Towards User-Bound Interfaces

We introduce User-Bound Interfaces which represent game characters that are trained in accordance with the users' real-life activities. This would increase the correspondence between the user's activities and its underlying interface's attributes, which acts as a motivational factor for them to participate in those activities. We discuss the design process of User-Bound Interfaces, allowing designers to create applications and devices that would motivate user through engaging in designer-intended activities.

Related Works
Researchers have applied methodologies from various fields of Psychology, Gamification and Persuasive Design in order to allow system designers to shape user behavior in their preferred directions:

- Persuasive Technology applies elements of rhetoric and conditioning to influence behavior, mainly (so far) in the context of social networking websites and mobile computing.
- Psychological social elements such as adding uniqueness to individuals and displaying feedbacks of their benefits to the society, have been translated as motivational elements for character-based games.
- Through Gamification, various reward and reputation systems with points, badges, levels and leader-boards have been incorporated as encouraging factors.

Future Works
In order to evaluate the effect of digital companions on children and its collaborative scenarios, we plan to conduct a longitudinal field study where we will observe users playing with Plexy at their natural environments for extensive periods of time.

We are able to track other activities through using a wider range of sensors in Plexy, such as world exploration through using GPS sensors that are able to track users position and traveling amount.

We believe that the present study, when viewed as a pilot for future more rigorous experiments, can contribute to the literature and that Plexy can introduce numerous possibilities for designers and researchers working in this space.

Implications for Design
The fact that people respond to computer products has significant implications for persuasion. We believe that knowing our target audience and providing a way for different groups of users to choose the role they prefer in the game is key for designers of persuasive technology. We are planning on drawing from a wide range of sociology, psychology, and interaction design research, as well as our own current and future study results in order to better understand our users.

We are also aware of the arguments around designing psychological cues into digital and computing products that raise ethical and practical questions. We are hoping to embed appropriate psychological cues into our design in an ethical manner.

Motivation
We had this intuition about children's existing toys not fully satisfying their socio-emotional needs, thus we did a survey in Iran's International Toy Festival and interviewed children between ages of 7 - 14 about the games they want to play and those that they currently play with.

57% of children prefer to play with their friends but end up playing alone!

If there was an electronic device that could hold children's interest in both multi-player and single player games it would be probably well received.

Design
An important factor in User-Bound Interfaces is to minimize the distance between the user and its underlying interface by increasing the directness of user's interaction with 3D game characters.

In Plexy, our main goal is encouraging children to participate in co-present activities as well as other beneficial activities such as Intellectual activities and Physical activities.

Implementation
We are using six IrDA modules on every side of Plexy to enable cooperation between Plexies and an AVR xMega microcontroller as the main processing unit that is able to manage the high number of required serial ports.

Furthermore, in order render 3D characters using Augmented Reality, we are using a uTOLED-20-G2 transparent display with four IR distance sensors. Finally, an IMU sensor consisting of a gyroscope, a magnetometer and an accelerometer is embedded within Plexy to sense players physical activity.

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