

Adaptive Interfaces

Professor Beste Filiz Yuksel
University of San Francisco
CS 686/486



UNIVERSITY OF
SAN FRANCISCO

CHANGE THE WORLD FROM HERE

What is an Adaptive Interface?

Traditionally, an adaptive user interface (AUI) is a user interface which adapts its layout and elements to the needs of the user and is alterable by each user.

But we are discussing *the next generation of adaptive interfaces*.

Particularly, systems that respond and adapt *with no additional and/or intentional effort from the user*.

Why focus on adaptive interfaces?

“Constructing a system that can detect a range of psychological states is pointless if [the] adaptive repertoire of the machine is unable to respond to those psychological states in an intelligible fashion”

- Fairclough, 2009

Why focus on adaptive interfaces?

The challenge of identifying emotion in the wild is not trivial.

Because of this, there is a danger that the focus of the community overemphasizes the improved detection of affect, with little to show for itself on the other end.

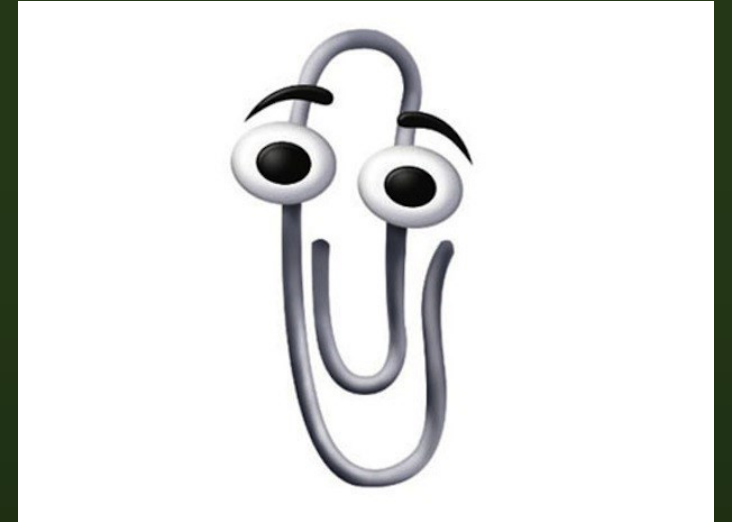
To counteract this, we also need to contextualize those improvements within the goals of the interface: how will better sensing lead to meaningful and intelligent improvement in people's interactions with computers, and eventually, lives?

Building *good* adaptive interfaces *is hard*.

First do no harm.

If your system has a false positive or true negative – it shouldn't be the end of the world.

Predictions are not always going to be correct.



But how can you build a system that has meaningful adaptations without it being critical if there are system errors?

- Trade off between cost and benefit.
- Create systems to *augment* traditional input devices (keyboard, mouse).
- Avoid irreversible or mission-critical adaptations.
- Subtle and/or gradual, helpful changes, that the user might not even recognize or attribute to the system adaptations.

Zander et al. 2010 proposes that such systems can be evaluated along three key dimensions:

- complementarity, or lack of interference with other input mechanisms;
- composability, or potential to stack with other monitors;
- controlled cost, or the effort of calibration and price of mispredictions

Adaptive strategies in Interactive Systems

Explicit adaptations – attentional foreground, consciously registered by the user

e.g. appearance of an avatar offering help.

Will cause self-appraisal for user: ‘am I stuck?’ ‘do I need help?’

Enormous potential for false alarms.

Explicit adaptations need to be curtailed so that used on an *infrequent basis or are relatively conservative*.

Fairclough, 2009

Adaptive strategies in Interactive Systems

Implicit adaptations – attentional background, not consciously registered by the user

e.g. a computer game increases intelligence of computer-generated opponents or speeding up tempo of background music.

In practice, however, it may be difficult to design adaptations that affect change in users while still remaining undetected.

Fairclough, 2009

Class Exercise

In your area of interest, take a moment to write down two adaptations that you might want to build:

1. Explicit (user notices adaptation)
2. Implicit (adaptation happens in background)

How would you ensure the explicit adaptation was not frustrating/overwhelming/detrimental?

How would the implicit adaptation be of benefit to the user?

Sometimes the simplest idea is the best

But the hardest to think of.

Simple ideas are not necessarily simplistic.

When you give your 'elevator pitch', want someone to be genuinely interested and say 'That's a great idea!'

Autonomy of the User

Affective computing systems are designed to 'manipulate' the state of the user in a benign direction.

But how do users feel about being manipulated by autonomous technology?

Who retains control over the process of manipulation?

Autonomy of the User

When a person exercises or listens to music, they have full control over the duration or intensity of the experience.

Many people may balk at the prospect of giving up any degree of control to autonomous technology.

Give system *accountability* and giving the user *control* over the system.

In addition, users need to understand how the system works so they are able understand the range of manipulations they may be subjected to, i.e., an analytic method for tuning trust in an automated system