

Do Animals and Machines Think like Humans?

– a Cluster Analytic Approach

Jakob von Recklinghausen

Institut für Philosophie, Humboldt Universität zu Berlin, Germany

vonreckl@informatik.hu-berlin.de

Abstract

Asking whether animals and machines think like humans brings up the question of how to define 'thinking'. In the history of the concept 'thinking' its definition has often been adapted to current scientific developments so that it only applied to humans. Yet recent scientific developments seem to melt away this anthropomorphic restriction on thinking. To discuss different definitions of thinking used in different disciplines and to investigate, who or what can be called 'thinking', I use cluster analysis, an unsupervised classification method that yields a class structure based on statistical properties of the input data.

As a first example I provide an analysis based on the distinction between implicit (perception, motor-control, *thinking how*) and explicit (mathematics, language, *thinking that*) cognitive abilities, which nicely illustrates the problem of anthropomorphic definitions of thinking. If you define thinking only by explicit abilities, as normally done before the computer age, you will have no problem to keep animals out of the extension of the concept. With machines playing chess as good as humans, you have to include implicit cognitive abilities to keep machines out. But research in animal cognition suggests that animals show a high degree of implicit and also explicit cognition endangering our exposed position

I will provide and compare results of cluster analyses based on different concepts of thinking taken from various disciplines, e. g. psychology, cognitive ethology, artificial intelligence. These involve diverging cognitive skills in different combinations and with different weighting such as social learning, language skills, abstract representation, cognitive maps. For the sake of simplicity I will focus on a few species including humans, chimpanzees, crows, ants, PCs, AIBO (Sony), ASIMO (Honda) and others.

The result should show, how the list of cognitive skills used in certain disciplines is influenced by the community's preference to include or exclude entities from thinking.