

Music 158

**B**

welcome to m158B!

situated instrument design for musical expression

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situated **instrument** design **for musical expression**

let's start with instruments for musical expressions



instruments are a tool for expression  
and performers become very intimately connected with their instruments



performers will go through pain, and contortion to perform their instruments!





oboe players make their own reeds

Franz Liszt  
Sprünge mit der Tremolo-Begleitung  
(No. 62 from Technische Studien)



in the 19th century liszt worked to achieve super human piano techniques through “mastering his hands”





“increases finger flexibility!”

and many people used contraptions



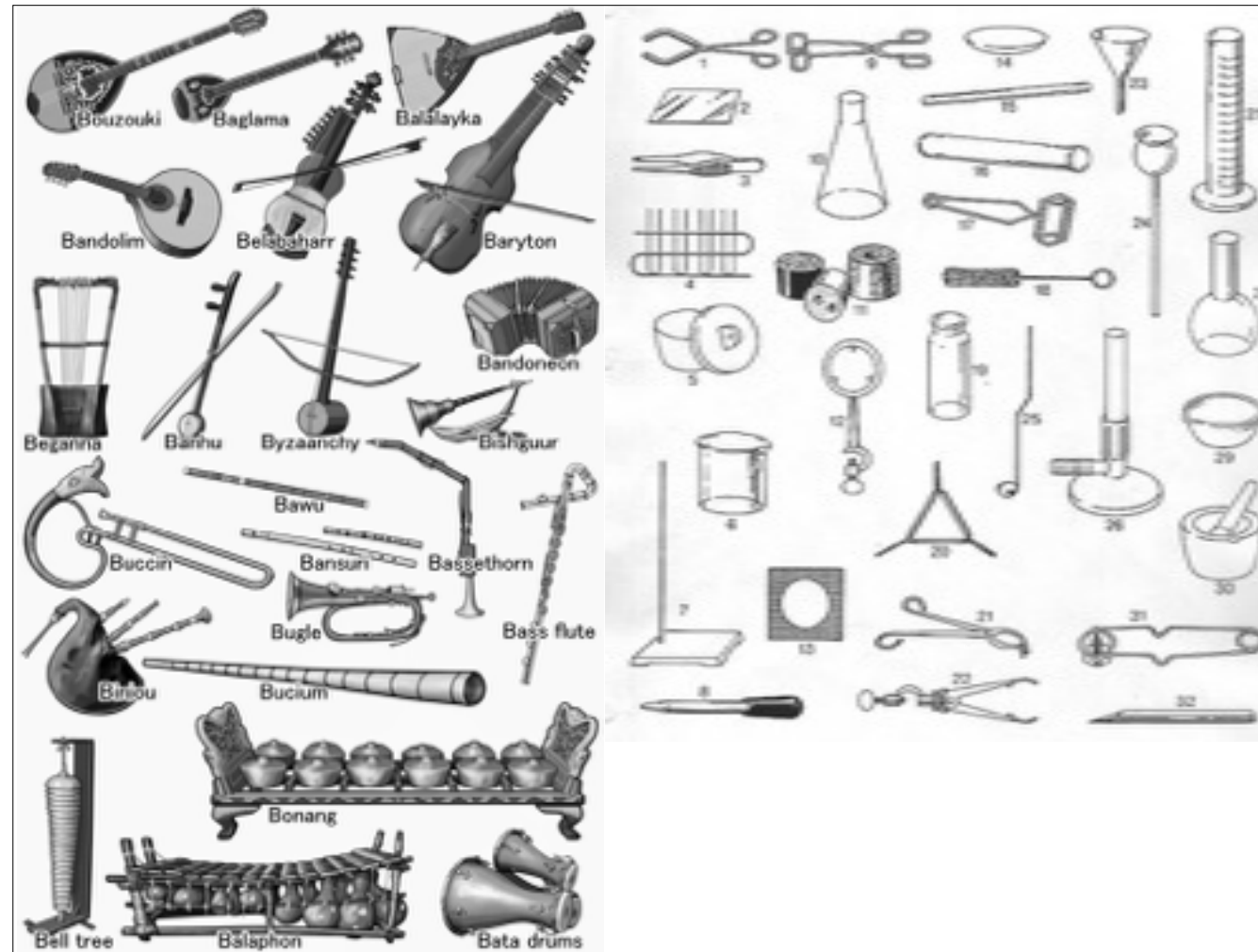
to be able to express themselves through music and ...



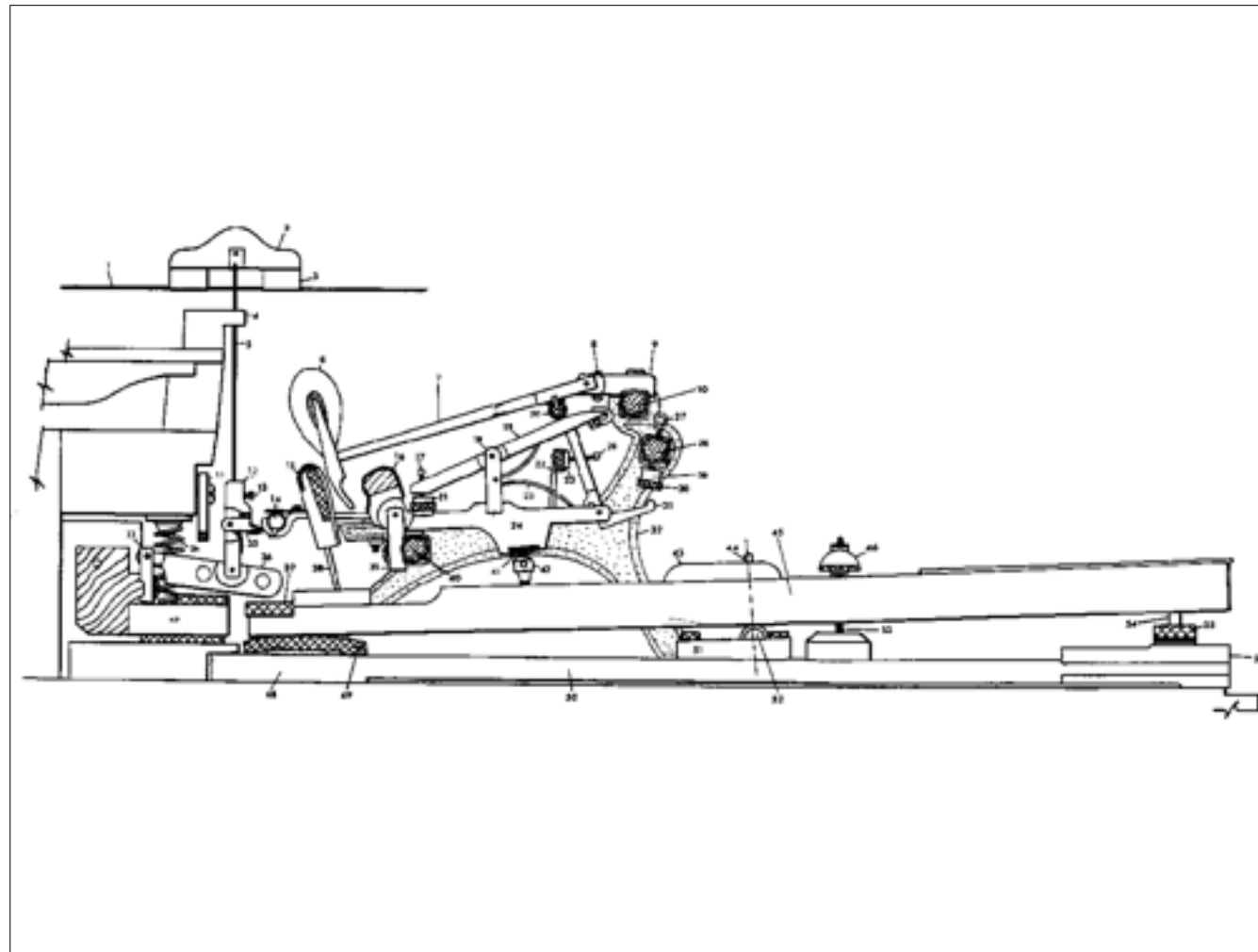
... to create a connection to other people through dance, and social functions

so... what's an instrument?

so, what is an instrument?



usually a kind of tool for doing something



instruments can be machines





in the 20th century (and a bit before that) electronic instruments became common



clara rockmore was one of the most famous early performers of an electronic instrument (playing the theremin)





later people like Pierre Schaffer started using recordings on tape to make music



Daphne Oram, who designed her own synthesizer which performed scores painted on film



people like Wendy Carlos used synthesizers to recreate traditional music, and to create “space age” music with new kinds of sounds, representing the modern age



and people like composers/performers like John Cage and David Tudor began to learn how to design and construct their own experimental instruments to be performed in new ways, in new contexts.



the beatles stopped performing live and decided to use the studio as their medium and compositional context



turntablism is another example of how technology changes the types of music that we express

**situated** instrument **design** for musical expression

what is the situation for designing an musical instrument?

**situated** instrument **design** for musical expression

who? what? where? when? why? how?

there are many aspects of a situation that we can draw from



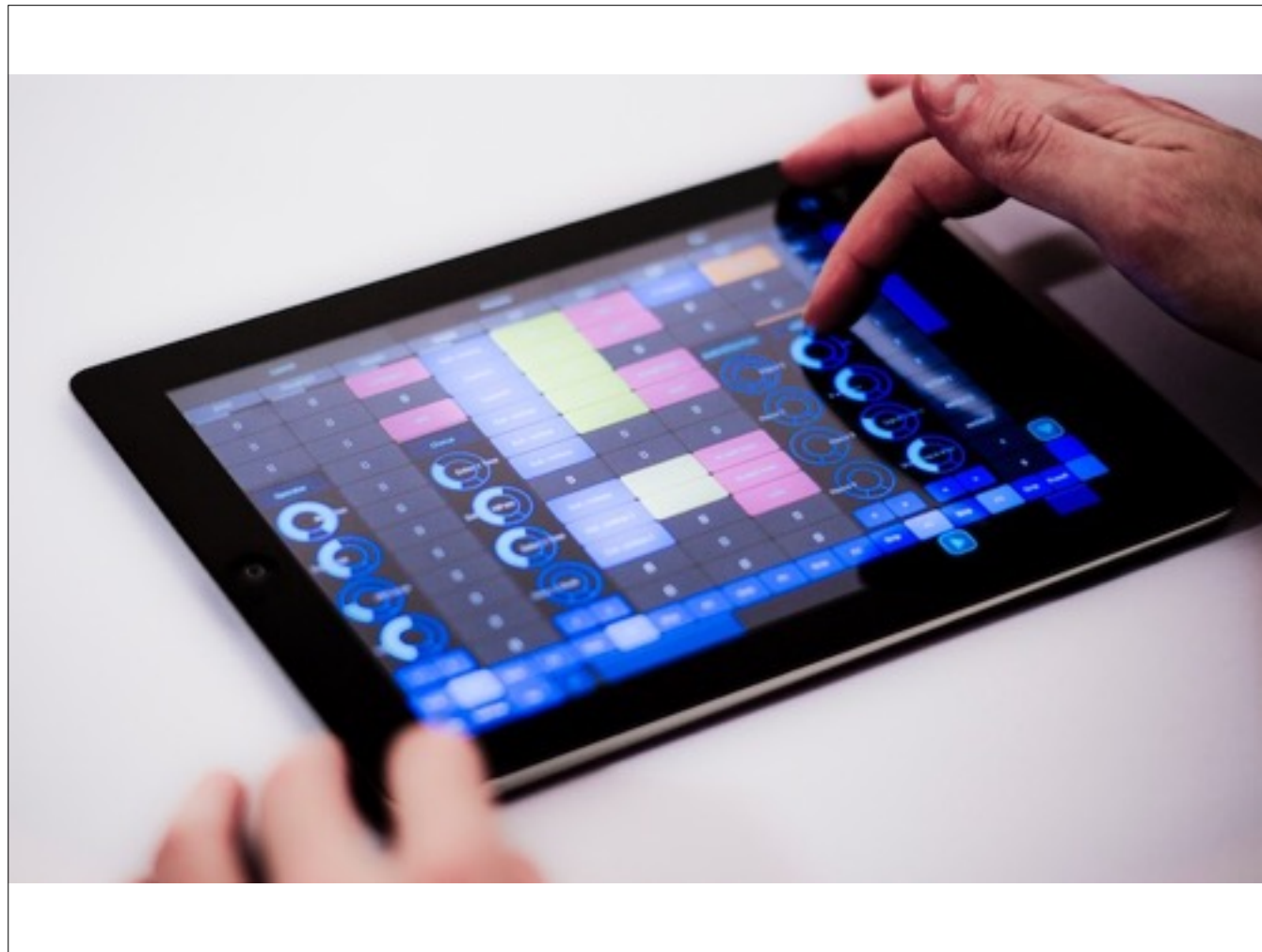
**situated** instrument **design** for musical expression

who? **what?** where? when? why? **how?**

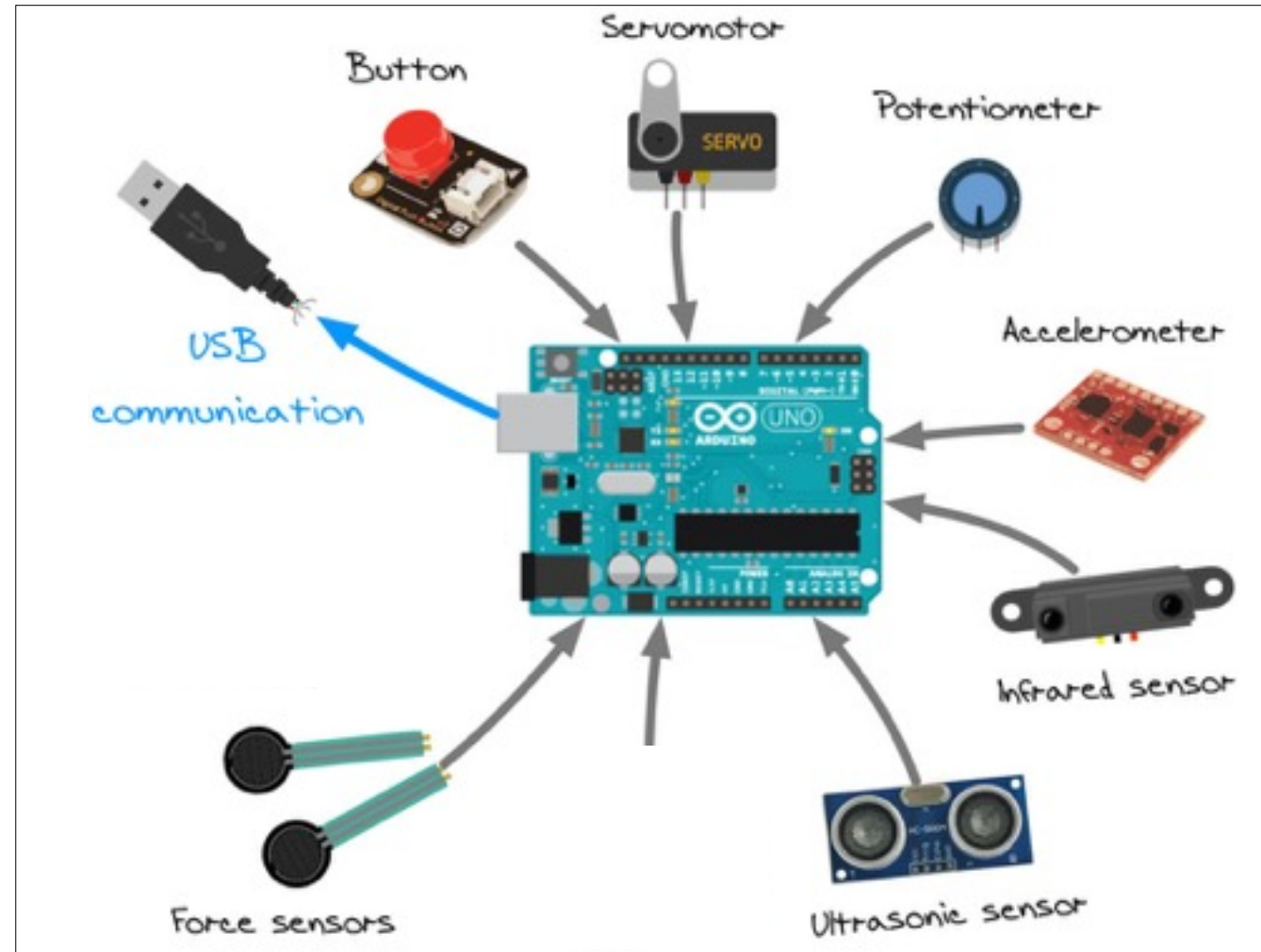
let's start with the what, and how

**sensing**

in the first week, we're going to start with sensing technologies



we now live in an era where we have a lot of touch screens



and we have access to all different kinds of sensors



in 158b we're going to be looking at a fairly wide variety of ways of sensing from tactile interaction with surfaces, sliders and knobs, to foot pedals, breath controllers, contact microphone, camera vision, accelerometers each is a different way of sending messages to the computer, and each has it's own expressive aspects.



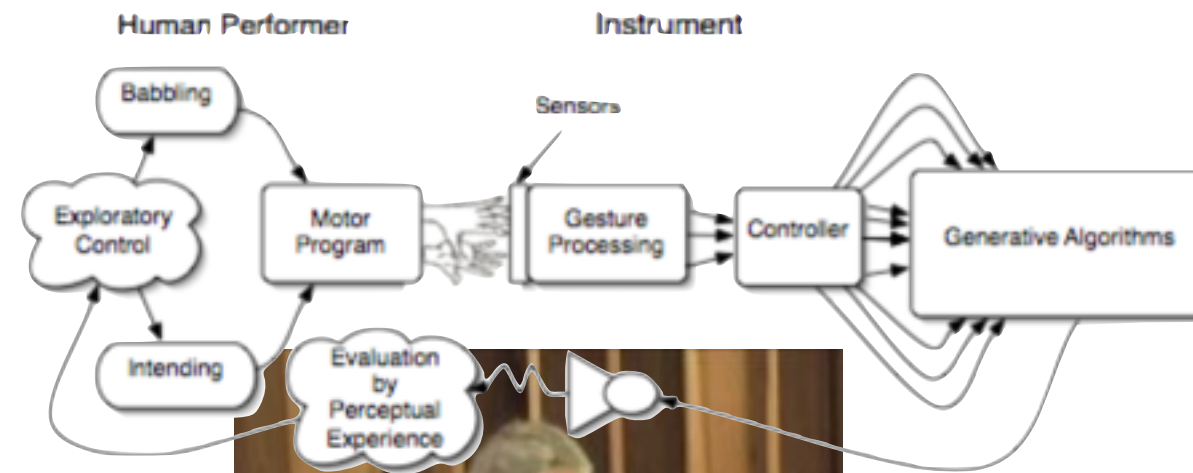
but what are we going to do with all these things?





is it possible that these sensing devices can be as intimate to us as traditional instruments?  
and as expressive?

## A framework for reasoning about computer-based musical instrumentation

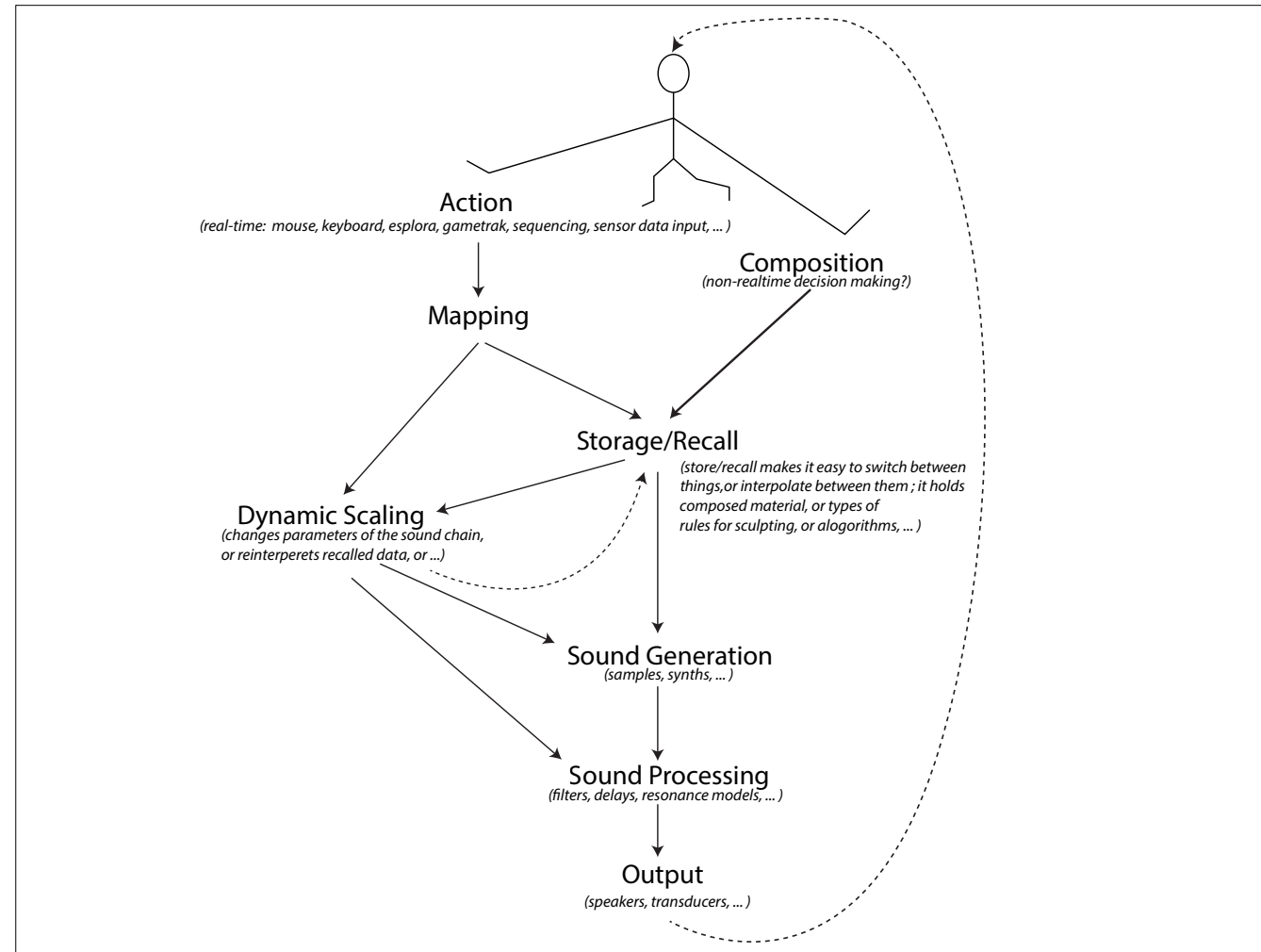


slabs:

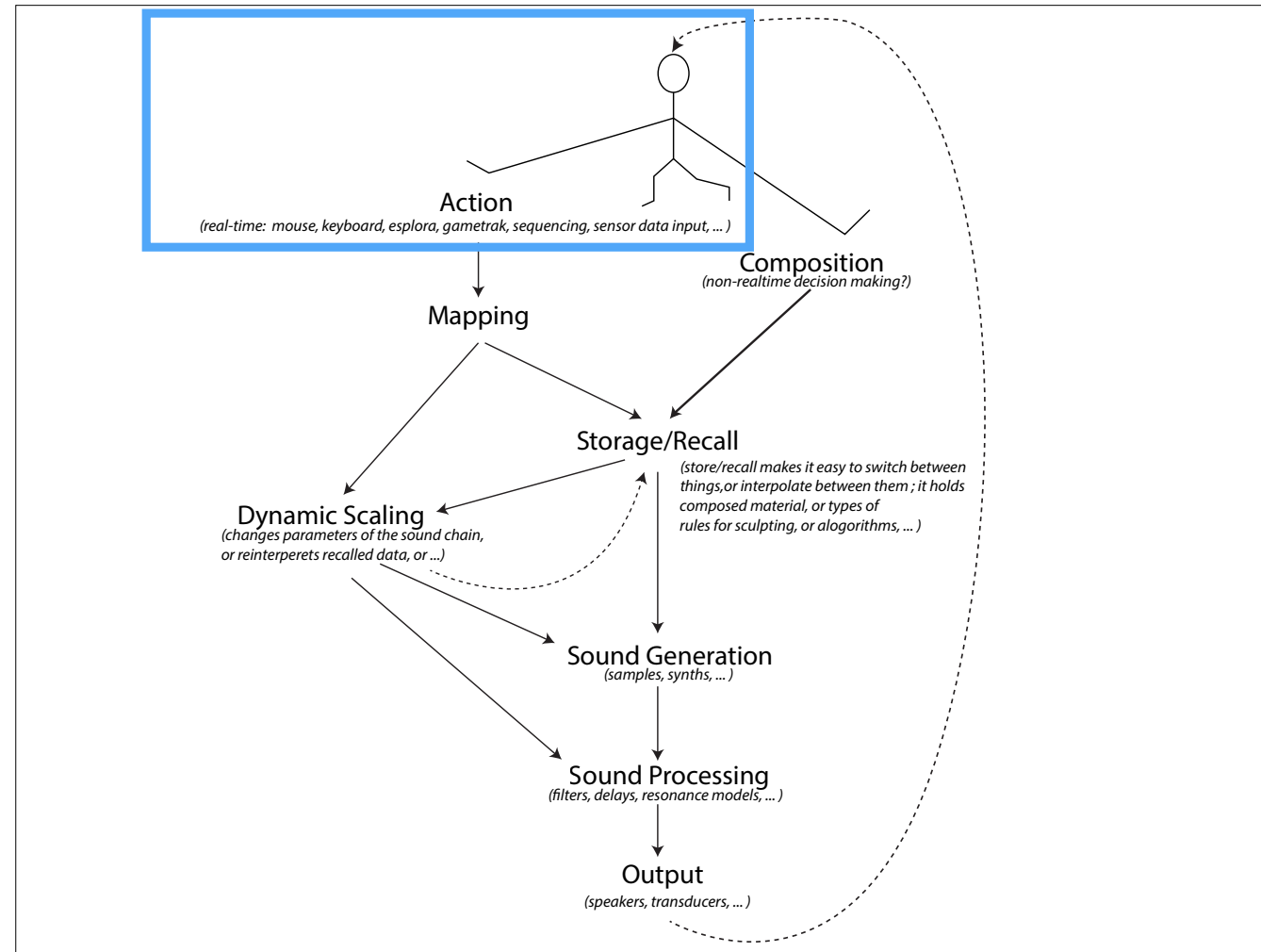
[https://www.youtube.com/watch?v=q\\_mtCZqNOMs](https://www.youtube.com/watch?v=q_mtCZqNOMs)

I think so, and so did David Wessel who was a pioneer on the topic of instrument design

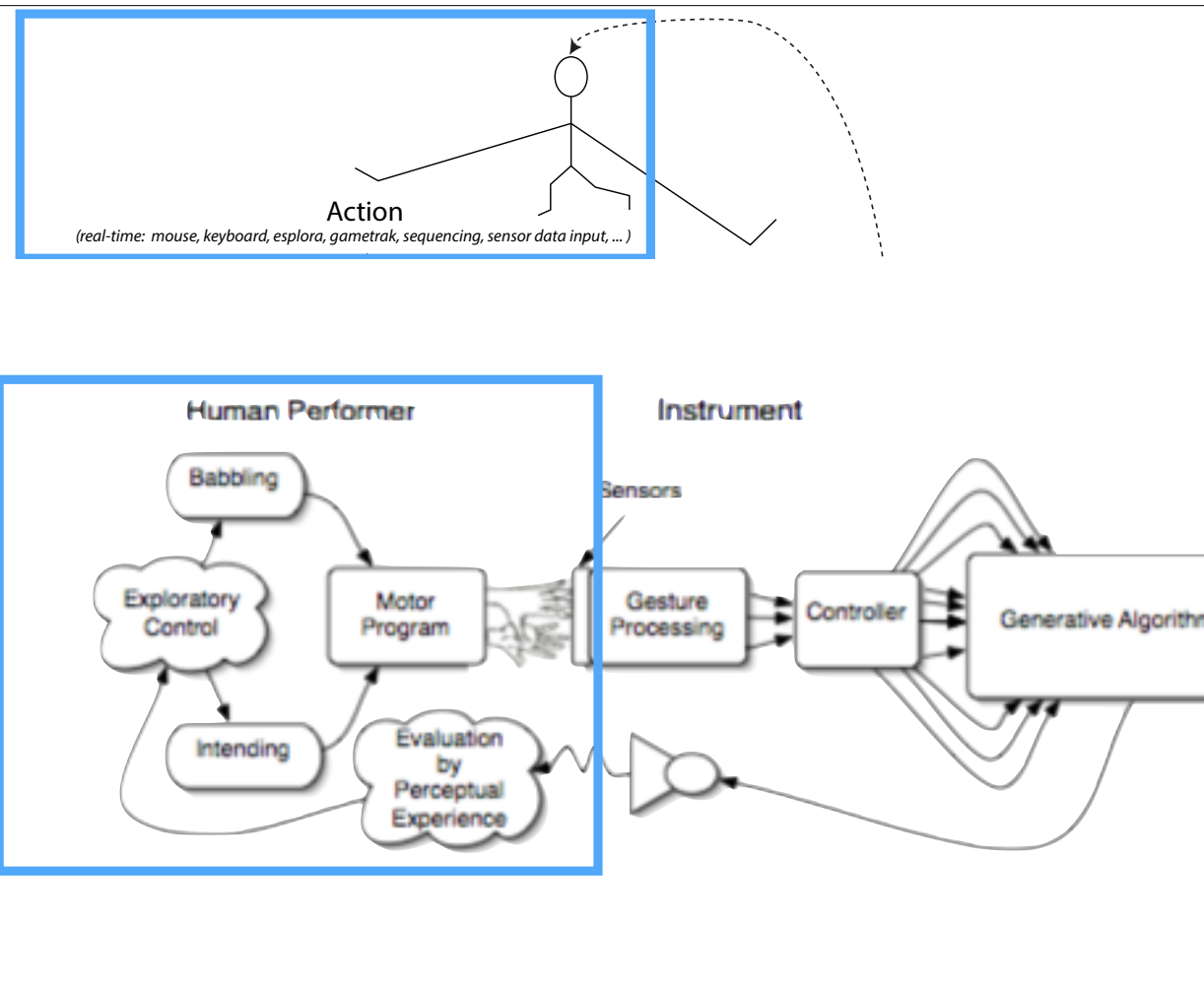




computational model of a possible instrument system



today we're going to start focusing on the Action / Input / Sensing part of this system



which relates to the human performer part of Wessel's diagram.

talk about learning

what are the types of gestures that instrumentalists use?

>> tabla / flute video

expressivity in musical gesture



Zakir Hussain vs Hariprasad Chaurasia  
<https://www.youtube.com/watch?v=TNMS3O3xDFc>

notice how two completely different instruments with completely different types of gestures can have melodic, rhythmic and timbral (tone color) interaction  
watch the way they move

## theater of musical gesture



Chico Marx:

<https://www.youtube.com/watch?v=IQeuw880tKI>

principles:

- cause and effect
- expressive performance extension of human body

## Lab 1

How do these input devices relate to movement?

How well does the range of values relate to the gesture of input?

How do the names of sensor values change the way we think about them?

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- cause and effect
- expressive performance extension of human body