Bioethics and Discussion Concerning the Nature of Applied Ethics The term “bioethics” has many uses, highlighting the relationship between theory and practice. First, it is the name of a disciplinary framework for various moral topics in relation to life sciences, human beings, animals, and nature. Second, it is an interdisciplinary approach that integrates various types of empirical data to solve practical problems. As an approach, bioethics claims to offer ethical guidance for practical problems and conceptual clarification of new types of complex issues. Additionally, its aim is to elaborate structured arguments by critically examining judgments and considerations in topical discussions. Bioethics employs moral philosophy when issuing problems arising from the biological nature of human beings. However, it can also contribute to the opposite, as the study of biological facts may give rise to specifications of ethical concepts, such as defining and understanding the notion of personhood (Gordon, 1995; Jonsen, 2012, 11–13). A central feature of bioethics has been the aim of solving real-life problems and forming guiding practices and policies. The ideal that has motivated the development of bioethics is to create a practical, applicable moral philosophy, and to not concentrate on speculative analysis. The adopted line of study presents bioethics as a form of discourse that promotes public debate on issues related to biomedicine, thereby encouraging people to find ways to resolve upcoming issues (Jonsen, 2012, 12–13). Such general descriptions of bioethics suggest that bioethics, even when emphasizing the importance of applicability, provides a theoretical basis for deducing practical solutions. If not, at least some principles are provided that people exercising bioethics can then apply to practical cases, thereby solving (or suggesting how to solve) the problems at hand. This view is intuitively appealing, but has been contested (Flynn, 2021). The pioneers of bioethics were philosophers and theologians who represented different traditions of moral philosophy, such as Kantian deontology, varieties of utilitarianism, or Thomistic thinking. Thereafter, virtue, feminist, and narrative ethics were added to the pool of bioethical approaches. The differences between the basic theoretical assumptions suggest that the practical solutions deduced from them would also differ, thus reflecting the variety of background theories. However, this was not the case. In bioethics, different theoretical assumptions have not led to different suggestions concerning practical solutions to concrete problems, and sharing a background theory does not necessarily lead similar recommendations. Such observations suggest that the view of bioethics as applied ethics— deducing practical outcomes from theoretical principles—does not correspond with the actual role and practice of bioethics (Gordon, 1995; Flynn, 2021, 503; see also Mittelstadt (2019) who does not question the deductive view of bioethics). The debate concerning the nature of bioethics as applied ethics has taken place among both practice-minded bioethicists and those who take a more theoretical approach to the discipline. Remarks concerning the discrepancy between the differences of opinion on the theoretical and practical levels of bioethics are the weightiest theoretical arguments against the deductive view of bioethics. The bioethical approach of considering bioethics as a theory and practice, which are linked by applying the basic values and principles offered by the theory to the practical problem at hand, is known as principlism (Gordon, 1995; Jonsen, 2012; Flynn, 2021). The critical voices against the principlistic approach gained impetus in the 1980s. The critics noted that the approach often generated more theory, instead of accounting for reallife issues and considering their acuteness in people’s lives. According to their view, abstract theory should give way to each actual case

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as the starting point of a bioethicist's consideration. Frontiers in Computer Science | www.frontiersin.org 6 April 2022 | Volume 4 | Article 776837 Hallamaa and Kalliokoski AI Ethics as Applied Ethics The suggestion, referred to as casuistry, was that top-down principlistic approaches should be replaced by a bottom-up type of reasoning and problem solving (Clouser and Kopelman, 1990; Gordon, 1995; Jonsen, 2012; Flynn, 2021). Casuistry did not replace principlism as the main approach in bioethics; however, it did demonstrate the need to modify deductive approaches. The reason why casuistry did not gain more support was the criticism that a mere case description does not help in solving practical problems. To make a normative decision, at least one normative premise is required in the form of values and principles. The solution suggested was that, in lieu of abstract principles representing high morality, the theoretical starting point of a theory of ethics, bioethical considerations should focus on mid-level principles (Gordon, 1995; Flynn, 2021). The most well-known suggestions of such mid-level norms are the four principles of autonomy, non-maleficence, beneficence, and justice, which was first defined in 1984 and repeatedly redefined by Beauchamp and Childress (2019). The gap between principlism and casuistry has been further bridged by methodological considerations borrowed from the discussion on how to best define the basic principles of societal justice. Based on John Rawls's concept of reflective equilibrium (Rawls, 1971), bioethicists have developed methods to balance each other's theoretical notions, moral principles, cultural and social conceptions, and facts concerning acute practical problems (Flynn, 2021). By critically considering all aspects of a case against each other, it is possible to reach a conclusion that can serve as a suggestion for managing the problem. During the deliberative process, each of the discursive elements and discussion parties affects the other elements. Consequently, the empirical observations and considerations based on them may affect theoretical conceptions and modify basic moral principles, and vice versa (Flynn, 2021). What could the discussion about bioethics contribute to the discussion of AI ethics? The subject matter of AI ethics is in many respects different from that of bioethics, as the applications and systems using AI do not relate to any overarching topic, unlike the focus on health and well-being in bioethics. However, the bureaucratization, and the conceptual and methodological developments in bioethics over the past decades warrant further examination. The concept of applied ethics implicit in AI ethical models follows the general pattern of how bioethics has been understood as an application of ethical theory to moral practice (Mittelstadt, 2019, 501) and there are signs of bureaucratization of AI ethics (Rességuier and Rodrigues, 2020). AI ethics has followed the deductive view of applied ethics, which has not been successful in realizing the desired change thus far. Is there something that could complement the deductive and principlistic approach, and what could the resources for doing that be? Bioethics began with the aim of establishing itself as a novel form of ethical thought that would form a discipline. Is this a path that AI ethics should try to follow, promoting professorships in AI ethics in universities? The bioethical endeavor has been successful in making bioethical considerations a part of the standard procedures of medical research. Moreover, it is not possible to conduct research without, at least nominally, pre-examining one's project from an ethical perspective. Would establishing AI ethics committees improve the ethical sustainability of AI? In simple terms, ethical reasoning can be implemented through three channels: improving the moral quality of human agents, establishing a set of regulations and control systems to discipline their

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application, or establishing that moral decency is beneficial. AI ethical models rely primarily on the first two techniques. We shall now discuss, whether it is possible to formulate the third technique, connecting moral considerations to other features of AI design and development—and suggest how it could be done.

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