Games: screening and therapy

Professor András Lőrincz, of Eötvös Loránd University, discusses the use of gaming technology to improve screening and therapy

The health and wellbeing of *homo erectus* concerns the whole personality mosaic, including our *homo sapiens* (wise Man) and *homo affectus* (emotional Man) faces. We are trying to approach both via the facet *homo ludens* (playing Man). The challenge is to embed cognitive and psychiatric tests into games, improve and maintain cognitive abilities and affective state through playful learning and practising. Last, but not least, a proper exercise level can serve a 'sound mind' if the body is healthy.

In order to execute our program properly, we have to: (i) consider personal rights; (ii) provide expert advice and support; (iii) and supervision based on high-quality information. At first sight, this seems impossible or at least very expensive. However, technological advances can serve our purposes well.

High concern

Personal rights are of high concern especially since we would be providing all kinds of data about ourselves, while not being aware of the high efficiency of data mining. Furthermore, therapeutic interventions would be influencing us requiring informed consent on subjects that are beyond our knowledge. One can easily envision problems that bring about ethical issues. We need expert support.

Thus, we need expert knowledge that helps expert communities to provide information that we can comprehend. Crowdsourcing comes to our rescue here; and data mining can also serve high level recommendations if high precision sensory information of diagnostic value is available. This leads to the third point.

Wearable and ambient tools, such as a smart bracelet, a smart watch, or ambient tools such as a smartphone or the handle of the refrigerator, can measure our heart rate or blood oxygen level during daily activities. Such simple sensors can, for example, give information about our stress level and – in principle – gaming situations can reproduce them. We can also see games as most entertaining ways of practising. Other methods may deal with meta-level information, such as real-time facial expression estimation and the characterisation of affective state via visual and auditory signals, including prosody.

Optimal and timely

Scientific observation reveals that psychiatric interviews are relatively crude and are not well suited for monitoring slow individual behavioural and cognitive processes under medication. Consequently, the precautionary actions may give rise to drug over-prescription that may increase the risk of side effects. Our approach can serve optimal and timely actions on this field, compensating the risk of over-prescription.

We propose gaming for monitoring, and sometimes later, 'off policy evaluations'. The latter means that the value of various actions including the ones executed are first estimated and are evaluated after learning the consequences. The procedure can optimise decision making.

Educational games. Top: an inductive reasoning task. Middle: framegame to modulate stress level and crowdsourcing tool for supervisory help. Bottom: (a) children can communicate occasionally during playing, (b) playing mostly alone, but framegame is added, (c) cumulated results of control groups. (a)–(c) subfigures show considerable improvements

We started our approach in a harmless field: we developed playful training of inductive reasoning. We demonstrated that our games are entertaining, they give rise to a considerable increase in inductive reasoning and the effects are long-lasting. We are developing crowdsourcing methods for experts who can evaluate gaming situations within the game and after seeing the results.

We are to recruit experts of special needs to form our expert board. The board can come to conclusion in ambiguous situations. They can also suggest tools to improve characterising situations in games. We have been developing mobile, wearable, and ambient tools, work with psychiatrists, psychologists, and neuroscience and education experts. We are to extend our developments towards elderly people and people with mental problems.

The EITKIC_12-1-2012-0001 project is supported by the Hungarian Government, managed by the National Development Agency, financed by the Research and Technology Innovation Fund and was performed in co-operation with the EIT ICT Labs Budapest Associate Partner Group (www.ictlabs.elte.hu).

Professor András Lőrincz
Eötvös Loránd University
tel: +36 1 372 2500 / Ext 8347
lorincz@inf.elte.hu
www.inf.elte.hu