

# USTH MM2.1

## Soft. Eng. for Interactive Media

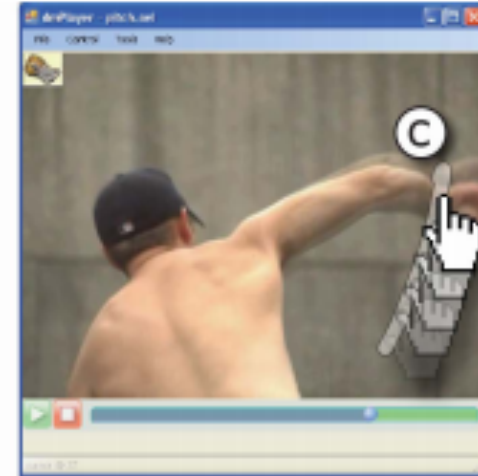


Reading Assignment #1:  
Video Browsing by Direct Manipulation  
ĐOÀN Tiến Tài & ĐOÀN Thị Phương Thùy

# What is Direct Manipulation?

- An approach for seeking video content which **focuses on objects movement** rather than on time (frames) axis like classical methods.

# Example



## Classical seeking

- Drag the seeking-bar
- Time oriented

## Direct manipulation

- Drag objects
- Content oriented

# How to make it?

- **Creating motion path**
  - A trajectory corresponding to the motion of a region
- **Dragging**
  - Providing the best experience for user when dragging

# What are the problems?

- Motion paths
  - How can we map any points in any video frame to a curve representing its trajectory over time?

# Solutions

- **Manual Annotation:**
  - Good performance on specific videos
  - Not general
- **Metadata Extraction**
  - MPEG contains motion information for decoding
  - Not very reliable
- **Automatic Estimation**
  - Video processing and computer vision techniques
  - Acceptable accuracy

# What are the problems?

## Dragging:

- a. Multi-scale
- b. Arc-length continuity
- c. Directional continuity

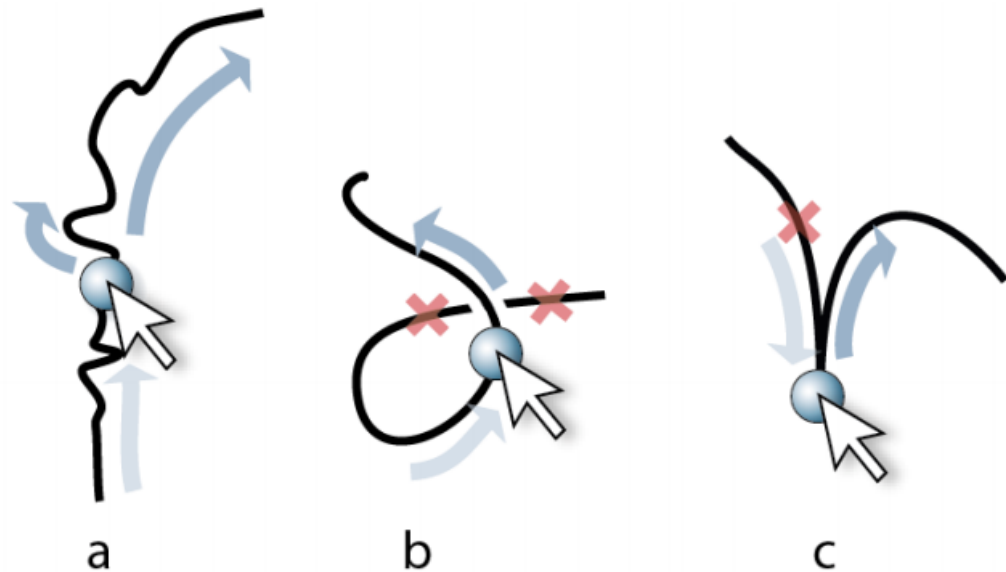
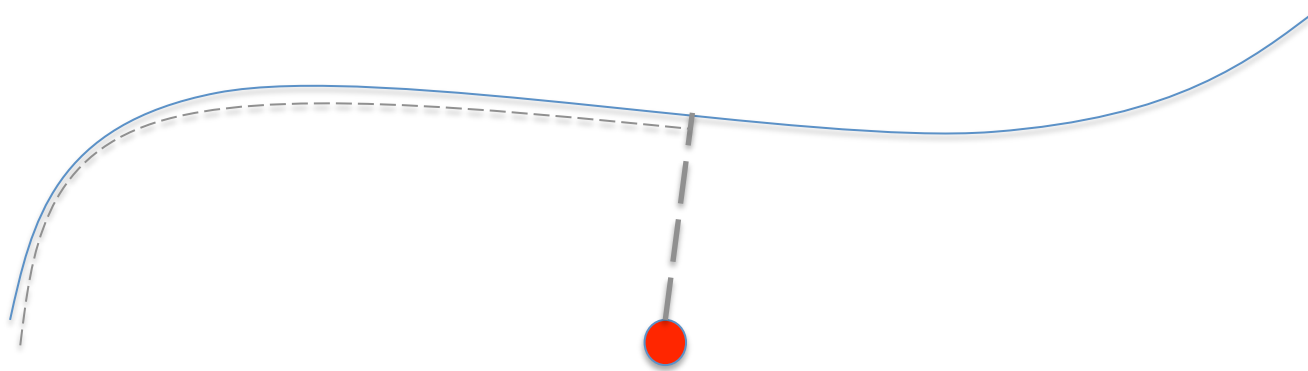


Figure 6: Three requirements for a curvilinear dragging technique: multi-scale navigation (a), arc-length continuity (b) and directional continuity (c).

# Solutions

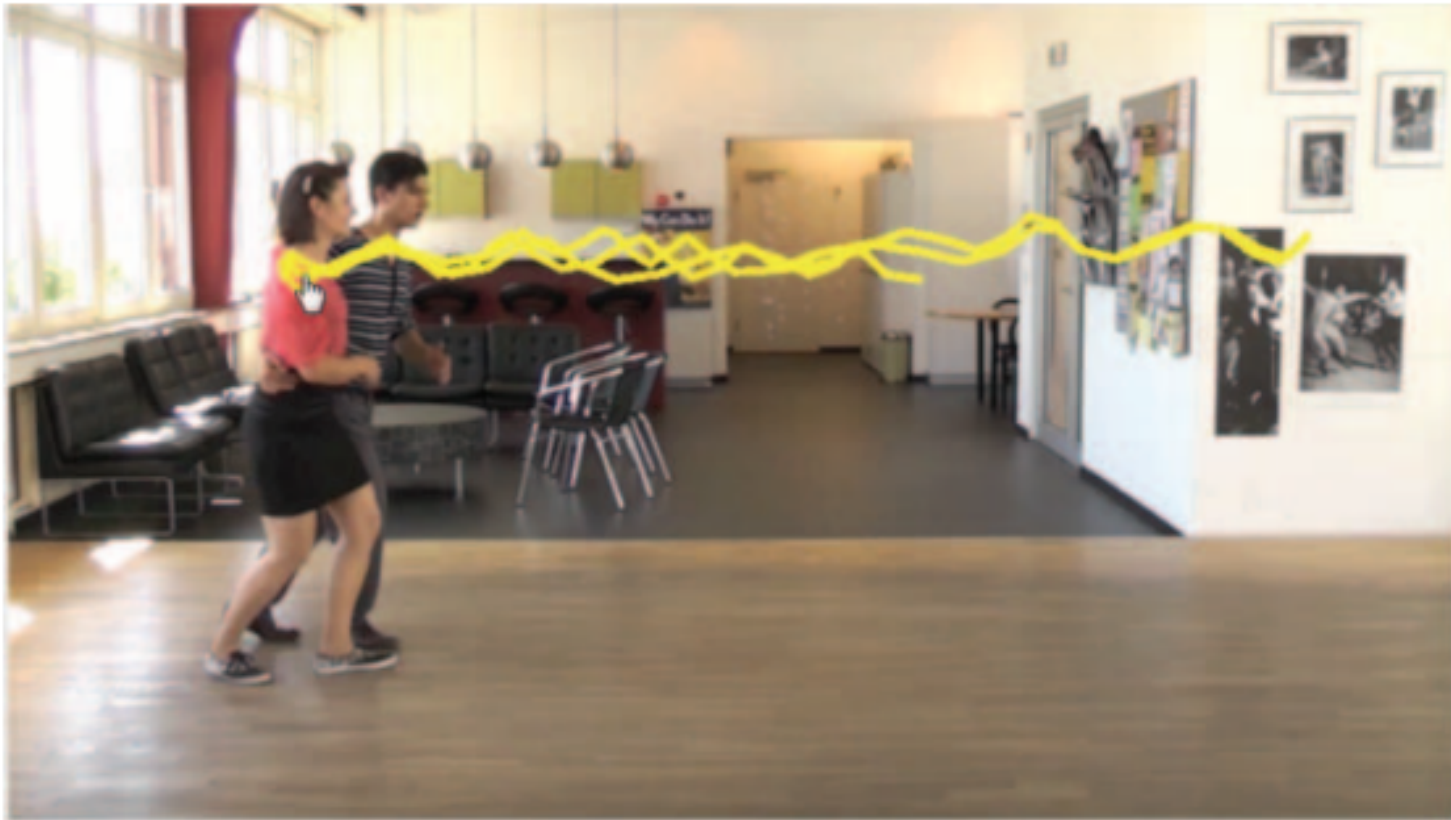
- Combining **Closest Point** approach and **3D Distance** method





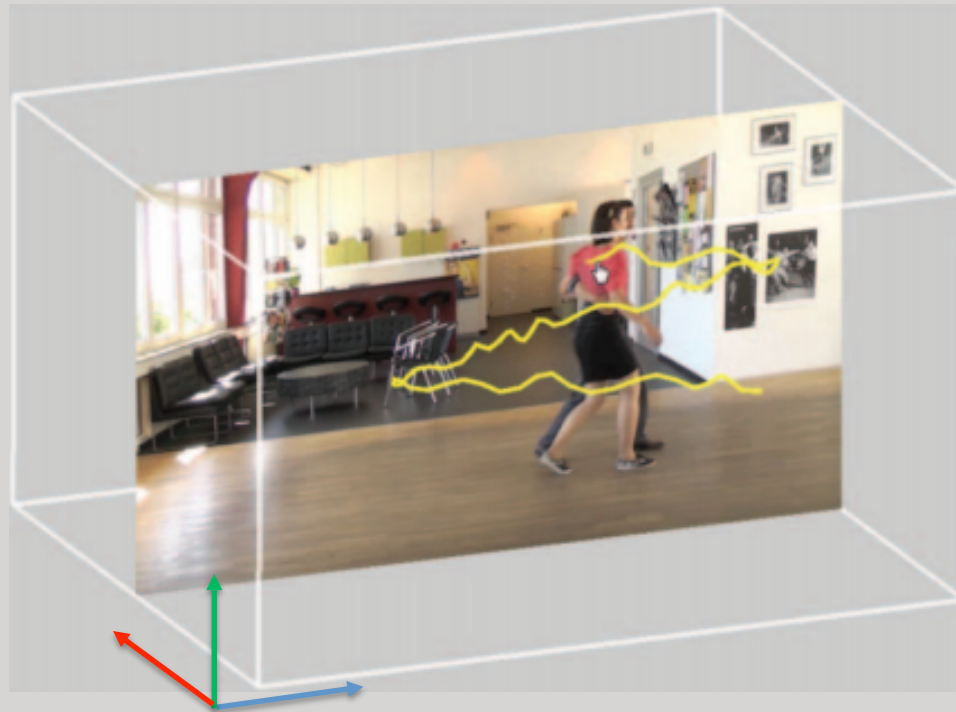
# 3D Video Navigation

- In cases that motion path is recursive



# 3D Video Navigation

- Solution: add one more direction of time



But do you want to watch a video this way?

- Improvement: semi-transparent frame



# Results

- The user performance in locating frames of interest in videos with the 2D and 3D DMVN system.
- The navigation time is measured in seconds and the navigation accuracy is measured in frames.

	Time: mean	Time: std	Accuracy: mean	Accuracy: std
2D	32.24	6.19	74.65	25.52
3D	17.87	8.08	2.83	2.58

# How does it relate to MM2.1 ?

- The goal of Interactive Media (IM)
  - Improve user interface
  - Enhance user experience (less effort for a task)
- Direct video manipulation
  - Make the seeking task more natural
  - Improve the UI, the task is even more simple