Artificial Ethics:
A Common Way for Human and Artificial Moral Agents and an Emergent Technoethical Field

Laura Pană, Polytechnic University of Bucharest, Romania

ABSTRACT
A new morality is generated in the present scientific and technical environment, and a new ethics is needed, an ethics which may found both individual and social morality, guiding a moral evolution of different cultural fields and which has chances to keep alive the moral culture itself. Pointed out are the scientific, technical, and philosophical premises of artificial ethics. Specifically the status and the role of artificial ethics is described and detailed by selecting ethical decision procedures, norms, principles and values that are suitable to be applied both by human and artificial moral agents. Moral intelligence as a kind of practical intelligence is studied and its role in human and artificial moral conduct is evaluated. A set of ethical values that may be shared and applied by both human and artificial moral agents is presented. Common features of human and artificial moral agents as well as specific properties of artificial moral agents are analyzed. Artificial ethics is presented and integrated in the multi-set of artificial cognition, discovery, activity, organization and evolution forms. Experiments and the results of this article are explored further in the article.

Keywords: Artificial Ethics, Artificial Moral Agents, Co-Evolution of Human and Artificial Moral Agents, Emergent Ethical Fields, Ethical Values, Moral Intelligence, Natural and Artificial Evolution, Technological and Social Prognosis

PREMISES FOR AN ARTIFICIAL ETHICS
A new morality, freer in spirit but at the same time more strictly regulated, is generated in the present scientific and technical environment, by social and cultural evolutions which keep their own moral dimension in more implicit ways. The new ethics which may found both individual and social morality, which can guide a moral evolution of different cultural fields such as science and technology, and which can also maintain and continue the moral culture itself, will be an artificial ethics when compared to the traditional one.

When we think of artificiality we have to take into account two basic truths: 1) society is the first artificial “object,” and all humanly established realities are consequently artificial; 2) perhaps the majority of contemporary results of human thinking and acting can be named artificial in comparison with all the past human performances.

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For the specific field of moral culture, Danielson (1998) showed that “important parts of morality are artificial cognitive and social devices” (p. 292). From a larger cultural perspective, even J. Bentham, who described “the whole fabric of morals and legislation” can be cited. Another authoritative argument is furnished by Aristotle: he writes in his *Politics* (II. 5) about the automatic tools and installations of Daedal and even about the mentally controlled tripods created by Hephaestus, which served the “band” of gods. We cannot forget, in this context, Plato’s *Republic*, where the oldest cyberneticist offered the first description of society as a human and artificial design and product, together with a project of a perfect but human organization of public affairs. As we know, he proposed and used a few efficacy means and criteria to build his “word-made” city.

If Aristotle emphasized the material and practical results of human or divine creativity, some very important and always necessary components, instruments and techniques of every activity – the intellectual ones - were earlier identified by the sophists who studied language as a “technique of techniques,” by the Old stoic school that practiced the first elements of logical calculus and by Euclid’s commentators who synthesized a lot of heuristic methods. Al-Khwarizmi later created working algorithms for any field of calculus (820 AD) and medieval mnemonics used linguistic algorithms in learning processes.

We are using here a general, but also not a soft meaning of the term “artificial.” By “artificial” we mean any completely new social outcome of human activity, either theoretical or practical, such as a concept, a method or artifact, a social body, a system of relations or an institution, therefore, any kind of real mental construction or material achievement. At the same time, even if we are situated in the realm of values and spirituality, the term “new” is taken in its hardest sense and meanly means “unprecedented.”

As an outstanding intellectual invention by which something entirely new was established, we can here mention a worthy successor of the above-named divine devices: the logical machine of Lull, made in order to produce all the possible knowledge by a mechanical method – his *Ars Combinatoria* (1275). This machine, made of paper, was effectively used for automatic but mechanical generation of religious truth.

We can include in the same class of “artifacts” or artificial products the first digital computer conceived by Pascal - the Pascaline (1642, 1645) - as well as his mechanical computer (1624).

The artificial universal language was coined by Kircher in *Polygraphia nova* (1663). In the same intellectual register we can add his *Ars magna scientiae sive combinatoria* (1669), alongside his cryptographic activities, his automata, as well as an image-projector or a magnetic clock and other magnificent inventions.

Leibniz was the more famous author of *Dissertatio de arte combinatoria* (1666) but also the inventor of a computing machine for the four mathematical operations, in different variants (the first in 1671). He also developed the binary computing system (1679/1701) and proposed the *characteristica generalis* (1682).

Perhaps as a follower of Descartes, who was not only a mathematician and a physicist, but also a biophysicist (he even had a dissection cabinet) and who proposed the mental experiment of the “brain in the tube,” Leibniz also studied the mind, by applying a large-scale model – “the mill”; as we know, this idea and even the term were later used by Babbage.

Because of the specifics of the moral field, the novelty here means something valuable – just like in all other creation fields - but also something that is imperatively necessary to be done. As a specific feature of moral prescription itself, we can note its spiritual nature. A few current, important and useful aspects of spirituality are that it is:

a. Abstract and generally applicable;
b. Easily intelligible and easily formalized;
c. It has or may receive a precise operable character.
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