

Continuous gesture control of audio and visual media

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Motivations - Context

- Expressive gestural control of digital media
 - ▶ Embodiment in music
 - ▶ Musical Expression (NIME)
- Applications in music and performing arts
 - ▶ Artistic and pedagogical applications
 - ▶ New interfaces (cell phone, Wii, etc)
- from « triggering » to « following »
 - ▶ push the button
 - ▶ lead the electronic music

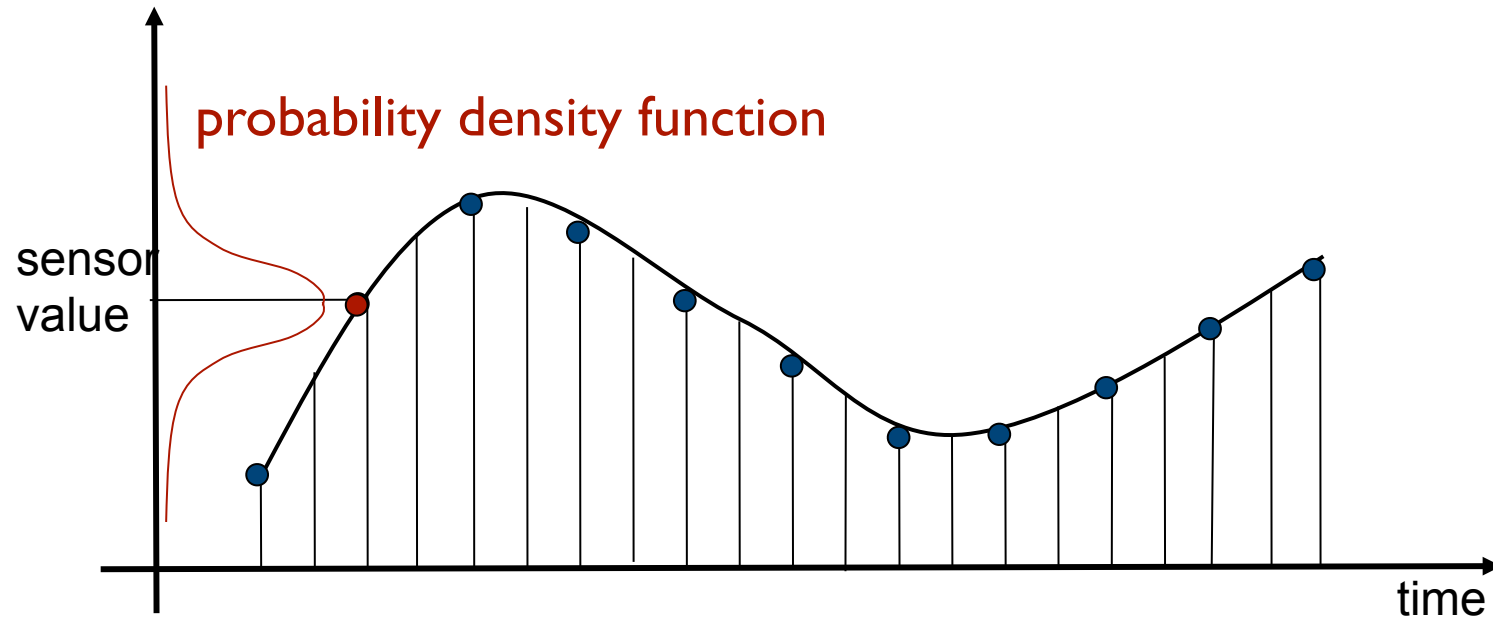
Goals

- Hyp: Gesture « *meaning* » is in *temporal* evolutions
- Real-time gesture analysis :
 - ▶ *gesture following*: **time progression** of the performed gesture
 - ▶ *recognition/characterization*: **similarity** of the performed gesture to prerecorded gestures
- Requirements
 - ▶ simple learning procedure, with a single example
 - ▶ adaptation to the user idiosyncrasies
 - ▶ continuous analysis from the beginning of the gestures

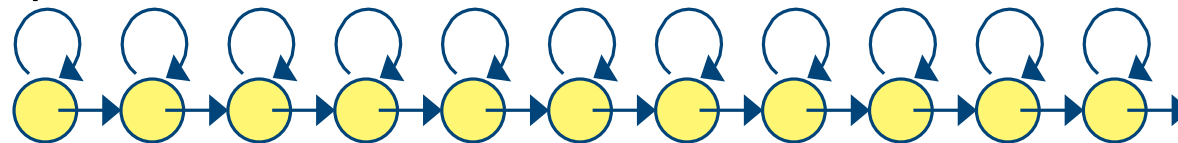
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- Demo max

Time Profile Modeling: HMM

Markov Models



transition probabilities



Markov Chains

Gesture ?

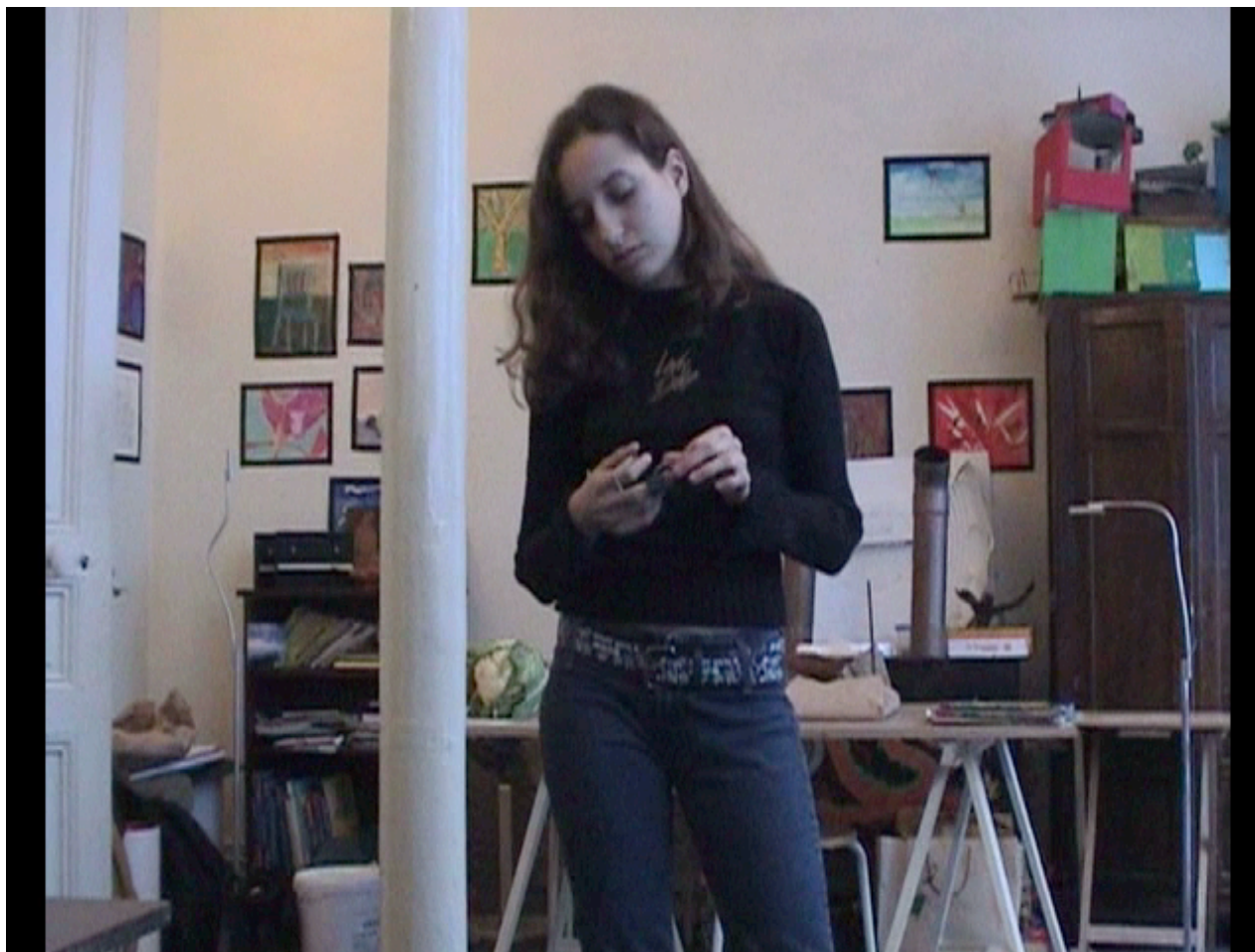
- Any datastream of continuous parameters
- typically 0.1 to 1000 Hz
- from motion capture systems:
 - ▶ image descriptors
 - ▶ accelerometers, gyroscope, magnetometers
- from sound descriptors
 - ▶ pitch, loudness
 - ▶ mfccs, ...
- multimodal data

Music Pedagogy Applications

- Continuous control of audio

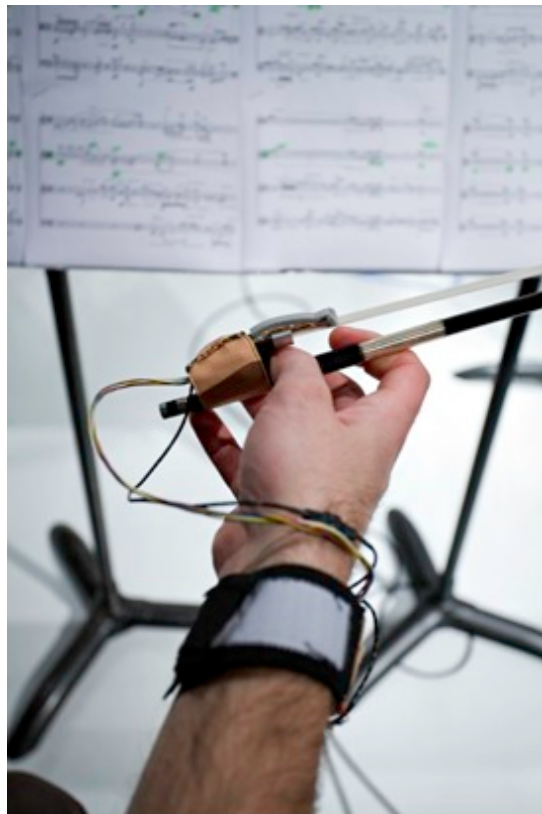


Music Pedagogy Applications



Artistic Applications

augmented string quartet
(StreicherKreis - Florence Baschet)



mention: Kleinferrn@france.com



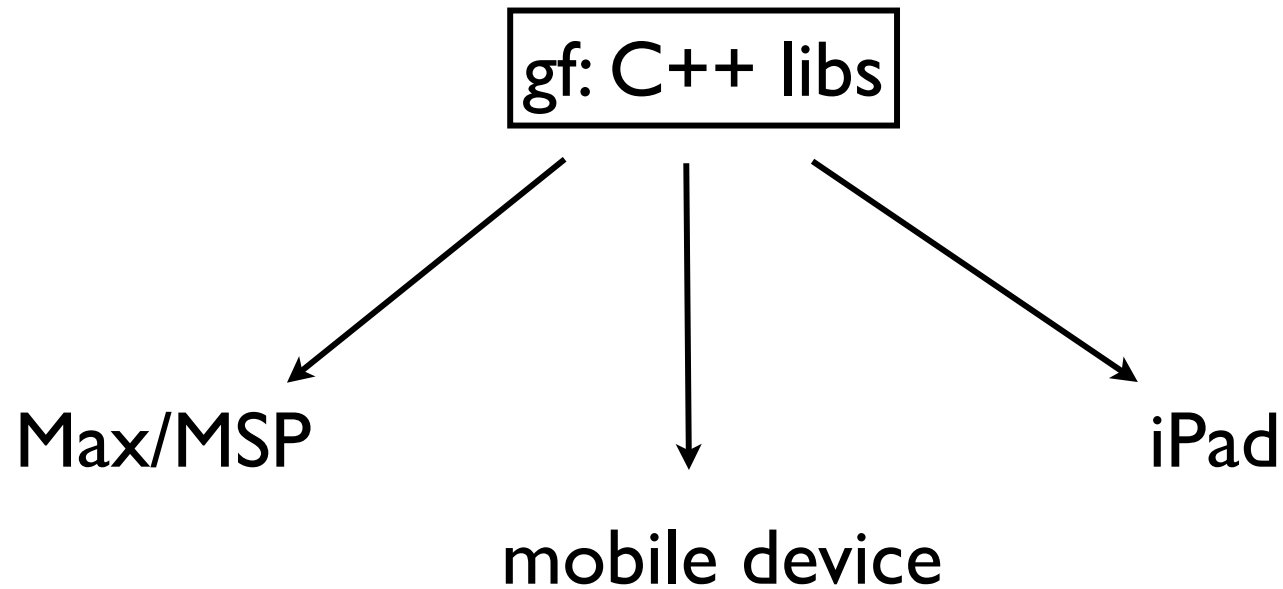
mention: Kleinferrn@france.com

Artistic Applications

- Dance performance - Continuous control of video



Implementation



+ **FTMCo and Mubu Library** : real time control of multimodal data and sound synthesis.

Conclusions

- Reliable system for realtime
 - ▶ continuous time warping (time progression)
 - ▶ time profile characterization based on comparison with examples, recognition possible
- Successfully implemented in artistic and pedagogical applications in performing arts
- Current work:
 - ▶ anticipation, prediction
 - ▶ adaptive system
- Demos at Barcamp

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