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Robot, let us pray! Can and should robots have religious functions? An ethical exploration of religious robots

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Abstract
Considerable progress is being made in robotics, with robots being developed for many different areas of life: there are service robots, industrial robots, transport robots, medical robots, household robots, sex robots, exploration robots, military robots, and many more. As robot development advances, an intriguing question arises: should robots also encompass religious functions? Religious robots could be used in religious practices, education, discussions, and ceremonies within religious buildings. This article delves into two pivotal questions, combining perspectives from philosophy and religious studies: can and should robots have religious functions? Section 2 initiates the discourse by introducing and discussing the relationship between robots and religion. The core of the article (developed in Sects. 3 and 4) scrutinizes the fundamental questions: can robots possess religious functions, and should they? After an exhaustive discussion of the arguments, benefits, and potential objections regarding religious robots, Sect. 5 addresses the lingering ethical challenges that demand attention. Section 6 presents a discussion of the findings, outlines the limitations of this study, and ultimately responds to the dual research question. Based on the study's results, brief criteria for the development and deployment of religious robots are proposed, serving as guidelines for future research. Section 7 concludes by offering insights into the future development of religious robots and potential avenues for further research.

Keywords Religious robots · Social robots · Ethics · Religion · Existential · Spirituality

1 Introduction

Considerable progress is being made in robotics, with robots being developed for many different areas of life: there are service robots, industrial robots, transport robots, medical robots, household robots, sex robots, exploration robots, military robots, and many more. Moreover, there has been a substantial amount of scientific, philosophical, and ethical research on robots, with conferences, journals, and book series dedicated to this field.[1] Introductory and overview literature on the debates surrounding robot ethics is already available as well (Van Wynsberghe 2016a; Coeckelbergh 2022; Nyholm 2020; Nyholm et al. 2023; Lin et al. 2012). The research literature covers various topics such as the moral status of robots and robot rights, responsibility, deception, human–robot interaction, ethical design, and risks. However, the question of robots with religious functions has been absent from the discourse thus far. Just as robots provide services to people, engage in conversations, and interact with individuals, religious robots can be employed in religious buildings to facilitate religious practices and ceremonies, engage in religious conversations, or accompany prayer. Additionally, social robots utilized in hospitals and education, originally designed for non-religious purposes, might also serve religious functions to enhance human–robot interaction.

This article addresses two fundamental questions by merging the perspectives of philosophy and religious studies: can robots have religious functions, and should they have them? This question echoes the inquiry into robot rights,

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[1] For example, the *Robophilosophy* Conference Series (since 2014), the book series *Ethics and Robotics* (edited by Steven Umbrello), the *International Journal of Social Robotics*, and the journal *Frontiers in Robotics and AI*.

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which is dominant in the field of robot ethics: can and should robots have rights? (Gunkel 2018; Nyholm 2023). Thus, this article adds a religious dimension to robot ethics.

As I will demonstrate, on the one hand, the religious perspective offers a valuable contribution to robotics. On the other hand, the emergence of religious robots raises new ethical questions that go beyond conventional robot ethics and require further investigation. This makes the engagement with the ethics of specifically religious robots both urgent and highly relevant.

Research on religious robots is still in its nascent stage, thus resulting in limited available literature on the topic. Initial explorations of the field include overviews of religious robots (Balle and Ess 2020), reflections on the relationship between religion and robotics (Ahmed and La 2021; Kimura 2017), and presentations and investigations of individual religious robots (Löffler et al. 2021; Trovato et al. 2021). However, the existing more in-depth articles predominantly concentrate on religious practices (Nord et al. 2023; Cheong 2020a, b) and theological anthropology (Herzfeld 2002; DeBaets 2012; Smith 2022), with a notable absence of philosophical–ethical research on religious robots. Simon Balle (2022) provides a "Roadmap for Theological Inquiry" into humanlike robots, wherein he reviews the current research literature on religion and robotics. Balle highlights that the limited existing literature primarily centers around anthropology and eschatology, while the increasing utilization of robots in social contexts necessitates further research on ethics and religious practices (2022, p. 134). The realm of religious robotics introduces numerous ethical and religious questions that extend beyond anthropological inquiries into the imago dei (Foerst 1998) and eschatological considerations concerning apocalypse and salvation (Geraci 2007), for instance, and these have been inadequately explored thus far. As a result, this article delves particularly into robots with religious functions within religious contexts, focusing on the pivotal question of whether robots can and should have religious roles.

To do this, the inquiry is approached from a philosophical perspective. As will become clear, theological and religious approaches offer diverse and sometimes conflicting perspectives on religious robots due to the variability among religions and their distinct ethical approaches. Therefore, to broadly examine religious robots, I focus on the philosophical perspective and only occasionally refer to theological and religious concepts and arguments. In discussing religious robots, I will adopt an interreligious perspective but will place a focus on Christianity. This is influenced by my own background as a philosopher and Catholic-Christian theologian and the close relationship between Western ethics and Christianity (Sect. 6.3).

To begin, Sect. 2 introduces and discusses the relationship between robots and religion. Given that the debate on religious robots is still in its early stages, it is essential to address the foundational connection between religion and robotics and demonstrate how religion can contribute to the discourse on robots. In the main part, Sects. 3 and 4 examine two questions: can and should robots have religious functions? After discussing arguments, advantages, and potential objections related to religious robots, Sect. 5 addresses the remaining ethical challenges that need to be confronted. Delving deeper into these questions raises fundamental inquiries about the understanding of religion, religious functions, ascriptions of life, the nature of robots, and the human–robot relationship. Section 6 presents a discussion of the findings, shows the limitations of this study, and finally answers the dual research question: can and should robots have religious functions? Based on the results of the study, brief criteria for the development and deployment of religious robots are put forward, which can serve as guidelines for future research. Section 7 concludes by providing an outlook on the future development of religious robots and potential areas for further research.

2 Robots and religion

Theology is the scientific study of religious belief. "Robot theology", a term coined by Joshua Smith (2022), delves into the theological study of robotics from a religious perspective, encompassing various types of robots such as service, military, sex, social, and religious robots. Robots can be analyzed through a multitude of lenses, including ethical, moral–theological, anthropological, metaphysical, biblical, pastoral–theological, pedagogical, and didactical perspectives. Considerations span from the philosophy of religion to canon law, offering a comprehensive exploration of this interdisciplinary field. The domain of robot theology covers diverse topics, ranging from investigations of the mind–body relationship to biblical inquiries into relationships with non-human entities. It also delves into ethical considerations regarding the design of social robots and establishes pastoral–theological and canonical legal frameworks for religious robots. This inclusive approach to studying robots from a religious perspective opens up avenues for a deeper understanding of their impact upon society and spirituality (Puzio 2023a).

Religious robots are robots used for religious purposes, such as celebrating religious ceremonies or accompanying prayers. In addition to religious robots, there can also be social robots primarily designed for other social interactions, yet equipped with religious functions and performing religious practices. These robots engage people in conversation about religious topics, or are designed with religious symbols.

For various reasons, religion is particularly suited to engage with robotics. For example, religion provides a rich

supply of examples of specific forms of relationships with non-human entities, such as animals and hybrid creatures in the Bible. Moreover, religion includes ethical considerations for interacting with the other, exemplified through acts of charity and special consideration for the alienated and marginalized, addressing both social and spiritual needs. This makes it highly relevant in both social robotics and religious robotics (Puzio 2023b).

Furthermore, the process of technologization raises numerous anthropological and ethical questions about the image of human beings and the world. Technological progress disrupts many traditional views on humanity, technology, metaphysics and the distinctions between nature and culture and nature and technology. As a result, society grapples with fundamental questions, including what sets humans apart from machines, considerations of justice and the good life, and the ethical application of robots. Religion offers a broad repertoire of answers to anthropological and ethical questions about understanding human beings and the world. However, these must be reflected upon anew in the context of technological developments. Anna Puzio (2022, 2023c) has argued that anthropology, in particular, serves as a crucial starting point for theological engagement with technology. Technological inventions of the time influence the human self-image, and over the centuries, humans have been negotiating what it means to be human in the face of machines.

Another vital aspect is the appearance of various religious motifs in the discourse on technology, including ideas of salvation, paradise, omnipotence, omniscience, the goal of reducing suffering, and the concept of creation. This diffusion of religious motifs into the technological discourse requires examination and analysis from the perspective of religious studies.

Thus, it becomes evident that religion and robotics are closely linked. Robotics holds relevance for religion, and in turn, religion can enrich the discourse on robots. The question arises of whether robots can effectively assume religious functions.

3 *Can* robots have religious functions?

3.1 What are religious functions and can robots perform them?

Discussing religious robots, one might first ask whether religious robots can have religious functions at all. Can robots perform religious functions? This is a very broad question that can be discussed from various viewpoints. Therefore, four main objections and challenges will be outlined.

The question of religious robots initially ties in with the question of how we define religion. However, religious studies do not reach a consensus on what precisely constitutes religion and how religion can be defined (Bergunder 2011, p. 12–13). The definitions are either too broad to actually define and distinguish religion from other phenomena, or they are too specific to describe all religions. This poses a particular challenge for religious robots. How can one speak of religious robots that refer to religion when religion cannot even be defined? Bergunder (ibid.) shows that what is agreed upon is an everyday understanding of religion that is unspecified and unclear. A particular problem is that Western, Eurocentric conceptions of religion and the major monotheistic religions are applied to other religions, and their criteria are used in the study. This has significantly shaped our understanding of religion and religious studies in the past and, therefore, still shapes our understanding of religion and religious characteristics today. Thus, what some consider to be religion or important characteristics of religion may not be for others (ibid.).

Another question that arises is whether a medium can be used for religious practices. Using religious media cannot be fundamentally dismissed or opposed from the perspective of various religions. Religion has always relied on various media and is always mediated. Sacred texts, books, and images serve as media, while priests and angels act as mediators between the divine and the earthly realms. Furthermore, media technology, such as broadcasting, television, film, internet, and social media, is utilized for religious communication within the religious community (Löffler et al. 2021, p. 571). But here, too, the concept of the medium would need to be specified further, for example, how the robot as a medium differs from the book as a medium, or to what extent a highly automated robot can still be seen as a medium.

Another possible objection is that not the medium, but rather the ontology of the medium or the robot plays a role. It could be assumed that religion is a matter between humans and the divine. Is the question of religious robots a question of ontology? A glance at the diverse forms of divine representation reveals that anything can become a divine representation: from people and animals, to objects, hybrid religious beings, places, plants, and other natural elements (Trovato et al. 2021, p. 546f). For instance, within Catholicism, holy people, scriptures, sacred places, buildings, mountains, stones, relics, and trees (including branches from St. Barbara's, palm branches, and fir trees) are all used in religious customs. Animals, such as doves and sacrificial animals in the Bible, hold great significance. Images and religious objects are employed in worship (e.g., tabernacles, chalices, patens, Easter candles, eternal lights, and altar bells). Additionally, natural phenomena like fire and light play pivotal roles, and almost everything can be blessed (even including weapons). From an ontological standpoint, robots are compatible with Catholic theology. Therefore,

ontologically, robots are compatible with Catholic theology. Moreover, robots can be designed in various forms, such as "anthropomorphic", "zoomorphic", "biomorphic," "physimorphic",[2] and "functional" forms (Trovato et al. 2021, p. 547f). However, Ilona Nord and Charles Ess (2022) criticize these categorizations, because they presuppose clear species boundaries, which are then applied to robots. To what extent can a clear distinction be made between anthropomorphic, biomorphic, physimorphic and functional design? Further research must examine in which cases such categorizations are useful and explore alternative taxonomies.

In addition to the question of whether robots *can* perform religious functions, another crucial aspect is whether this human–robot interaction is ultimately successful. By successful interaction, I mean that users are able to interact with the robot and feel enriched by it in their religious practices. Anna Puzio (2023a) emphasizes the importance of design in religious robots, as it not only contributes to a successful human–robot interface, but also creates space for religious experience. It is important to acknowledge that when exploring these aspects, the utilization of religious robots entails a highly intricate, relational, and subjective process between the user and the robot. This means that the experience of using religious robots is contingent upon the individual user and the specific context in which the interaction takes place (Daelemans 2022).

The fact that we struggle to define religion makes it difficult to answer the question posed, but also broadens our view of religious functions and practices. This demonstrates that religion and its practices are constantly evolving, and thus, religious robots would also bring about transformations in religious practices and their interpretations. Whether these robot practices will be regarded as religious in the future remains uncertain, as it would depend on their integration into our daily lives and the establishment of genuine relationships with them.

Indeed, by forming close relationships with robots, there could be higher acceptance and greater trust in delegating tasks to robots. Additionally, specific contexts in which the robots are implemented would need to be considered to draw meaningful conclusions. Thus, it is possible to argue that only certain religious practices can be performed by robots.

To deal with these many challenges surrounding religious robots, such as the fundamental problem of defining religion, and to continue working in a methodically sensible way, I choose a practical approach in this article. This approach does not categorize and determine religious robots according to properties (Trovato et al. 2018; 2021) but is based on the specific religious contexts and religious practices in which robots are or can be used. This means that the term technical "function" in "religious functions" is not traced back to characteristics of religions, but is now executed in terms of "religious practices". This practical approach allows for a broader understanding of religious robots, and a more extensive description of religious robotics. Which religious practices and functions are already being performed by robots will be demonstrated subsequently using some examples from practice.

3.2 Religious robots in practice today

With approximately 20 religious robots worldwide, religious robotics is still in its early stages (Balle 2022). However, there are already some notable examples of religious robots, and with advancing technology, it is expected that their numbers will increase. Here is a brief overview: BlessU-2, a German robot, delivers blessings in various languages (Löffler et al. 2021, p. 575). SanTO (the Sanctified Theomorphic Operator) (Trovato et al. 2019) takes on the appearance of a Christian Catholic saint and recites sacred texts while accompanying the faithful in prayer. It also serves as a companion with psychological functions, contributing to the well-being of individuals, particularly the elderly (Löffler et al. 2021, p. 573; Trovato et al. 2021, p. 545). Celeste, resembling a Catholic angel, provides spiritual guidance through prayer and prints personalized Bible verses. Meanwhile, Mindar, a robot priest in Japan, embodies the Buddhist teacher, Kannon Bodhisattva, and conducts Zen ceremonies at the temple (Smith 2022, p. ch. 5; Klein 2019). The monk robot, Xi'aner, follows visitors around the temple, responds to their inquiries about Buddhism and plays Buddhist music. It is also available as a chatbot with which you can communicate over online messenger services. Xi'aner is designed with the purpose of promoting Buddhism in China (Trovato et al. 2021, p. 544; Löffler et al. 2021, p. 573). Consequently, it is perceived not as a threat to religious teachings but rather as a means of contributing to the dissemination of Buddhism (Löffler et al. 2021, p. 573). Moreover, in Japan, the humanoid robot Pepper is utilized in Buddhist funerals because it is cheaper than a human priest. It also broadcasts the ceremony over the internet for those who are unable to attend (ibid.). Michael Arnold et al. (2021) delve into the deployment of Carl, Pepper, and the robot dog, Aibo, in funeral settings.

It is important to note that religious robots are still in the early stages of development and are not as advanced as many other robots, including various social robots. Furthermore, they are currently less prevalent in practical use compared to social robots (Balle 2022, p. 147).

Amongst the religious robots, two groups can be distinguished: first, there are robots, which serve specifically

[2] Trovato et al. refer to "zoomorphic" as the shape of an animal, to "biomorphic" as the shape of a living being and to "physimorphic" as something that resembles nature.

religious purposes. Such robots are used exclusively in religious settings or for religious ceremonies. Examples of such robots are BlessU-2, SanTO and Celeste, which are designed only for religious interactions. The second group of religious robots consists of robots that can have religious functions, but this is not the sole reason for their development. These robots are predominantly "social robots". Social robots are designed for social interaction, and are used for human–robot interaction in, for example, hospitals, care facilities, or education (Nyholm et al. 2023). Many social robots aim to take over and enhance specific human activities through their unique modes of human–robot interaction, communication, or relationality; they can assist in therapy or improve learning outcomes, for instance. When religious functions are embedded in social robots, the capabilities and purposes of these robots could be expanded: religious robots employed in education can teach about religion, and robots in hospitals can discuss not only secular topics with patients but also accompany them in their prayers (Sect. 4). Examples of these kinds of robots include the popular robots Pepper and NAO.

Although there are robots for various religions being utilized in different countries, it is noticeable that the acceptance of robots varies significantly among cultures, countries, and religions. These differences encompass how robots are handled, the purposes for which they are employed, and their position and significance within religious life. As a result, the field of robot theology exists in a pluralistic form: "robot theologies" (Puzio 2023a, p. 99). There cannot be a unified religious stance on robots, which also implies that the question of whether robots can and should assume religious functions is contingent upon the specific religion in consideration. Comparatively, Hinduism, Taoism, Confucianism, Shintoism, and Buddhism tend to be more receptive and open towards religious robotics than the monotheistic religions. Religious robots play a supportive role in rituals, aid in disseminating religious teachings, and evoke enthusiasm for the faith (Trovato et al. 2021, p. 543f, 547). In Hinduism, this alignment is facilitated by the worship of multiple deities or in diverse forms, encompassing concepts of reincarnation and the sacred character of animals and other entities (Trovato et al. 2021, p. 543). Buddhism explores the attribution of Buddhahood to robots, and in Shintoism, inanimate objects like robots can be perceived as sacred and are believed to possess spirits (Trovato et al. 2021, p. 544; Geraci 2013, p. 2070).

The attitude towards (religious) robots is intertwined with different concepts and ideas, including life and aliveness, the distinction between animate and inanimate, nature and culture, the relationship with non-human entities and objects, and our perception of technology. These notions are not fixed but rather culturally negotiated and subject to change over the course of history (Puzio 2023a).

Currently, within Christianity, a predominant technological skepticism prevails, resulting in the rejection of robotics. However, this perspective has evolved over time. For instance, during the medieval and early modern periods, the church promoted automata to astonish people with their apparent magical abilities (Trovato et al. 2021, p. 542; Puzio 2023a, p. 99). As robots become increasingly integrated into various aspects of work and daily life, and as we develop more profound interactions and relationships with them, it is plausible that our attitude towards religious robotics will also undergo transformation.

From this philosophical and practical perspective, it can be asserted that robots *can* and *could* have religious functions. The evidence presented above strongly indicates that this is, in fact, highly probable. Nonetheless, there might be theological objections from specific religions, depending on their traditions, dealings with non-human entities, notions of sanctity, etc. From a Christian perspective, for instance, it is very likely that a significant distinction will be made between a robot merely reading religious texts and engaging in religious conversations, and actually performing religious ceremonies and sacraments. A different question from the "can" question is the "ought" question, i.e., whether robots *should* have religious functions. This is an ethical question:

4 *Should* robots have religious functions?

4.1 Possible objections

Many objections to robots performing religious practices may be raised. The following will highlight two of these dominant objections, simultaneously illustrating that they come with certain issues. These issues may not completely invalidate the objections, but they necessitate a reconsideration in the context of religious robots.

One prominent concern is that robots lack essential human characteristics, which are often considered to be properties like consciousness, intelligence, sentience, and free will. It is often presumed that these traits, attributed to humans, are central to religious practices. This objection can also be raised in response to the aforementioned "can" question, meaning that robots may not be capable of performing religious functions because they lack consciousness, sentience, etc. This highlights the fact that the "can" and "should" questions are not distinctly separable and are interconnected. Furthermore, it becomes clear that there are certain activities that have always been associated with human agents and thus with human properties, presenting us with the challenge that technology might now take over some of these activities.

This objection is closely associated with the so-called "properties approach" (Coeckelbergh 2012, p. 13), which holds significant sway in the field of robotics ethics. The properties approach posits that the moral consideration of a robot, that is, how we ought to treat it, depends on whether it possesses one or more of the aforementioned human-like properties (ibid.; Gunkel 2018). This implies that the manner in which we engage with an entity, whether it can have rights, and whether it can be a moral agent, depends on whether this entity exhibits characteristics such as consciousness, cognitive abilities, intelligence, or sentience—traits traditionally ascribed solely to humans. However, this properties approach faces several challenges, as extensively critiqued by David Gunkel (2018). One primary challenge is the difficulty in defining these properties. For instance, despite long-standing philosophical inquiries, there remains no consensus on what consciousness is precisely. Velmans (2000) states that "consciousness," means "many different things to many different people" (5). The other properties face similar complications. With regard to sentience, Daniel Dennett (1998) points out that the reason "why you cannot make a computer that feels pain" (228) has "nothing to do with the technical challenges with making pain computable. It proceeds from the fact that we do not know what pain is in the first place." (Gunkel 2018, p. 92f). Another problem is "the other minds problem". As many of these properties are internal states-of-mind, it becomes challenging to definitively attribute them to any being or entity. This uncertainty extends to animals, robots, and even our fellow human beings (Gunkel 2018, p. 93). We cannot know what it feels like to be someone else, experience their pain, or create their experiences (Nagel 1974). This complicates the task of determining whether a different entity—be it human, animal, or robot—can be conscious or sentient. Additionally, it is challenging to ascertain which property or set of properties is most crucial. What criteria are essential for ethically categorizing an entity? Is it the possession of sentience, or is intelligence more critical?

In response to methodologies such as the properties approach in robot ethics, numerous ethical theories advocate for relational approaches (Coeckelbergh 2010; Gunkel 2018; New Materialism, e.g., Haraway 2004, Barad 2007). In other words, they emphasize that our relationships with non-human entities (such as robots or animals) more profoundly shape our interactions with these entities than their actual ontological properties do. While it may seem intuitive to base ethics on properties within the ethical tradition, many approaches question whether our real-life, everyday decisions are genuinely based on properties. Coeckelbergh and Gunkel, for instance, argue that our behavior towards entities like robots is not determined by their ontological properties, but is heavily influenced by the relationships we establish with them. We first engage with robots and behave towards them without contemplating their ontological properties (Gunkel 2018).[3] As such, our relationships with robots significantly influence our actions towards them, a vital aspect for the ethical exploration of religious robots. This is because, with religious robots, the numerous personal and existential themes involved can quickly lead to a delicate relationship with the robot. This discussion cannot be resolved here. Instead, this paper seeks to note that conducting ethics based on properties has already been extensively questioned.

So, while this discussion has already been extensively conducted within robot ethics research, this article focuses primarily on the religious aspects. In the case of religious robots, it is crucial to consider whether these properties are genuinely essential for fulfilling religious roles. This will also depend upon the intended purpose of the robot. For the performance of certain religious practices, such as more reflective religious conversations, many might demand that the entity one is interacting with possesses specific mental capabilities, while for mere reading of religious texts or streaming religious ceremonies, this might not be required. It will be critical to scrutinize in the case of religious robots whether and which properties play a role for which religious practices.

Interestingly, the absence of qualities like sentience and consciousness may actually facilitate more personal and intimate conversations with robots.[4] People might find it easier to confide in robots, believing that they can express themselves without shame or inhibition, particularly when discussing private matters. The inhibition threshold is lower than when talking about private matters with a religious authority. For instance, in 2020, Jason Rohrer developed Project December (2023), a website where users could chat with customizable chatbots, such as Samantha, that were based on GPT-3 and could be given their own personality. The project gained attention when one user, Joshua Barbeau, fed the GPT-3 chatbot with texts from his deceased fiancée Jessica, enabling him to communicate with her posthumously. He found solace in this chat, and it aided him in his grieving process. Rohrer said the technology allows for the most private conversations because there is not even a human involved, there is no shame, and there is no worry of being a burden to anyone (The Decoder 2021).

A second important objection to religious robots is their lack of religious experiences. It could be argued that for religious practices, it seems indispensable to involve a human being with authentic experiences who can share their

[3] For a critical examination of Coeckelberghs and Gunkel's approach, see Sætra (2021).

[4] I refer again to the many problems mentioned above that accompany the discussion of properties.

encounters and have a special relationship with the deity, deities, or the divine. Robots are often criticized for executing religious functions superficially, and not in a "real", "true", "sincere" or "genuine" manner. Indeed, it is intuitive that personal experiences hold importance in certain contexts. However, despite this valid point, several issues arise with this objection.

Similar to the first objection, we encounter the challenge of discerning whether robots can indeed have religious experiences. This quandary extends beyond robots to humans as well: Even if my fellow human beings tell me about their religious experiences, I am left uncertain about the nature of their religious encounters. How do they feel? Are they different from mine? Is claiming or being convinced that one has had a religious experience sufficient for actually having one? Assuming that robots are incapable of having genuine experiences leads us, in turn, to the understanding that they are merely simulating them. In this context, it becomes crucial to confront the value of these simulations and determine whether they carry less weight than our own experiences. Simulations can have practical uses, for instance, in therapy (Sect. 4.2), indicating that it is not always prudent to dismiss them. Moreover, the difficulty in defining religion, and by extension religious experiences as discussed earlier in Sect. 3, continues. The precise identification and definition of religious experiences is elusive, made all the more complex by the vast diversity of cultures and religions globally. What constitutes a religious experience? Which religious experiences are considered valuable, and which are not? If a friend confides in me that they have encountered something divine in their daily life or in a dream, according to what criteria do I ascertain that it was a religious experience? Do I believe them?

As previously observed regarding the definition of religion (Sect. 3), the difficulty in defining and identifying religious experiences need not be solely a disadvantage, but can also facilitate a broad perspective on religious experiences. Adopting an expansive view of religious robots can be advantageous because it allows us to appreciate the diverse ways individuals experience and express their spirituality and religion. Moreover, our understanding of religious experiences has evolved over time, and it is plausible that religious robots will continue to transform these experiences and their interpretations.

Setting aside the question of whether robots can have *religious* experiences, it is still possible to assert that they will engage in some form of experience with humans. Robots partake in various interactions with humans, and while these experiences may deviate from traditional human experiences, it is because robots have distinct methods of interacting with and interpreting the world. Therefore, even though these experiences differ from human ones, this new robotic type of experience could potentially offer something valuable for specific religious practices. For example, robots' abilities to store (or "memorize") information for extended periods, notice things in interactions with humans that might elude us, or transcend our limitations of time, space, and physical form, could be insightful.

4.2 Advantages of religious robots

Aside from the objections, religious robots come with several advantages, contributing significantly to the debate on whether robots should perform religious functions. It is evident that religious robots can not only enrich religious practices but also enhance contemporary human–robot interaction overall. The following discussion will highlight both perspectives, showing how religious robots can enrich religious practices as well as general human–robot interaction—both are interconnected. As before, the focus will continue to be on the practical perspective, emphasizing the benefits that religious robots bring by engaging in religious practices, not by possessing certain inherent properties that make them religious robots.

4.2.1 Advantages of religious robots for religious practices and communities

Firstly, religious robots come with many advantages for religious practices, leading religious communities to consider whether it might be worthwhile to employ them for certain practices. One of these advantages is that they can provide individualized and personalized services tailored to the user's specific needs. This could include personalized prayers or religious ceremonies conducted in multiple languages. A prime example of personalized technology is the application called Farvel (2023), which allows users to create virtual memory rooms for the deceased and upload objects and memories associated with them. This personalized approach can be highly beneficial in the grieving process, as mourning is a deeply individual experience, and technology can be utilized to offer customized support during this challenging time. Such functions are easily implementable in robots as well. Additionally, religious robots can facilitate broader access to religious offerings. Through technology, the constraints of space and time can be transcended. With chat and streaming functions, religious ceremonies and other offerings can be broadcast to individuals who, for reasons such as illness, may not have had the opportunity to participate otherwise (Puzio 2023b).

Another advantage is that robots can be employed to generate attention and interest in religions and their offerings. That was actually the purpose of the Xi'aner robot in China (Löffler 2021). For the Christian religion, which has experienced a decline in importance in Western societies, reaching out to people has become a challenge. People no longer

frequent churches as much as before, thus necessitating a reversal of approach: churches must now actively reach out to people. Alternative approaches are required to connect with the public. Placing robots in public spaces can serve as a novel and engaging means to reach out to people. These robots can interact with individuals, explore their interests, concerns, and values, and entertain them in innovative ways. While deploying robots alone will not resolve the complexities faced by the Christian religion, it can serve as a positive starting point and contribute to its modernization.

Religious robots can play a vital role not only in conveying religion to others but also in assisting religious researchers and leaders in studying religion. By utilizing religious robots, researchers can delve into religious communication and experiment with new religious practices. For instance, robots like BlessU2 challenge believers to reconsider the meaning of blessings and explore the conditions attached to them (Löffler et al. 2021). Embracing the broad definition of religion and religious experiences allows for a comprehensive exploration of the diversity and evolution of religious and spiritual encounters. Many diverse faith practices are often not fully captured by established religions, and religious robots can offer a novel approach to understanding and accessing these varied experiences. In this manner, religious robots fulfill the role of delving into religious experiences, communication, and practices themselves.

A crucial advantage of religious robots is their potential to promote inclusivity in religious practices. By integrating chat functions, streaming capabilities, and virtual reality/augmented reality features, religious participation becomes accessible to individuals who may be confined to their homes, care facilities, or hospitals due to illness or other limitations. Often, individuals desire to bid farewell to their loved ones at funerals, but in some instances, they may not be able to physically attend. With virtual/augmented reality and other special equipment, people who are not able to participate in religious ceremonies can touch religious objects and experience haptic and olfactory impressions. Virtual/augmented reality technology and other special equipment allows people who are unable to physically attend religious ceremonies to touch religious objects and experience haptic and olfactory impressions. This technology can also provide special access to religious events for people with disabilities, including assistance in facilitating certain movements. Apart from providing physical assistance, it also extends support in terms of visualization and language, enabling individuals to participate in multiple languages or offering non-linguistic access (Puzio 2023b). Of course, this is only an advantage as long as inclusivity is not merely about solving the access issue for people who are, for example, ill, by simply providing remote participation. It is also crucial that continued efforts are made to ensure they can participate in ceremonies in the manner they desire. True inclusivity in religious practices involves accommodating the varied needs and preferences of individuals, ensuring that they feel fully engaged and part of the religious community, and are not just remote observers.

Finally, it is highly probable that religious robots will induce a transformation in religious practices, leading to new forms of spirituality. While Christian religions heavily rely on ancient objects like candles, bells, and chalices, which possess a traditional and familiar allure due to their historical significance, religious practices can also be expanded with technology tailored to contemporary needs and personalized experiences. This paves the way for potentially deeper spiritual experiences through the integration of certain technologies. For instance, it becomes an intriguing prospect to explore whether specific technologies can evoke the light and warmth of a candle in an even more captivating and emotionally resonant way. Whether such technologies can enrich people's religious practices and spiritual experiences will need to be further evaluated with experiential insights and empirical studies.

4.2.2 Advantages of religious robots for current non-religious robotics

Allowing robots to perform religious practices comes with many benefits, extending also to the current field of non-religious robotics. Below, I highlight two main aspects that demonstrate to philosophical robot ethics, why religious functions for robots should be seriously considered.

A central aspect of the advantages of social robots, in general, lies in their potential to enhance social interactions, psychological functions, and well-being. Adding religious functions to social robots could enrich both religious practices and the existing capabilities of social robots. To understand these benefits, it is first necessary to explain the kind of support social robots provide. Studies have shown that social robots in education, health and care can provide valuable support for dementia and Autism Spectrum Condition (Darling 2021), for better learning (Leyzberg et al. 2018; Ackerman 2015; Tanaka et al. 2012) and the development of certain skills in children such as creativity (Elgarf et al. 2022). Kate Darling (2021) provides a compelling example of a child with autism who, after years of therapy with only limited communication with its therapist, finally starts engaging in conversation and interaction with a robot. This underscores the distinct nature of communication, interaction, and relationships with robots, opening up novel possibilities for therapeutic interventions (ibid.). Moreover, social robots are being increasingly designed and deployed in hospitals to improve patient experiences. For instance, the teddy bear-shaped robot, Huggable, accompanies children during their hospital stay, administering tablets and injections in a playful manner (MIT Logan et al. 2019; Matheson

2019; Smith 2022; 2010–2017). In cases of prolonged hospital stays or chemotherapy, robots can play a pivotal role in easing the stress and anxiety of children by engaging them in playful interactions. The presence of a cute, non-threatening robot that looks like a toy, taking the child's blood or giving the scary injection, can be more comforting to a child than a hurried doctor in a white coat (MIT 2010–2017). Interestingly, one of the central functions of religion is to contribute to well-being, as studies indicate (Pew Research Center 2019, p. 5). By integrating social robots into religious practices and contexts, it can be anticipated that there will also be positive effects here, due to the distinctive character of human–robot interaction and human–robot relationships, which differ from those between humans.

My argument is not meant to be confined solely to well-being. While it partially intersects with the concept of well-being, it certainly cannot be limited to it. My primary argument is that religious robots offer something that, so far, other robots cannot: engagement with existential questions and spiritual needs. Especially during hospital stays, patients often grapple with existential, religious, and spiritual questions. We already observe from current interactions with voice assistants, chatbots, and generative AI that people are inclined to ask Alexa or Siri questions about the meaning of life or use chatbots for self-disclosure (Skjuve 2023; van der Lee et al. 2019).[5] People can ask AI about profound topics such as the meaning of life, the afterlife, the reasons for suffering, and the existence of a higher power, such as a deity. With the growing use of the beforementioned social robots in medical settings, the important question arises of whether these robots should remain atheistic or agnostic, or whether they should be deliberately designed to address patients' religious needs. Religious robots can be particularly well-suited to fill a niche in social robotics: addressing existential questions and spiritual topics. Such questions and issues pertain to one's own life and existence, the meaning of life, the exploration of inner thoughts and emotions, the contemplation of transcendent realities, meditation, and spiritual practices. These profound topics have not yet been adequately addressed in the realm of social robotics.

In addition to their deployment in hospitals and care settings, it was also mentioned that social robots serve educational purposes. By adding religious functions to these social robots, it becomes possible for robots to disseminate religious content and provide information about various religions. They can offer vivid and personalized ways to learn about religious teachings and beliefs. If robots are used for teaching in schools, religious education could also be incorporated into their teaching curriculum (Alemi et al. 2020). In this manner, they expand both religious practices and the common educational functions of non-religious robots.

Since there is, as mentioned, a need for discussion on religious topics and spiritual questions, it is logical that as social robots continue to evolve and become capable of more sophisticated conversations, people will naturally pose these existential and religious questions to them. The danger then lies in this not being handled responsibly. For these religious practices, such as religious conversations, there must obviously be an understanding of religious teachings and reflections, which can be developed in collaboration with experts in religious studies or theology in the field of religious robots.

The second main aspect, which is also very important for the development of non-religious robotics, is that the religious perspective is crucial in contributing to diversity in robotics. Religions play a significant role in the lives of many individuals worldwide. According to the World Religion Database 2020, 88.42 percent of the world's population adheres to a religion, while only 11.57 percent are "non-religious" (Agnostics and Atheists) (Johnson and Grim 2022). Studies indicate that this tendency is even on the rise, so more people will belong to a religion in the coming years. It is important to note that this increase in followers is also related to demographic growth (Pew Research Center 2015). Thus, alongside factors such as gender and cultural aspects, religion is also vital in addressing the diversity of people and their backgrounds. This enables more equitable access to robotics, a field of technology developed for all people, appealing to and inclusive of everyone, thereby preventing discrimination.

5 Ethical challenges

Philosophical research has extensively explored various ethical aspects of robots. Therefore, these aspects will not be exhaustively explored here. Instead, the question will be how these ethical challenges present themselves anew in the context of religious robots. Since, as previously noted, there is no existing research on the ethics of religious robots, the subsequent examination will involve applying ethical aspects as they have already been identified in robot ethics to religious robots. For this purpose, the ethical aspects gleaned from the overview literature on non-religious robots initially cited (Van Wynsberghe 2016a; Coeckelbergh 2022; Nyholm 2020; Nyholm et al. 2023; Lin et al. 2012) will be utilized. These central ethical aspects in the robot ethics of non-religious robots include questions concerning autonomy, responsibility, deception and manipulation, design, relationships, discrimination and diversity, and anthropological questions. In line with the practical approach to religious robots proposed initially, the focus will be on the contexts

[5] I would like to thank Jana Sedlakova for her insights on self-disclosure and chatbots.

in which religious robots are employed compared to other robots, and what makes their practices distinct. From this, it will become clear how ethical challenges present themselves anew in the specific application contexts of religious robots.

As previously indicated, the contexts and practices of religious robots are characterized by (1) social interactions with humans and existential themes, underscoring the relationship between human and robot as well as the personal and intimate nature of these interactions. This special, delicate interaction simultaneously brings the aspect of human vulnerability into focus. This aspect becomes further pronounced considering that religious practices particularly address vulnerable groups such as the sick, the elderly, and individuals at vulnerable stages of life, like after birth (e.g., Christian baptisms, Jatakarman in Hinduism), during adolescence (e.g., Bar Mitzvah and Bat Mitzvah in Judaism, Upanayana in Hinduism, Confirmation in Christianity), and during major life transitions, illness, and dying. (2) Secondly, the practices of religious robots are embedded within a religious setting, meaning they convey religious themes, take place in religious buildings, use religious language, and adhere to the rules of religious ceremonies. This necessitates that religious robots take into account the religious tradition of the respective religion, its language and symbolism, religious teachings, and their interpretations.

One frequently debated aspect in non-religious robot ethics is *autonomy* (Beer et al. 2014). Debates revolve around whether robots can act autonomously or how human autonomy can be preserved during interactions with robots. In the context of religion, the independence of robots and their relationship to religious authority becomes particularly intriguing (Cheong 2021). Are robots limited to merely reproducing religious teachings, essentially executing what is pre-programmed, or are they allowed to express their own religious attitudes through their ability to gather data from their environment and interact with humans? This conflict has been notably evident with Deep Learning. Can religious teachings be faithfully reproduced without evolving through experiences within their environment, for instance? Furthermore, it is reasonable to consider that robots themselves may hold a form of religious authority when performing religious practices and teaching, thereby influencing the dynamics of the relationship with religious authority (Balle 2022). It would be beneficial if robots, through their features like voice and instructions to believers, contribute to less hierarchical structures and encourage equal participation in the religion by engaging with believers in a social manner, rather than reinforcing hierarchies.

A second important aspect discussed in robot ethics is *responsibility*. It is debated who bears the responsibility for the robot and its actions within human–robot interaction, especially if something goes wrong (Nyholm 2020; Coeckelbergh 2022). Upon closer examination, extensive networks of responsibility are revealed that extend beyond the simple user-robot dyad. These networks include the owner, the company, developers, programmers, designers, lawmakers, and others. Responsibility is distributed and not confined to a single individual, a phenomenon also known as the "problem of many hands" (Doorn and van der Poel 2012), which complicates the attribution of responsibility. In the religious context, this network expands to include believers, the religious community, parishes, religious authorities, and religious institutions. The critical question then arises: Who commissions the religious robots and makes decisions regarding their development and use? This could be governed by secular law, but it will also depend on the organizational structures and hierarchies inherent within the respective religion. Consequently, existing laws and structures within religious organizations will be confronted with new challenges posed by the advent of religious robots.

Another frequently discussed ethical aspect is that of *deception and manipulation* of the user in the interaction with the robot (Danaher 2020). Danaher (2020) points out that deception is a normal part of our everyday actions, nevertheless there is still a moral boundary to consider. With robots, the question arises as to whether and when they are deceptive, for example, when vulnerable groups of people cannot distinguish the robotic entity from a non-robotic entity. Is a simulation of certain human (as with humanoid robots) or animal abilities (as with the robotic seal Paro) already a deception? When is deception permissible, and when is it not? Another form is the manipulation of users through business strategies, as has already been criticized in the case of the Replika app (Smith 2022), because it establishes a bond with users and emotionally sways them, ensuring they continue to use the app, thereby serving only the business strategies of the company. This is especially relevant for religious robots: Firstly, very personal and confidential information, data, and topics play a role with religious robots, given that sensitive conversations are conducted and personal issues discussed. Therefore, special caution is required. Moreover, robots interact, as mentioned above, with vulnerable groups that need particular protection. Secondly, precisely because the function of a robot still remains unclear to many, robots that have particularly religious characteristics can be associated with supernatural abilities. Therefore, education about the functioning of a robot and responsible design is needed, so it is not assumed that one is dealing with divine powers instead of a program.

The debate about deception in human–robot interaction is closely intertwined with the *design* question, i.e., how should the robot be designed? (Wynsberghe 2016b) It is often discussed whether anthropomorphic design, i.e., a robot in human shape, is too deceptive and whether it is beneficial at all (Nyholm 2020). In religious robotics, the design question is taken further: should robots have religious

accessories and clothing? Should they take the form of a religious person or entity? Should they appear holy and divine? Trovato explores the concept of "theomorphic design", which involves creating robots resembling divine entities (Trovato et al. 2021). However, research has frequently raised concerns about the appropriateness of discussing theomorphic design. In their thoughtful critique of Trovato's research, Nord and Ess raise concerns about the concept of "theomorphic robots". It remains unclear what precisely is implied by "theomorphic design", and the idea of theomorphic shape may be provocative, especially in the context of Christianity, where God is not to be depicted in a specific image (Nord and Ess 2022). Thus, it becomes evident that the design question in the religious context is confronted with very specific challenges that differ from the other discussions in robotics and, as such, calls for theological research.

Besides the question of the robot's shape, there are many other design questions. For example, the robot's voice, its ("skin") color, its movements and its size. Design is not neutral: Values are implemented in design. Therefore, design is closely linked to ethics (and religious studies).

As previously stated, *relationships* hold a pivotal role in human–robot interaction (Darling 2021). In the case of religious robots, where existential and deeply personal questions may be at stake, a bond with the robot can be quickly established. It must be evaluated to what extent this is desirable. While friendship with the religious robot seems to be an option, touch and bodily intimacy do not fulfil their purposes in the religious context. Erotic and intimate features may also be subliminally present. For instance, when using the Celeste robot, which has a female name, the user needs to place a finger or hand on a hole or small area on the robot's base to communicate with it, as it has difficulty understanding the user's voice. Such features unnecessarily create an intimacy that may be appropriate for sex robots but is inappropriate for human–robot interaction in a religious context. Caution is particularly required when dealing with Christian religions, given the many cases of abuse in churches related to physical intimacy. Particularly with Christian religions, because of the many cases of abuse in the churches, special caution is required when using physical intimacy.

However, examining human–robot relationships is a significant aspect that impacts human–robot interactions and religious practices. There are already instances where individuals claim to have friendships or partnerships with robots, which necessitates reflecting on this unique new type of relationship within a religious context. While Christian teachings place immense importance on relationships among people, relationships with robots have, until now, been completely neglected. Therefore, it becomes crucial to explore how human–robot relationships differ from human–human relationships, how human–robot relationships affect interpersonal relations, and which human–robot relationships are valuable in a religious context. In which cases can these relationships provide opportunities not possible within human–human relationships?

Robot ethics encompasses the issue of *discrimination* and the imperative for *diversity* in the development and implementation of robots. However, this concern remains inadequately addressed in non-religious robot ethics so far and requires more robust attention (Barfield 2023; Fosch-Villaronga et al. 2023). Given that religions perform charitable functions in society (for example, Christian churches operate hospitals, care facilities, educational institutions, and humanitarian aid organizations such as "Adveniat" and "Missio"), they advocate for justice in their respective societies and champion marginalized groups, always assuming critical functions against societal and political developments. These aspects should also constitute a central theme in religious robotics. This means that religious robots should prioritize the avoidance of discrimination and actively advocate for diversity. Robots rely on data and extensive input, which in turn are based on biases and one-sided views already prevalent in society. This also affects the design of robots. What bodies will robots have? It is anticipated that stereotypes, discriminations, and problematic assumptions, already existing within society, will be reproduced in the functionalities, practices, and design of robots. Currently, robots are primarily designed by white men from WEIRD (Western, Educated, Industrialized, Rich, Democratic) countries, and many social groups lack representation and a voice in the process (Graham 2002; Puzio 2022). The question arises: How can robotics embrace diversity?

Therefore, as with non-religious robots, the goal of religious robots should also be to avoid racist, ageist, ableist, and sexist implications, for example, and to represent diversity. In the case of the robot Celeste, its voice is male, and the robotic manner of speaking, along with the magical-sounding tones that precede its speech, create an impression of a male religious authority to be worshipped. Unlike Siri or Alexa, Celeste's voice cannot be changed, rendering it unaccommodating and reinforcing sexist and hierarchical structures within the religious context. Moreover, Celeste encounters significant difficulties with speech recognition, leading to an exclusionary interaction that disregards different pronunciations, including those of non-native speakers. This inadvertently perpetuates discrimination and hinders meaningful engagement with a diverse range of individuals. Since the protection and support of vulnerable groups is of particular concern for many religions, the future task for the development and application of religious robots will be to explore how they can be used to support and empower vulnerable individuals and communities.

Furthermore, within Christianity, there is a multitude of theological interpretations on various subjects, and not just

a single religious viewpoint. Thus, the challenge of diversity also pertains to religious perspectives, meaning that the *diversity of religious viewpoints* should be considered when implementing religious aspects in robotics. This is in line with previous discussions on manipulation, underscoring that robots should not be utilized as instruments to propagate a singular religious or theological perspective. The programming of religious robots must avoid endorsing fundamentalist positions and should not exclusively represent a narrow group of individuals, such as religious authorities or people from WEIRD (Western, Educated, Industrialized, Rich, Democratic) countries. Since religions engage people globally, and their adherents are dispersed among diverse cultures, recognizing this extensive reach offers an opportunity to encourage diversity. By collecting more empirical data, there is potential to advocate for diversity with regard to, for example gender, race, theological interpretations, and religious practices.

In addition to ethical challenges, *anthropological questions* also emerge, which are closely interwoven with ethical considerations. Even when robots do not possess a human form, there is a noticeable tendency among people to *anthropomorphize* them, ascribing human features and treating them similarly to humans. For instance, it is common for individuals to assign names and human-like qualities to robot vacuum cleaners soon after acquiring them (Buyx 2019). This tendency to anthropomorphize is not limited to robots but extends to our interactions with animals, such as when we treat our pets like humans. Consequently, discussions in robot ethics consider whether anthropomorphization of robots is an unavoidable outcome of psychological processes, or if it is something that should be consciously avoided (Nyholm 2020; Darling 2017; Damiano et al. 2018). From a theological standpoint, it is intriguing to observe that this propensity to anthropomorphize extends even to deities, to whom we assign names and forms. Religions have long been engaged in discussions that question the portrayal of a personal God, often depicted with human attributes (Müller 2021). Nord and Ess (2022) also encourage reflection on the concept of God and the concept of the human being in the context of religious robots. The discourse on anthropomorphism underscores the deep linkage between robots and inquiries into the conception of the human being. Technology influences and embodies human interpretations of what it means to be human (Puzio 2022). In this way, our very concept of the human being is continually reevaluated in relation to robots. Within religious frameworks, these anthropological considerations are compounded by additional queries, such as whether robots might be endowed with souls (Poole 2023; Livingston and Herzfeld 2009) or regarded as elements of the divine creation. Christian theology, for instance, continues to stress the uniqueness of humans as distinct from non-human beings (anthropocentrism). However, the advent of robots prompts further exploration and critical reassessment of the boundaries delineating humans from non-humans, as well as those between the earthly and divine realms.

6 Discussion

In this section, I will discuss my findings on the ethics of religious robots. In addition to synthesizing and critically categorizing the results, criteria for the deployment of religious robots will also be developed, and the limitations of the study highlighted.

6.1 Results

The investigation focused on the ethics of religious robots, centering on the question of whether robots *can* and *should* have religious functions. This question loosely associates with the debate on whether robots can and should have rights (Gunkel 2018; Nyholm 2023), which is one of the largest debates in robot ethics. After explaining the connection between religion and robots, where promising arguments were already found, suggesting that a link between religion and robots can be sensible and beneficial (Sect. 2), objections and pro-arguments for both questions (can and should) were discussed in Sects. 3, 4. It is important to note that, just as Gunkel elucidates for the robot ethics debate, it is also possible here to combine different answers: for example, (1) Robots can and should have religious functions, (2) Robots cannot and therefore should not have religious functions, (3) Robots can, but should not have religious functions.

In examining the *"can" question* (Sect. 3), the study initially adopted a practical approach that translated the inquiry from religious functions of robots to their participation in religious practices. This was necessitated by several constraints, such as the lack of a uniform definition of religion. From the perspective of this practical approach, it is certainly feasible for robots to engage in religious practices. However, this is contingent upon accepting the conditions and limitations inherent in this methodological approach. Furthermore, theological arguments specific to each religion will be essential to adequately address this question. Just as artificial intelligence represents a form of intelligence distinct from human intelligence, and as social robots facilitate social interactions differently from the interactions familiar among humans, so too might religious robots in the future introduce an entirely unique mode of religious practice.

The second question, whether robots *should have religious functions* or perform religious practices (Sect. 4), proved to be closely linked to the "can" question. This may be partly because it is new for us to see many activities, previously attributed only to humans, now being

performed by non-human entities such as robots. Several significant objections to religious robots were introduced, such as questioning the necessity for robots to have religious experiences. These objections were discussed, and it was demonstrated how these objections are newly challenged by religious robots and, therefore, must be re-considered. However, these objections have not been completely invalidated and remain important in the discourse. In addition to the objections, the advantages of religious robots were also discussed—they offer benefits for both religious practices and communities, as well as for current non-religious robotics. In the latter case, two key advantages for current non-religious robotics were identified: the integration of existential questions and religious needs into robotics, and the recognition of religious affiliation as essential for the necessary diversity in current robotics.

The answer to the "should" question can thus be affirmed, though it depends on the practices the robots perform. For example, there may be a difference between a robot merely reading texts to people who cannot read themselves and one providing pastoral care. It also depends on the specific religion, its teachings, and structures (e.g., whether images are allowed or worship by non-human entities is possible). Therefore, the religious and theological perspective must be added to this philosophical perspective to provide comprehensive answers. Since there is no existing research on the ethics of religious robots to draw upon, an initial step will be to refer to results in related disciplines. For instance, current discussions in psychotherapy indicate that certain therapeutic tasks cannot be undertaken by AI or robots (Brown et al. 2021). These discussions can be fruitfully applied to religious counseling.

Finally, the *ethical challenges* presented by religious robots were examined (Sect. 5). Due to the scarcity of research specifically on the ethics of religious robots, the study drew upon the established ethics of non-religious robots. Employing a practical approach, it focused on identifying the unique features of religious practices and contexts that might transform or modify the ethical considerations applicable to religious robots. These religious practices and contexts are characterized by human–robot relationships, existential, intimate, and personal themes, vulnerable groups, and the religious setting itself, i.e., the tradition, teachings, and organizational structures of the respective religion. The ethical aspects transferred from non-religious robot ethics include questions concerning autonomy, responsibility, deception and manipulation, design, relationships, discrimination and diversity, as well as anthropological questions. These aspects were then applied to the aforementioned religious contexts and practices. It was demonstrated that the ethical issues often associated with non-religious robots are posed differently in religious practices, leading to new questions and shifts in focus.

Considering the outlined advantages that religious robots can provide, there is a case for developing religious robots for specific purposes. However, it is crucial to establish certain criteria for religious robots. These criteria are intended to guide the future of religious robots and will put forward in the following section based on the results gathered so far.

6.2 Criteria

Firstly, religious robots must adhere to high-quality standards. While this might seem evident, it is particularly significant in the context of religious robots. Existing Christian robots, such as BlessU2, Santo, and Celeste, are relatively underdeveloped, impeding their capacity to adequately perform religious functions. When compared to voice assistants like Alexa or Siri, these robots are significantly lacking, making communication with some of them nearly impossible.

Secondly, the integration of robots into social and religious practices requires careful consideration and a user-centered approach. It is important to recognize that religious experiences are highly subjective, making the use of religious robots greatly dependent on the specific individuals involved. Human–robot interaction in religious contexts is complex and delicate, demanding an approach that sincerely respects the diverse needs and beliefs of various individuals. Special attention must be given to vulnerable groups, including children, the elderly, people with disabilities, and the sick. While there is an argument for integrating religious functions into robots, the actual success of human–robot interaction hinges on the individual's engagement. Emphasizing a user-centered approach involves actively including users in the development and testing phases of religious robots. This also implies that the development of religious robots should be grounded in empirical studies.

Another crucial aspect is ensuring that the development and application of religious robotics are meaningful and serve a good purpose. Given that religious robots require significant financial resources and can profoundly influence religious practices, their deployment should not be taken lightly. This calls for deliberate reflection on the specific purposes for which religious robots are most appropriate. One such meaningful purpose, as previously discussed, is the promotion of inclusivity. However, it is equally important to recognize that there might be certain tasks or contexts where the application of religious robots is unsuitable.

Given the significant role of religious values, teachings, practices, and spiritual needs in religious robots, it is imperative to involve theologians in their development. Religious robotics should not be solely propelled by commercial interests but must integrate theological expertise. Adherence to

theological research is essential to responsibly shape religious robots.

As human relationships are crucial in the Christian religion, the goal of religious robots should not be to completely replace human relationships, even though they may certainly take over some tasks within the context of human-human interaction. Religious robots are not about replacing or imitating humans with technology; rather, technology should do what it does best (Löffler et al. 2021, p. 583). This includes, for example, great light effects and deep virtual experiences, enabling participation for sick people and engagement in religious practices transcending the boundaries of time and place. However, robots can be used to enhance or improve these relationships, introducing new forms to strengthen the community of believers and for various tasks, it may be beneficial to replace human–human interaction with a human–robot interaction. At the same time, it is essential to consider and study the relationships between humans and robots. Kate Darling (2021) extensively illustrates how humans have been forming unique connections with non-human entities, particularly animals, for centuries, and how parallels can be drawn with our interactions with robots. She argues that relationships are not limited to human–human interactions, thus expanding our perspective on the "diversity of our social relationships" (206). In a manner similar to the benefits of relationships with animals, she also views robots not as substitutes for humans but as a "new category of relationship" that can serve positive purposes, e.g., in therapy (241).

6.3 Limitations

My approach comes with some limitations due to the presupposed method and the scant research on religious robots. Addressing these limitations in further research could be enriching for future studies.

Firstly, as religious robots are still in their early stages, there is a need for more empirical studies to further develop the ethics of religious robots. This pertains to insights on how people experience religious robots, how human–robot interaction operates within religious contexts, and for what purposes they are especially suitable or unsuitable. Certainly, further ethical challenges will emerge from these empirical observations, which must be addressed in research.

Secondly, in this study, I employed a philosophical method that needs to be complemented by religious and theological insights. Additionally, even though religious and interreligious aspects and arguments were incorporated, this study remains primarily Western and Christian-oriented. This is because robot ethics, in general, is still predominantly Western-oriented, and the overview literature in robot ethics reflects the prevailing discourse. Moreover, my own perspective is influenced by my Christian-informed research background, and Christian ethics is closely intertwined with philosophical ethics in the Western context. In other religious traditions, such as Buddhism or Shinto, different aspects might take priority, and there are diverse conceptions of life, animate and inanimate objects, humans, and the body. Future research needs to delve more deeply into the variety of cultural and religious aspects, which can enrich robot ethics as a whole.

By addressing these two aspects, more adequate answers to the dual research question of this article can be found, and on this basis, future research can further develop the ethics of religious robots.

7 Conclusion and outlook

In light of the significant advancements in robotics and their deployment across diverse areas of life, this article has engaged in an exploration of whether robots *can*, and *should*, have religious functions. This examination dedicated itself to the ethics of religious robots, which is an area that represents a research gap within the broader field of robot ethics. Both posed questions can be affirmed, albeit with certain restrictions. The query as to whether religious robots can fulfill religious functions can be positively answered given the precondition of a practical approach that considers religious robots as those that perform religious practices.

The ethical question of whether religious robots should have religious functions or perform religious practices can also be affirmed. This conclusion comes from discussing counterarguments and highlighting numerous benefits that religious robots bring to both religious practices and non-religious robotics. The two key advantages of religious robots that I have highlighted are: first, integrating religious practices into robots can enable the addressing of existential questions and spiritual themes, thereby meeting the religious and spiritual needs of individuals, such as those that may arise with social robots in hospital settings. Second, incorporating the religious perspective into robotics can enhance diversity within the field, as religion itself represents a facet of diversity. However, there remain significant counterarguments that should be acknowledged, such as the prerequisite of religious experiences for religious practices. Whether robots should perform religious practices will greatly depend on the specific practices, the religious traditions of the respective religions, and the actual experiences individuals have with these robots. Further empirical studies and the inclusion of religious perspectives in future research promise to provide more nuanced responses to these questions.

The subsequent examination of the ethical challenges posed by religious robots has demonstrated that the same ethical challenges that apply to non-religious robots can be posed and applied to religious robots. However, because

religious robots differ from non-religious ones in their contexts and practices, there are shifts in focus, new questions, and modifications to the ethical challenges. Lastly, based on the results, criteria for the "should" question, or rather for religious robots, were developed. These can serve as recommendations and guidelines for future research. Ultimately, as it aimed, this study serves as an initial exploration and categorization of the field of ethics concerning religious robots, a field that should be further pursued by future research.

In the outlook, it is intriguing to pose another question that can only remain open-ended: the question of whether robots *can* and *should* perform religious practices can be supplemented by asking whether they actually *will* perform them. Since this effort was an attempt to pioneer a new field of research, the direction it will take remains uncertain. It is quite possible that there will be a lack of initiative (for instance, within religious communities) to further pursue religious robots as a distinct category. However, at the same time, religious and existential questions might still be posed to the existing social robots because, as observed, there is a demand for it. Discussing this in a specialized field of religious robots enables responsible dialogue with religious actors and experts, rather than leaving it to developers who are only focused on social robots. Moreover, the implementation of religious functions in robots is likely to generate interest for economic reasons as well. The esoteric industry, for example, is experiencing a surge in alternative forms of spirituality and yoga practices across many societies. Furthermore, as previously noted, religious motifs are undergoing a resurgence in technological discourse. To ensure these developments are not solely profit-driven, it is imperative to involve scientific interpretation and contributions from fields like philosophy and religious studies. This multidisciplinary approach ensures a balanced and thoughtful exploration of religious themes in robotics, beyond commercial incentives.

Religion provides a distinct and valuable approach to robotics. The religious perspective has already highlighted that technological success is not just about efficiency and speed. It is also influenced by other factors, including significant cultural elements, and dimensions such as values, psychological comfort, spiritual experiences, and existential questions. These aspects contribute to the success of technology and human–technology interaction. When addressed appropriately, religious robots hold the promise of enhancing the current landscape of robotics.

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Data availability Data sharing not applicable to this article as no datasets were generated or analyzed during the current study.

Declarations

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Informed consent Because this article does not contain any studies with human participants, informed consent is not relevant.

Research involving human and animal participants This article does not contain any studies with human participants or animals performed by the author.

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