Proxemic interactions: The new ubicomp?

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What are proxemics?

“An area of study that identifies the culturally dependent ways in which people use interpersonal distance to understand and mediate their interactions with other people”

Four proxemic zones:

- **Intimate**: Less than 1.5 feet
- **Personal**: 1.5 - 4 feet
- **Social**: 4 - 12 feet
- **Public**: 12 - 25 feet
Proxemics

- Closer distances lead to increasing expectations of interpersonal engagement and intimacy

- **Fixed features**: Those that mark boundaries, and people tend to organize social activity within these boundaries

- **Semi-fixed features**: Entities whose position can affect the space, and whether the space tends to bring people together or move them apart
Ubicomp - Ubiquitous computing

- The concept and science where computing is made to appear anytime and anywhere.
- Can occur using any device, in any location and in any format

Mark Weise - founder of ubicomp

“Technologies that disappear, that “weave” themselves into the fabric of every day life until they are indistinguishable from it, where computers are integrated seamlessly into the world”

Are we there now?
It is here proxemics can help us

Just as people expect increasing engagement and intimacy as they approach others, so should they naturally expect increasing connectivity and interactions possibilities as they bring their devices in close proximity to one another and to other things in the ecology.
Ubicomp proxemics

Concerns inter entity distance, where entities can be a mix of people, digital devices, and non-digital things
5 proxemic/ubicomp dimensions

- **Distance**: Discrete or non-discrete
- **Orientation**: Angle, roll, facing towards or away from etc..
- **Identity**: From exact identity to less detailed
- **Movement**
- **Location**: Important - The four above often dependent on the location
Example 1

The proxemic face

Driven by a simple set of rules:

a. Lonely when no one is present
b. Happy when friend comes into the room
c. Maintaining eye contact and expression as a function of distance
d. Becoming sadder as friend moves or looks away
e. Annoyed if friend pokes it in the eye
f. Angry if friend crosses intimate zone
Ow, stop it.

Not so close
The proxemic presenter

Example 2

Exploits distance, orientation and identity to distinguish the speaker from others

a. Speaker faces audience -> presentation fills the screen
b. Speaker stands on one side -> small readable pane appears on edge (the pane follows the speaker)
c. Speaker looks back at audience -> pane fades away
d. If speaker to far away -> pane will not appear
e. If speaker shields the display from the audience -> scrollable deck of slides appear to quickly change slide
The Message

Speaking notes, elapsed time and slide selection can be controlled directly through the presentation surface via proximity.
Example 3

The proxemic media player

- This example considers a broader room ecology of multiple people, multiple devices and even non-digital devices.

- Includes fixed and semi-fixed features, and all the procemix dimensions
The new ubicomp?

If designed well, it can exploit people's expectations on how they and their devices should interact with particular ecologies as they move toward one another.

But, there are uncertainties and challenges....
Challenges

- Assumes that a set of rules of behavior exists to dictate what that entity should do based on implicit acts. No guarantee that this will be correct.
- Many cases where applying a rule in a particular instance will be the wrong thing to do.
- Sensing systems are just guessing what is going on. Most inputs will likely be inaccurate with noise and errors, and critical info will be lost.
Challenges

- To design robust proximity interactions around inaccurate and incomplete information will be challenging.

- It is a fairly new field of study, and we just don’t understand the Human-computer-interaction of proxemics yet.

But, we can create simple and effective proxemic interaction systems today.