

Wearable Technologies and Applications (Wearable Informatics)

Winfree

Lecture 2

Winfree

Dimensions of Functionality

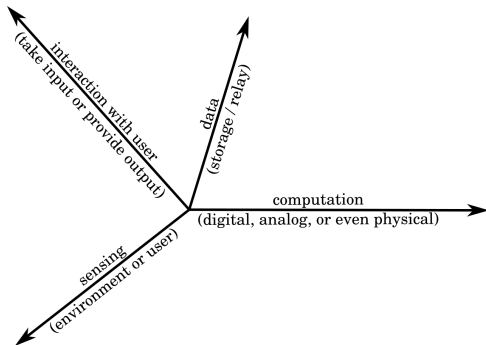
Δύο

Early Examples

“Recent” Examples

More Examples

Dimensioning Examples



- ▶ Four dimensions of functionality.
- ▶ Each axis is not necessarily orthogonal to any other.

Dimensions of Functionality

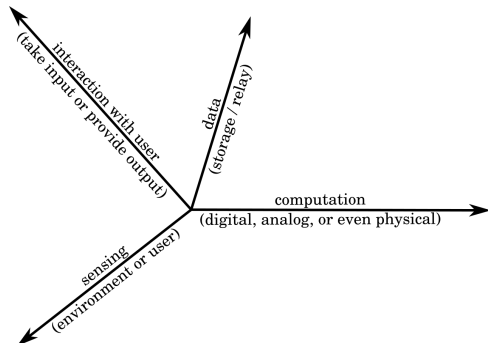
Δύο

Early Examples

“Recent” Examples

More Examples

Dimensioning Examples



- ▶ Environmental
 - ▶ Temperature (not skin)
 - ▶ Location
 - ▶ Air quality
- ▶ Wearer (user)
 - ▶ Temperature (eg skin)
 - ▶ Heart Rate
 - ▶ Physical Activity Level

Dimensions of Functionality

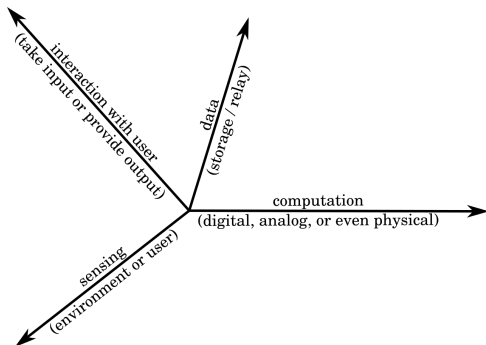
Δύρε

Early Examples

“Recent” Examples

More Examples

Dimensioning Examples

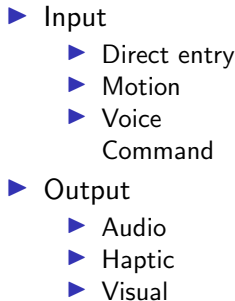


- ▶ Storage
 - ▶ Local
 - ▶ No storage - process and throw away
- ▶ Relay
 - ▶ Physical storage - SD card
 - ▶ Wired on command
 - ▶ Wireless
 - ▶ Continuous or Staged

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Dimensioning Examples



Dimensions of Functionality

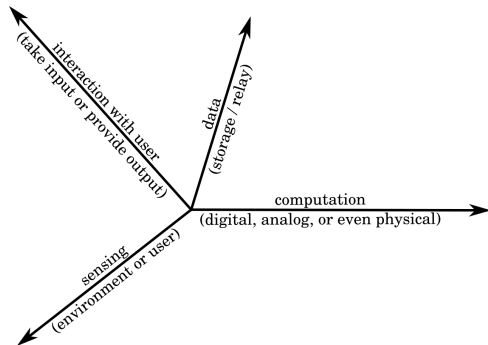
Δύρε

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Dimensioning Examples

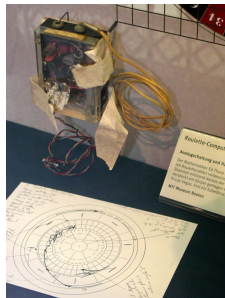


- ▶ Mechanical
- ▶ Analog
- ▶ Digital

Roulette Computer

August of 1961 Edward O. Thorp and Claude Shannon, of MIT

"They worked as a team. Shannon watched the wheel, clandestinely clocking the speeds of the rotor and the ball by flipping micro switches in his shoe with his big toe. The signals coursed through wires that ran up his pant leg to a small computer strapped to his waist. The machine calculated the ball's final resting position and then transmitted this prediction wirelessly to a receiver under Thorp's shirt. Through a tiny speaker in his ear, Thorp heard one of eight distinct tones that advised him on how to bet."^a



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Dimensions of
Functionality

Axes

Early Examples

Rivet Glasses

Countess of Lovelace

Roulette

"Recent"
Examples

Computing on the Wrist

Environmental Sensing

Human Sensing

More Examples

Fashion

Communication

Mobility

Implantables

Dimensioning
Examples

^a[http://spectrum.ieee.org/
consumer-electronics/portable-devices/
wearable-computers-will-transform-language](http://spectrum.ieee.org/consumer-electronics/portable-devices/wearable-computers-will-transform-language)

Computing on the Wrist

Casio CA-90
(1970s)



Seiko UC-2100 (1984?)



Casio Data Bank
(1980s to
current!)



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Environmental Sensing

Dimensioning Examples



¹<http://www.treehugger.com/clean-technology/environmental-sensors.html>

Human Sensing



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Little Boots Cyber Cinderella LED Dress

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See '1 - Little Boots Cyber Cinderella LED Dress [HD, 1280x720p].mp4'

Signing

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See ‘2 - SignAloud Gloves that Transliterate Sign Language into Text and Speech [HD, 1280x720p].mp4’

Orthotics and Prosthetics

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See ‘3 - Can Prosthetics Outperform Real Limbs Cyborg Nation [HD, 1280x720p].mp4’

Neural Prosthetics

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See ‘4 - Amputee Makes History with APL’s Modular
Prosthetic Limb [HD, 1280x720p].mp4’

Cochlear Implants

See '5 - How A Cochlear Implant Works by Advanced Bionics [HD, 1280x720p].mp4'

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Dimensioning Examples

See '6 - Kai hearing hearing her voice for the first time [Low, 480x360p].mp4'

Dimensioning Examples

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