Interaction Assessment through Physiological Interfaces in Collaborative & Mobile Environments

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1. Motivation
The evaluation stage of the design process of a system is of utmost importance for it to prevail. In recent years, we have witnessed a rise in the adoption of physiological interfaces as a complement to other interaction modalities. These novel interaction modalities are capable of detecting an individual’s biological signals and use that data to interact with a system, covering domains such as arts, entertainment or sports. Despite the existence of some validated work in this area, it mostly focuses on individual and laboratorial environments, failing to not only explore the possibilities and challenges of other scenarios but also to mimic the conditions found in the real world. Among these scenarios are collaborative and mobile environments. The increase in the number of participants, the more complex communication channels and data management are some of the issues present in collaborative settings; on the other hand, crowded environments, influential environment variables and the mobility factor are challenges present in mobile environments. The influence of all these aspects on an individual’s biological traits is yet to be addressed in existing work.

The purpose of this work is therefore the study of human behavior and biological reactions in collaborative and mobile environments through the use of physiological interfaces. While some of aspects related with these behaviors have already been addressed, it has mostly focused on laboratorial settings and ignored adequate evaluation techniques suited for collaborative or mobile settings.

The assessment will be performed through the use of an integrated platform for the evaluation of collaborative and mobile applications, using physiological sensors as a complement to traditional assessment techniques. The platform builds on an existing mobile prototyping framework, named MobPro [1], which comprises a set of modules for the design and evaluation of mobile prototypes. The physiological assessment library being integrated in the existing prototyping framework is comprised by a set of modules related to different interaction modalities considered for the context of this work. Among these is the recording of the heart beat rate and movement through the help of accelerometers.

2. Experiments
The performed experiments have mostly addressed mobile scenarios. These encompassed the utilization of the heart rate assessment module to study frustration induced by design faults in mobile devices, covering laboratorial and mobile settings. Results have shown that there are clear fluctuations in the individuals’ biological signals when confronted with interfaces with bad design, thus hindering their enjoyment and user experience. Results have shown there is a relation between an individual’s biological traits and the problems he / she encounters while interacting with an application (in this particular case I focused in frustration caused by certain events).

3. Conclusions & Future Work
The major contribution of this particular work is the use of physiological data along with observational and logged interaction data in mobile environments, already provided by MobPro. While existing approaches have utilized physiological data in desktop and stationary settings, these experiments showed it is plausible and possible to use the same data to perform usability assessment in mobile ones. Albeit not a pioneering work in the field, the breakthroughs in complementing traditional analysis techniques with physiological assessment tools brings new possibilities to both mobile application designers and analysts.

The future studies performed within this work will further give valuable hints and information regarding specific individual reactions and behaviors observed and documented with the help of the physiological assessment mechanisms.

4. REFERENCES