The Art and Science of Depiction

Non-linear Drawing systems

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Non-linear drawing systems

Munch exhibition
- Boston College
- Until May 21.
- Birth of expressionism

Munch

Munch

Munch
Plan

- Drawing and projection
  - Linear perspective & the Renaissance
  - Drawing systems
    - Catalogue of “all” drawing systems
      - Advantage/disadvantages
    - Distortion and constraints
  - Denotation
  - Tone & color

Classification of drawing systems

- Linear
  - Parallel
  - Orthogonal
  - Fold-out oblique
  - Horizontal oblique
  - Vertical oblique
  - Orthographic
    - Isometric
    - Others
  - Non orthogonal
    - Oblique
    - Axonometric
  - Linear perspective
    - One point
    - Two points
    - Three points
    - Divergent perspective

- Non Linear
  - Quasi linear
    - Naive perspective
    - Expressional perspective
    - Importance driven
    - Cell panorama
  - Curved projections
    - Panorama
    - Fish-eye
    - Topological
    - Split views, fold-out
    - Multiple viewpoints

Drawing systems
### Linear projections
- Straight lines and alignments are preserved
- Can be expressed in primary geometry
  - Ray-image intersections
  - A matrix
- Parallel
- Linear perspective
- Divergent perspective

### Classification of drawing systems
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### Non Linear
- Does not preserve straight lines
- Can get rid of some distortions
- More freedom
- Dramatic effects

### Quasi linear
- Locally linear
- Preserves the drawn straight lines
- No “accurate” space
- Unified space

### Quasi linear
- Naïve perspective
- “Expressionist” perspective
- Importance-driven
- Locally linear
- Cell panorama
**Naïve perspective**

- Attempt to depict scene 3 dimensionally
- Often lack of skill
- More or less formal secondary geometry rules

**Naïve perspective**

- Pompeii

**Naïve perspective**

- Giotto

**Naïve perspective**

- 18th century

**Locally linear**

- Linear for objects or parts of the scene
- Choose the best system for each part
- Allows different scales, provide context
- In fact, this is the most common system!

**Locally linear**

- Folk
Locally linear

• Egyptian
• Best view for each object

Locally linear

• Persian miniature, 1494
• Oblique+vertical oblique

Locally linear

• Plan of Manhattan

Locally linear

• Llibre Dels Feus 1162-1199
Locally linear

- *St John the Baptist Retiring to the Desert*
  Giovanni di Paolo 1454

Importance-driven

- Size depends on importance, symbol

Importance-driven

- Piero de la Francesca
  *Mercy*

Comparison

- Piero de la Francesca, *Flagellation*, 1460
**Importance-driven**

- Scientific American

**Data-driven**

- Scientific American

**Cell multiperspective panorama**

- Pinocchio, Walt Disney

**Multiperspective panorama**

- [Wood et al. 98]

**Multiperspective panorama**

- [Wood et al. 98]
“Impressionist” perspective
- Pissarro

“Expressionist” perspective
- Munch, the Scream

“Expressionist” perspective
- Van Gogh

Cézanne
- Still life with basket, composition rule

Cézanne
- Montagne Ste Victoire
“Expressionist” perspective

- Max Beckman *Family Picture* 1920

“Expressionist” perspective

- Umberto Boccioni
  *The Street Enters The House* 1911

Quasi linear

- Modigliani
  *Femme au Chapeau*

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Leonardo & contradictions

- Wide angle vision

Leonardo & contradictions

- Wide angle vision
- Lateral recession
Curved perspective

- Panorama
  - Preserve verticals
- Fish eye

Curved perspective

- Jean Fouquet, 15th century

Curved perspective

- A View of Delft Carel Fabritius (follower of Rembrandt) 1652

Curved perspective

- Turner Petworth Park Tillington, Church in the Distance 1828

Curved perspective

- Panoramic camera
“Expressionist” perspective

- Van Gogh, Bedroom in Arles

Curved perspective

- Panorama
  - Preserve verticals
- Fish eye

Fish-eye vs. wide angle

Fish-eye vs. wide angle
Bird’s eye attachment

Fish-eye

• MC Escher, Hand with Reflecting Globe

Fish-eye

• MC Escher, Balcony

Fish-eye

• London from St Paul’s cathedral 1845

Fish-eye

• Anthony Green The 30th Wedding Anniversary
**Projection surface**

- Panorama, Imax
- “Good viewpoint”
  - Primary geometry and viewing conditions match

**Projection**

- Pavilion in the Colosseum
  - Regent's Park
  - 1829

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**Topological**

- Paul Klee, Another Camel

**Topological**

- London Underground, Beck, 1931

**Topological**

- Children drawing
Topological

• Comics

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Split views, fold-out

• Can be seen as a smooth viewpoint change
• Can represent an object from all sides
• Continuity, preserves topology

Split views, fold-out

• Picasso,
  Portrait of a woman
Split views, fold-out

- Northwest Indian Double Profile Bear

Split views, fold-out

- Multiple-center of projection images, Paul Rademacher

Split views, fold-out

- Multicultural study

Split views, fold-out

- Interactive caricature (Fred Vernier)
**Split views, fold-out**

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**Split views, fold-out**

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**Cinema**

- Robert Wiene The cabinet of Dr Caligari 1919-1920

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**Multiple viewpoints**

- No more unity of pictorial space
- Represents objects from different viewpoints
- Less continuity, no topology
**Cubism**

- *Candlestick*
  - George Braque
  - 1911

**Hockney**

**Escher**

- *Other World* 1947

**Mirrors, lenses**

- *Freddie Francis*
  - *The Skull*
**Mirrors, lenses**

- *Hedgecoe*

**Mirrors, lenses**

- *Casas Abarca*
  *Le Salon*
  1875-1958

**Discussion**

- No universal solution
- Secondary geometry
- Invariants
- Property mapping or translation

**Drawing and cinema**

- Characters too close
- Trenching
- Etc.