Friedrich-Alexander-Universität
Technische Fakultät

Machine Learning
Data Analytics

FAU

# Human Computer Interaction

## Discussion Session 8: Technology

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Machine Learning & Data Analytics (MaD) Lab
Summer term 2024

# Technology

## Input & Output

### Input:

Vision

Speech


Affective Computing

Haptic

### Output:

Vision


Smell & Taste

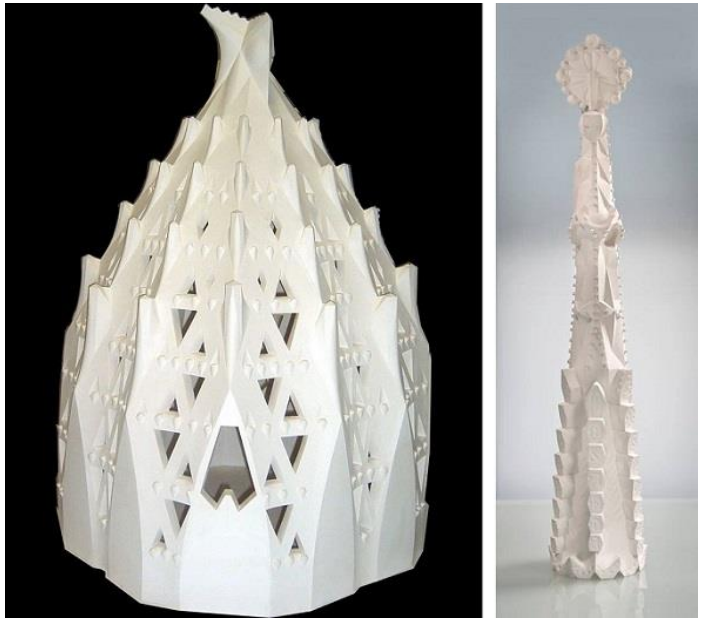
Activating the Human body

Audio

Haptic

Application of 3D-Printing: **Sagrada Familia**

- Incomplete blueprints
- 3D printed prototypes to visualize designs



# Technology

## Input & Output

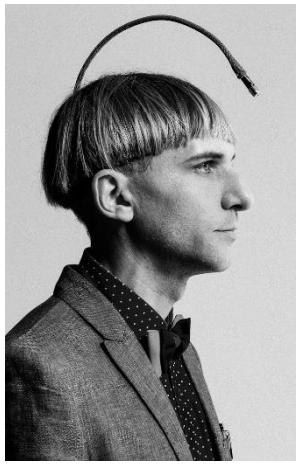

Why haven’t devices with 3D displays succeeded by now?

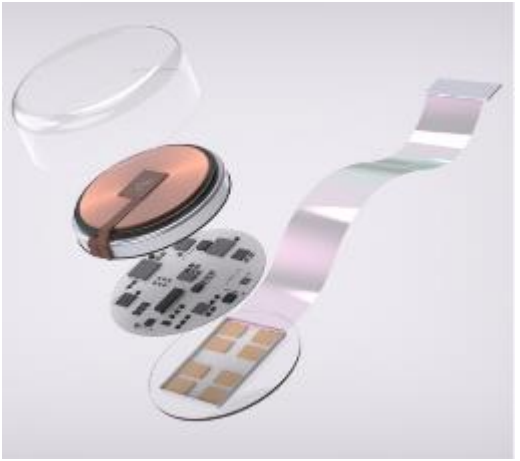
What other technical flops come to your mind?

# Technology

## Biohacking & Human Enhancement

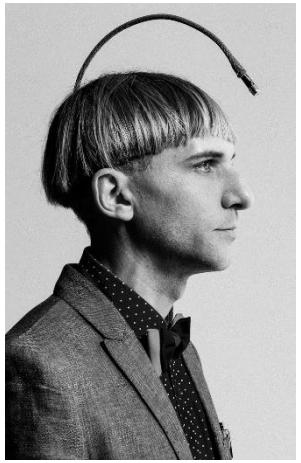

Not just science fiction!

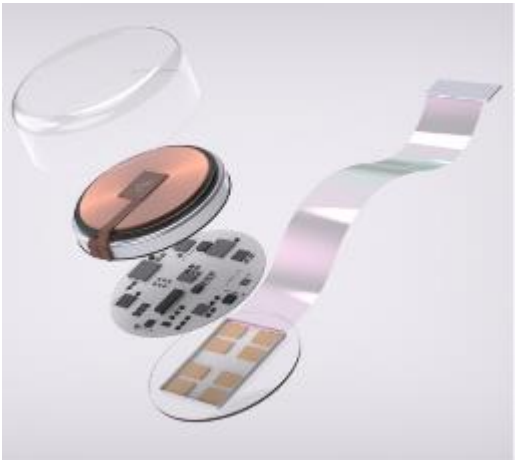




# Technology

## Biohacking & Human Enhancement





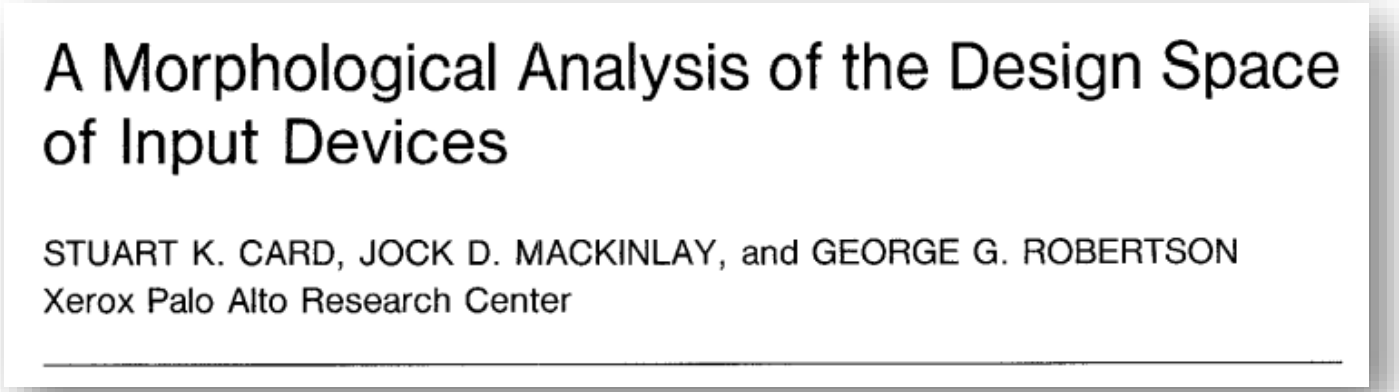
What ethical aspects need to be considered?

What impact could it have on society?

What challenges & barriers do you see regarding data privacy and data protection?

# Technology

## Design Space of Input Devices



A Morphological Analysis of the Design Space of Input Devices

STUART K. CARD, JOCK D. MACKINLAY, and GEORGE G. ROBERTSON
Xerox Palo Alto Research Center

- Market with bewildering variety of input devices
  →Introduction of a means to systematize devices through morphological design space analysis

- Design space consists of:
  - Primitive movement vocabulary
  - Composition operators

## A Morphological Analysis of the Design Space of Input Devices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- Primitive movement vocabulary

<M, In, S, R, Out, W>

Table I. Physical Properties Used by Input Devices

| | Linear | Rotary |
|---|---|---|
| Position | | |
| Absolute | Position **P** | Rotation **R** |
| Relative | Movement **dP** | Delta rotation **dR** |
| Force | | |
| Absolute | Force **F** | Torque **T** |
| Relative | Delta force **dF** | Delta torque **dT** |

M = Manipulation operator,
In = Input domain,
S = Current state of device,
R = Resolution function mapping from input domain to output domain set,
Out = Output domain set,
W = General-purpose set of device properties

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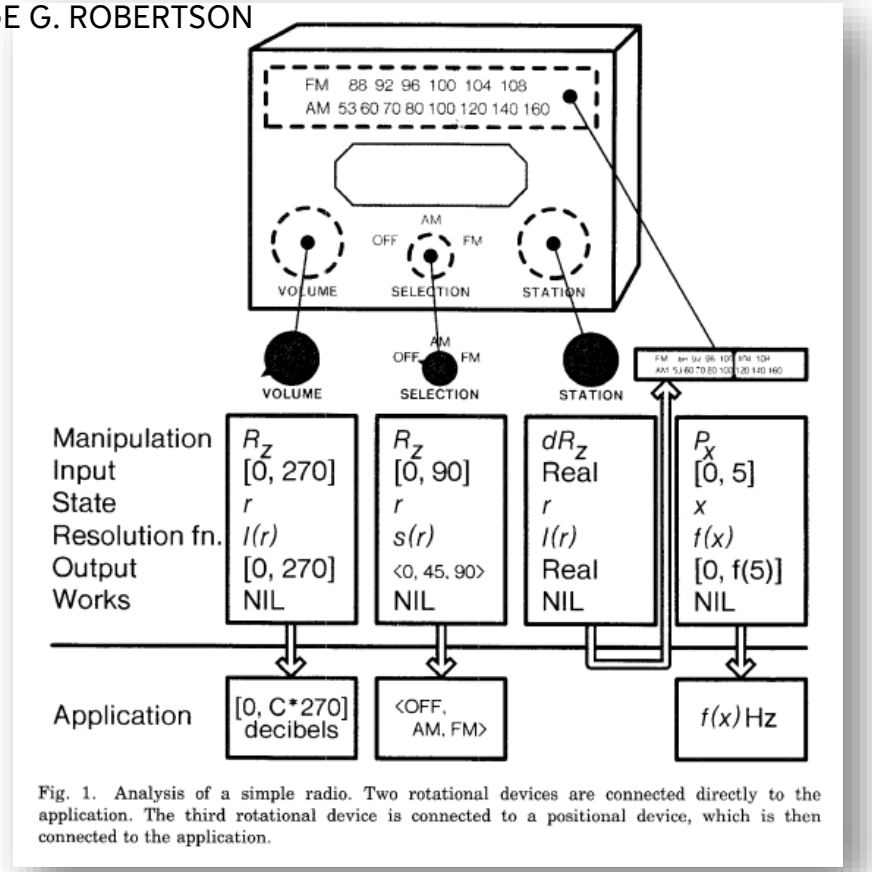


Fig. 1. Analysis of a simple radio. Two rotational devices are connected directly to the application. The third rotational device is connected to a positional device, which is then connected to the application.

## A Morphological Analysis of the Design Space of Input Devices


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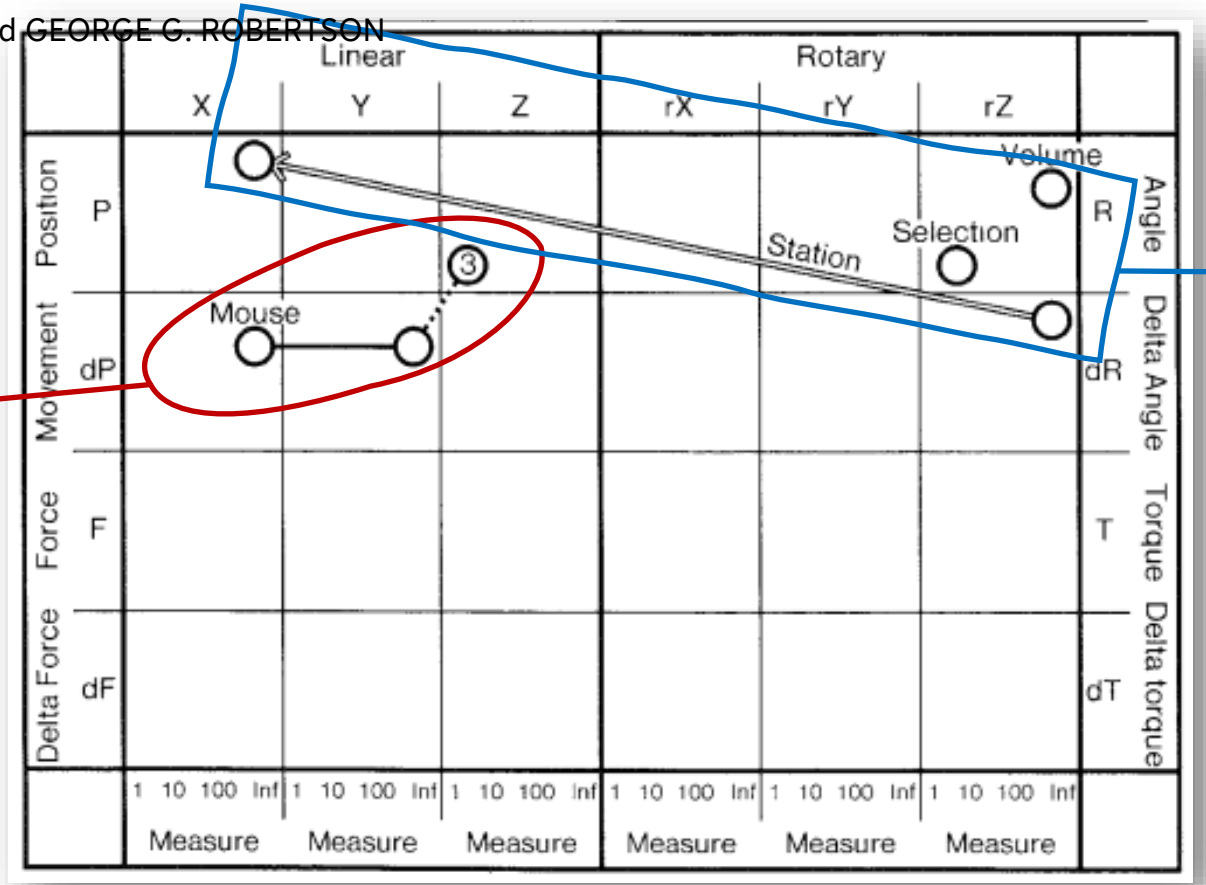

# Thank you for your attention!

Are there questions