Capturing the Moment

Michael Cohen

Microsoft Research

The Moment

- Definition will (hopefully) evolve as talk progresses
- Goals
  - Get you to think about *moments* as a new media type
  - Start a discussion of what kind of tools should be developed to support *moments*
    - *capturing, editing, displaying*

Moment vs. Photograph

- **Photograph:** an (almost **objective**) visual representation of a *point* in time and space

- **Moment:** a visual representation of the **subjective** reality at some specific time and place
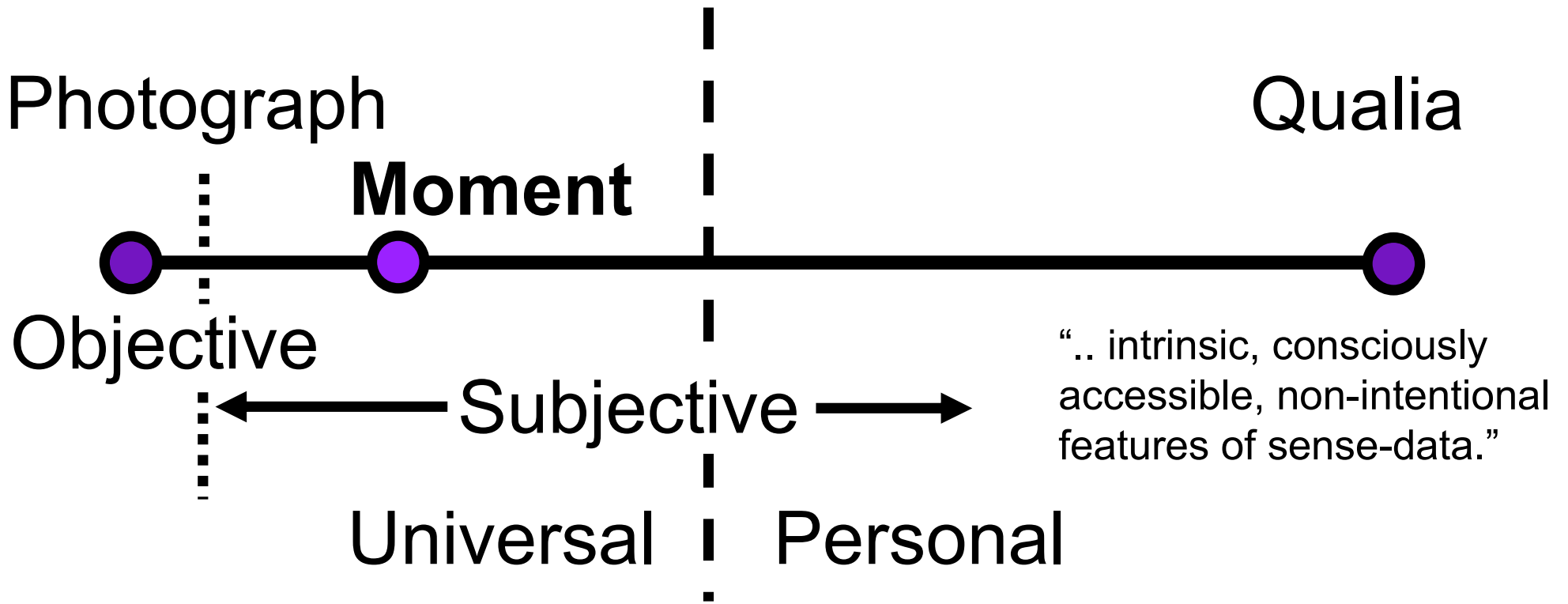

A Photograph

A Moment

Photograph vs. Moment vs. Qualia

Photograph

Moment

Qualia

Objective

".. intrinsic, consciously accessible, non-intentional features of sense-data."

← Subjective →

Universal | Personal

Sonya: "… well, what prevents you from murdering somebody?"
Boris: "Well, murder's immoral."
Sonya: "Morality is subjective."
Boris: **"Yes, but subjectivity is *objective*."**
Sonya: "Not in any rational scheme of perception."
Boris: "Perception is irrational and implies eminence!"
Sonya: "But judgement of any system or a priori relation of phenomanae exists in any rational or metaphysical or at least epistimiological contradiction to an abstract and empyrical concept such as being, Or to be, or to occur, *in* the thing itself or *of* the thing itself!"
Boris: [Conceding] "Yes, I've said that many times." - Woody Allen's Love & Death

The Moment in History
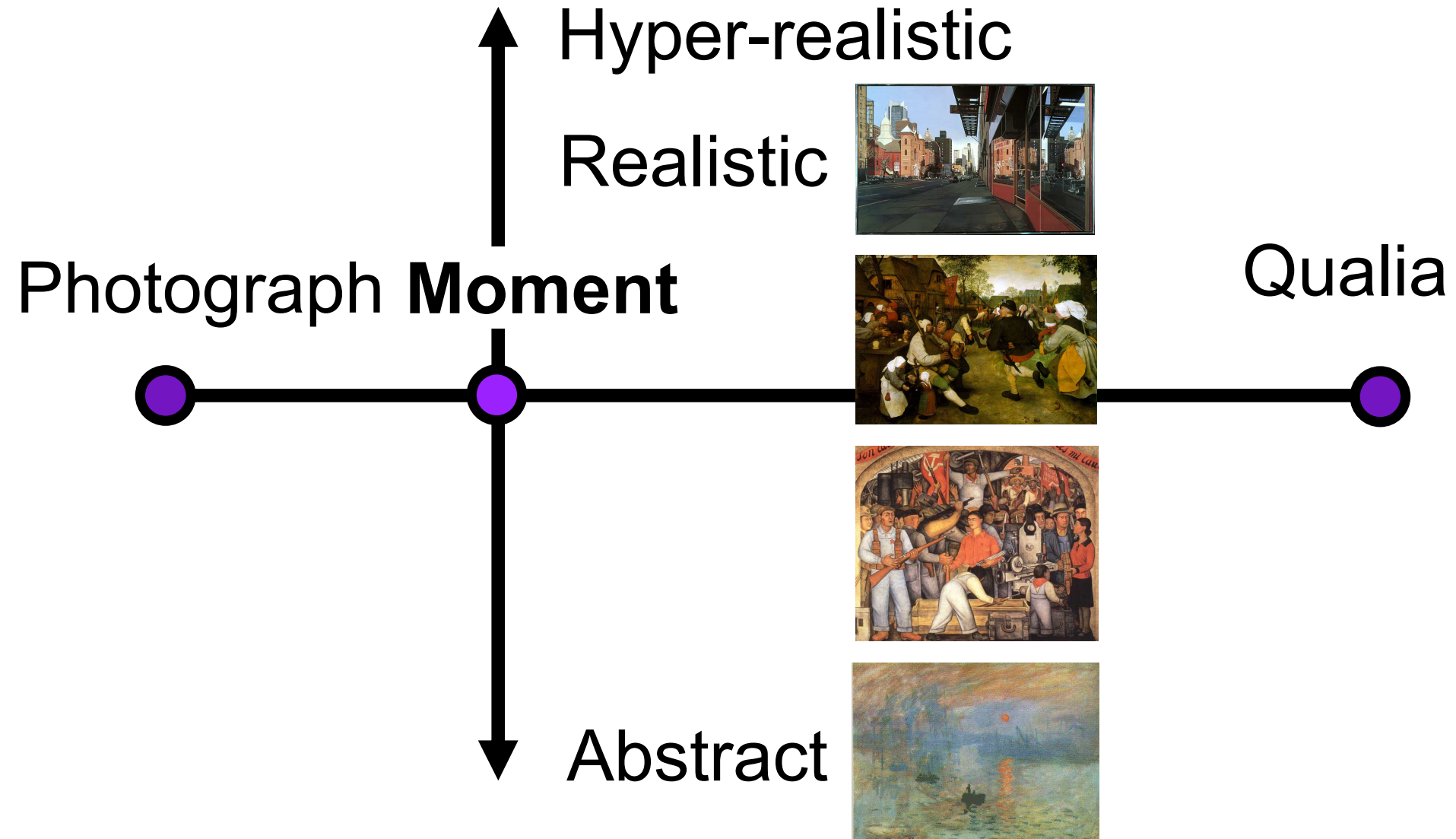

Pieter Bruegel (about 1525-69)

The Moment in History

Diego Rivera (1923)

The Moment in History

Monet (1870's)

Realistic vs. Abstract

↑ Hyper-realistic

Realistic

Photograph **Moment**

Qualia

↓ Abstract

Giving way to photography

- Late 1800's
  - Historical recording given to the camera
  - Art becomes more abstract
- The moment is lost?
- (Re) capturing the moment

(Re) Capturing the Moment
The Compucam

- 10 Mpixel sensor
- 200 fps, exposure < 1/200th of a second
- Buffers 5 seconds of capture
  - 10 Gigapixel (circular) raw buffer
  - Continuously "on"

Point-and-click

- ## Normal mode: *point-and-click*
  - Semantics of *click* means save previous 4 seconds and next 1 second = "cliplet"
    - Missed that precious instant?
      - No problem, wind back time a bit
      - No more closed eyes in photos

    - HDR for free
      - Registered frames: "time to # photons" = radiance
      - See Bennett and McMillan, SIG 2005

Missed the Right Instant?

Panoramas

- ## Panorama Mode
  - Semantics: click == start, click == stop
  - Buffer to stitch HDR panorama on the fly
  - Transient events removed (or enhanced)

Panoramas on-the-fly?
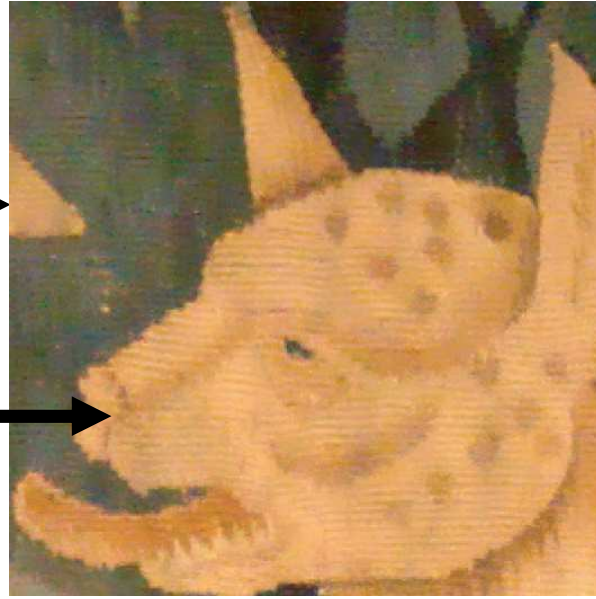
Panorama - Ghost Removal

Flash, No Flash

No-Flash
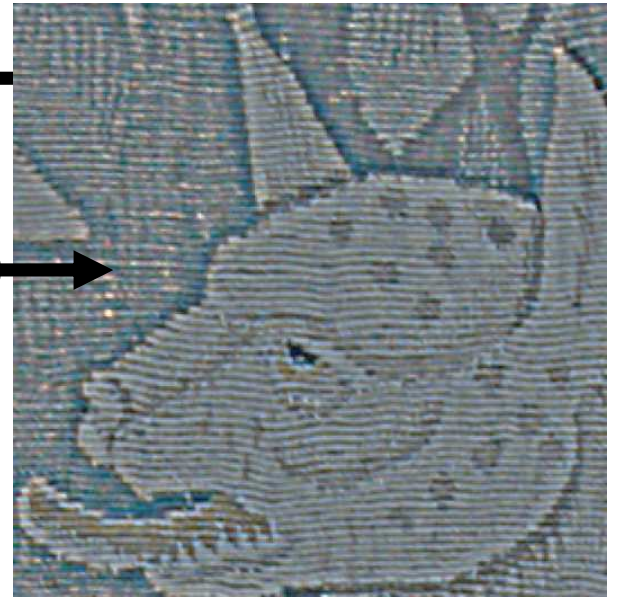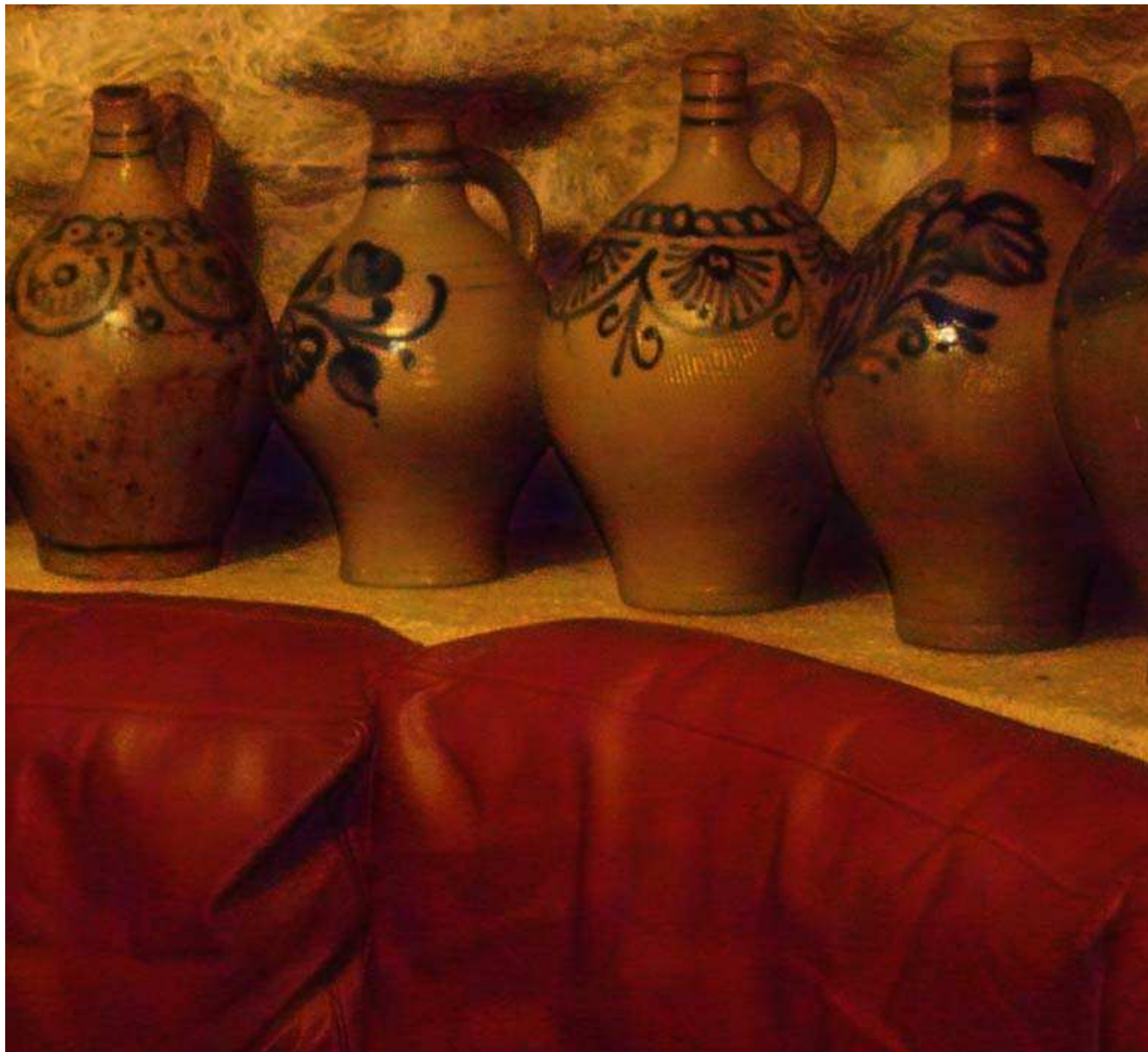
Joint Bilateral Filter

Result

Flash

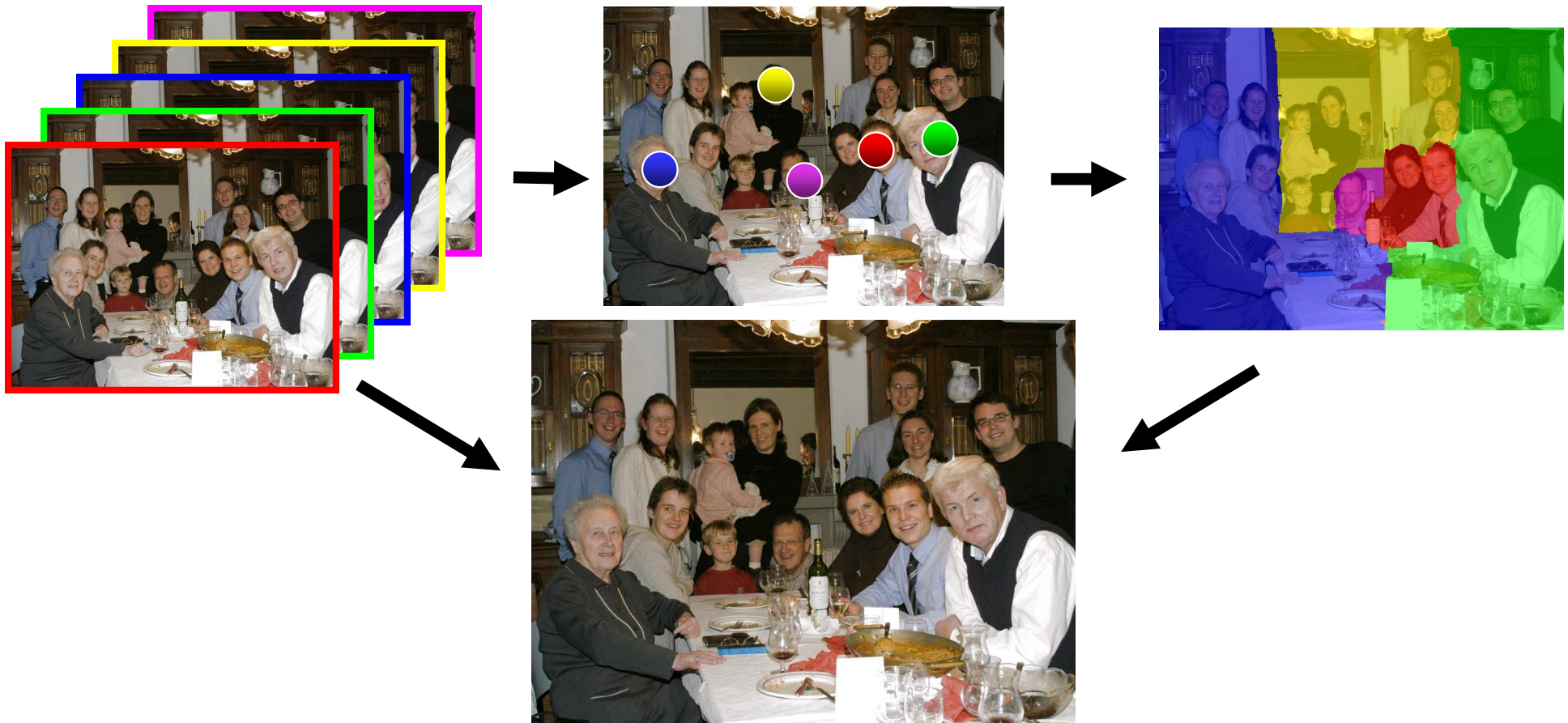Bilateral Filter

Detail Layer

Flash, No Flash

Photomontage

- Photomontage mode
  - Semantics: click == start, point == save local buffer, click == stop

The Compucam

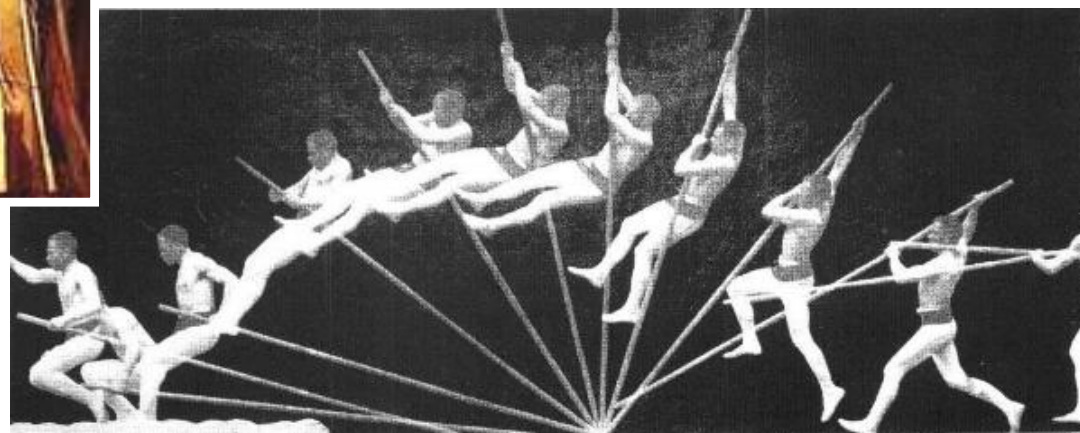- Other modes: Pull focus,…

How about Motion?

Boccioni

Duchamp
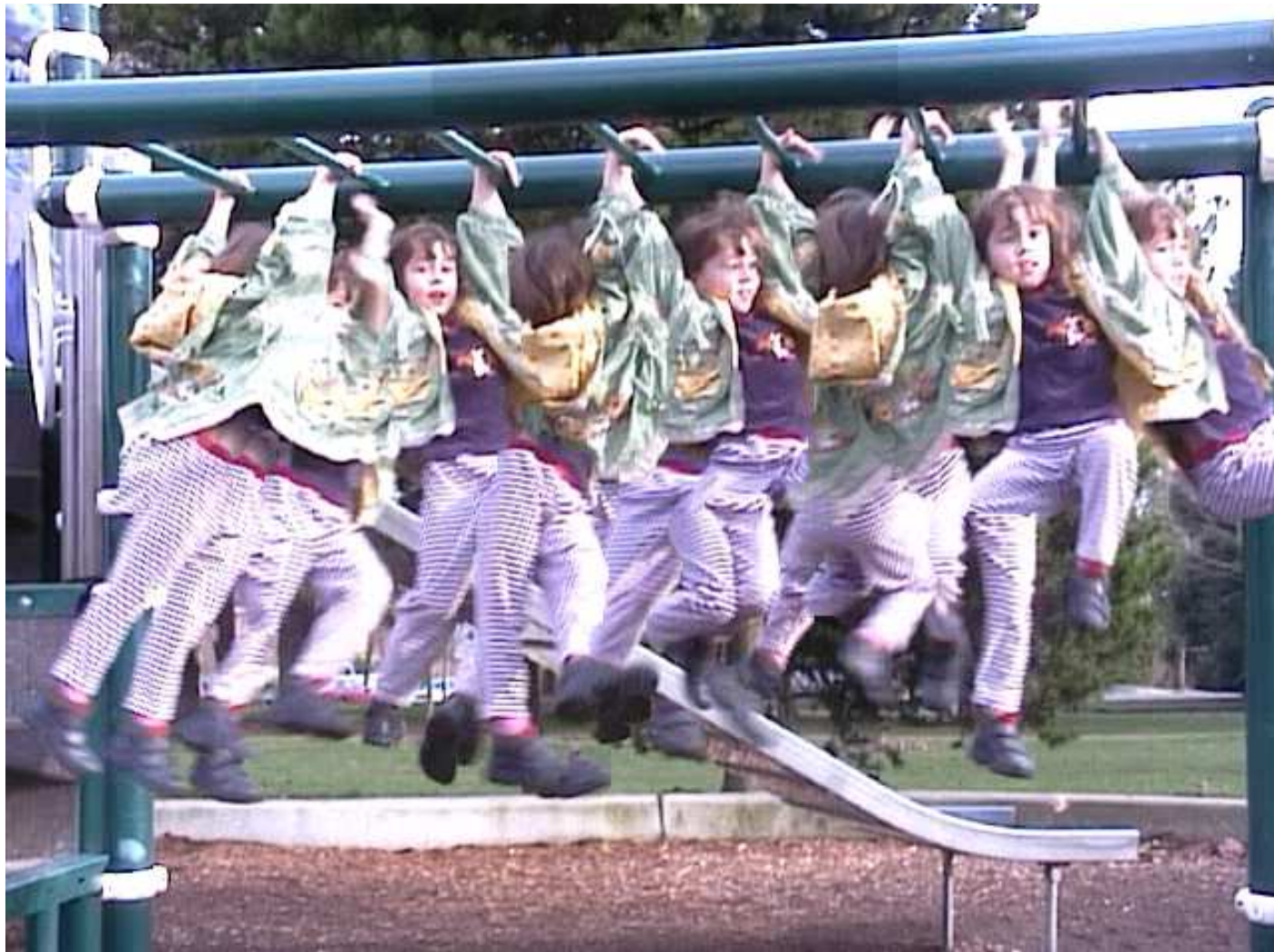
Cohen

Muybridge

Turning a video…

…into a still, like this….

…or this,

or a single scanline over time.

Question

- If I gave each of you a state-of-the-art digital camera and sent you outside for an hour, do you think you could come back with a professional looking photograph?

- If I gave each of you a state-of-the-art digital **video** camera and sent you outside for an hour, do you think you could come back with a professional looking video?

Photos vs. Video

- Video is "harder" than photos
  - Hypothesis: Photos require imagination from viewer, videos do not
- Cliplets also spark user imagination
  - Same way, different way?
  - an unstudied type of media
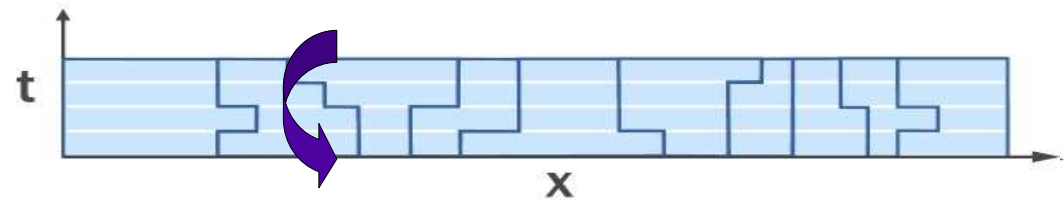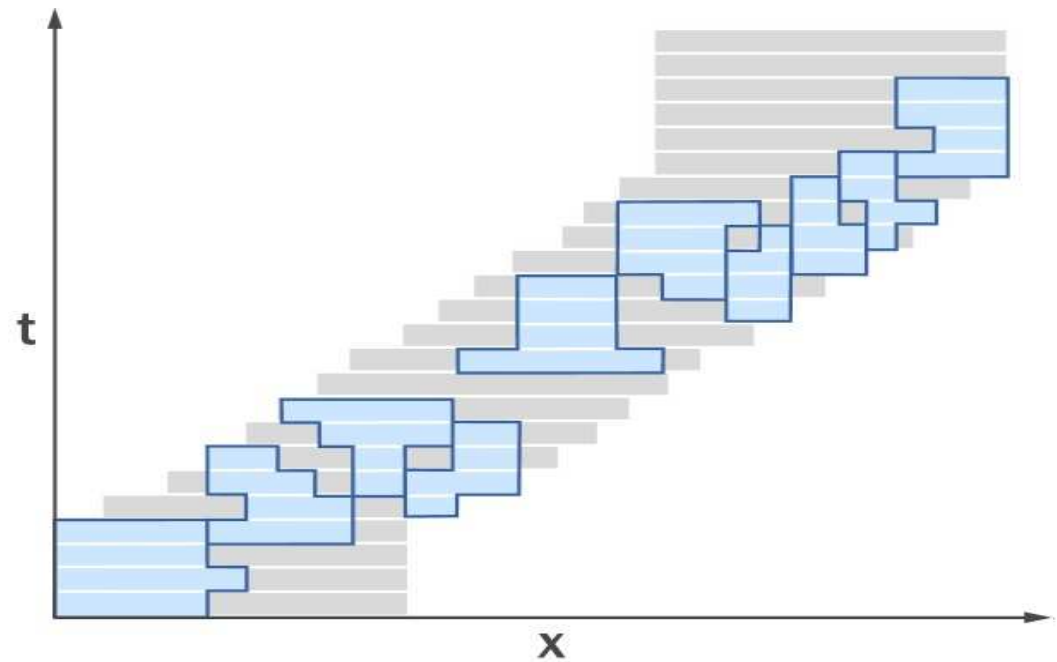
Cliplets

Cliplets

Cliplets

Cliplets

- Raw Capture is easy
- Editing?
  - Cropping in space and time
  - Ease in, ease out
  - (needs high frame rate)
- Viewer?
  - Hold, play, hold?
  - Thumbnails?
  - Sound?
- Integration of stills, cliplets

Video Cutout

Video - Panorama

Photorealism

In an interview Estes observed, "When you look at a scene or an object you tend to scan it. Your eye travels around and over things. As your eyes move the vanishing point moves, to have one vanishing point or perfect camera perspective is not realistic."

"The reason I take a lot of photographs is to make up for the fact that one photograph really doesn't give me all the information I need. Also, the camera is like one eye and it really deals only with values. And painting is trickery, because you "can make people respond by guiding their eyes around the picture. The photograph doesn't do that because a camera doesn't have ideas. It can only reproduce, so you have to use a lot of trickery."

Richard Estes

Photorealism

Photorealism

Photorealism

Ralph Goings

Photorealism

Michael Cohen

Photorealism

- ## What I want
  - (Semi)Interactive multi-perspective stitcher
  - Material enhancer
    - Knows what idealized glass, leather, metal looks like
    - Knows how to fix my photos this way

Why (not) Moments?

L. A. Times

"Cover: Photo illustration by Michael Elins
... head shot by Marc Bryan-Brown."

(Re) Capturing the Moment

- Moments: the real goal of photography?
- New Tools: computer+camera
- Cliplets:
  - A new media type?
  - Needs study, support