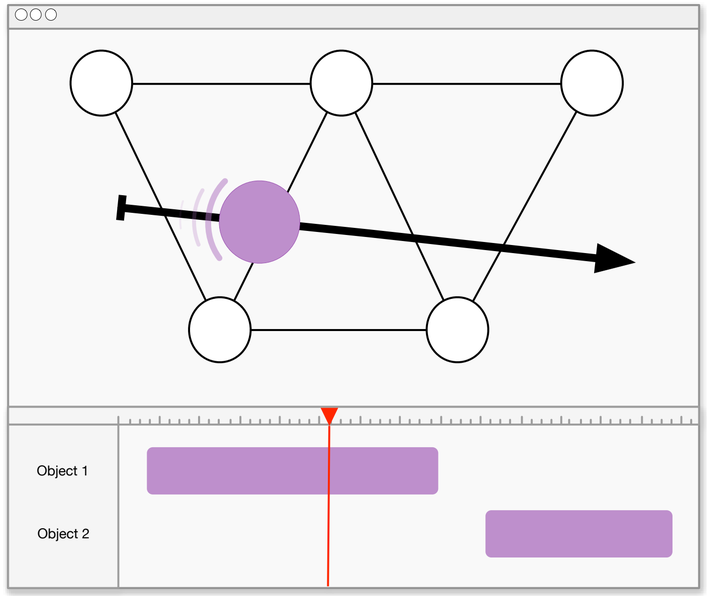
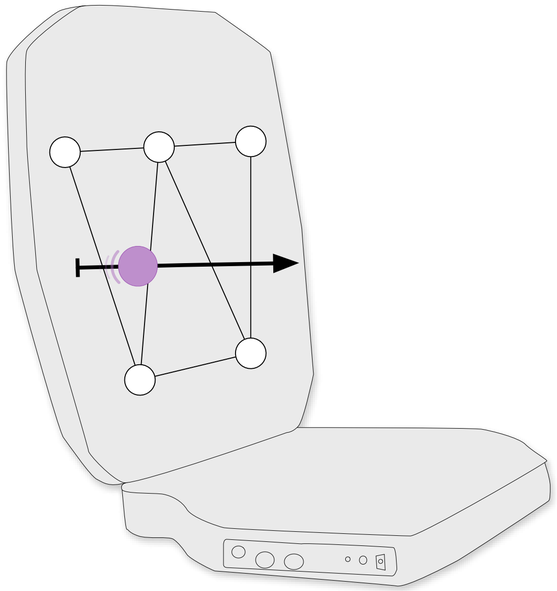
Tactile Animation by Direct Manipulation of Grid Displays





Oliver S. Schneider, Ali Israr, Karon E. MacLean

http://oliverschneider.ca/tactile-animation

Disney Research

UBC

Newell Ave
0.6mi
Then
3 min
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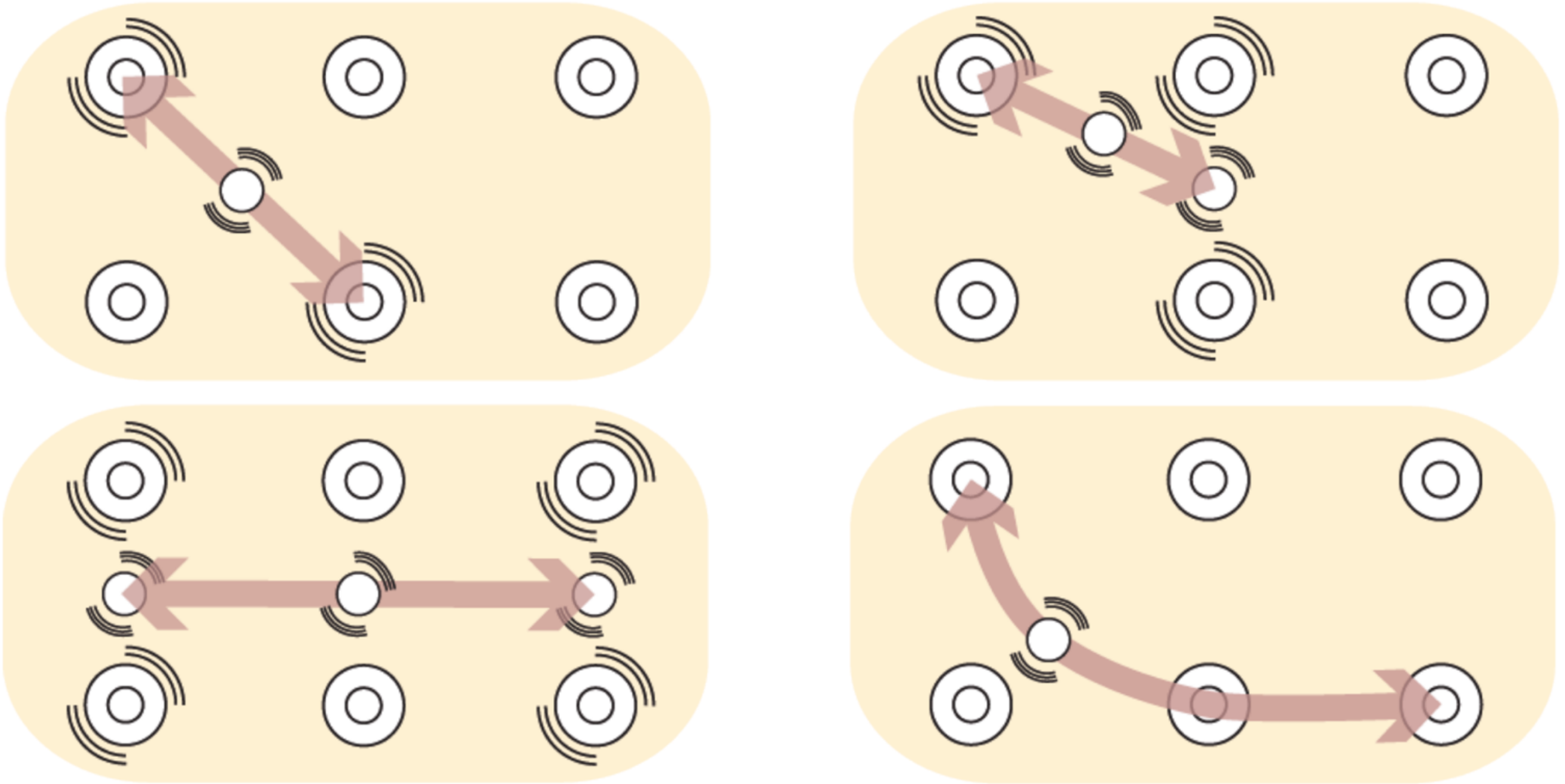
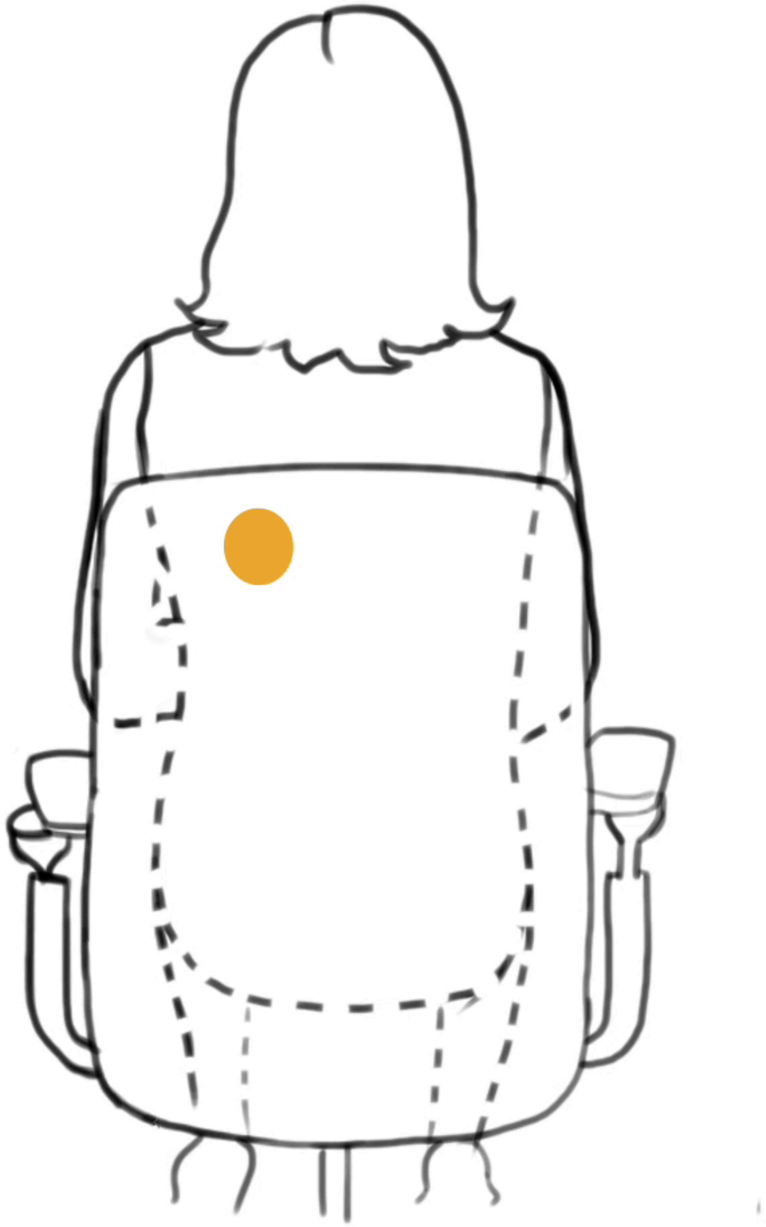
HaptiMoto
Prasad et al 2014

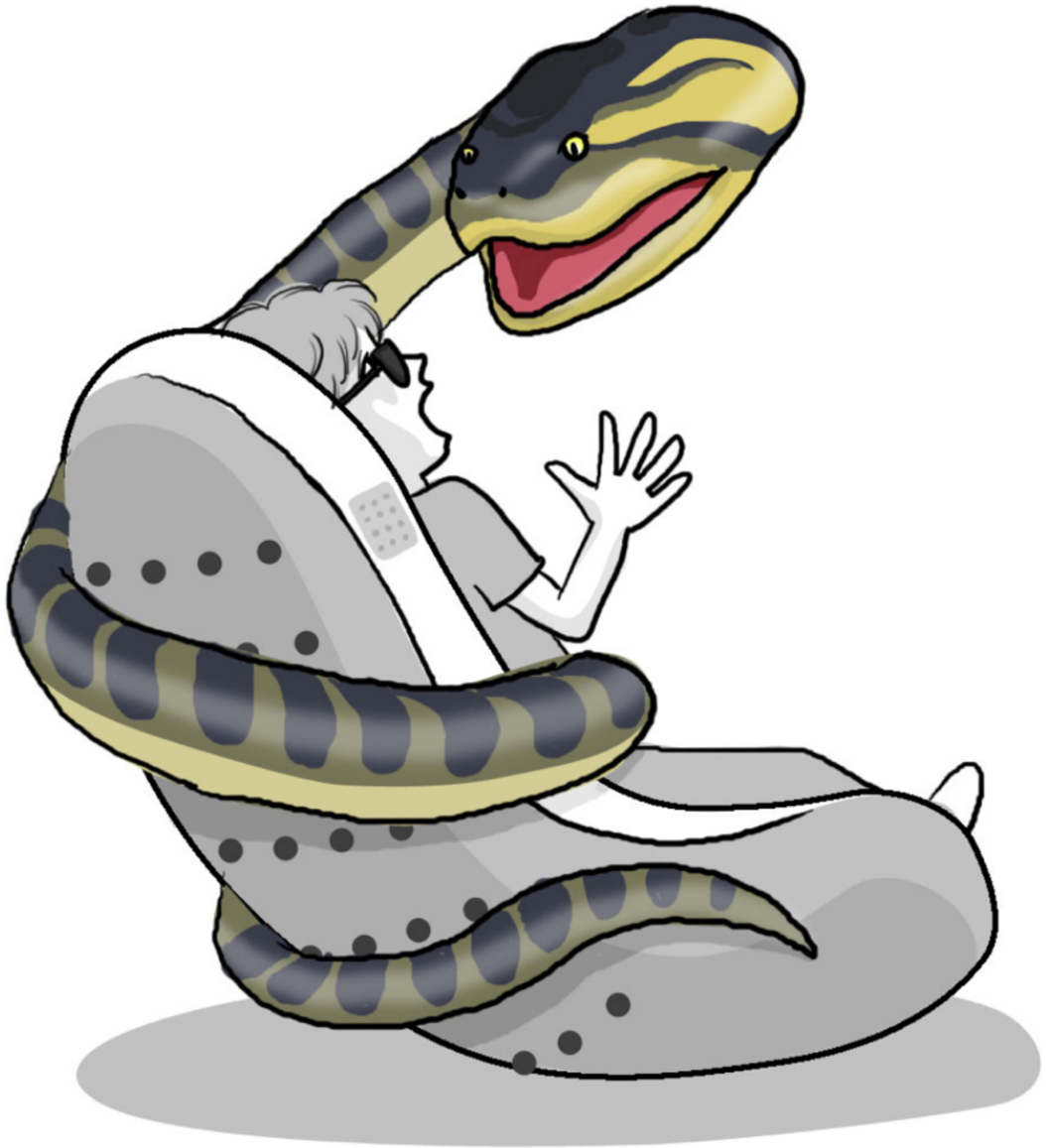
Tactile Brush
Israr et al 2011

Tactile Brush
Israr et al 2011



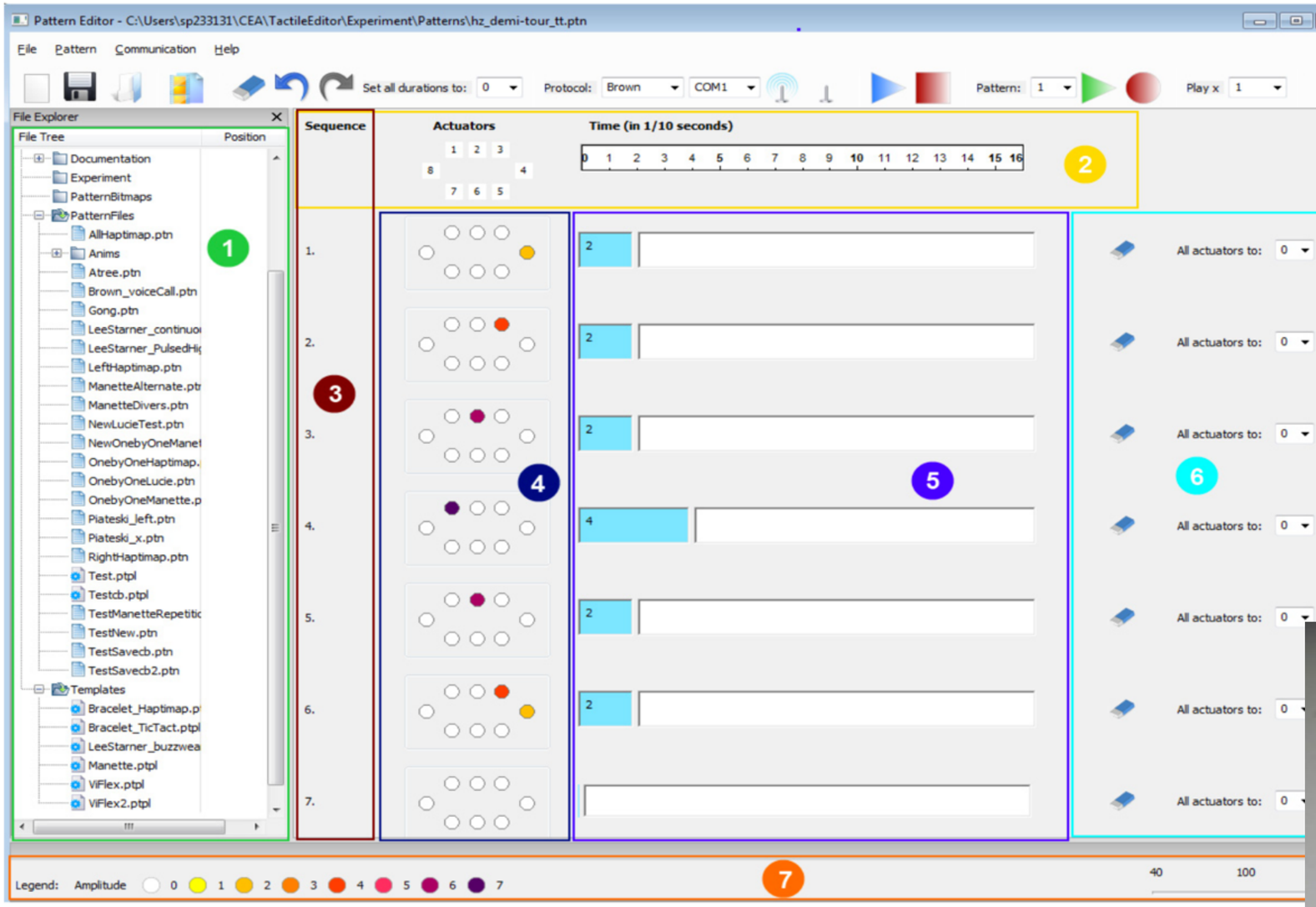
FeelCraft
Schneider et al 2014

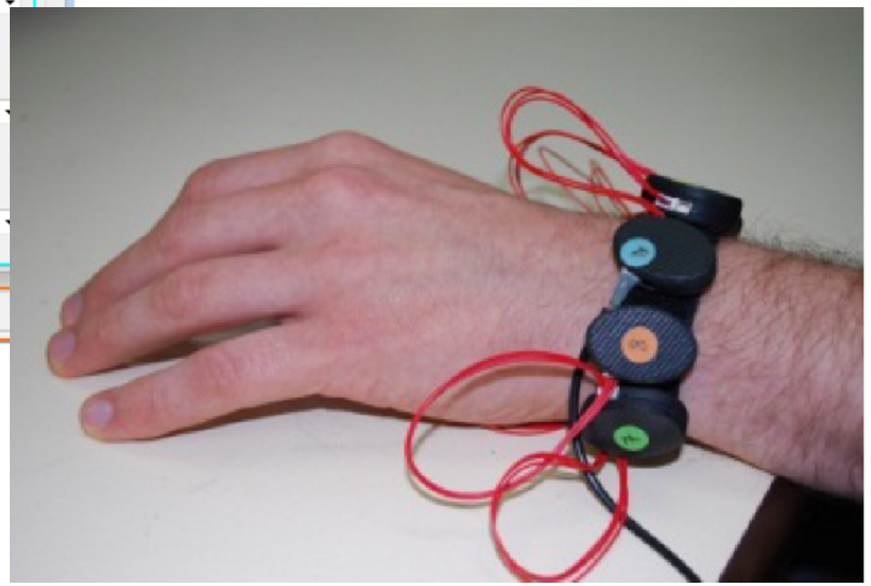


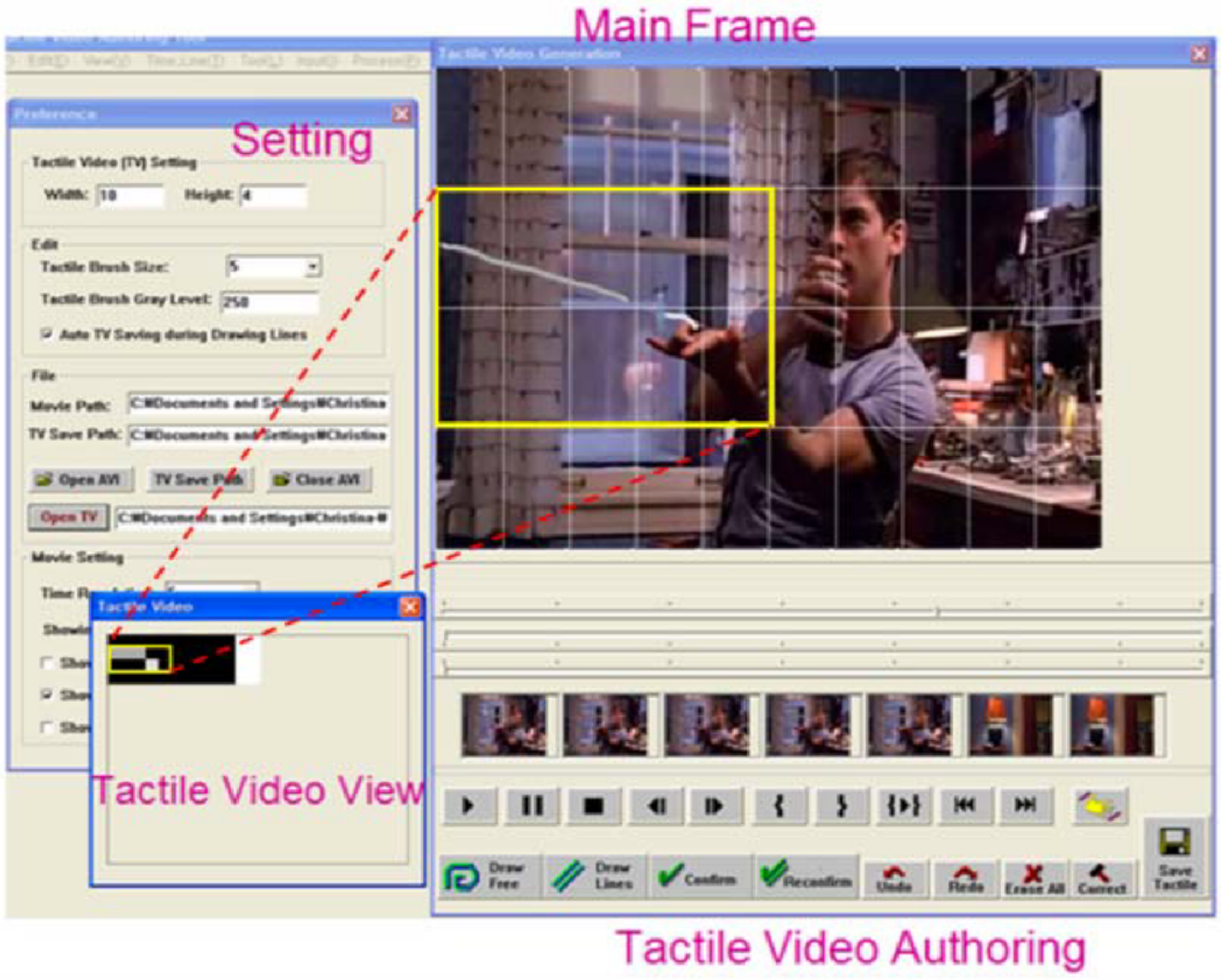


Surround Haptics
Israr & Poupyrev 2010

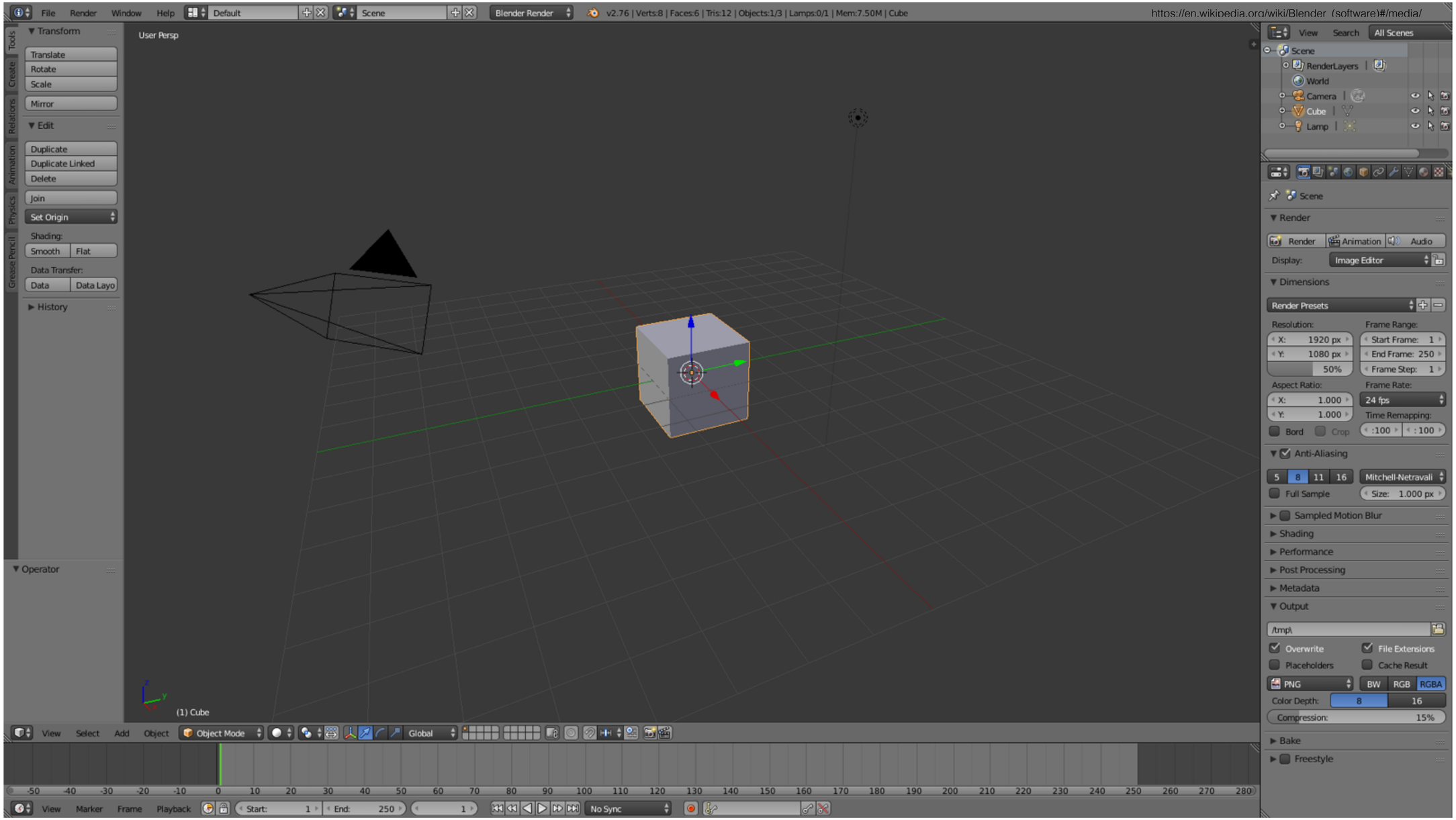
TactiPEd
Paneels et al 2013







Tactile Movies
Kim et al 2009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Transform
Translate
Rotate
Scale
Mirror
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Duplicate
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Set Origin
Shading:
Smooth Flat
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(1) Cube
View Search All Scenes
Scene
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World
Camera
Cube
Lamp
Render
Render Animation Audio
Display: Image Editor
Dimensions
Render Presets
Resolution:
X: 1920 px
Y: 1080 px
50%
Frame Range:
Start Frame: 1
End Frame: 250
Frame Step: 1
Aspect Ratio:
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Y: 1.000
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Time Remapping:
Bord Crop
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Sampled Motion Blur
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Output
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Placeholders
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Bake
Freestyle
View Select Add Object Object Mode Global
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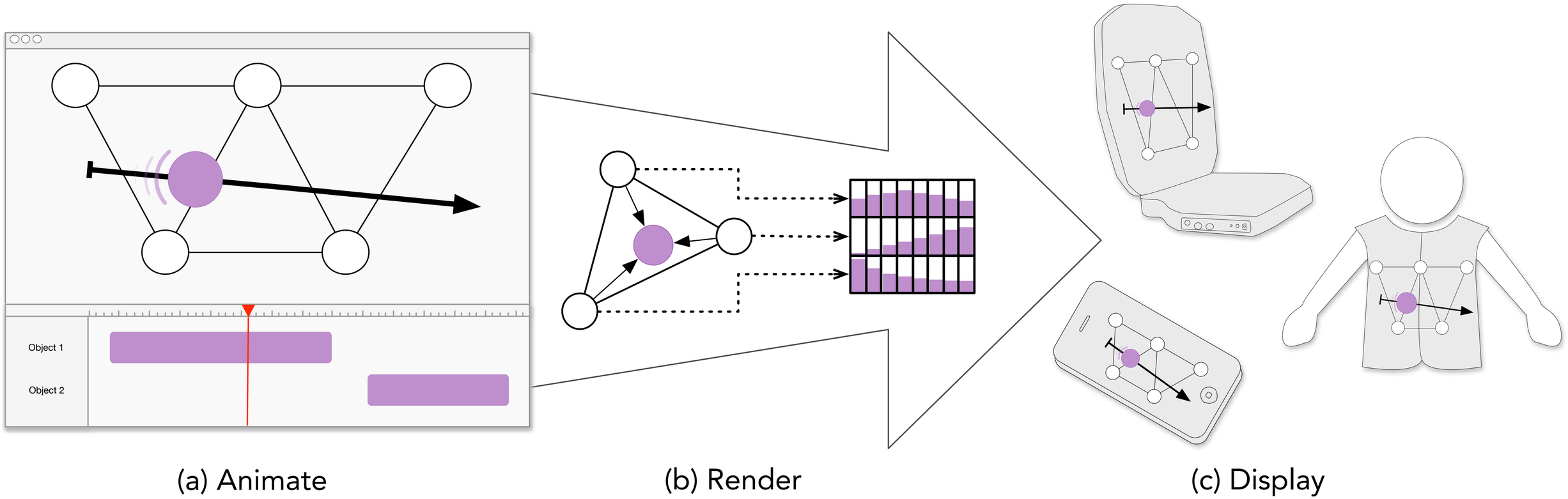
Agenda

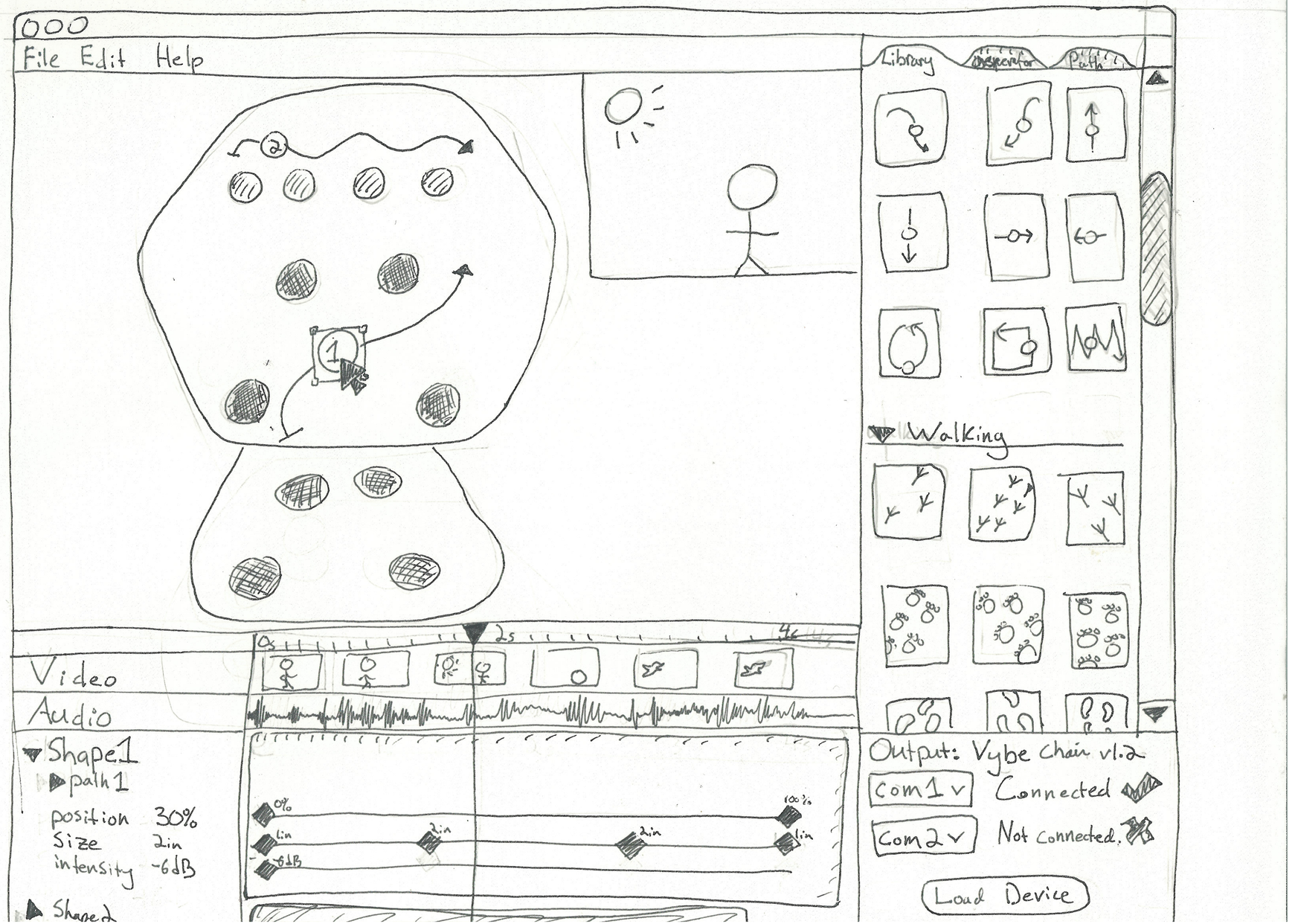
1. Motivation
2. **Tactile Animation**
3. Evaluation
4. Applications

Tactile Animation



(a) Animate (b) Render (c) Display

HAI4 - DC1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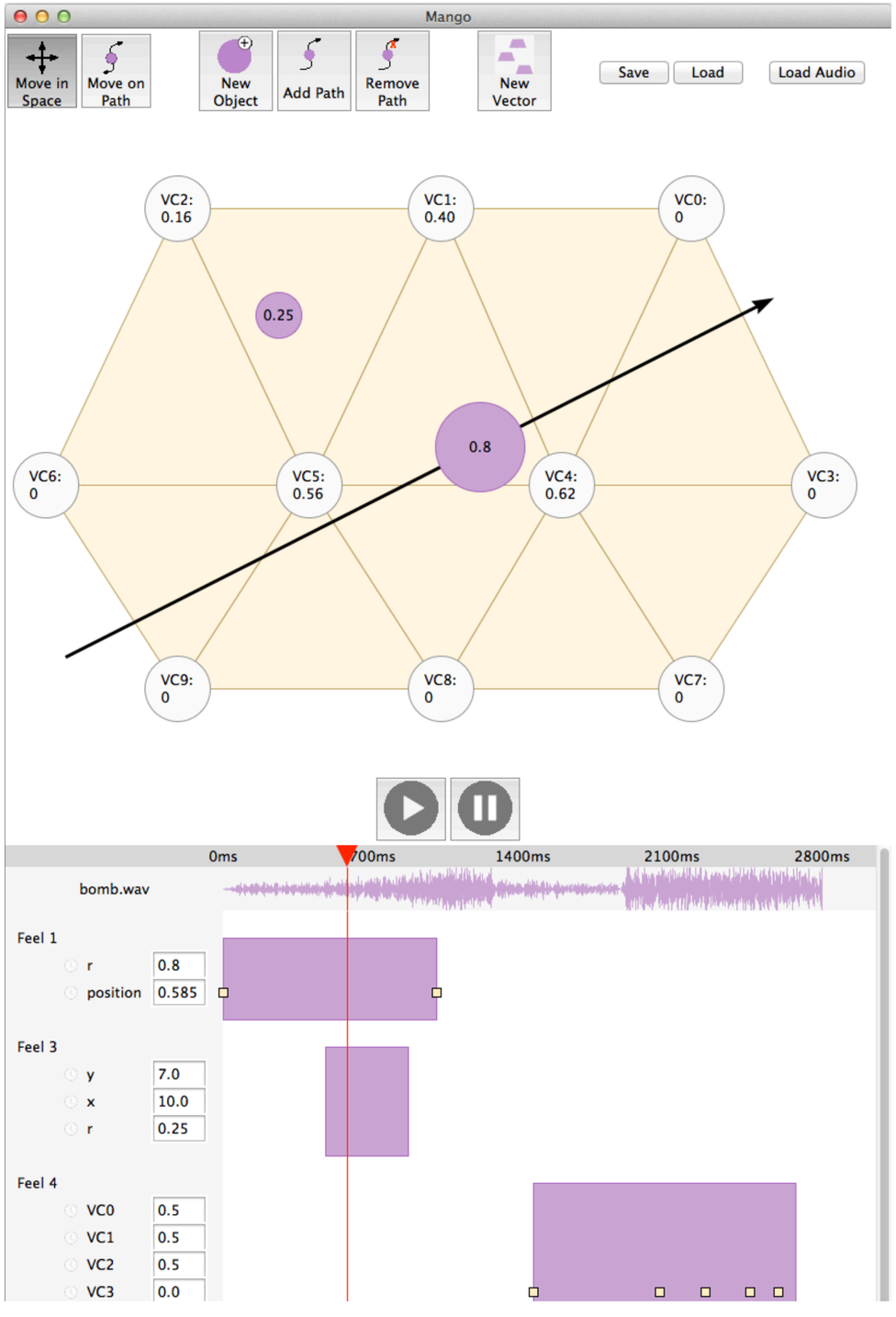
Size 2in
intensity -6dB
Shape2
Output: Vybe Chair v1.2
com1 Connected
com2 Not connected.
Load Device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Move in Space
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New Object
Add Path
Remove Path
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Save
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Load Audio
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VC1: 0.40
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0.25
0.8
VC6: 0
VC5: 0.56
VC4: 0.62
VC3: 0
VC9: 0
VC8: 0
VC7: 0
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bomb.wav
Feel 1
r 0.8
position 0.585
Feel 3
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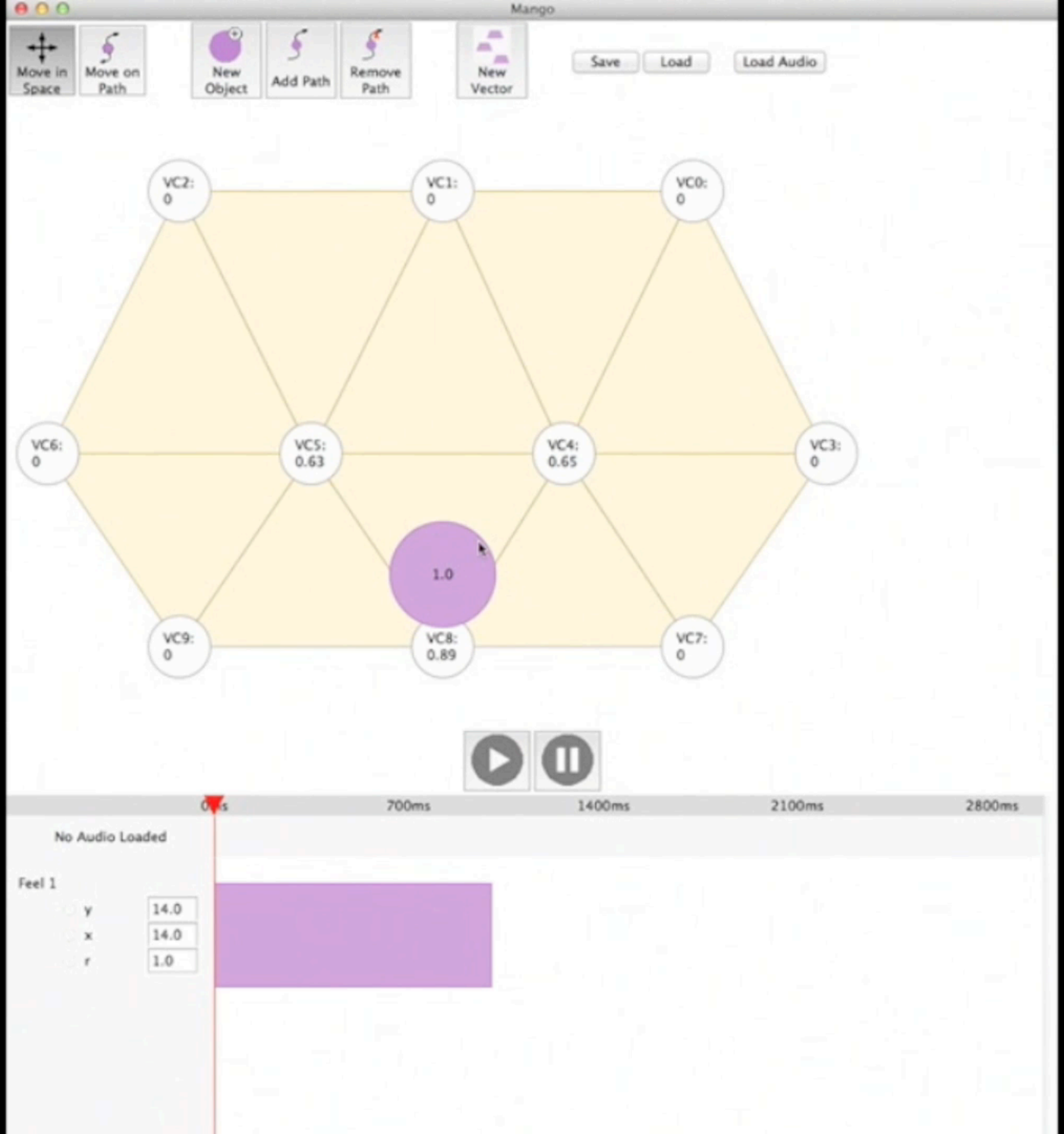
r 0.25
Feel 4
VC0 0.5
VC1 0.5
VC2 0.5
VC3 0.0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VC4: 0.65
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Feel 1
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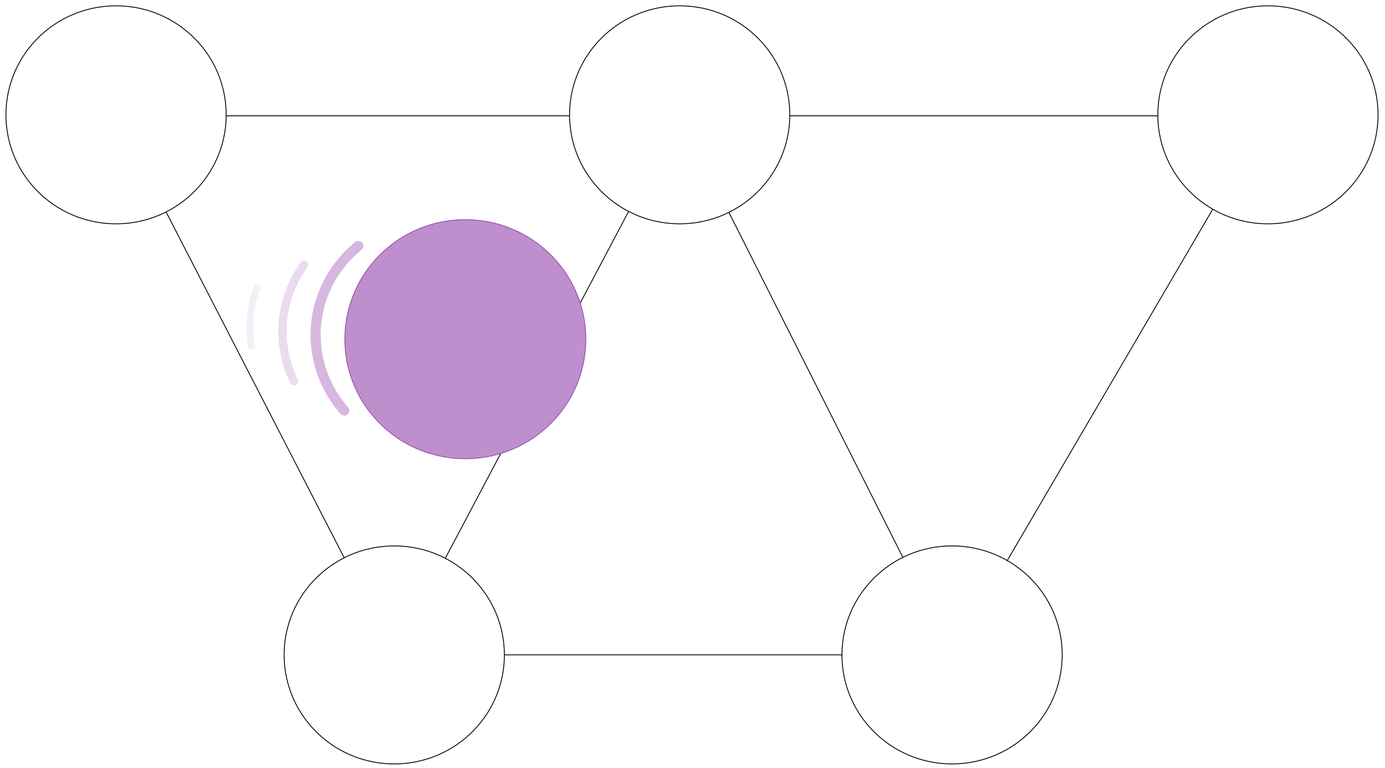
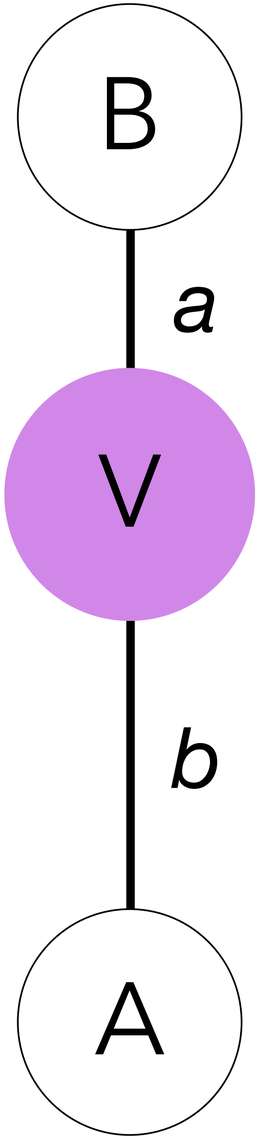
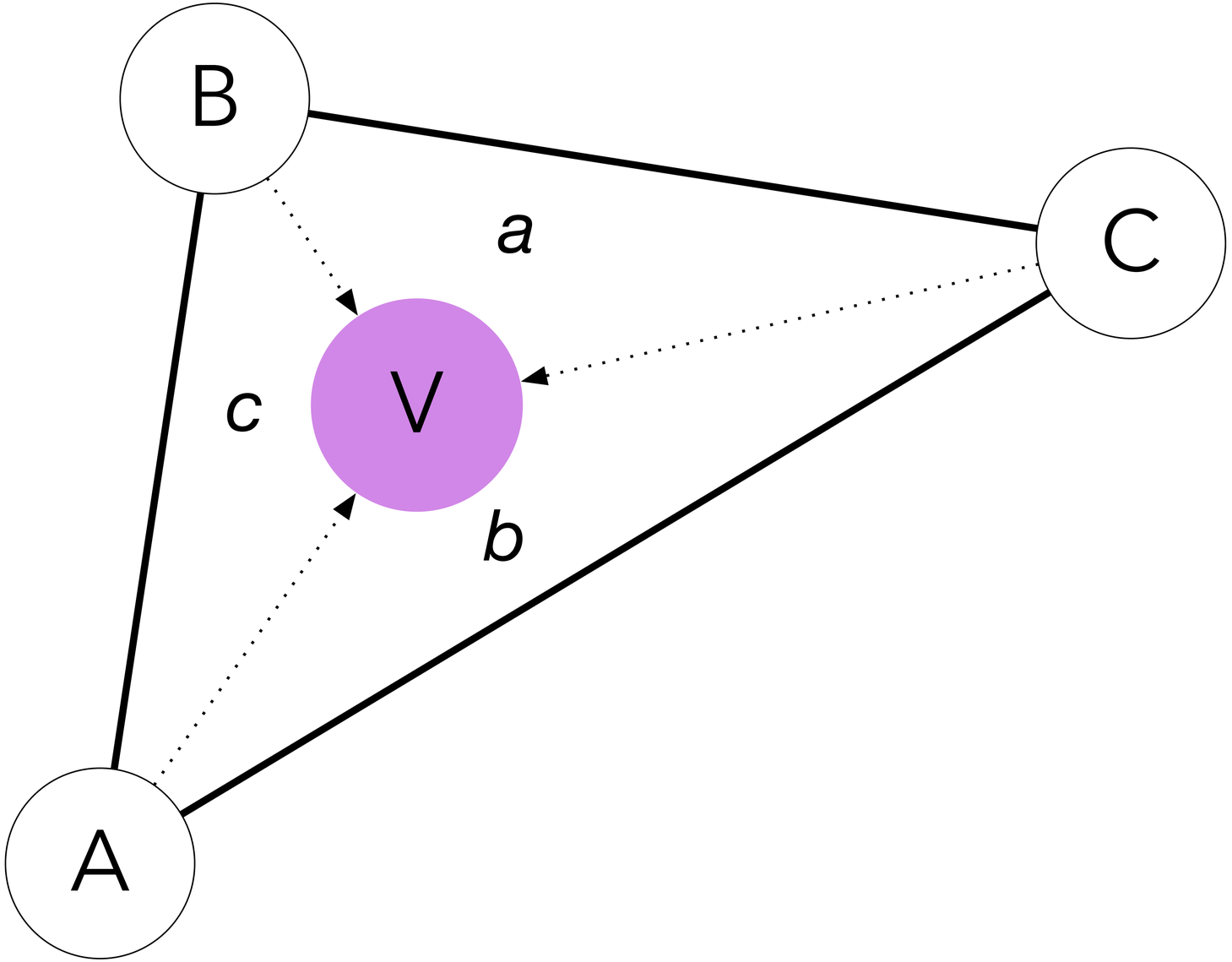
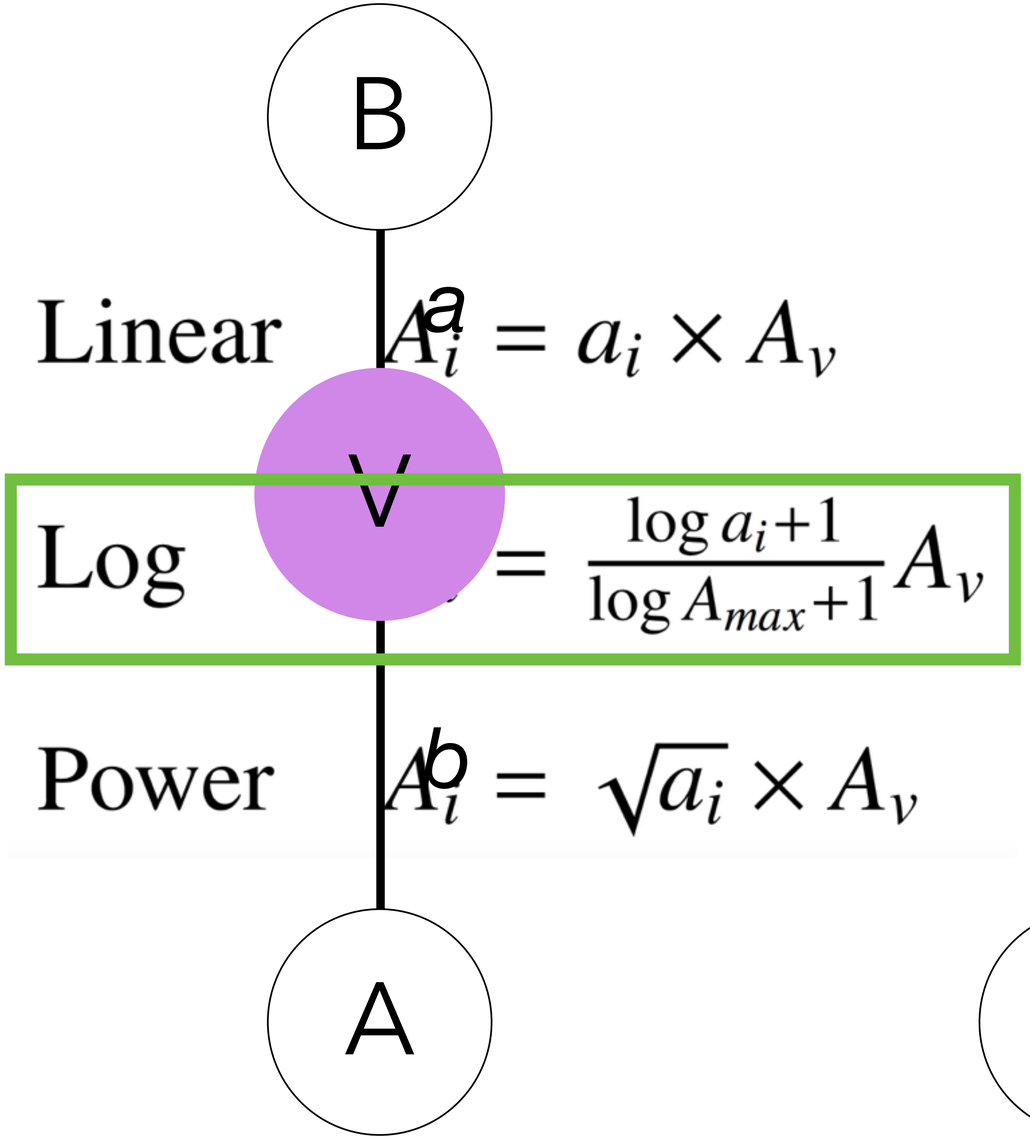
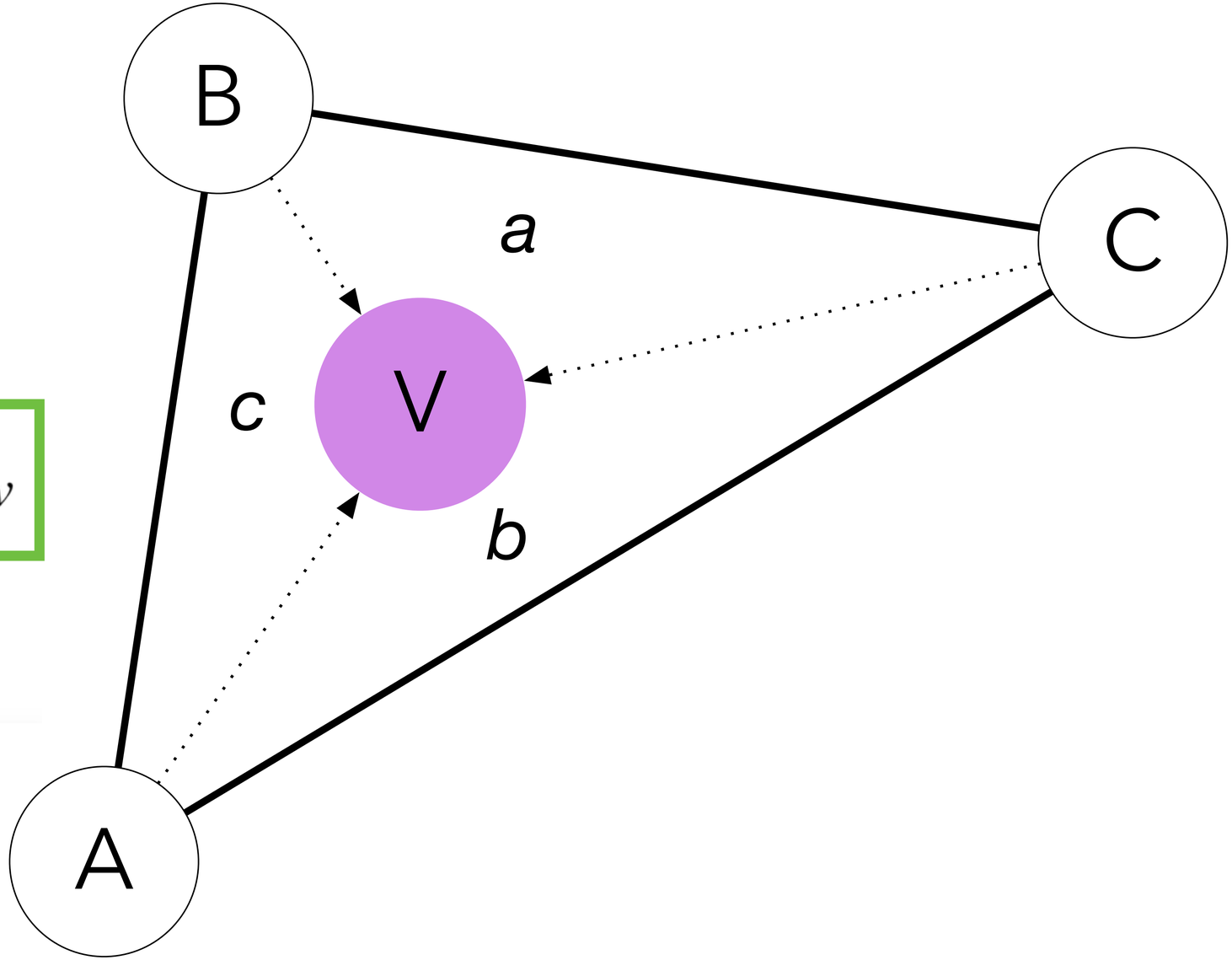



B
a
V
b
A


B
C
a
c
V
b
A


B
Linear
a
$A_i = a_i \times A_v$
V
Log
$= \frac{\log a_i + 1}{\log A_{max} + 1} A_v$
Power
b
$A_i = \sqrt{a_i} \times A_v$
A


B
C
a
c
V
b
A

Agenda

1. Motivation
2. Tactile Animation
3. **Evaluation**
4. Applications

Evaluation

- 6 participants (5 animators)
- 3 tasks:
  - “Heartbeat”
  - “Turn Left”
  - “Match Sound”

Animation Metaphor

All participants finished all training, tasks, and a post-interview in an hour.

“This is totally animation” (P2)

“It felt very much like an animation tool” (P4)

Animation Objects vs Vector Sensations

“After using the new object I’d probably never use vector again.” (P2)

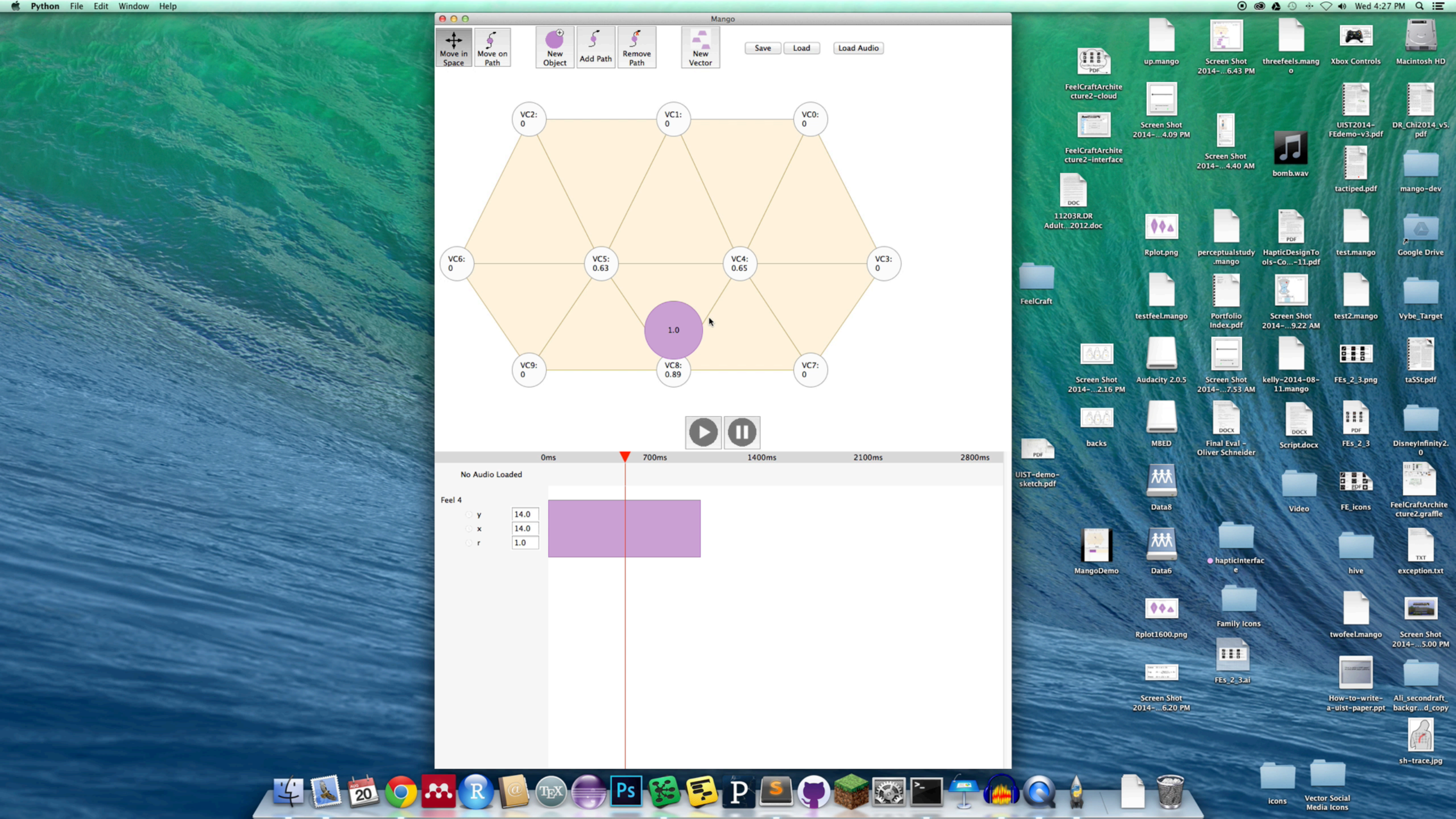
“If I weren’t an animator I think I would only use [animation objects].” (P4)

“You can control multiple [actuators] at the same time, so you don’t have to create new objects and then put them everywhere on the screen.” (P1)

Direct Manipulation

“I would …just play around with [the animation object] before creating the animation, as a way to pre-visualize what I was going to do.” (P5)

“I kind of play around with it, and randomly come up with the ideas.” (P6)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Mango
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Video
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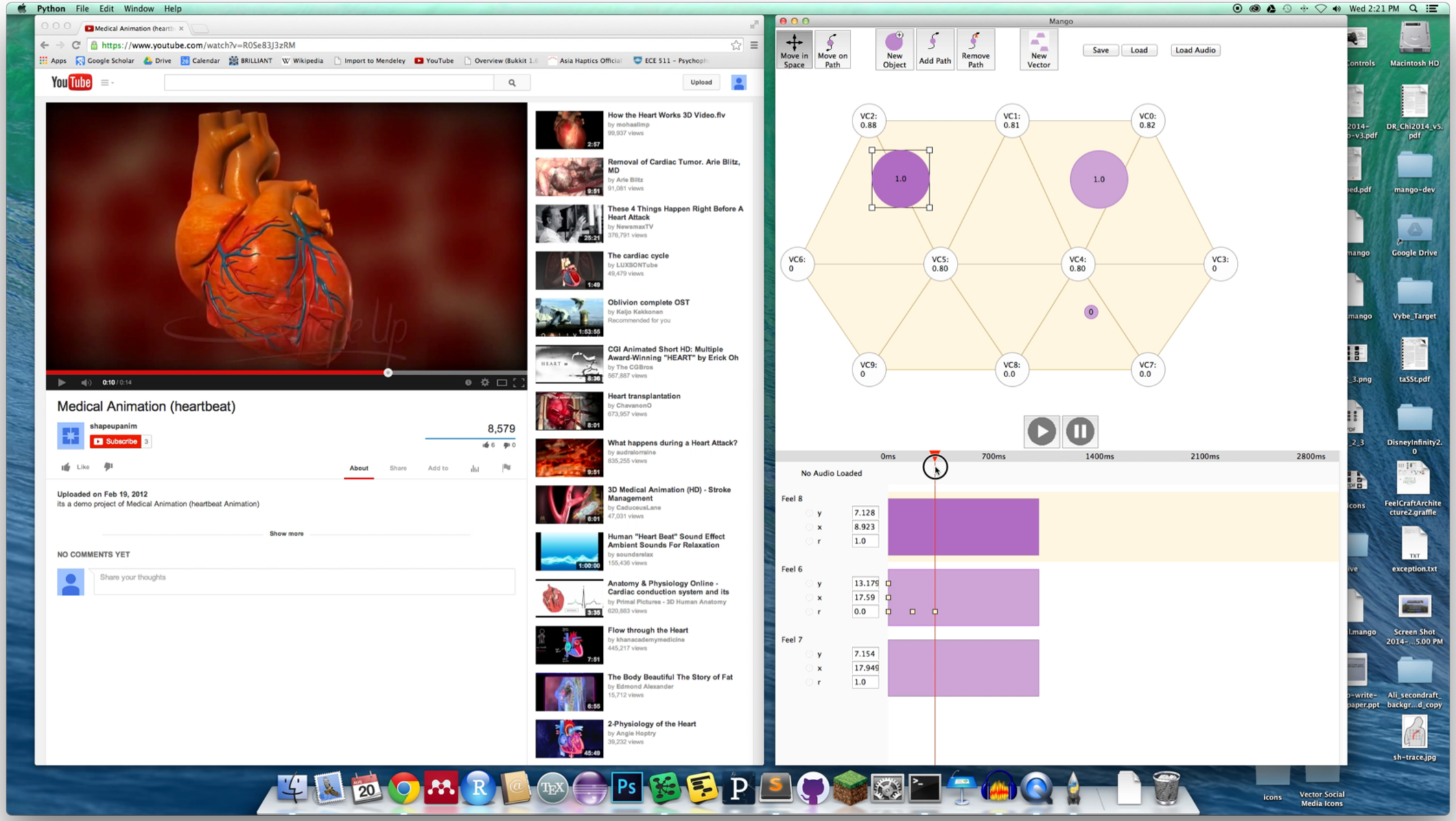
icons
Vector Social Media Icons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Medical Animation (heartbeat)
https://www.youtube.com/watch?v=R0Se83J3zRM
Upload
Medical Animation (heartbeat)
shapeupanim
Subscribe
8,579
Uploaded on Feb 19, 2012
its a demo project of Medical Animation (heartbeat Animation)
Show more
NO COMMENTS YET
Share your thoughts
How the Heart Works 3D Video.flv
Removal of Cardiac Tumor. Arie Blitz, MD
These 4 Things Happen Right Before A Heart Attack
The cardiac cycle
Oblivion complete OST
CGI Animated Short HD: Multiple Award-Winning "HEART" by Erick Oh
Heart transplantation
What happens during a Heart Attack?
3D Medical Animation (HD) - Stroke Management
Human "Heart Beat" Sound Effect Ambient Sounds For Relaxation
Anatomy & Physiology Online - Cardiac conduction system and its
Flow through the Heart
The Body Beautiful The Story of Fat
2-Physiology of the Heart
Mango
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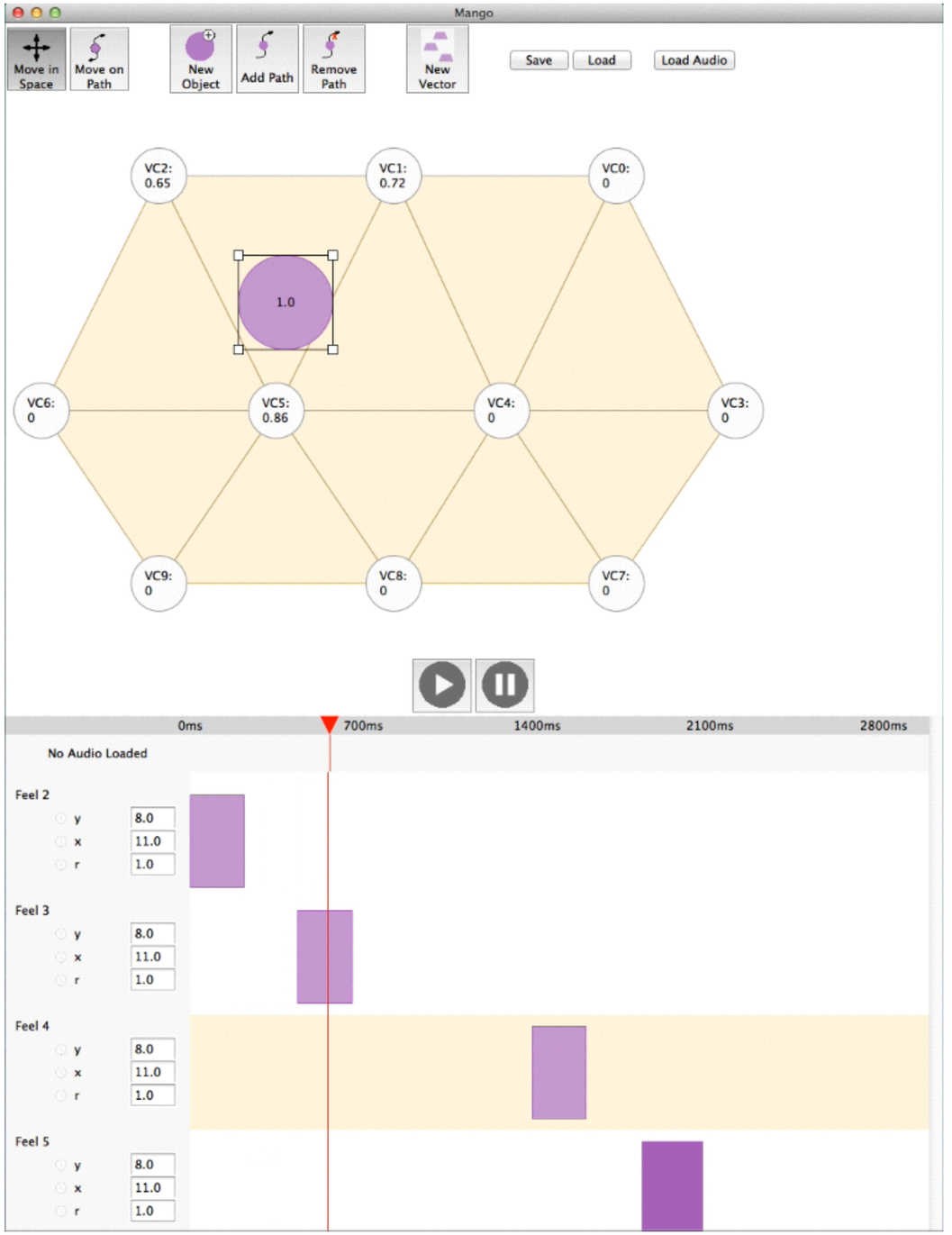
Vector Social Media Icons

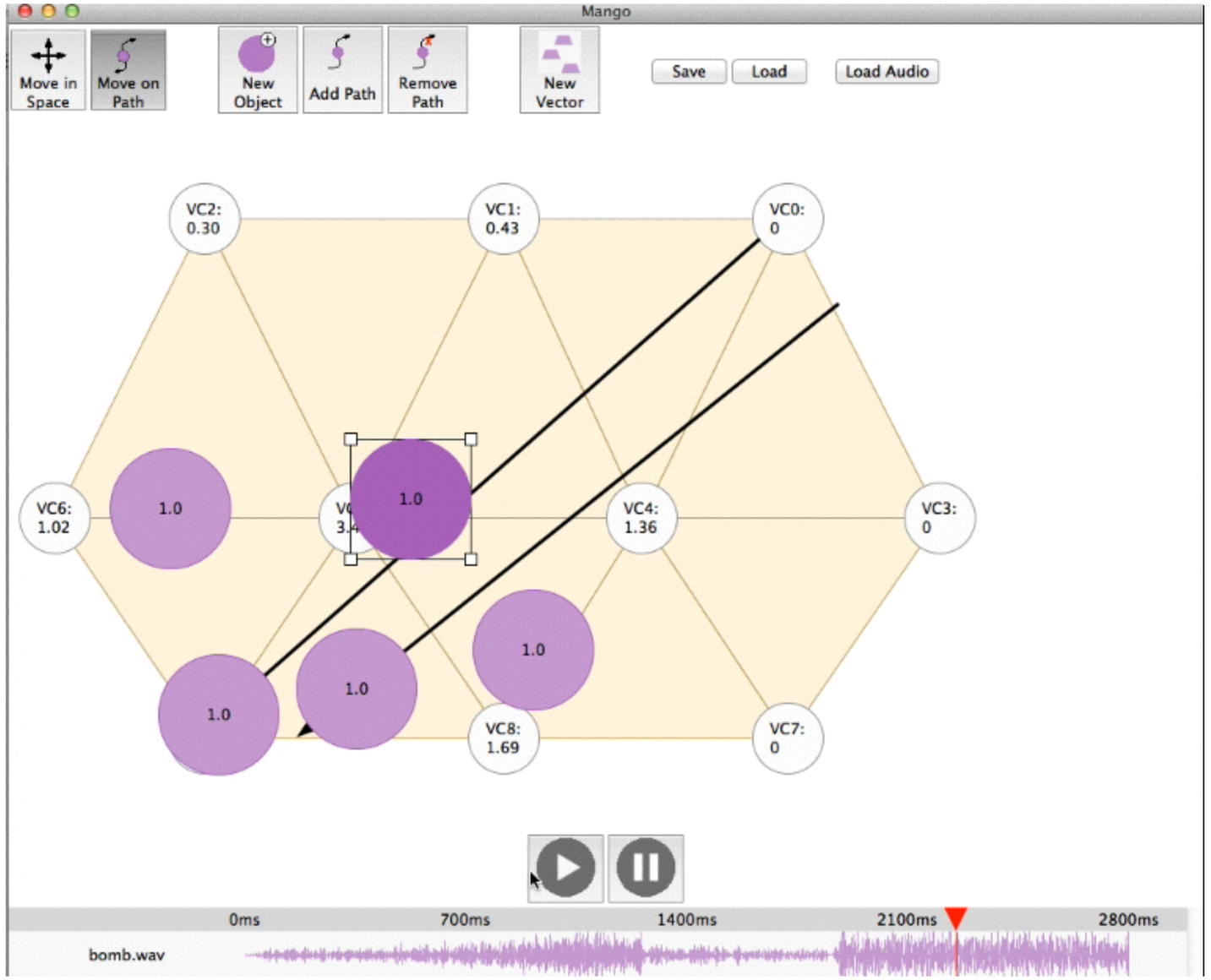
Replication

- Copy/paste (P1-3,5,6)
- Both time and space



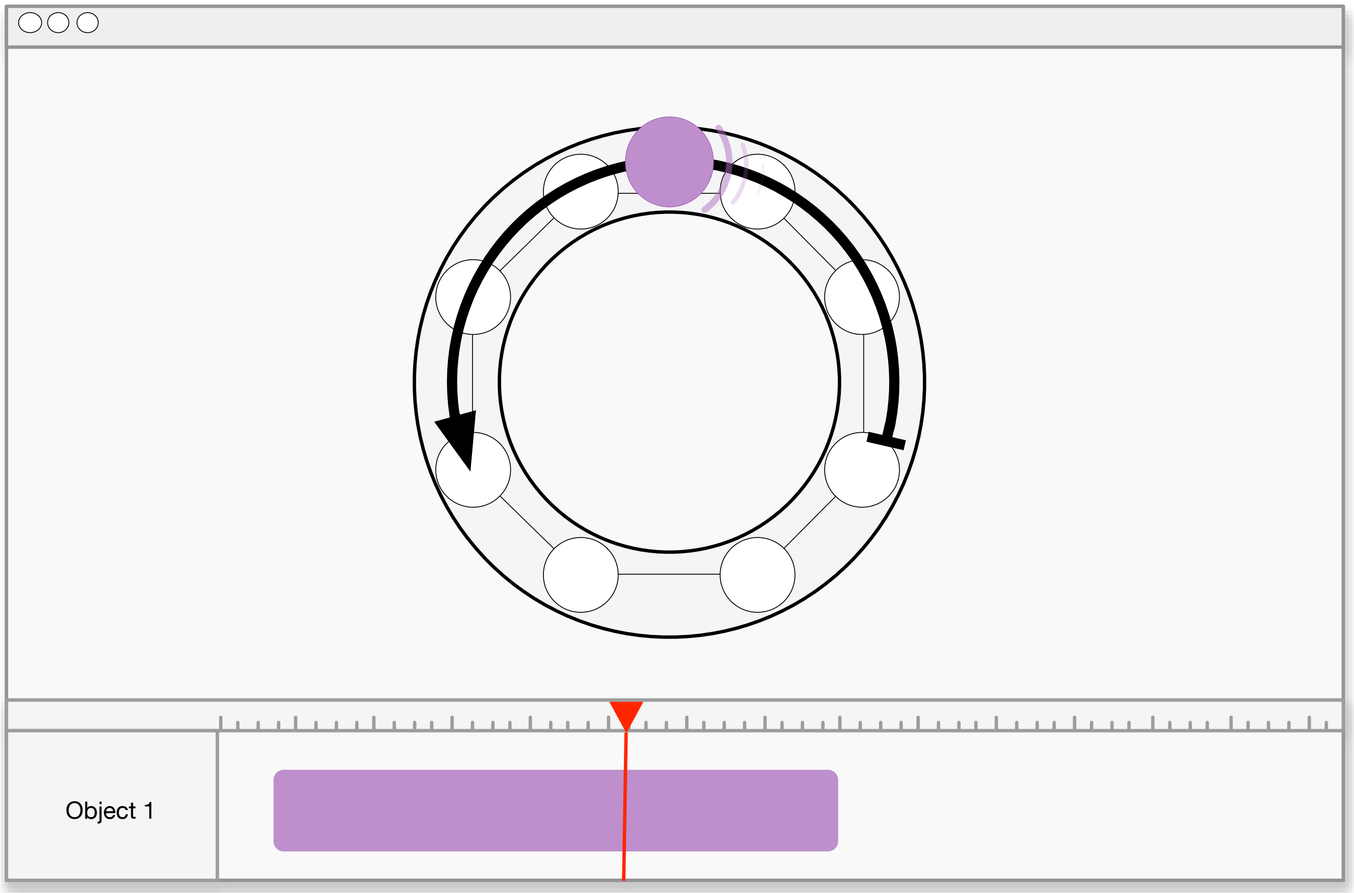
Replication

- Copy/paste (P1-3,5,6)
- Both time and space



Agenda

1. Motivation
2. Tactile Animation
3. Evaluation
4. **Applications**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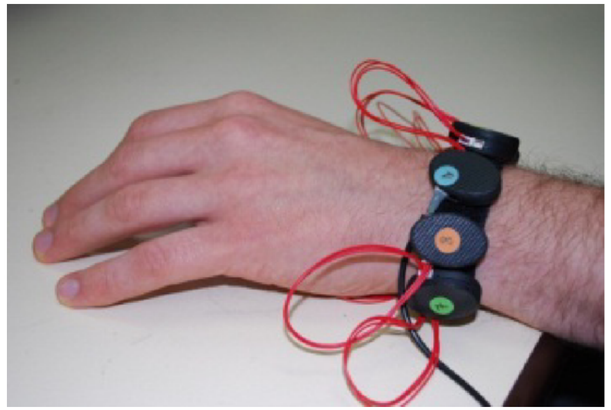

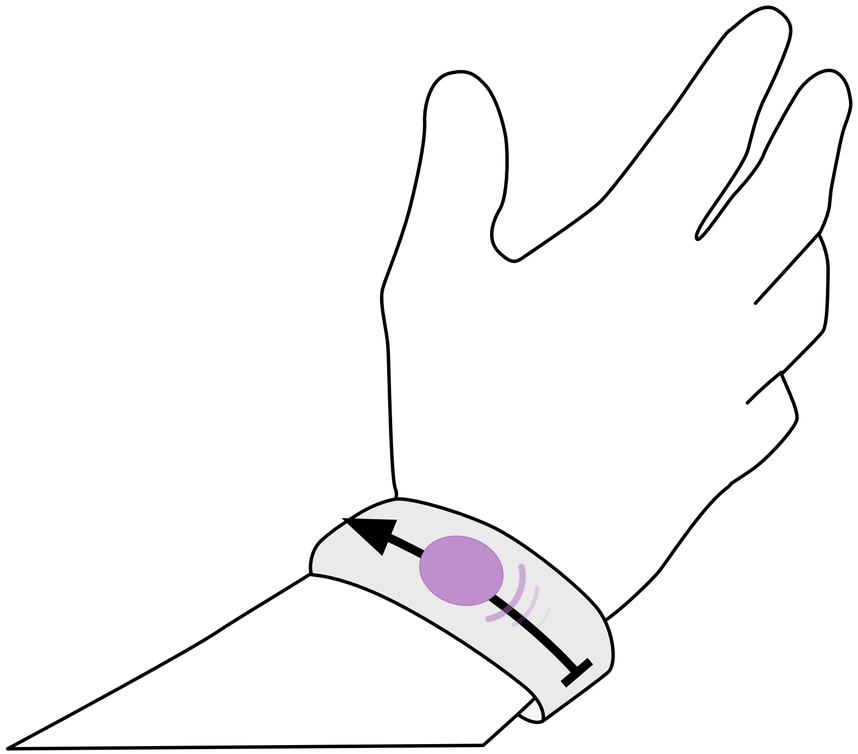

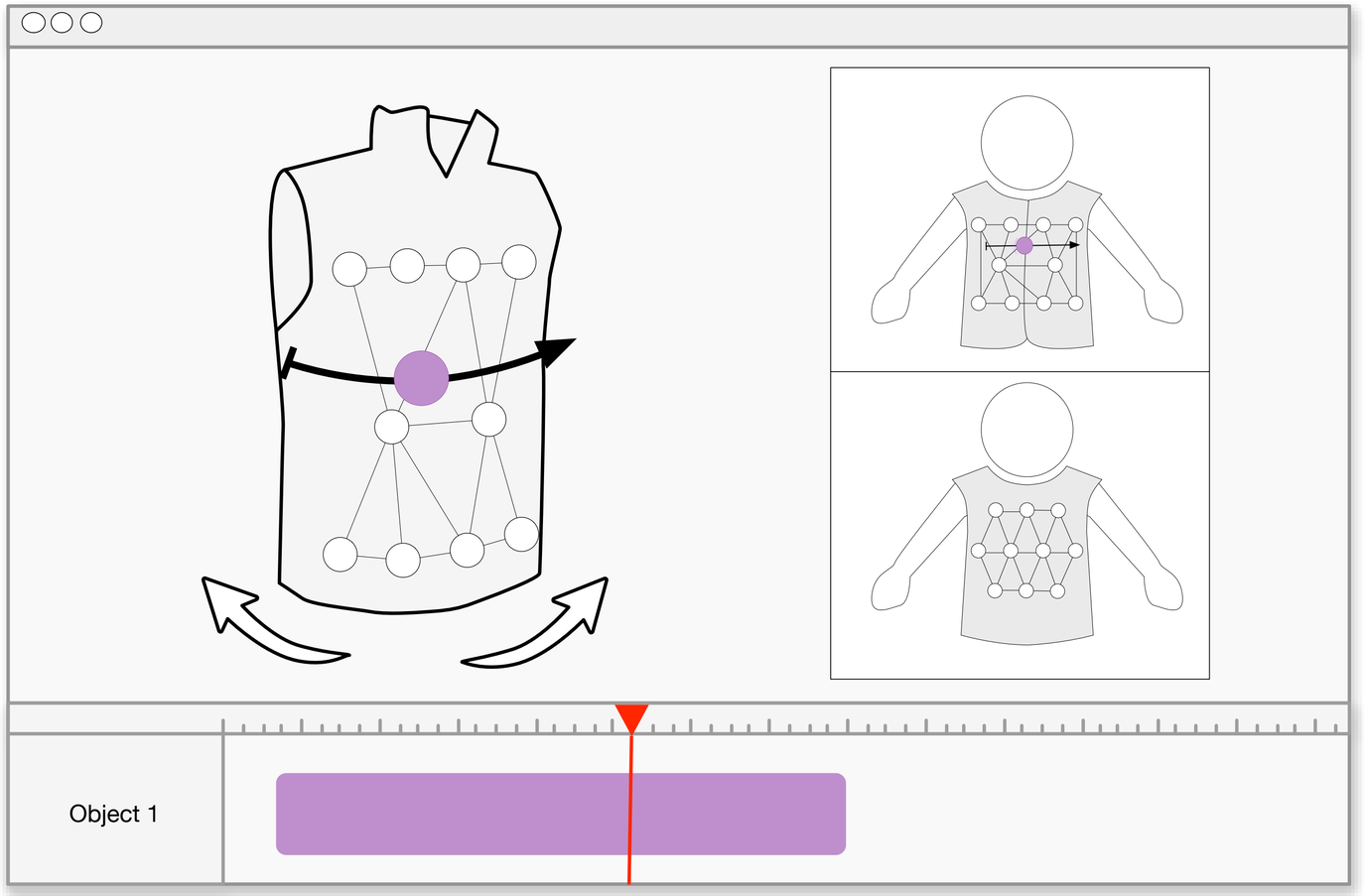
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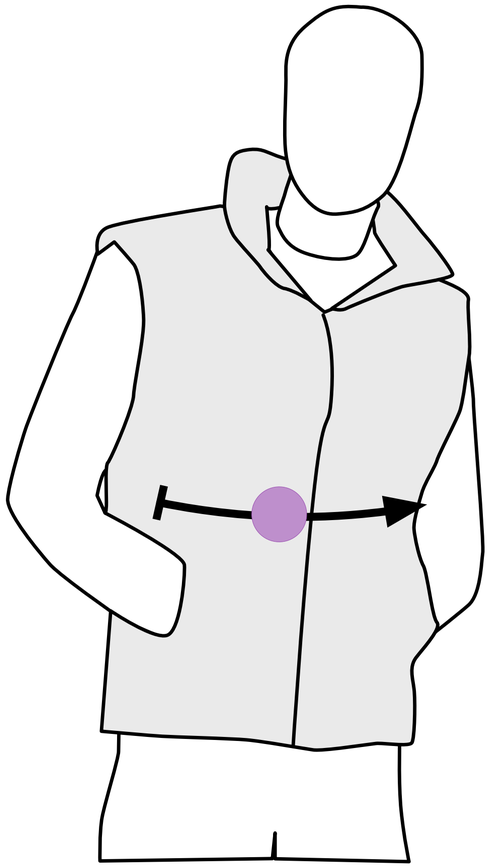

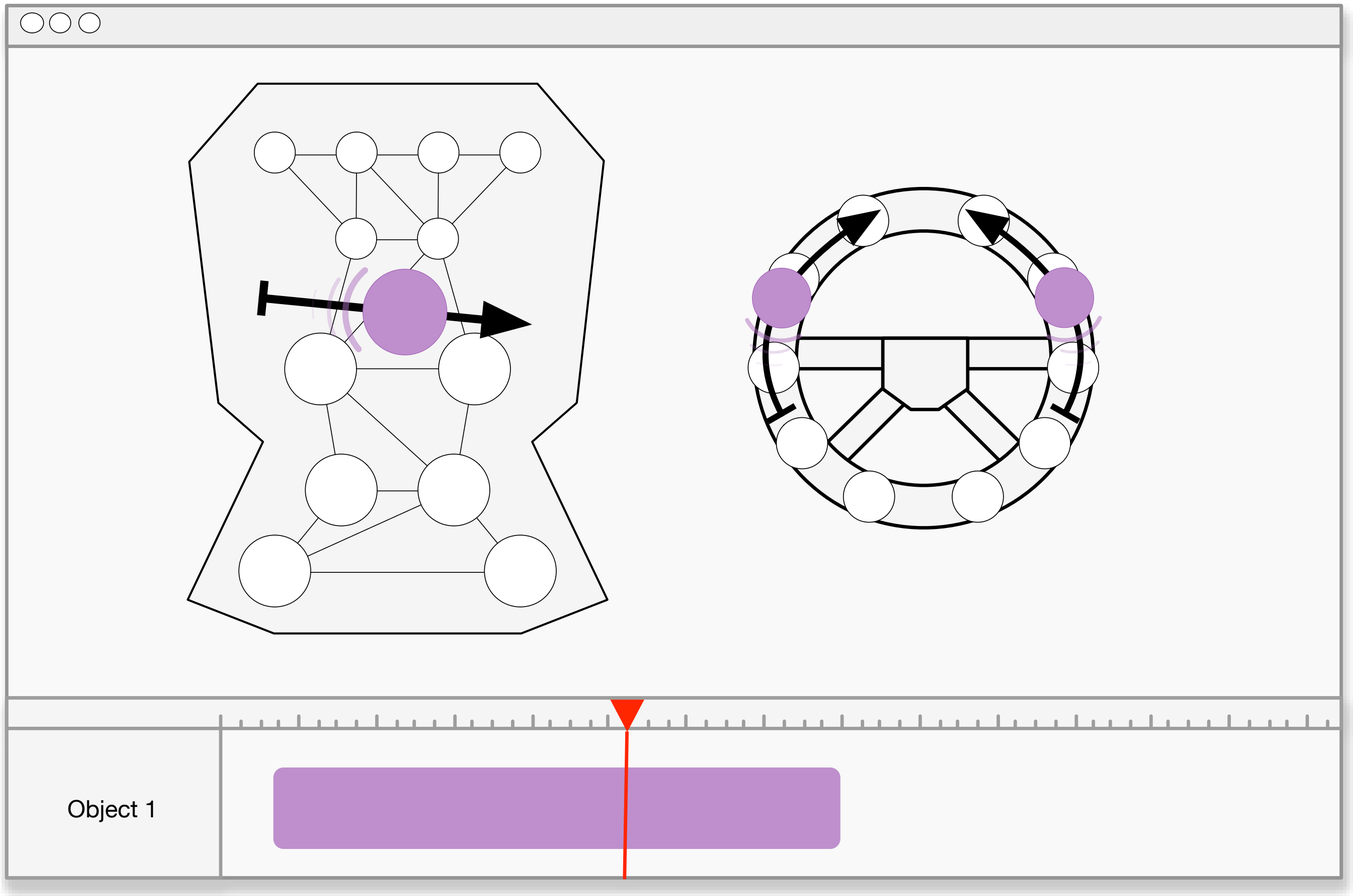
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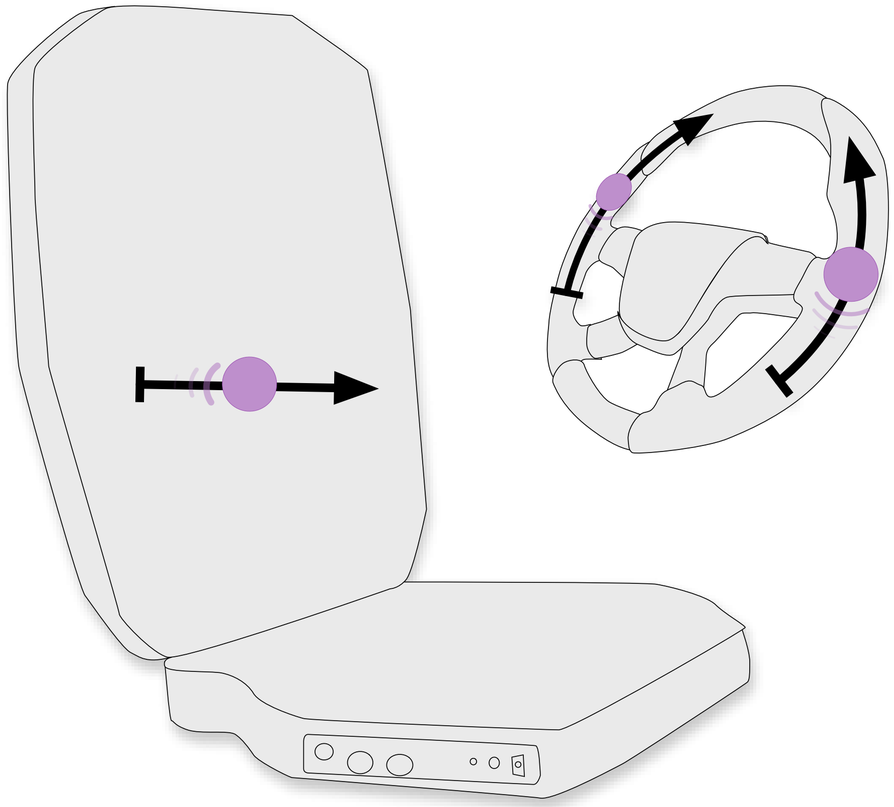

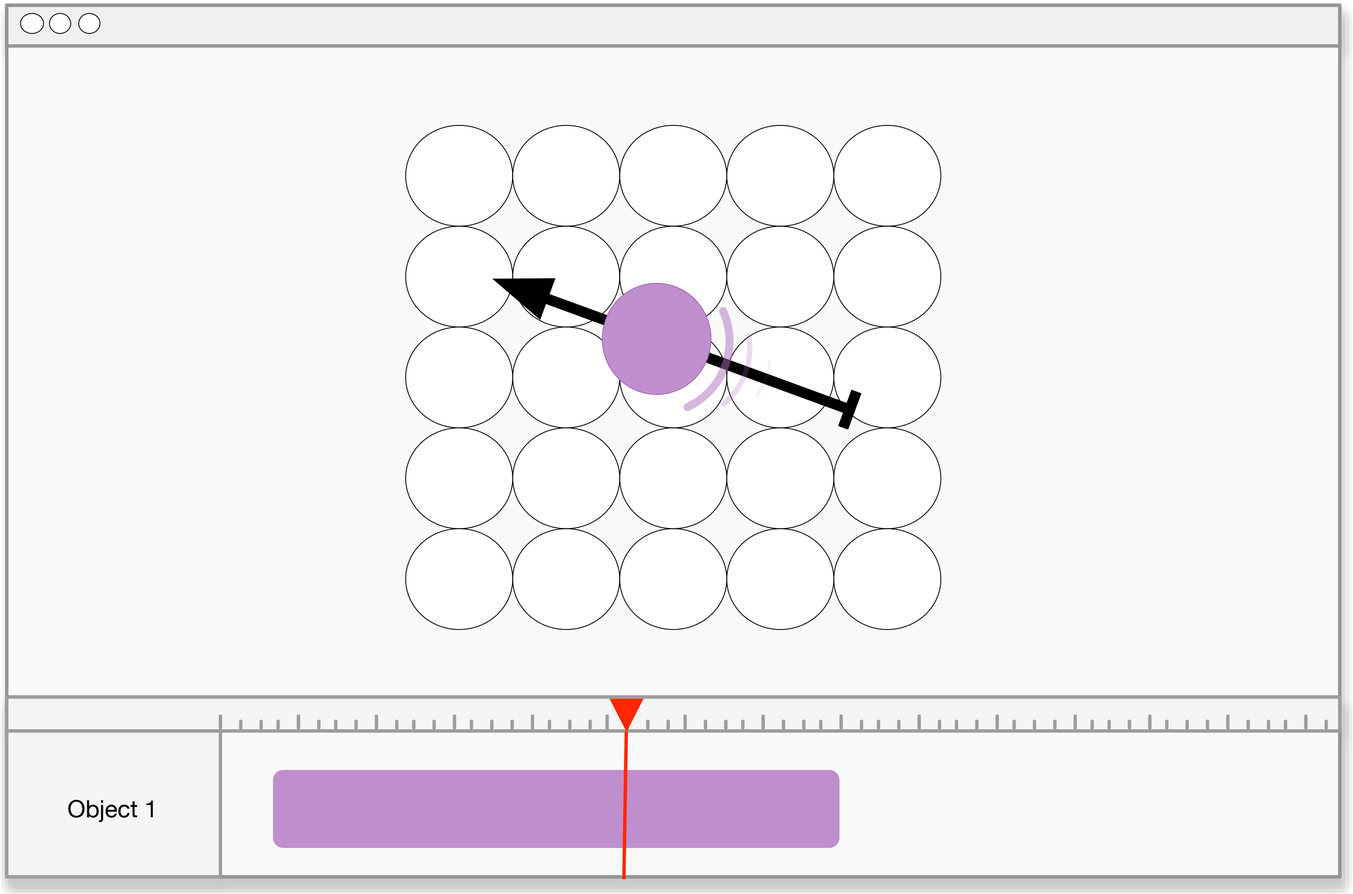
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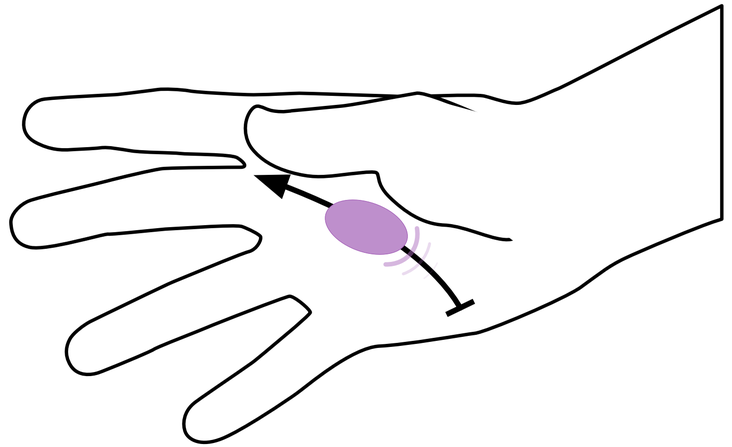
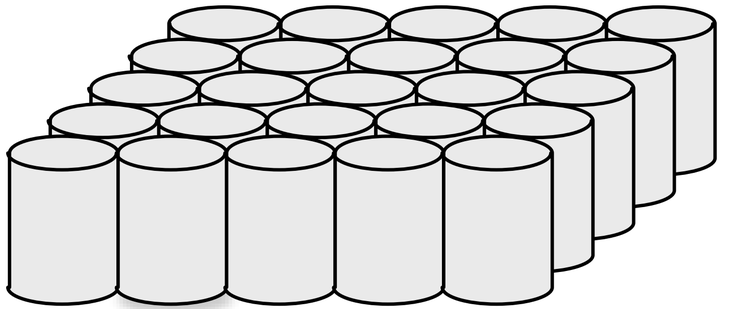




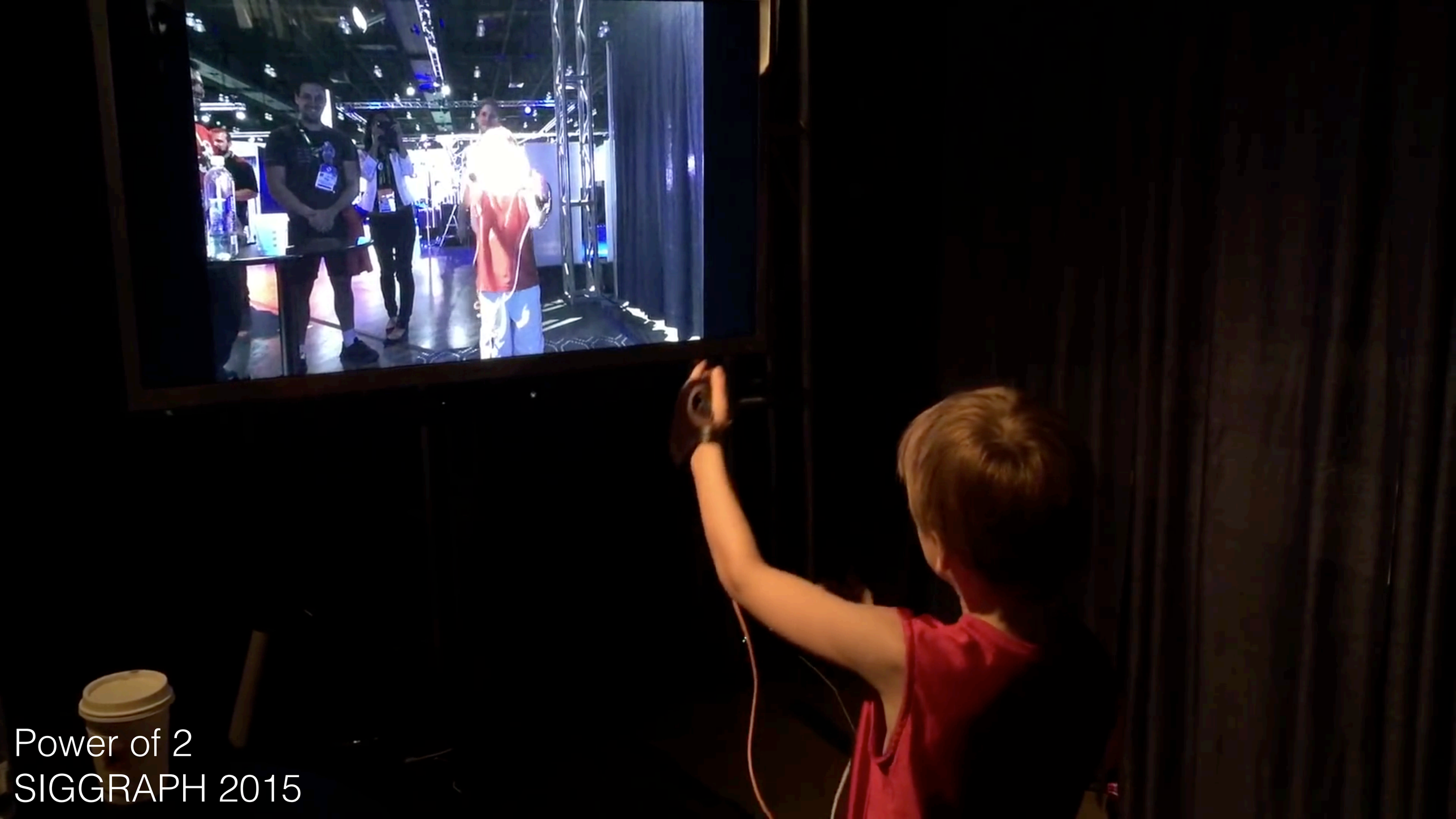
Tactile Animation

- Enables continuous, direct manipulation through 2D interpolation
- Accessible, powerful metaphor for haptic design
- Potential to generalize to different devices

Future Work

- Scaling tactile animation and Mango to VR, AR
- New techniques for haptic design
- Building content for new immersive experiences

“Step into the Page”
Glen Keane



Power of 2
SIGGRAPH 2015

Thanks! Check out our demo

Tactile Animation by
Direct Manipulation of Grid Displays

oliverschneider.ca/tactile-animation

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@oschneid

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