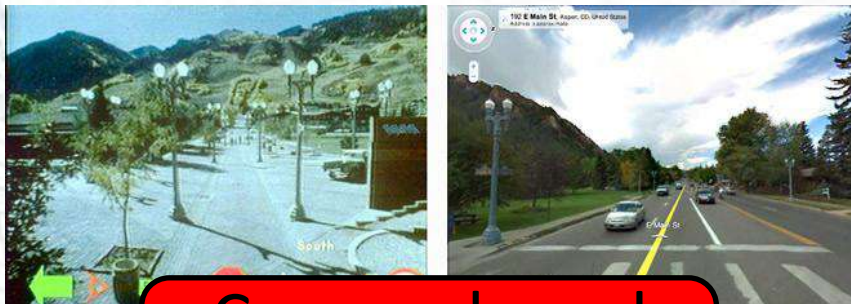
Spatial
representation of
events

Interactive narrative



VR approach

Time-based
representation of
events



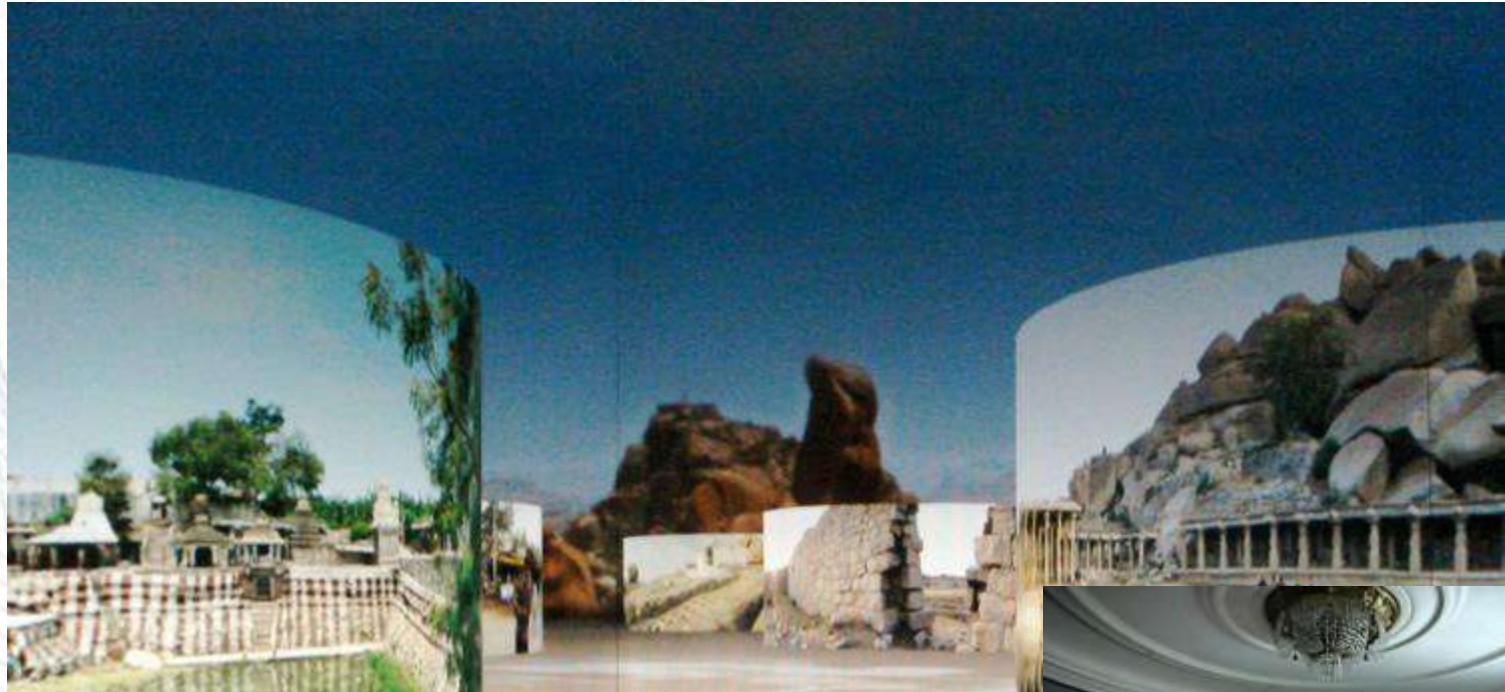
Camera-based
approach

Spatial
representation of
events

50 200 250 300 350 400 450

VR approach

- VR navigable space in *Place-Hampi*



Camera-based approach

- Street-level navigation and interaction

Aspen Movie Map



Photographs

1978

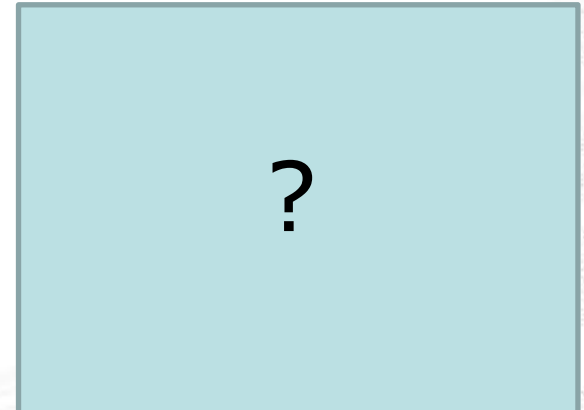
StreetView



Panoramas

2007

Panoramic int. film

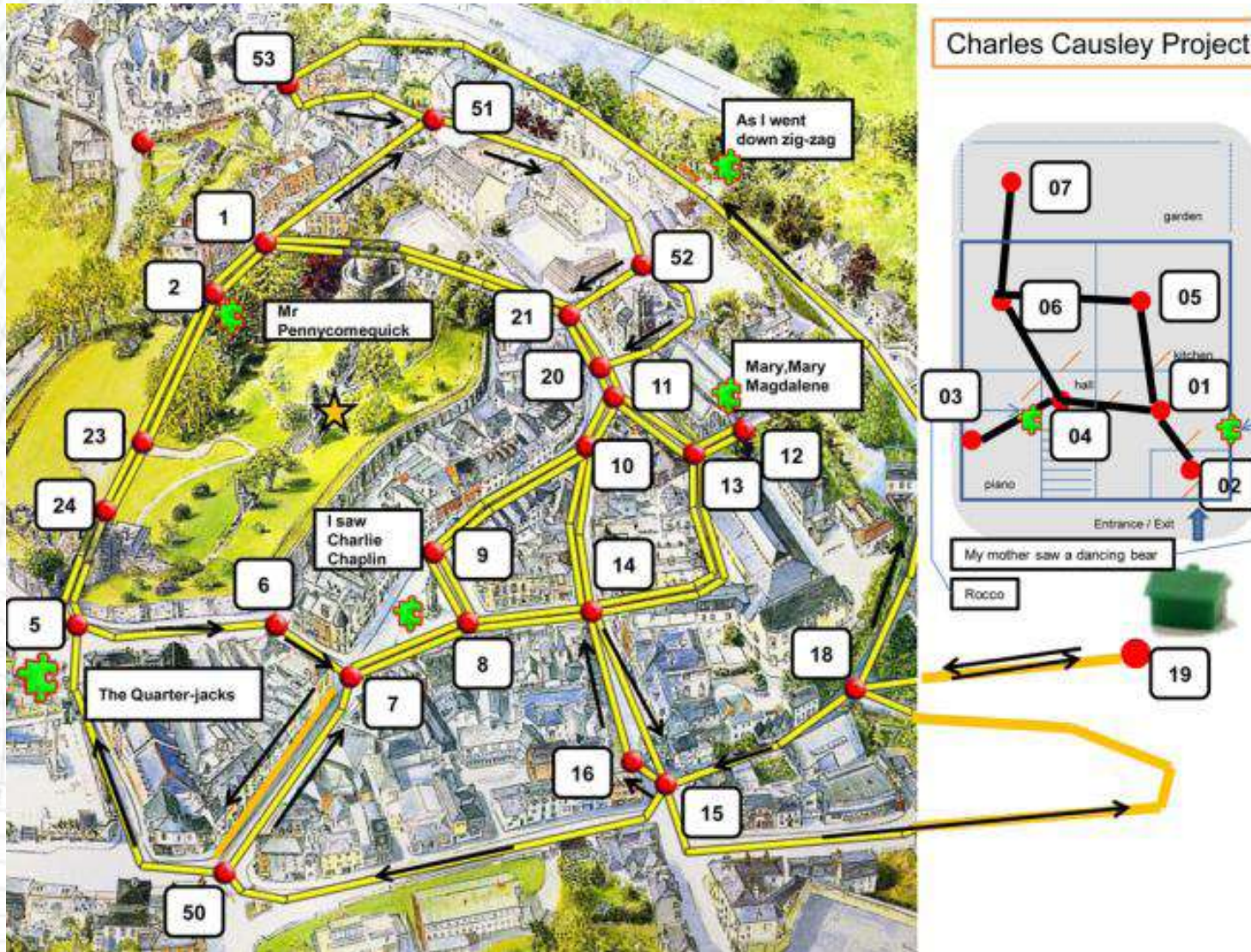


Panoramas & video panoramas

now

- ‘Photographic exploration could open unique esthetical possibilities that cannot be achieved in 3D computer graphics’ Manovich (2001)

Camera-based approach



4. How to record 360° films?

- 360° video cameras
- Video panoramas
- Static 360° films
- Moving 360° films

360° video cameras



Cineorama (1900s)



Sony Bloogie



Ladybug2



Ladybug3



Dodeca



SA9



Sensocto



Totavision



Ladybug 2

spherical video camera



- Max. framerate: 29.97fps
- 1.19 kg
- max. resolution: 3500x1750 pixels

Approx.
2GB/min

LADYBUG 2
Spherical video camera

<http://www.ptgrey.com/products/ladybug2/index.asp>

Ladybug 3

spherical video camera



- Max. framerate: 16 fps
- 2.41 kg
- max. resolution: 5400x2700 pixels

Approx.
3GB/min

LADYBUG 3
Spherical video camera

<http://www.ptgrey.com/products/ladybug3/index.asp>

Multiple cameras



360° films (static)

Spin the camera
around

Zoom in

Zoom out

Control timeline



Ladybug cameras from Point Grey Research

How to create
a mobile setup?

360°films (moving)

Spin the camera around
around

Zoom in

Zoom out

Control timeline

Quasi navigation

Choose trajectories



5. How to view 360° films?

- Panoramic viewers
- Computer screens
- Immersive screens
- Tablet computers
- 360° narratives on 360° screens

How to view 360° films?

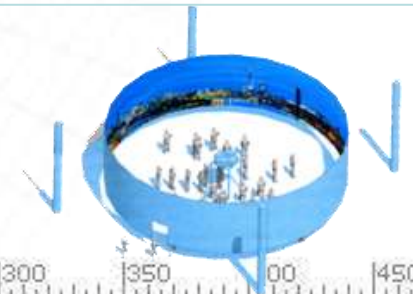
Panoramic viewer



Tablet computer

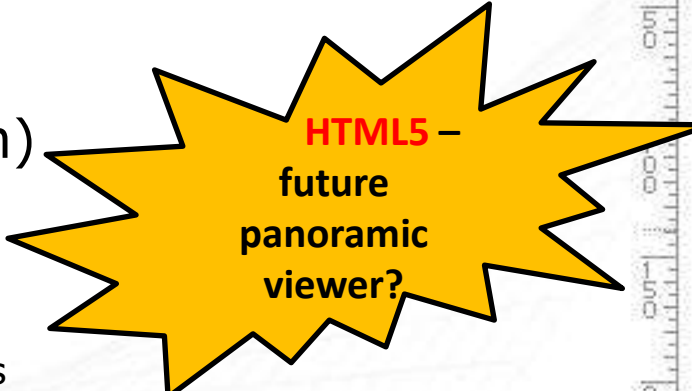


Immersive screen



Panoramic viewers

- KrPano (www.krpano.com)
- Lucid Viewer (www.lucit.it)
- Pano2VR (www.pano2vr.com)



HTML5 –
future
panoramic
viewer?

- support still and video panoramas
- based on Flash technology (most popular plug-in)
- based on coding in XML
- navigational benefits of viewing spherical video
- **allow to publish interactive narrative in the Internet**

Programming

■ XML:

```
<?xml....
<lcid>
    <viewer ...>
    <scene ...>
    </scene>
</lcid>
```

File name: program2-1.jpg

```
lucid - Notepad2
File Edit View Settings ?
1 <?xml version = '1.0'?>
2
3 <lcid>
4 <viewer mouse="" bar="hide" tooltips="true" toolpanel="true"/>
5
6 <scene file="program2-1.jpg" name="ICCI360" bar="" mouse="hold" adjust="0,0,0" limits="90,-90"
  camera="-45,-1,4" play="true" next="false" loop="true" popup="" audio="" info="More info:
  karol.kwiatk@plymouth.ac.uk" scene_action= "fullscreen">
7
8 </scene>
9
10
11 </lcid>
```

Direction of viewing, field of view

e.g. Lucid Viewer



media



index



license



lucid



lucid



lucid

database

XML file

Video panoramas



Tablet computer

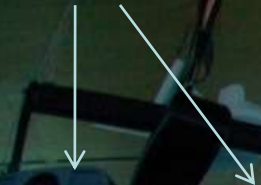


Immersive screen

- Panoramic spaces with 360° screens no longer address an individual, but the **large audience**
- **Point of view** is different, **not fixed**
- No longer observing a fragment of **field of view**
- **Audience** is inside the image space
- No longer possible to **examine everything** that happens around the spectators
- Spectators can **change their position**

Panoramic projection systems

Projectors



6. Examples of 360° interactive films

- Panoptica
- Wartime Wedding

360° screens and stories

ICCI 360 Festival in Plymouth



Wartime Wedding (1941)

- Linear ➡ non-linear story
- Chroma keying technique (Green screen studio)
- Recording with Ladybug2

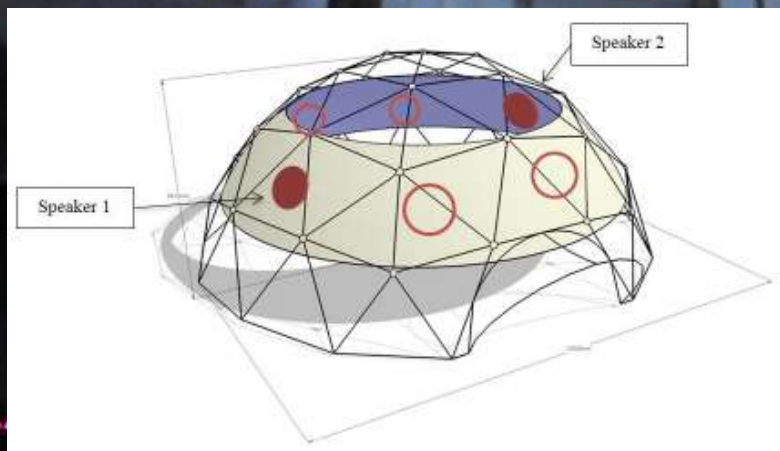


- Ken – 97
- Phyllis – 91
- In 2011 they celebrated 70th wedding anniversary

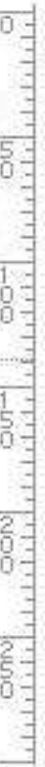
Reconstruction of the wedding



Charles Church on 360° screen



7. Conclusion



Conclusion

- Video panoramas
 - new consequences for the film making process
 - new method for presenting interactive narratives
- The application of interactivity within a 360-degree screen enhances viewer's involvement in the creation of the narrative
- 360° screens provide new forms of presentations of 360° films (games, interactive narratives)

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Thank you

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