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A FAUSTIAN EXCHANGE: WHAT IS TO BE HUMAN IN THE ERA OF UBIQUITOUS TECHNOLOGY?

# Toward mutual dependency between empathy and technology

**Toyoaki Nishida**

**Abstract** Technology explosion induced by information explosion will eventually change artifacts into intelligent autonomous agents consisting of surrogates and mediators from which humans can receive services without special training. Four potential problems might arise as a result of the paradigm shift: technology abuse, responsibility flaw, moral in crisis, and overdependence on artifacts. Although the first and second might be resolved in principle by introduction of public mediators, the rest seems beyond technical solution. Under the circumstances, a reasonable goal might be to create a mutual dependency between empathy and technology: Using technology to help people cultivate empathy among people, so empathy in the society may allow people to help each other to recover from disasters beyond the scope of the assumption underlying the society of mediators. I highlight an immersive collaborative interaction environment for helping people share first-person view and its application to building empathic agents.

**Keywords** Technology abuse · Responsibility flaw · Moral in crisis · Overdependence on artifacts · Empathy · Sharing hypothesis · Empathic agents · Teaching by indwelling · Learning by mimicking

T. Nishida (✉)
Kyoto University, Sakyo-ku,
Kyoto 606-8501, Japan
e-mail: nishida@i.kyoto-u.ac.jp

## 1 Info- and techno-plosion

The digital universe is exponentially expanding. The volume of information on the net has exhibited an exponential increase in the last decade. This phenomenon is often called information explosion or info-plosion (Kitsuregawa and Nishida 2010). In the info-plosion age, the user is becoming more interested in information services brought about by artifacts, rather than artifacts themselves. Info-plosion not only visualizes a long tail of desire that might serve as a driving-force for technology but also popularizes methods and tools for realizing desire. The collective intelligence empowered by the information infrastructure enables agile fabrication of a solution to desire. The more desire is satisfied, the more desire is generated.

Eventually, info-plosion will result in techno-plosion, causing a paradigm shift from the artifacts-as-designed-tools to the artifacts-as-autonomous-agents. In this paradigm, we live with autonomous agents for assistance in the living space. They will serve as an integrated interface between the real and cyber world. They will be able to collect the situational information around themselves through sensors and provide a suitable service with the user through actuators of various kinds. They will hang around you and help you both reactively and proactively. As the technology will realize the details, the human will not have to be a computer geek in order to benefit from the advanced information and service environment brought by intelligent autonomous agents. From the moral points of view, the advent of autonomous agents may more conform to humanity, for they will allow us to concentrate on the *end*, as opposed to the *means*, and ultimately, we will not have to pay much attention on the tools, or the means for the end, as autonomous agents will take care of all the details concerning the tools on behalf of us.