Chapter 4
Machine Ethics Interfaces:
An Ethics of Perception of Nanocognition

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ABSTRACT

The purpose of this chapter is to conceptualize cognitive nanorobots, an ethics of perception, and machine ethics interfaces. Three areas are developed as a foundational background. First is the context and definition of cognitive nanorobots (nano-scale machines that could be deployed to facilitate, aid, and improve the processes of cognition like perception and memory as a sort of neural nano-prosthetics). Second is philosophical concepts from Bergson and Deleuze regarding perception and memory, and time, image, difference, becoming, and reality. Third is a summary of traditional models of ethics (Ethics 1.0). These building blocks are then used to connect perception and ethics in the concept of machine ethics interfaces, for which an ethics of perception is required, and where an ethics of immanence (Ethics 2.0) is most appropriate. Finally, killer applications of cognitive nanorobots, and their limitations (neural data privacy rights and cognitive viruses) and future prospects are discussed.

INTRODUCTION

The aim of this chapter is to provide a comprehensive discussion of the concept and implications of an Ethics of Perception of Nanocognition (Nanorobot-aided Cognition). The ethics of perception of cognitive nanorobots contemplates the idea of having on-board nanorobots in human brains (as a sort of neuro-prosthetic or next-generation brain-computer interface) to aid with cognitive activities like perception, and explores what kinds of ethics modules might be appropriate for how we would like cognitive nanorobots to guide our

perception. These are previously unconsidered topics in philosophy, social science, nanotechnology, and neural nanomedicine because the idea of cognitive nanorobots has not yet been considered, and neither have related philosophical issues been articulated such as that of an ethics of perception. The notion of cognitive nanorobots is new and speculative, both from a science and philosophical perspective. Philosophically, 'an ethics of perception' is a new idea is that having had only one unalterable means of perception has meant that we have not thought to question the ethics of our existing mode of perception, or

even that there might be an ethics to our existing perceptual paradigm. In fact, to some degree we have failed to notice that even if we think there is not, there is an inherent ethics in everything: people, societies, and technologies. These default existing models of ethics have principles and effects that have not always been deliberately thought out or examined, and this is investigated in the context of cognitive nanorobots. Inherent models of ethics, default or otherwise, should be addressed explicitly in the design of new technology (Ihde, 2001). The objective of the chapter is to propose an ethics of perception (and an ethics of reality) both conceptually from a philosophical point of view, and in their potential concretized implementation in machine ethics interfaces.

This chapter seeks to present nanorobot-aided cognition and perception as a potential future development in nanotechnology, and suggest possible 'ethics modules' and 'machine ethics interfaces' for these new ways of guiding and aiding our perception. The chapter proposes a formulation of an Ethics 2.0 for emerging and alternative modes of perception and perceptual paradigms. The possibility of changing and modifying our perceptual apparatus, for instance, by addressing the biased way we tend to see and appreciate others, is important to examine, as is the very notion of choice in perception. To provide a comprehensive consideration of these topics, the chapter seeks to achieve a few interrelated goals: defining and explaining the importance of proactive analysis of machine ethics interfaces; making the case for the continued relevance of Bergson and Deleuze in relation to machine ethics interface issues and more broadly; and finally, connecting these analyses with an interpretation of modern ethics and its challenges. Thus the chapter on nanocognition as a perceptual technology is organized into two main sections. First, there is a deep-dive into the philosophy of Bergson and Deleuze to provide the motivation and substantiation for a view of an ethics of immanence to accompany the new functionality unfolded by the new capabilities af-

forded in nanocognition. This is a contextualized mobilization of their thought, specifically directing it and making it accessible and applicable to the situation of perception, reality, and nanocognition. The second portion of the chapter concretizes these ideas into the proposal of an Ethics 2.0 of Immanence, and a discussion of the philosophy of perceptual augmentation technologies, and potential killer applications of machine ethics interfaces such as bias reduction, memory management, and value-system optimization.

Terminology

Machine ethics is a term used in different ways. The basic use is in the sense of people attempting to instill some sort of human-centric ethics or morality in the machines we build like robots, self-driving vehicles, and artificial intelligence so that machines do not harm humans either maliciously or unintentionally. This trend may have begun with or been inspired by Asimov's famous Three Laws of Robotics which seek human-safe interaction with robots (Asimov, 1950). However, there are many different philosophical and other issues with this definition of *machine ethics*, including the lack of grounds for anthropomorphically assuming that a human ethics would be appropriate for a machine ethics, especially beyond the context of human-machine interaction. There is another broader sense of the term *machine ethics* which means any issue pertaining to machines and ethics, including how a *machine ethics* could be articulated by observing machine behavior, and (in a Simondonian sense) how different machine classes might evolve their own ethics. There is yet a third sense in which I am using *machine ethics*, to contemplate human-machine hybrids, specifically how humans augmented with nanocognition machines might trigger the development of new human ethical paradigms, for example an ethics of immanence that is completely unlike traditional ethical paradigms and allows for a greater realization of human capacity. *Machine ethics*

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