

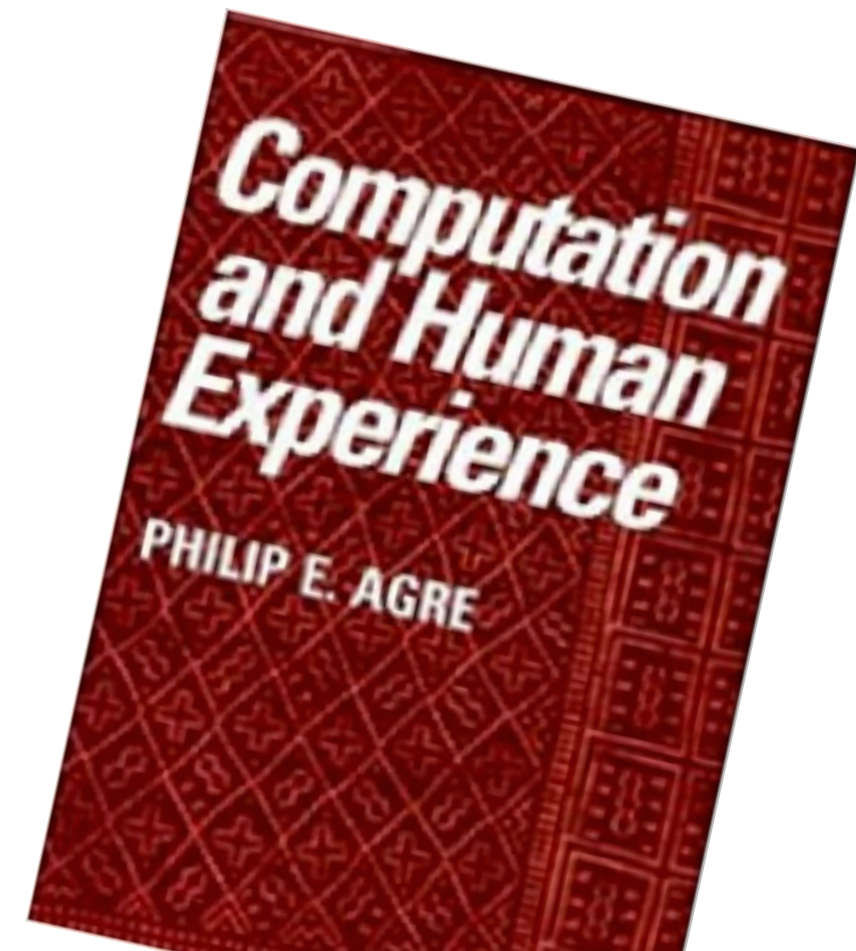


Freedom of Movement

Generative Responses to Motion Control

Putting the “Experimental” in EXAG..

- Phil Agre’s “critical technical practice”
- Making small prototypes to understand & explore spaces
- Experimenting with new venues, use cases
 - Web pages
 - Twitterbots
 - Burning Man / art festival installations
 - Furniture?

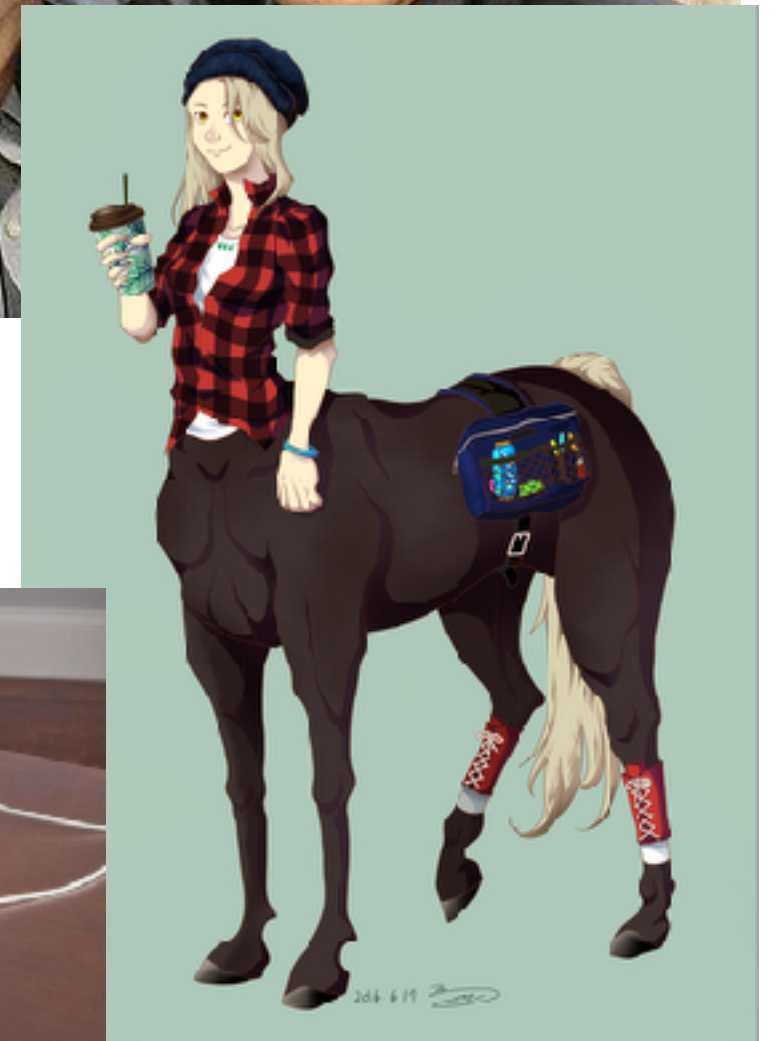


Where does AI fit in our lives?

- How does AI listen to us?
- How does AI speak to us?
- “Where” is AI?
 - Not always a human-shaped agent...
 - Rooms
 - Environments
 - Clothing
- But today... for “motion control”



Make centaurs, not buttons!



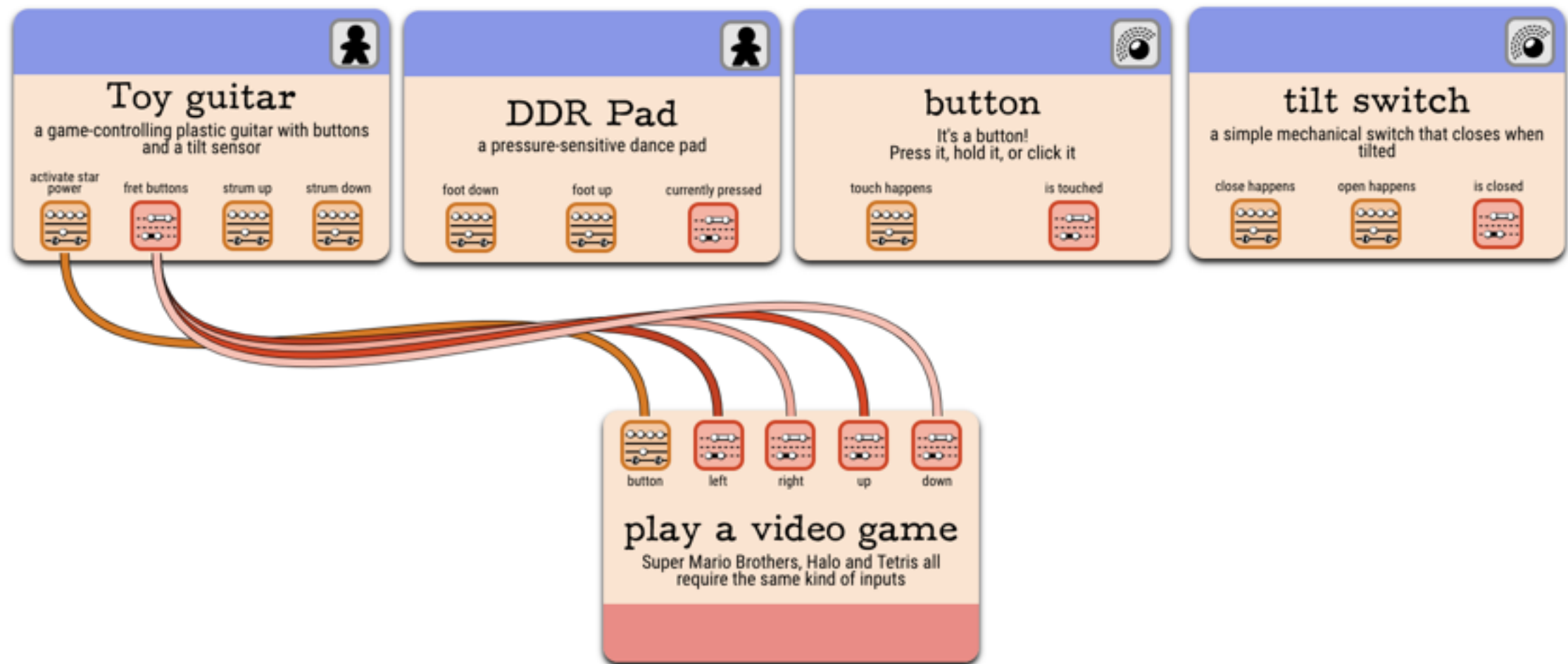
Why do motion control and generativity go together?

Listening & Responding

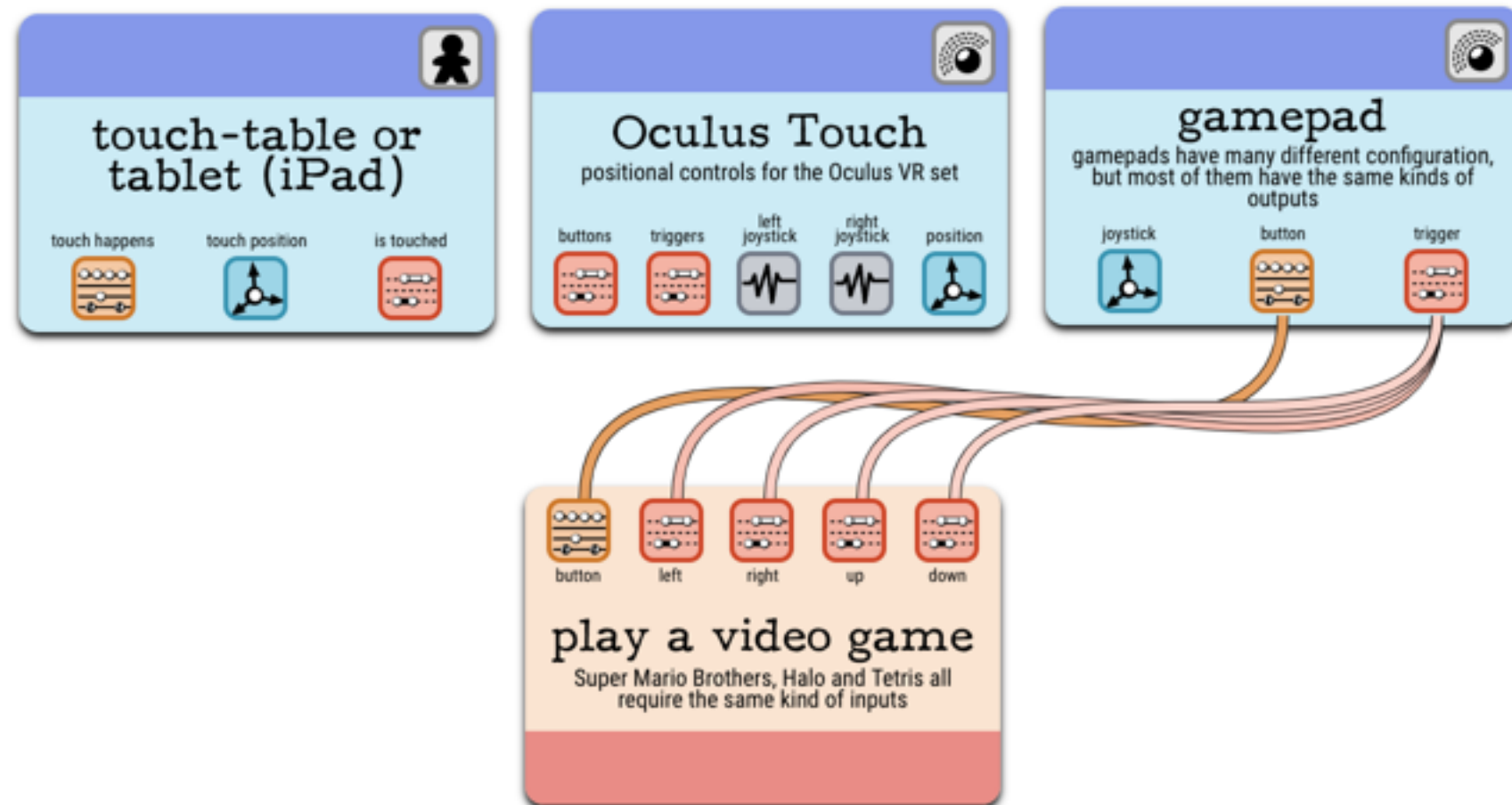
- Input (listening) is compressed to what our software can process (responding)
- Ideally, a stream of button presses & if statements...
 - Is dance a sequence of button presses?
 - If we treat dance as a sequence of button presses what kinds of experiences do we get?
 - What else can we design?



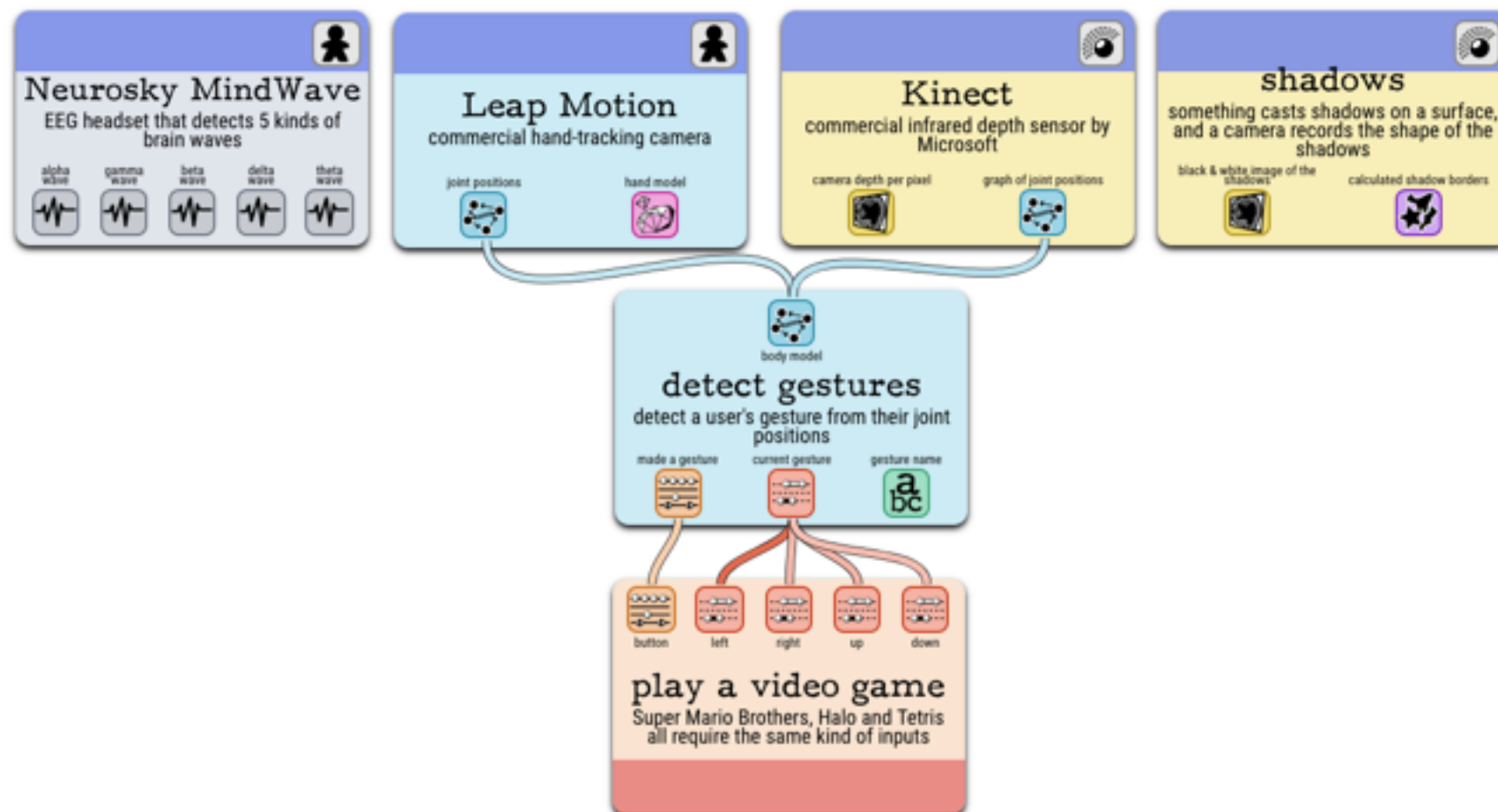
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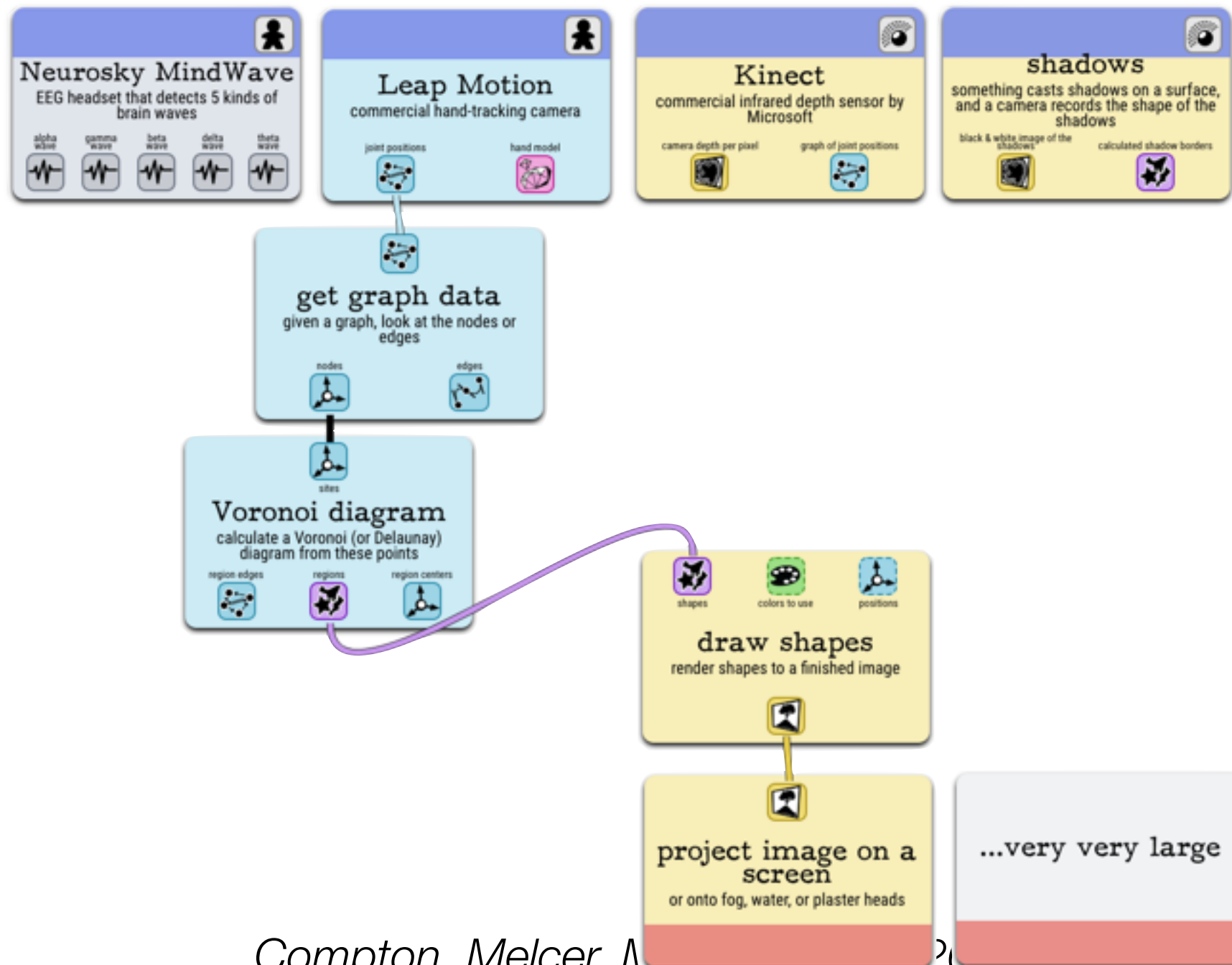
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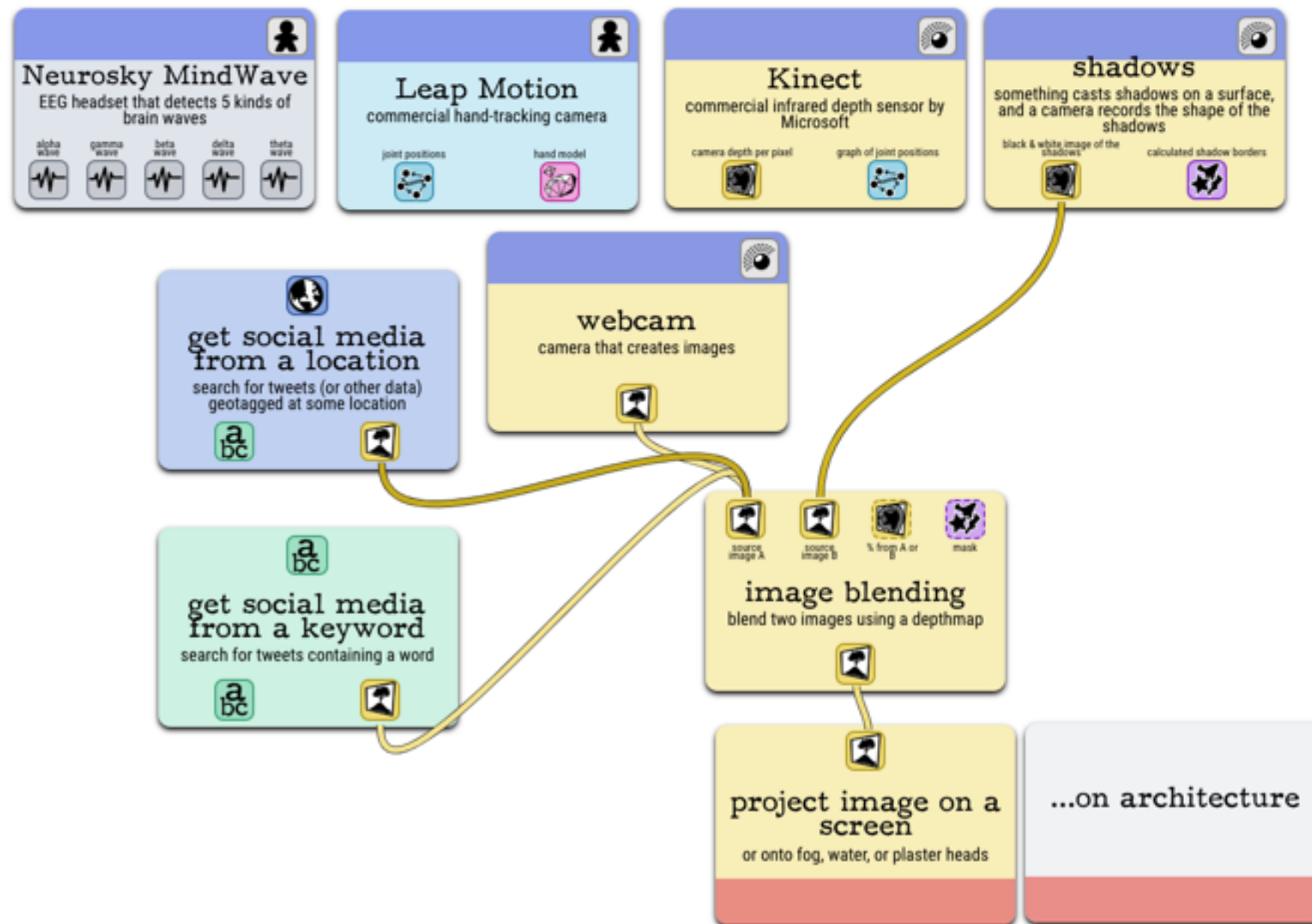
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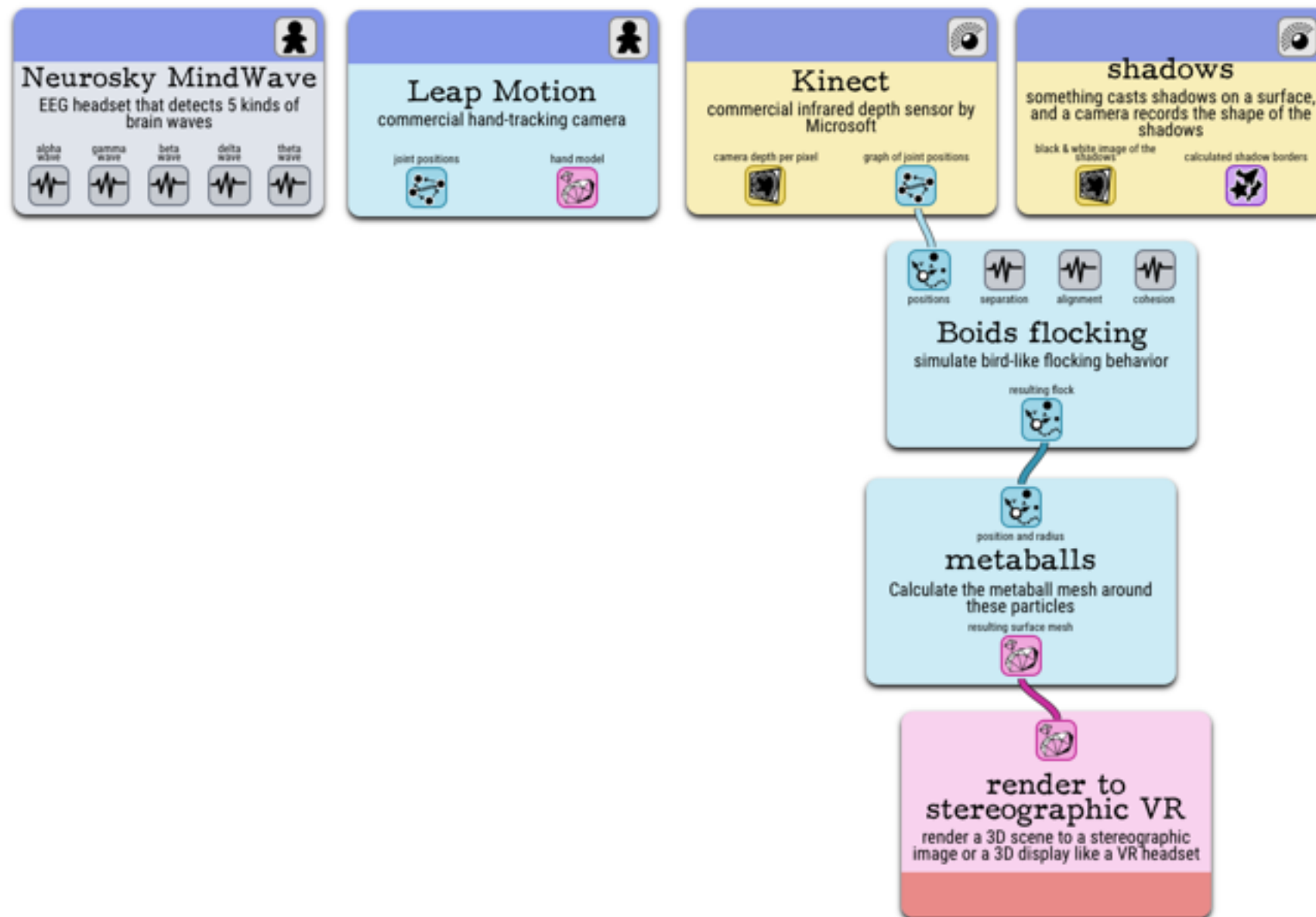
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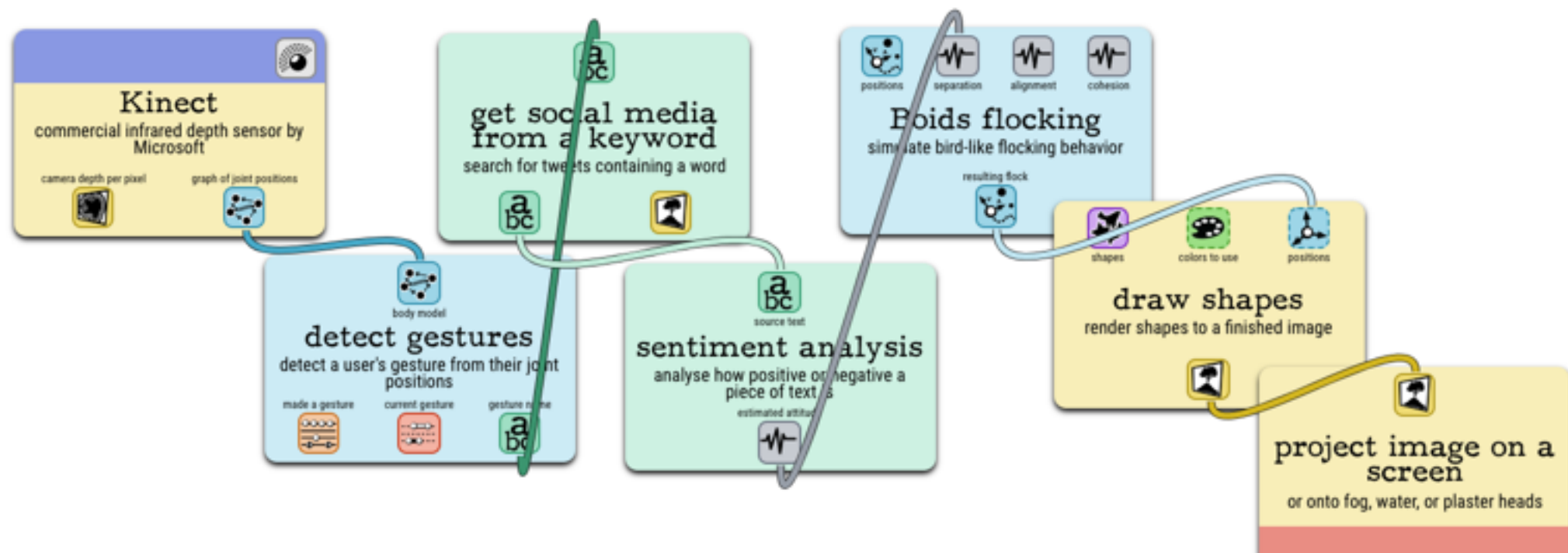


Why do motion control and generativity go together?



How does dance use AI now?

- We can create pipelines of motion control into generative methods
- What kind of experience can we create with those pipelines?
- BAD: a generative pipeline with high latency, confusing transformations (the “Game of Telephone” pipeline), no directness, no “presence”



Related work

Lumin.AI (Duri Long, Mikhail Jacob, Nicholas Davis, Brian Magerko)



“only 14 people entered the dome and did not physically interact with the system at all”

“It's not about judging or whether we know how to dance, just about playing with body movements...that's how dancing should be”



Issues:

Generativity creates interestingness in the “body”, but not used for surprise in the dance
Lack of temporal immediacy, rhythm, weight
Does the AI “hear” my movements right?
Is it improvising, or has it lost Kinect tracking?

Related work

Mueller & Isbister, “Movement-based game guidelines” 2015

Embrace ambiguity

Instead of fighting the ambiguity of movement, embrace it.

DO use the ambiguity of movement and sensor data to enhance the game.

DON'T use buttons during the early development phase (even if it seems easier), as you will miss the opportunities arising from dealing with ambiguity.

Celebrate movement articulation

Celebrate how well players articulate movement, and the joy of movement, by giving feedback on movement quality moment-to-moment.

DO provide feedback if and when movement occurred, but also on how.

DON'T worry about judging the how, players can figure it out themselves as long as they get feedback.

Consider movement's cognitive load

Moving can demand a lot of mental attention, creating high ‘cognitive load’ especially when learning new moves. Don’t overload players with too much feedback.

DO reduce cognitive complexity during movement: for example, if your player can usually remember 3 rules, as soon as she/he moves, she/he will only remember 1.

DON'T forget once players learn new movements, they may need to re-learn old ones as they integrate new skills.

Focus on the body

Focus on the body, not just the screen, when designing player feedback.

DO start imagining your game without a screen.

DON'T forget that for players who feel self conscious or reluctant to move, diverting attention away from the body might be beneficial to reduce the barrier to play.

Facilitate social fun

Facilitate social fun by making movement a social experience.

DO engage other players and audiences by turning the movement into a performance.

DON'T forget that movement in spaces where others do not know that there is a game going on, such as public spaces, might create socially awkward situations.

Intend fatigue

If you use fatigue as a game challenge, make it intentional rather than incidental.

DO use the management of fatigue as a game mechanic.

DON'T assume players know how to manage fatigue, support them in figuring it out.

Exploit risk

Exploit physical risk sensibly.

DO put the player's safety first.

DON'T assume players will be fully aware of any emerging physical risks, as they might be distracted by engaging play.

Map imaginatively

Map movements in imaginative ways.

DO engage your creativity in the mapping process.

DON'T use this guideline if you want to simulate a real- world sports experience, such as designing a golf simulator.

Highlight rhythm

Help players identify rhythm in their movements.

DO see movement in games not just as a string of independent actions, but as a sequence of rhythmic actions that, with a beat, get easier.

DON'T forget that engaging competitive gameplay can emerge when allowing players to try to throw their opponents off their beat.

Support self-expression

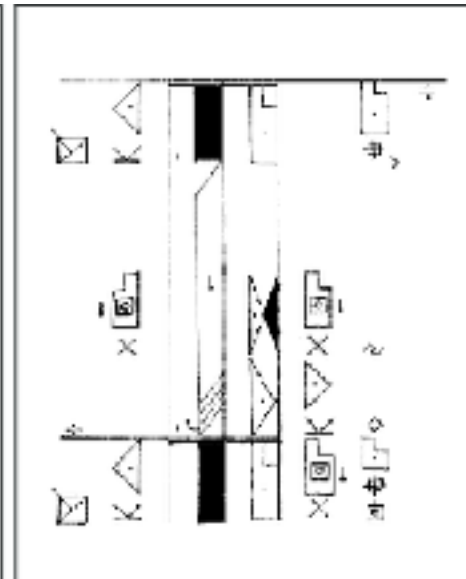
Support players in expressing themselves using their bodies.

DO see movement as a form of self-expression that can make your **game** more fun.

DON'T forget self-expression is not only concerned with the player, but also with other players and any audience.

Know your domain!

- My domain isn't *all dance*, but pleasurable movement-based interaction (sometimes with music)
- For casual users, with a bystander/performance component (e.g. art festivals!)
- Clear, understandable, direct and *present*
- Acceleration over position! Forces over form!



Costumes



Costumes

- Secondary motion
- “Yes-and” for physical gestures
- Locationally, directionally, temporally linked to a movement
 - *very direct* causal link!
 - Emergence (movement + generativity)



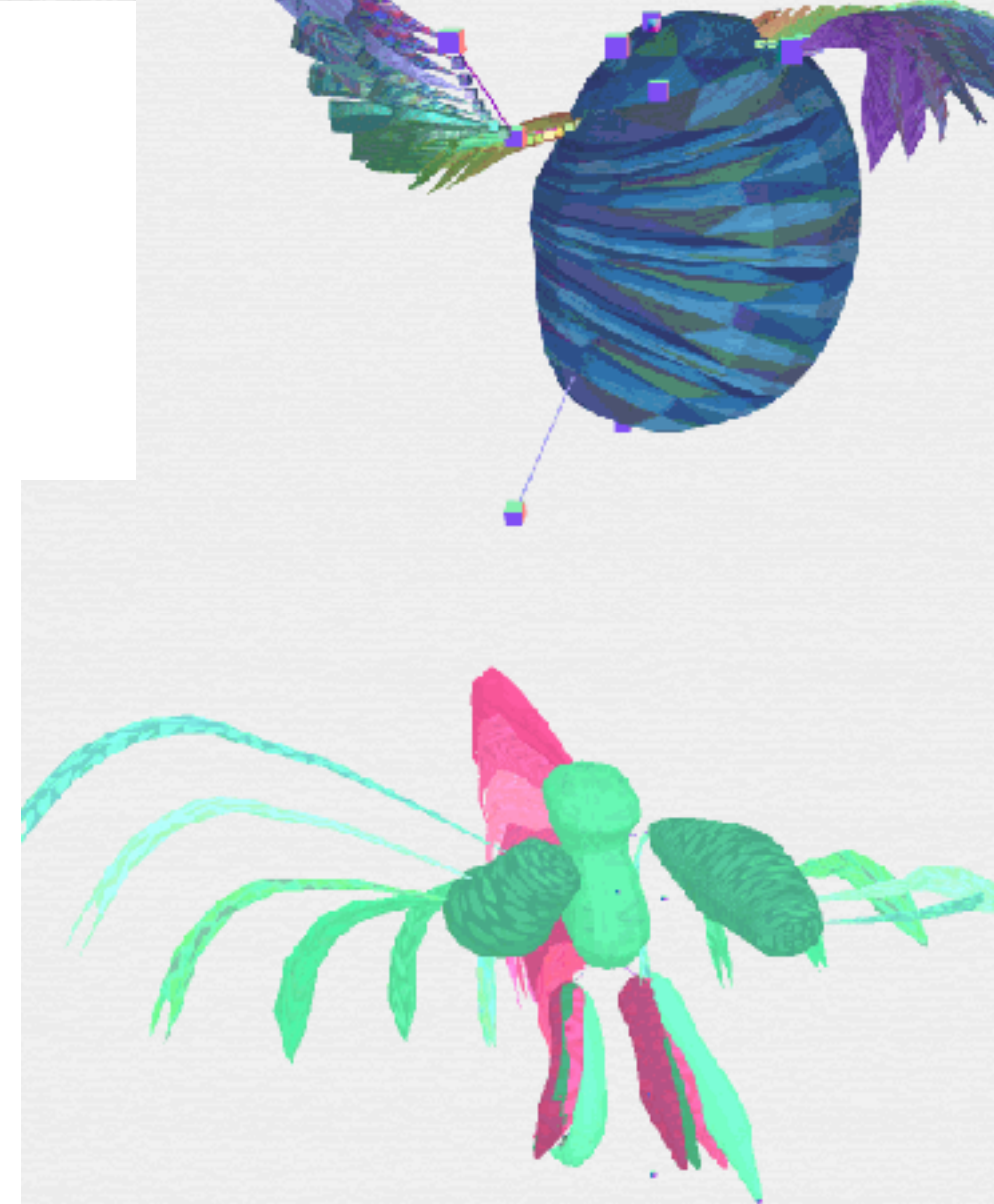
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Costumes

Takeaways

- Listen: gesture
- Respond: Accent & exaggerate motion
- can be: physical, extradiegetic (speed lines), sound-based (explosions, tap shoes)
- BASE ON ACCELERATION (forces, stops and starts, not physical position)



Fields



Text Rain

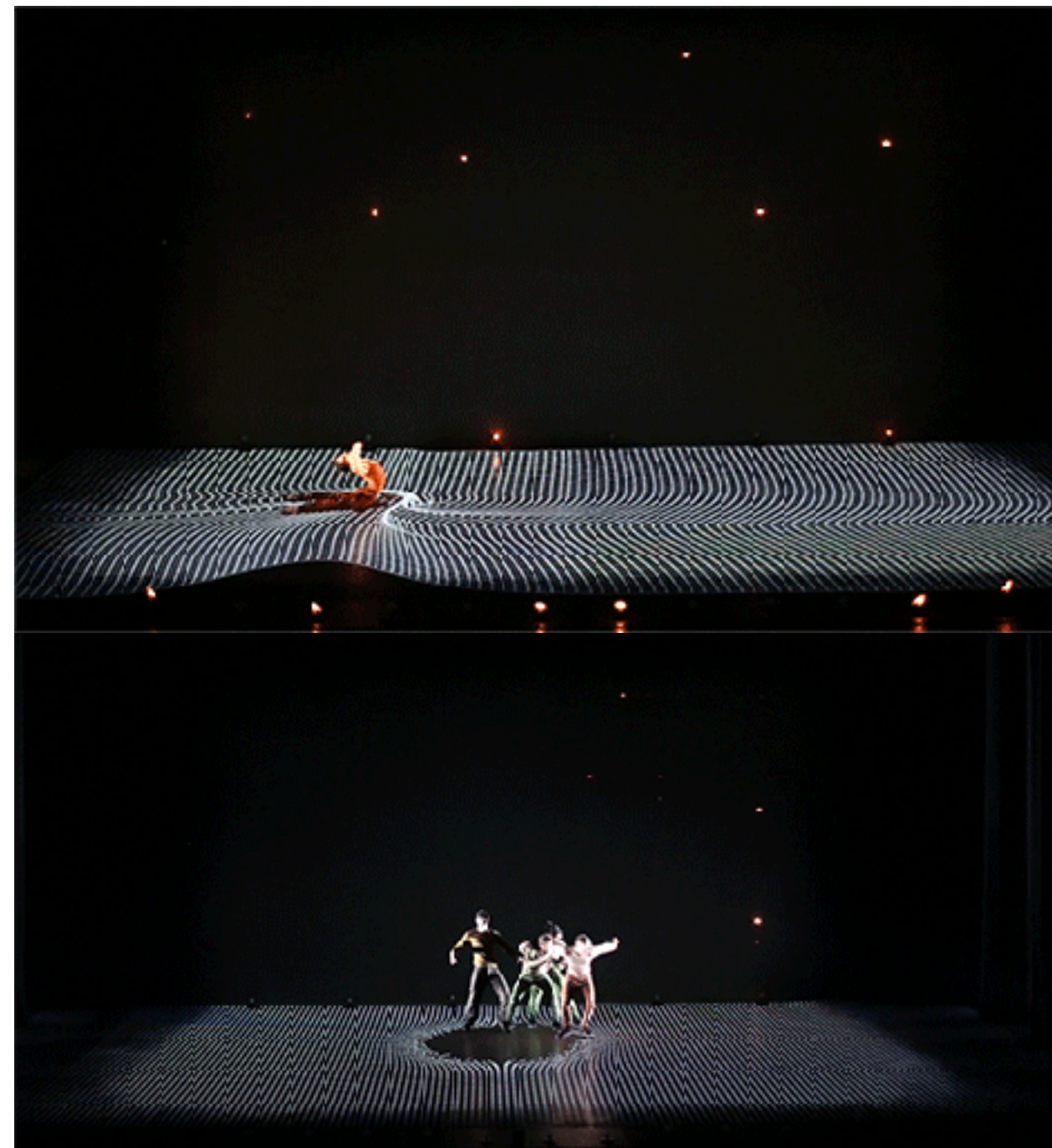
Romy Achituv & Camille Utterback (2000)



MakeAGIF.com

Pixel

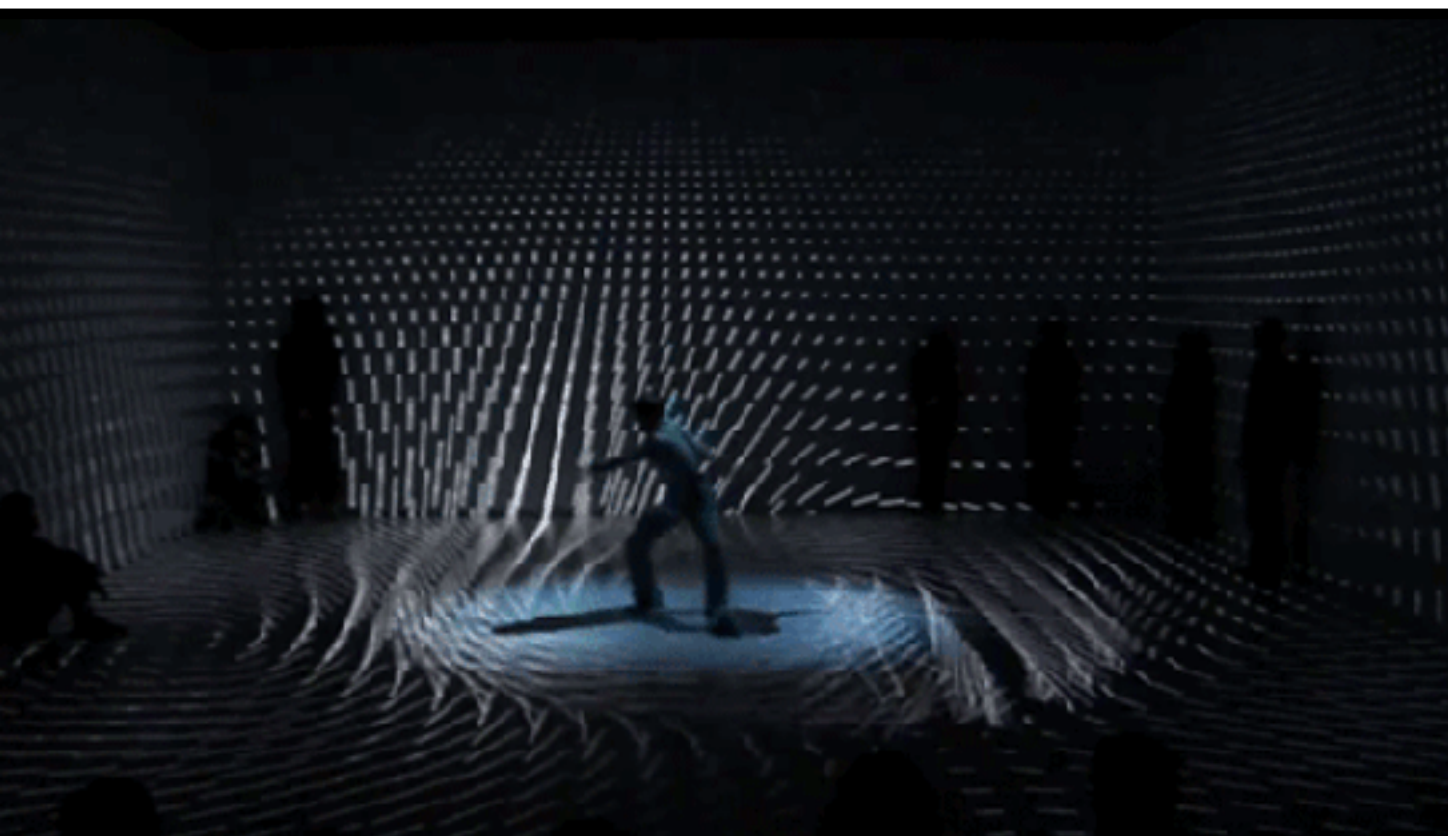
Adrien M / Claire B and Mourad Merzouki (2014)



Fields



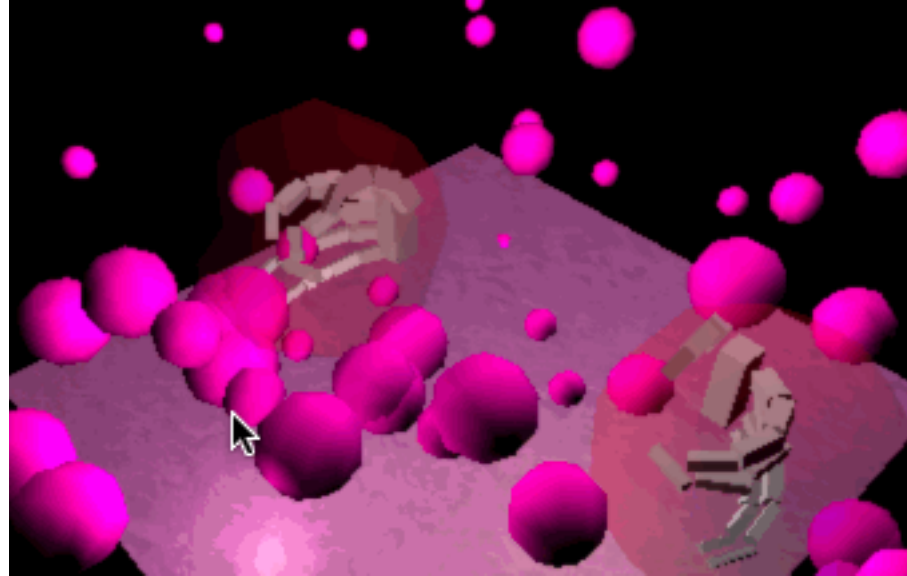
Teamlab



Seventh Sense
anarchydancetheatre 2011

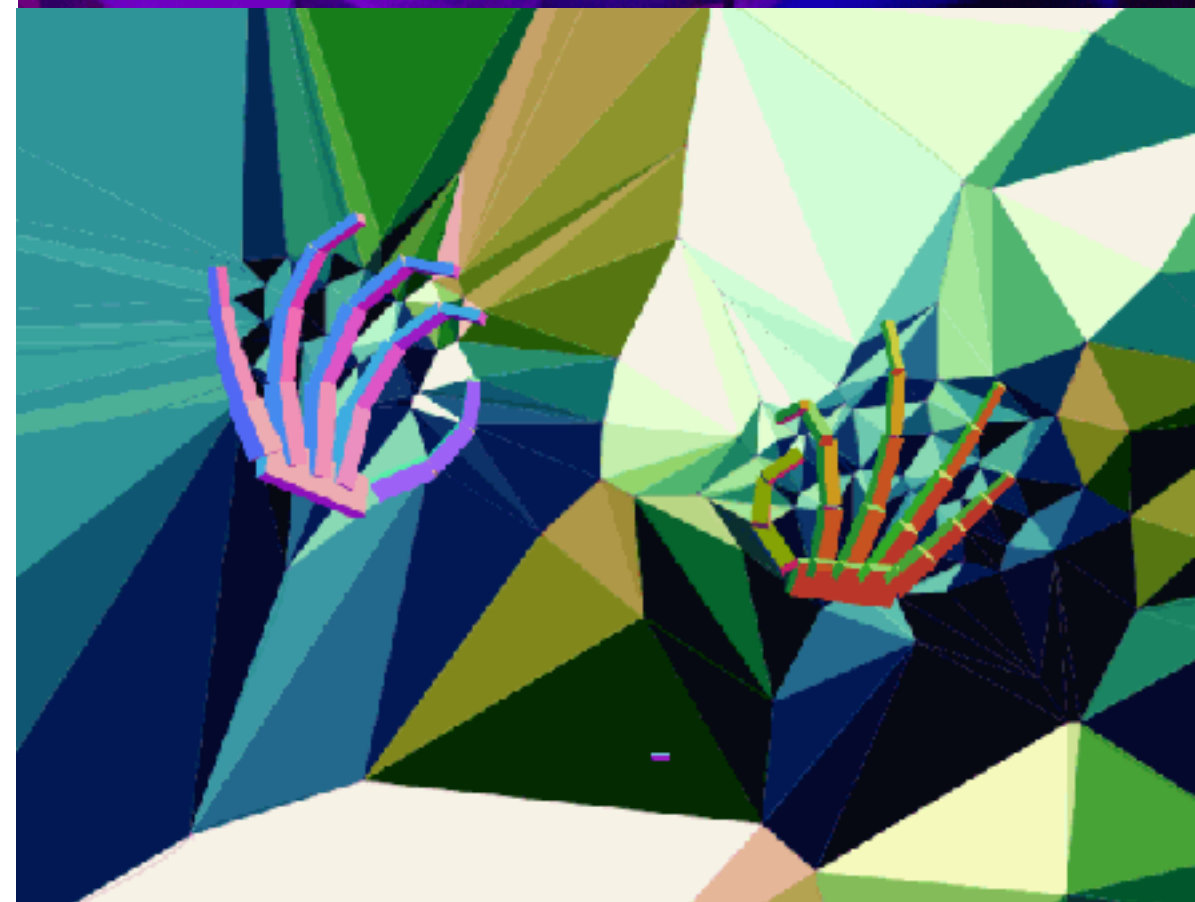


Fields



Takeaways

- Listen: spatial movement in a plane
- Respond: Deform, pull
- can be: gravity, magnetic fields, physical object (field of grass), particles (even agent particles like Boids)
- create force-fields around the body

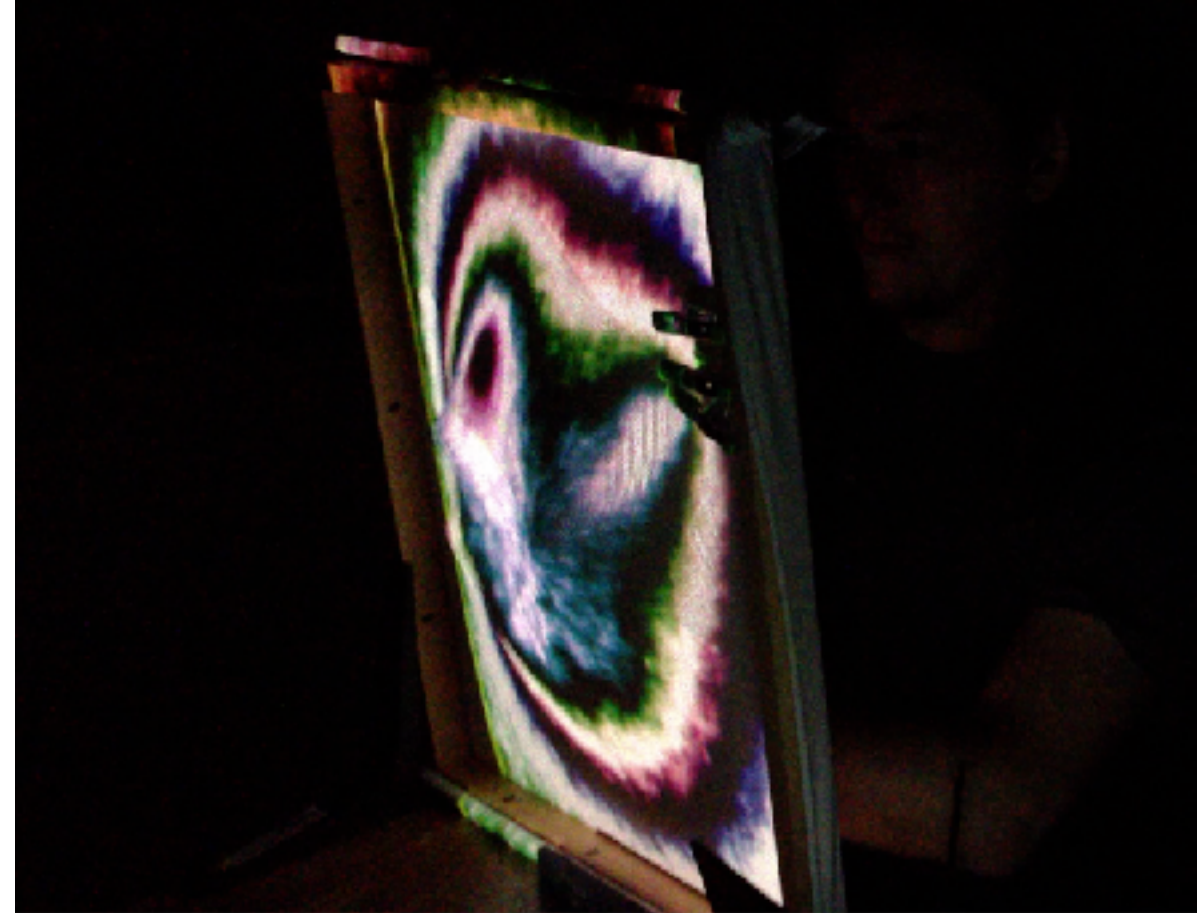


Idle Hands, me (2017)

Fields

Takeaways

- Listen: spatial movement in a plane
- Respond: Deform, pull
- can be: gravity, magnetic fields, physical object (field of grass), particles (even agent particles like Boids). Create force-fields around the body!
- Is there resistance? feedback?



deeptouch, me(2010)



Space Palette, Tim Thompson (~2010)

Agents (physically connected)

Takeaways

- Listen: gesture, outline, image...
- Respond: *immediate* *directly linked* feedback
- How are the bodies connected?
 - Mirror
 - Agent
 - Mirror-agent spectrum
- Is it a mirror or a costume?



Chris Milk, Treachery of Sanctuary



Daniel Rozin



Agents (expressively connected)

Takeaways

- Listen: to ...abstractions (emotion, pose)
- Respond: temporally de-linked gesture, has “agency” in response
- Is it “agency”, or did the Kinect tracking stop? Do users “trust” the AI working (and is it actually working?) You can fool the user, but don’t fool yourself.



Figure 3: flow chart

Where is the "AI"?

- Puppets (muppets)
- Dance Partners
- Mirrors
- Costumes
- Environments
- Fields
- "music" / improv script
- drawing tools? (paintbrush as partner)
- centaurs not buttons!

