6.0 What solutions exist to the problem of bias?

As is the case in library and information science, where the interests and priorities of the user community demand a privileging of those interests, bias is not always regarded as a bad thing. It is generally agreed that the very fact of a specific perspective unwittingly and unavoidably generates bias towards the favoured group (such as classification schemes for libraries with specific religious affiliations). Given the importance of meeting user expectations and the needs of the user community, bias can be seen as an ethically-neutral phenomenon.

In other cases the investigation of bias is simply a part of the scholarly study of society and the legitimate search for patterns and trends in human cultures. For example, a paper by Kozlowski et al. (2019, 38) shows how the machine analytical technique of word embedding can help to reveal changes in social attitudes over time and historic changes in word meanings. In different situations, the identification of bias may be the preliminary to addressing it in a social and political context, and is a useful tool in highlighting social inequalities.

In a wider context however, bias should be energetically tackled if the system is not to appear as the tool of a particular cultural, political, or disciplinary community. Bias inherent in data is generally regarded as undesirable and has generated an area of research activity under the general heading of machine-learning fairness. Barocas, Hardt, and Narayanan (2018) provide a broadly-based survey of a number of problems and potential solutions, based on statistical adjustment. The book "offers a critical take on current practice of machine learning as well as proposed technical fixes for achieving fairness."

Mancuhan and Clifton (2014) also propose a statistical solution to bias in data used for automatic financial decision-making, employing Bayesian techniques to identify and automatically correct bias. This is incidentally one of the few papers to reference religion as an attribute subject to bias, although the authors do not go on to include it in their study.

6.1 A moral and religious solution

As with every other area of human life, machine intelligence has impacted religious communities, apart from the general philosophical questions of whether robots can act as moral agents. A number of applications exist which aim to support religious practice, such as the Roman Catholic Confession app (Rau 2011) and Muslim Pro which can tell you prayer times and the direction of Mecca in your own town or village (Muslim Pro 2019), and attempts have already been made to use robots in ritual. Most of the literature here is in popular journals and the press, so it may be difficult to assess how serious these efforts are. We learn of a Christian robot priest in Wittenberg which radiates light from its hands and pronounces blessings in five languages as part of an exhibition to celebrate 500 years since the invention of printing technology, instrumental in the Reformation and the rise of Protestantism (Sherwood 2017). Other cases include a robot Buddhist monk in China (Tatlow 2016) which reads scripture and can answer questions, and another in Japan (Field 2017) which can "chant prayers and tap drums as part of a funeral ceremony."

There is also a literature in the overlap between religious philosophy and AI that considers the nature of the relationships between intelligent agents, humans and the person of God, typically whether the creation of intelligent agents in some sense mirrors the creation of humans (Herzfeld 2003), and if the possibilities of transhumanism through the technological alteration of species are realizable (Dumsday 2017). Vidal (2007, 930) makes a comparison between man's interaction with artificial beings and his interactions with the gods, asking whether the similarities are not caused by uncertainty:

> But it is also true that where interaction is supposed to exist between the gods and their worshippers, there always remains a strong element of uncertainty which cannot easily be dismissed concerning the exact ontological nature of the hybrid arrangement by which the divinity's presence is made manifest. It is precisely the same sort of ontological uncertainty that one finds expressed in the field of robotics. And this is also why robots both fascinate and worry the general public.

6.2 The moral and religious life of machines

A pressing question is whether a real sense of moral responsibility can be developed in intelligent agents, or, more fancifully perhaps, a proper religious sense. In human beings, it may seem obvious that ethical decisions differ in some significant respect from other kinds of decisions, and that intellectual reasoning is subordinate to, or at least strongly influenced by, emotional intelligence. As Liao (2016) says:

> Central area of intellectual inquiry across different disciplines involves understanding the nature, practice, and reliability of moral judgments. For instance, an issue of perennial interest concerns what moral judgments are and how moral judgments differ from nonmoral judgments. Moral judgments such as "Torture is wrong" seem different from nonmoral judgments such as "Water is wet." But how do moral judgments differ from nonmoral, but normative judg-