

Let's be sensitive: Social Signals in Human-Computer Interaction



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Humans **communicate** social intentions through patterns of **nonverbal language** (posture, gestures, body motion) and are able to **recognize and respond** to that **social signaling, machines don't.**

Research Problem

This project aims to develop a **Social Signals Processing (SSP)** model based on **computationally inexpensive video processing** techniques applied to a real-world context can predict user's **interaction quality**, namely task difficulty, interaction incidents or need for assistance.



fig. 1 - Humans communicate social intentions through patterns of nonverbal language even while interacting with a machine.

Expected results

- **Identify social signals** that are related with user's **difficulty** or **interaction incidents**;
- Research and identify **video processing** techniques to extract **social signal metrics** from the user **behavior**;
- Build a **classification model** to infer user's difficulties from those metrics;
- Apply, test and evaluate the model applied to **HCI system** placed on a **public space**.

Preliminary Results

A group of participants (users) **performed** three different tasks on a **photocopier** while their **movements** were **recorded** (fig.1). The resulting clips were shown to another **group of volunteers** (evaluators), were they **identify** the level of **difficulty** displayed by the users. The evaluators could **predict 65%** of the user's **expected difficulty** with margin of error of one [1].

A set of **motion's features** were extracted using simple **video processing** techniques. These features, **Activity** and **Emphasis**, were used to compute a linear model that could **predict 46.6%** of the variance of **task difficulty** [2]. Using the same features is possible to infer the task difficulty after **25 sec.** of interaction.

Conclusions

These results suggest that will be possible to build **interactive systems** that are "**aware**" of the users **social signals** leading to interactive systems that are more "**social competent**".

References

- [1] N. Branco et al., "Blink: observing thin slices of behavior to determine users' expectation towards task difficulty.," in Proceedings of the 2011 annual conference extended abstracts on Human factors in computing systems - CHI EA '11, 2011, p. 2299.
- [2] J. P. Ferreira et al., "Thin slices of interaction: predicting users' task difficulty within 60 sec.," in Proceedings of the 2012 ACM annual conference extended abstracts on Human Factors in Computing Systems Extended Abstracts, 2012, pp. 171-180.

