Robot Theology

On Theological Engagement with Robotics and Religious Robots

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Abstract

As robots increasingly find their way into the various spheres of human life, the question of religious robots becomes relevant. This article examines from a Catholic-Christian theological perspective whether robots can be used for religious purposes, and it asks how this may be done and what issues are important to consider. In addition, the study contributes to research on the theological engagement with robotics. It is argued that the use of religious robotics differs significantly depending on the specific religion. From a Christian perspective, the use of religious robotics is fundamentally plausible, especially since a wide variety of entities are used as religious media or representations of the divine. However, the use of religious robotics will ultimately be decided by different concepts (e.g. human, life), religious doctrines and culturally transmitted and subjective attitudes. This article places particular focus on the design of religious robotics. It becomes clear that the reasons for accepting religious technology do not lie in the technology itself but in phenomenological preferences and various time- and culture-dependent ideas and concepts. It is likely that as robotics rapidly advances and our relationship with it develops, the use of religious robots also will change.

1 Introduction

In many religions, light and candles play an important role. When one lights a candle (e.g. a votive candle or prayer candle in the church), it is associated with specific religious feelings, experiences and practices. It gives light and warmth, stands for the 'light in the world', hope and the 'light in the darkness'. The candle has a special smell, it flickers, and the wax melts and drips. It

has an effect in the room in which it is placed, and it works with the other candles with which it can be lit. With the lighting of the candle, petitions are formulated, prayers are recited, the deceased and unwell are remembered, and gratitude is expressed. In recent years, wax candles have been replaced in some churches by electric votive candles with LED lamps. By inserting money, one of the many candles is automatically lit. Although electric votive lights have practical advantages, many people lose some dimensions of religious experience and practice in the process. Switching on the electric lamp by inserting money is a simple automation that seems unspectacular and lacks meaning.[1] So, does this mean the end of technology for religious purposes? What about the many beneficial technologies and the great technological advances, e.g. in robotics? Would this mean religious robots will never become popular?

The question of the use of robots arises for theology from the many advances in robotics and their widening use in society (e.g. social robotics in the health sector). Since robots are increasingly present in the various spheres of human life, it is timely to ask questions about religious robots, i.e. robots used for religious purposes. This paper examines whether robots can be used for religious purposes from a Roman Catholic theological perspective, and it asks what is at stake and how they will be used. In addition to the Christian theological orientation, interreligious considerations are explored. Section 2 reflects on the connection between robotics and religion, the relevance and significance of religion for robotics, and theological engagement with robotics. In Section 3, the study focuses on religious robotics. Section 3.1 introduces religious robots and presents the relationships of different religions to them. Sections 3.2 and 3.3 take a closer look at the design and functioning of religious robots. A wide range of possibilities is discussed. What does a robot have to be like to facilitate religious experience? The various steps of the investigation provide insights into philosophical and religious concepts, religious teachings and attitudes that play a role in religious robotics. Finally, Section 4 offers some conclusions and considers the outlook for the theological study of religious robotics.

This paper contributes to research on theological engagement with robotics, referred to here as 'robot theology',[2] which is still in its infancy in international research. It identifies pioneering perspectives, tasks, and questions to be addressed for the theological study of robotics. In this way, the paper contributes to the theological debate on technology. This paper looks beyond references to hubris ('playing God'), the overemphasis on danger or the replacement of humans by omnipotent, powerful artificial intelligence (AI) or robots who have a religious faith and will be our saviours. Instead, a shift in the questions is necessary for

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[1] For the candle example see Löffler, Diana/Hurtienne, Jörn/Nord, Ilona: Blessing Robot BlessU2. In: International Journal of Social Robotics 13/4 (2021), 569–586, here 569f. DOI: 10.1007/s12369-019-00558-3.

[2] The term 'Robot Theology' already appears in: Smith, Joshua: Robot theology. Eugene, Oregon 2022.

theological debates about technology, and this article shows how theological research can ask more pertinent questions.

2 Robot Theology: Religion and Robotics

Robot theology is the theological study of robotics. It approaches the diversity of robots scientifically, including service, combat, sex, social and religious robots. Robots may be analysed from various perspectives, including the ethical, moral-theological, anthropological, metaphysical, biblical, pastoral-theological, pedagogical and didactical. Considerations range from the philosophy of religion to canon law. Diverse topics can be covered, and robot theology addresses questions of the mind–body relationship. It also includes biblical investigations of the relationships with non-human entities, ethical questions of the design of social robots, and pastoral-theological and canonical legal frameworks for religious robots.

For various reasons, theology is especially suitable for dealing with robotics. For example, theology has a rich supply of examples of specific forms of relationship with non-human entities (e.g. in the Bible). Theology includes the ethics of dealing with the Other (e.g. charity and special consideration for the alien and marginalised) and addresses social and spiritual needs. These factors are highly relevant in social robotics and religious robotics. Moreover, technologization raises many anthropological and ethical questions about the image of human beings and the world. The profound technological progress shakes up many traditional views and ideas about humanity, technology, metaphysics and the distinctions between nature and culture and nature and technology. A need for orientation arises in society concerning questions such as what distinguishes humans from machines, questions of justice and the good life, and the ethical application of robots. Theology 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. In addition, the acceptance and handling of robotics differ significantly between countries and cultures. Religions as cultural actors have shaped and continue to shape today's cultural and societal views on robotics.[3] From a theological perspective, many other benefits and advantages of dealing with robotics can be explored. The diversity of disciplines within theology makes it possible for theology to explore robotics broadly (e.g. practically, historically, biblically, ethically and philosophically).

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[3]   See Trovato, Gabriele et al.: Religion and Robots. In: International Journal of Social Robotics 13/4 (2021), 539–556, here 540. DOI: 10.1007/s12369-019-00553-8.

3 Religious Robots

3.1 Robot theologies: Religious robots in different religions

Robots have been used for various religious purposes. For example, BlessU-2 is a German robot that plays blessings in different languages.[4] SanTO (the Sanctified Theomorphic Operator)[5] takes the appearance of a Christian Catholic saint who quotes sacred texts and accompanies the faithful in prayer. As a companion, it also has psychological functions and contributes to well-being (e.g. for the elderly).[6] Mindar is a robot priest from Japan who represents the Buddhist teacher Kannon Bodhisattva and celebrates the Zen ceremony in the temple.[7] 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 intended to spread Buddhism in China.[8] As such, Xi'aner is not regarded as threatening religious teachings but rather as contributing to religious dissemination.[9] In Japan, the humanoid robot Pepper is used for Buddhist funerals because it is cheaper than the human priest. It also broadcasts the ceremony over the internet for those who are unable to attend.[10] Religious robots are not limited to religious purposes in the narrow sense, such as using them in church and for religious ceremonies. So-called social robots with religious characteristics can take on other tasks.

The significance of religion for robotics is especially evident in the example of the robot DarumaTO-2, which is used in health and elderly care. It does not fulfil any religious purpose, but it is familiar to older people because of its religious appearance, so they feel comfortable with it. DarumaTO-2 is designed like the Daruma dolls, which depict the Buddhist monk Bodhidharma and are supposed to bring good luck as talismans in Japan and China.[11] Trovato,

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4   See Löffler et al.: Blessing Robot BlessU2, 575.

5   See Trovato, Gabriele et al.: Communicating with SanTO. 28th IEEE International Conference on Robot and Human Interactive Communication (RO-MAN) 2019, 1–6. DOI:10.1109/RO-MAN46459.2019.8956250.

6   See Löffler et al.: Blessing Robot BlessU2, 573; Trovato et al.: Religion and Robots, 545.

7   See Smith: Robot theology, ch. 7; Klein, Mechthild: E-Priester im Einsatz. In: Deutschlandfunk 25.09.2019. Online at: https://www.deutschlandfunk.de/religion-in-japan-e-priester-im-einsatz-100.html (as of: 18.09.22).

8   See Trovato et al.: Religion and Robots, 544; Löffler et al.: Blessing Robot BlessU2, 573.

9   See Löffler et al.: Blessing Robot BlessU2, 573.

10   See ibid.

11   See Trovato et al.: Religion and Robots, 545, 552; Trovato, Gabriele et al.: The creation of DarumaTO. Proceedings of the 2019 IEEE/ASME International Conference on Advanced Intelligent Mechatronics, 606–611, here 607.

for instance, identifies the connection of religion with mental health and well-being.[12] These robots vary in their movements, size, facial expressions, voice, speech functions, display of emotions, light functions, and whether they have integrated screens, are 'anthropomorphic', 'biomorphic' or 'idiomorphic' (i.e. functional) in design. Besides robots, religious technologies include timers for the Jewish Sabbath, an electronic Quran and a Christian electronic rosary.[13]

The acceptance of robots varies greatly between cultures, countries and religions. Differences include how they are handled, the purposes for which they are used and their position and importance in religious life. Therefore, robot theology exists only in the plural: robot theologies. Currently, Christianity remains dominated by technological scepticism and a rejection of robotics. However, this position has changed over the years. For example, in the medieval and early modern periods, automata were promoted by the church to astonish people with their apparent magical abilities.[14] A famous example was the clockwork monk made for King Philip II of Spain in the 16th century. The monk occupied an intermediate position between the living and the non-living. In the course of time, the understanding of aliveness changed.[15] In Islam, religious robotics is confronted by aniconism, which can result in a low acceptance of religious robotics.[16] In Judaism, various activities are forbidden on the Sabbath because believers are supposed to rest, so technology is used to automate some tasks (e.g. automatically turning the lights on and off). Here, automated technologies can facilitate everyday activities and thus deepen the experience of the Sabbath.[17]

Hinduism, Taoism, Confucianism, Shintoism and Buddhism are more open and accepting of religious robotics than the monotheistic religions. Religious robots support rituals, spread religion and generate enthusiasm for it.[18] In Hinduism, this is facilitated by worshipping multiple deities or worshipping the deity in different forms and representing reincarnation and the sacred character of animals and other beings.[19] In Buddhism, the attribution of Buddhahood to robots is discussed, and in Shintoism, inanimate objects like robots can be sacred and have spirits.[20] Thus, there are significantly different attitudes to religious robotics across reli-

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[12]   See Trovato et al.: DarumaTO, 607.

[13]   Trovato et al.: Religion and Robots, 548, 544f. See footnotes 33 and 35.

[14]   See ibid, 542.

[15]   See ibid.; Löffler et al.: Blessing Robot BlessU2, 572 f.

[16]   See Trovato et al.: Religion and Robots, 542 f.

[17]   See ibid, 543 f.

[18]   See ibid, 543 f., 547.

[19]   See ibid, 543.

[20]   See ibid, 544; Geraci, Robert M.: Robotics and Religion. In: Runehov, Anne/Oviedo, Lluis (eds.): Encyclopedia of sciences and religions. Dordrecht 2013, 2067–2072, here 2070.

gions and between monotheistic and polytheistic faiths, depending on their positions on divine representation, the environment and their handling of images and idols, among others.[21]

From a Christian perspective, the Incarnation may play an important role in establishing religious robotics. According to Christian doctrine, God became a human being in a body with flesh and blood.[22] The Word became flesh – but what about robots, and what is flesh? Technologization has blurred the boundary between the body and technology. On a biological level, the body's boundaries are not as clearly defined as is often assumed.[23] Can technology also be understood as part of the human body? The theological understanding of the body also has diverse potential for interpretation and could be further transformed into a more open, dynamic understanding with increasing technologization.[24] Specific religious teachings are important for establishing religious robotics and understanding and transforming concepts such as the human, the body, life and creation.

Diana Löffler et al. show that Japan, in particular, has animistic views because of the extent of Buddhism and Shintoism. In these religions, objects are alive and have a soul or a spiritual essence, so there is more openness towards robots. This contrasts with the discussion of the 'Frankenstein complex' (the fear of robots) in Western countries.[25] Among other factors, this fear is attributed to the impact of the industrial revolution, including the many social challenges (e.g. poverty, unemployment, hunger and suffering) produced by technological development.[26] In addition, people in Japan are very familiar with cartoon robots such as Tetsujin 28-go/Gigantor, Doraemon and especially Tetsuwan Atomu (Astro Boy). These robots play an important role for the Japanese, and they have been with them since childhood. These robots have close relationships, emotional bonds and families of their own.[27] Compared with many robots in western science fiction, they do not pose a threat to humans but are friends who save humans from danger.[28] The influence of cartoon robots and the ideas of Shintoism and

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[21]   See Trovato et al.: Religion and Robots, 547.

[22]   I am grateful to Noreen Herzfeld for discussions on this topic.

[23]   See Barad, Karen: Agentieller Realismus. Berlin 2012, ch. 'Körpergrenzen'.

[24]   See Puzio, Anna: Zeig mir deine Technik und ich sag dir, wer du bist? – Was Technikanthropologie ist und warum wir sie dringend brauchen. In: Diebel-Fischer, Hermann/Kunkel, Nicole/Zeyher-Quattlender, Julian (eds.): Mensch und Maschine im Zeitalter 'Künstlicher Intelligenz'. 2023; Puzio, Anna: Über-Menschen. Philosophische Auseinandersetzung mit der Anthropologie des Transhumanismus. Bielefeld 2022, part III; Puzio, Anna: Digital and Technological Identities – In Whose Image? In: Cursor (2021). Online at: https://cursor.pubpub.org/pub/y2bcesx4 (as of: 14.03.22).

[25]   A term coined by Isaac Asimov in his robot novels.

[26]   See Löffler et al.: Blessing Robot BlessU2, 574.

[27]   See Robertson, Jennifer: Robo sapiens japanicus. Oakland, California 2018, 1 f.

[28]   See Geraci: Robotics and Religion, 2070.

Buddhism may explain the more open, approachable and welcoming attitude towards robots in Japan:

> Broadly speaking, his [sc. the cartoon robot's] influence, combined with the persistence of Shinto and Buddhist ideas in the largely agnostic country, promotes a spirit of cooperation and affection between human beings and robots. As a result, many Japanese eagerly look forward to the introduction of functioning, intelligent humanoid robots.[29]

Therefore, the use of robots for religious purposes depends strongly on the respective religion and its ideas, beliefs, teachings and concepts. In addition, it is closely interwoven with other cultural and societal aspects. Conversely, the acceptance of robots in society can also depend on religion, as the example of the Daruma dolls demonstrates. In Shintoism, robots can be sacred and have spirit; they are 'living things', and this implies a certain nature–culture relationship:[30]

> [N]ature is not external to culture and society but is an immanent component or symbiotic constituent of them; moreover, the reality of nature is contingent upon human artifice and mediation […]. Robots are 'living things' in the Shinto universe. While they may not claim to be animists, many Japanese roboticists nevertheless draw from this synergistic nature–culture 'platform' in advocating not only the interchangeability of robots and humans in everyday life but also their mutual enhancement and even mutual constituency.[31]

Life and aliveness, the distinction between animate and inanimate, nature and culture, the relationship to non-human entities and objects, and the relationship to technology are religiously and, more generally, culturally negotiated concepts. The attitude taken towards religious robots is related to these concepts, whether robots are seen as a threat to or promoter of religious purposes and whether they can serve as a divine representation and medium. Moreover, these negotiations and attitudes change over time. Religious robotics is thus always subject to time- and culture-dependent negotiations. Therefore, understandings and attitudes towards religious robotics will continue to change especially during times of technological upheaval and great technological advances.

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[29]   Ibid.
[30]   Robertson: Robo sapiens japanicus, 15; Geraci: Robotics and Religion, 2070.
[31]   Robertson: Robo sapiens japanicus, 15.

3.2 Designing religious robots: How does religiousness get into the robot, or: Is it all a question of design?

As previously discussed, the use of religious robotics depends on specific ideas, concepts, and cultural and religious contexts and is already established in some religions and places. However, can robots as technological objects (i.e. their shape, form, design, material, made-ness, movements and control) fulfil religious functions and represent the divine?

Looking at the different forms of divine representations, it is striking that anything can become a divine representation: from people and animals to objects, hybrid religious beings, places, plants and other natural elements. In these representations, the divine can, in turn, appear in anthropomorphic objects and anthropomorphised animals and nature and as sacred objects in zoomorphic or physiomorphic form. Therefore, there are numerous mixed and intermediate forms.[32] This diversity of divine representation applies not only between religions, but also within religions. For example, in Catholicism, there are holy people, scriptures, places, buildings, mountains, stones, relics and trees (and St. Barbara's branches, palm branches and fir trees are used for religious customs). Moreover, great importance is bestowed on different kinds of animals, such as doves and sacrificial animals in the Bible. Images and religious objects are used in worship (e.g. tabernacle, chalice and paten, Easter candle, eternal light, altar bells). Natural phenomena such as fire and light play important roles, and almost everything can be blessed (including weapons). Therefore, ontologically, robots are compatible with Catholic theology. In addition, robots can be 'anthropomorphic', 'zoomorphic', 'biomorphic' and 'physimorphic',[33] 'functional', etc.[34]

Ilona Nord and Charles Ess criticise these categorisations into anthropomorphic, biomorphic, physimorphic, functional, etc. shape. These categorisations 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 categorisations are useful and explore alternative taxonomies.[35]

Furthermore, the use of religious mediums cannot be rejected or opposed from a Catholic perspective. Religion always depends on a medium and is always mediated, and a wide variety of

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[32] See Trovato et al.: Religion and Robots, 546 f.

[33] 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.

[34] See Trovato et al.: Religion and Robots, 547 f.

[35] See Nord, Ilona/Ess, Charles: Robotik in der christlichen Religionspraxis. Anschlussüberlegungen an erste Experimente in diesem Feld. In: Merle, Kristin/Nord, Ilona (ed.): Mediatisierung religiöser Kultur. Praktisch-theologische Standortbestimmungen im interdisziplinären Kontext. Leipzig 2022, 227–258, here 249, 256f.

mediums have been used. Sacred texts, books and images function as mediums; priests and angels are mediators between the divine and the earthly. Also, for religious communication within the religious community, media technology, such as broadcasting, television, film, internet and social media, is used. However, adaptation to new media technologies has been slow, and only those media that have become widespread and proven are usually accepted in religious communication.[36]

If there is no argument against religious robotics regarding the entity or its medial character, the question remains how religious robots may be designed. How does holiness or religiousness get into the robot? Trovato et al. argue that robots in theomorphic design (i.e. robots in the 'shape of something divine')[37] are advantageous in many religious areas of application – namely, in terms of 'acceptance' by the user, 'comfort' (i.e. that the user feels more protected by the religious robot), and 'regard' (i.e. an ordinary object is held in less esteem than a religious looking one). The theomorphic appearance can also make religious people feel more comfortable and help those more alien to religion feel more comfortable with religious traditions. For example, the elderly might deal more easily with a religious robot and feel more comfortable with it because they have a strong emotional attachment to religion, even though they are less familiar with technology.[38]

In their insightful critical examination of Trovato's work, Nord and Ess problematise this category of 'theomorphic robots'. It remains unclear what exactly is meant by theomorphic design and the theomorphic shape seems provocative with regard to considerations of the 'image of God'. Moreover, they identify many dualisms in Trovato's approach, such as the dualism of God and the world, which are theologically untenable.[39] 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 call for theological research.

Other factors in the design of religious robots include size, voice, face and facial expressions, gestures, graphics and screens.[40] Besides shape, there are many aspects of design and practical implementation to consider: robot-likeness, name, (religious) symbols, materials, movement, user control and customisation, light, touch and location.[41] In general, anthropomorphic traits or highly complexity in robots, such as movement and communication, might not always be beneficial, especially in religious robotics even if they facilitate the interface between humans and robots. A robot that does not communicate like a human and moves in less than a human-like way affects the user's expectations and makes room for interpretation of how the user makes

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[36] See Löffler et al.: Blessing Robot BlessU2, 571.

[37] Trovato et al.: Religion and Robots, 539, 541.

[38] Ibid., 549.

[39] See Nord/Ess: Robotik in der christlichen Religionspraxis, 245–250, 256f.

[40] See Löffler et al.: Blessing Robot BlessU2, 580, 582.

[41] See Trovato et al.: Religion and Robots, 550–552; Löffler et al.: Blessing Robot BlessU2, 580.

sense of the robot's behaviour. Errors or lack of reactions on the part of the robot could also be reinterpreted by the human, whereas the errors and malfunctions of a highly complex robot would contradict the expected infallibility of the divine.[42] Further investigation is needed to identify which characteristics and which behaviours of the robot show 'thingness' and the 'robotic element' well, and when it is better to hide them. A related issue is user control of the robot by buttons, switches, keyboards, and touch screens, as well as the robot's reliance on power cords or batteries.[43] Suitable materials are those that are considered valuable, linked to the divine or perceived as natural.[44] Names and (religious) symbols can facilitate embedding the robot into the religious context. Where the robot is found also is important. The location of the robot (e.g. in a museum as an exhibit or a designated place in a church) can influence people's perception of it.[45]

In addition to the robot's design, it is evident that the context and the practices in which it is embedded are decisive, including the place, the processes and rites in which it is integrated and how religious authorities deal with it. A blessing of the religious robot or other practices by a religious authority also could reinforce the integration of the robot into the religious context.[46] The design guidelines outlined above remain vague. They have emerged from studies of the relatively few religious robots. Moreover, even though there will be more advances in research in the future, no guidance for developing religious robots will guarantee successful human-robot-interaction.[47] As the discussion below illustrates, the use of religious robotics is a highly complex, relational and subjective process between the user and the robot.[48] In this process, the space for religious experience might be made possible through construction and design. Among other issues, it is about gaps and the opening of spaces:

3.3 The puzzle of the candle: Space-opening robots and robots with gaps

The example of the wax candle and the electric candle in Section 1 demonstrates what matters in religious robotics and what successful religious robotics must look like. Superficially, one

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[42] See Trovato et al.: Religion and Robots, 550 f.; Löffler et al.: Blessing Robot BlessU2, 574.

[43] See Trovato et al.: Religion and Robots, 550 f.; Löffler et al.: Blessing Robot BlessU2, 578, 583.

[44] See Löffler et al.: Blessing Robot BlessU2, 583; Trovato et al.: Religion and Robots, 551.

[45] See Trovato et al.: Religion and Robots, 550 f.

[46] See ibid., 551.

[47] Another important question is how to define successful interaction in a religious context. When is this interaction considered successful? See Nord/Ess: Robotik in der christlichen Religionspraxis, 237.

[48] See Daelemans, Bert: The Need for Sacred Emptiness. In: Religions 13/6 (2022), 515, 1–15, here 14. DOI: 10.3390/rel13060515. – Of course, dealing with religious robotics also involves looking at the relationship with God.

could argue that the wax candle is natural and the electric candle is artificial. The immediate critique is that technology makes the electric candle less meaningful. I have argued elsewhere that, on closer inspection, the distinction between naturalness and artificiality is not viable. There is neither pure nature nor pure culture; the two are inextricably interwoven.[49] Actually, the 'wax candles' used today are not made of beeswax or other natural products. They are mostly paraffin, and they require chemical processes for their production.[50] Therefore, perceiving one candle as natural and the other as artificial is a phenomenal rather than an ontological distinction. The wax candle offers a comprehensive sensual experience, gives warmth and has a special smell. By appearing less modern and nostalgic, it seems closer to tradition and ancient rites, and the mutual lighting of candles can symbolise connectedness. A lengthy process can be experienced – of lighting, flickering and burning down – which is not controlled by us. This process has elements beyond our direct influence (whether the candle can be lit, whether it flares up strongly, when it goes out and whether it spontaneously goes out in between). The electric candle has a simple automatic mechanism, and the flicking on reminds us of a light switch or a drinks machine. The process is very short and unspectacular. Even if a candle not selected by us turns on, the process is still quite simple and seems to be controlled by us. If the candle does not come on, we blame it on a fault in the system and get angry at 'the technology'.

This response may also be due to our sceptical attitude towards technology. However, this inadequacy of the electric candle is not due to the technologies per se. What the wax candle offers in terms of experience could also be provided by better technology. For example, consider the effect of fireworks. A firework is as artificial as an electric candle and is chemical rather than natural, but the effect on the spectator is spectacular. The delicate ignition, the magnificent play of colours, the contrast of glowing light in the dark, the movements, noises and the uncontrolled course have an impressive effect. It happens (at best) far above our heads and transcends us; it has an element of danger; it is a multi-sensory experience; it astonishes and evokes a romantic feeling. Fireworks are also associated with nature (sky, darkness, weather), and perhaps the element of nature may be conducive to religious experience. However, fireworks are also about wonder and something out of our control. They demonstrate that we do not necessarily require the nostalgic and pre-modern for a poignant, moving, stirring, overwhelming or romantic feeling.

Technology not only evokes such experiences but also offers completely different experiences and functions. Technology can provide impressive sensory experiences and expand the senses (e.g. by implementing senses of the animal world such as infrared vision or magnetic sense in

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[49] See Puzio: Über-Menschen, ch. 4.1.
[50] Churches use different material for votive candles and the material also depends on the type of candle.

technology), enable new spatial experiences (virtual and augmented reality) and change the perception of time. Therefore, it will be important for religious robotics to appeal to different senses and trigger various sensory stimuli (e.g. acoustic, visual, olfactory, haptic, tactile) or enable aesthetic experience while it connects with sensory experiences and experiences that are associated with the religious (e.g. smells in church, religious sounds and singing). Light effects may play an especially important role in robotics, since light has a major role in religious experience, is charged with ideas of good and evil, and is associated with hope, salvation, enlightenment and divine communication.[51] Why couldn't a religious robot provide as meaningful a religious experience as a bell, singing bowl or candle? The function of religious robotics is not to replace interpersonal experience and imitate humans. Instead, it can be 'used to extend the experience in ways only the technology can do'.[52] For example, the simple switching mechanism of the electric candle is not useless; it fulfils its quick, practical function for requirements such as switching on lights or buying drinks. However, for a religious, meaningful experience, the technology would have to be designed differently – which is quite possible.

Therefore, the future of religious robotics will also depend on our attitude towards technology, how technology feels to us and how we perceive it, and on its design. In addition, religious and spiritual needs and values when using religious robotics should be considered. For example, lighting a candle is about contemplation, thinking, hoping and praying – as enabled by the wax candle, but maybe not by the electric candle. Furthermore, the development of religious robotics also reveals 'important values in religious communication, like […] feeling connected to others. […] These values need to be carefully translated into meaningful experiences mediated through robot technology […].'.[53]

Furthermore, religious robotics will not involve omnipotent, god-like robots, as critics may suggest. Instead, robots will be effective when they have gaps and open spaces. As discussed above, it is not necessarily the human-like or perfect robot that facilitates religious experience, but precisely the mechanical movements of a robot, its gaps and shortcomings, and its distanced moment, which is alien to us. This gap or lack may open space for reflection and contemplation, meditation and prayer, and experiencing fullness and thinking more deeply. The religious robot is not an image of the divine, but it is meant to facilitate the religious experience, and in doing so, it can and must always be incomplete and fragmentary. Its gaps create space for one's thoughts, memories, wishes, hopes and religious experience.

The example of sacral architecture can illustrate this phenomenon. Since the development of religious robotics is still in its initial stages, sacral architecture, in particular, offers inspi-

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[51]   See TROVATO et al.: Religion and Robots, 552.
[52]   LÖFFLER et al.: Blessing Robot BlessU2, 583.
[53]   Ibid., 584.

ration. Ivica Brnić speaks of the 'gap, [the] emptiness and [the] nothingness' as 'design principles'[54] and clarifies the construction of the 'presence of the absent' through space, opening and light[55]. He writes: 'In architecture, leaving things out is what makes spatial perceptibility possible in the first place and, as a result, also makes it possible for something to happen'.[56] The gap irritates and points to the whole. Moreover, paradoxically, the emptiness enables the experience of fullness and creates space – for the absent, the mystery, hope, thoughts and prayer.[57]

Brnić also refers to Paul Tillich, who convincingly illustrated the meaning of emptiness for religion:

> This emptiness is not emptiness by privation, but it is an emptiness by inspiration. It's not an emptiness where we feel empty, but it is an emptiness where we feel that the empty space is filled with the presence of that which cannot be expressed in any finite form.[58]

Tillich shows that 'emptiness is not mere absence but presence, not privation but inspiration'.[59] This concept of 'sacred emptiness'[60] can also be applied to religious robotics, as Daelemans states: 'Meaningful symbols and rites need room, sacred emptiness, to resonate and unfold'.[61] Technology in the form of religious robotics does not aim at godlikeness and perfection, but the construction of 'sacred emptiness' can paradoxically express the simultaneity of 'vulnerability and presence' and of 'limitation and fulfilment':

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[54] Brnić, Ivica: Nahe Ferne. Zürich 2019, 197. Own translation. Sentence in German with original quotations from Brnić: Ivica Brnić spricht von der 'Lücke, [der] Leere und [dem] Nichts' als 'Gestaltungsprinzipien' und verdeutlicht die Konstruktion der 'Anwesenheit des Abwesenden' durch Raum, Öffnung und Licht.

[55] Ibid., ch. 'Anwesenheit des Abwesenden', from p. 195.

[56] Ibid., 197. Own translation. Original: 'In der Architektur ermöglicht das Auslassen überhaupt erst die räumliche Wahrnehmbarkeit und infolgedessen auch das Geschehen.'

[57] 'Gap' ('Lücke') and 'void' ('Leere') are used side by side in this article, while Brnić and the discourse in architecture differentiate more sharply between both terms.

[58] Tillich, Paul: On art and architecture. Ed. by John Dillenberger and Jane Dillenberger. New York 1987, 227. Also cited by Brnić: Nahe Ferne, 198.

[59] Daelemans: Sacred Emptiness, 7.

[60] Daelemans: Sacred Emptiness. Daelemans refers, among others, to Tillich, e.g: Tillich, Paul: Art and Society. In: Tillich, Paul: On Art and Architecture. Edited by Dillenberger John and Jane Dillenberger. New York 1989, 11–41.

[61] Daelemans: Sacred Emptiness, 14.

> The empty space in the open ring 'is also Christ's empty seat at the table of this world. The death of the Lord and his going forth are the wound where history bleeds. When the Lord departed, he left the world open behind him' (Schwarz [1938] 1958, p. 78). Sacred emptiness expresses at the same time vulnerability and presence, expectation and promise, human limitation and divine fulfillment.[62]

One could argue that the limitation of technology may be included with the 'human limitation' in this last aspect.

It is important to note that Tillich argues in his elaborations that it is the architecture that constructs this emptiness:[63]

> 'The sacred void can be a powerful symbol of the presence of the transcendent God. But this effect is possible only if the architecture shapes the empty space in such a way that the numinous character of the building is manifest. An empty room filled only with benches and a desk for the preacher is like a classroom for religious instruction, far removed from the spiritual function which a church building must have' (Tillich [1962] 1989, p. 217). Again, he contrasts sacred and mere emptiness, which does not have the power to express the 'numinous', the presence of the divine.[64]

He even considers this shaping of emptiness through architecture to be 'powerful'.[65] Not every emptiness is a 'sacred emptiness', but it becomes one. In addition, architecture or design also plays a role in this becoming, both in religious spaces and in religious objects. A church, bell, singing bowl, host or Easter candle does not fall from the sky. Neither does a robot. Religious experiences are mediated.

Religious experience requires enduring and tolerating the difference between wish and wish fulfilment.[66] Moreover, speaking of God is not a perfect, superhuman language. Rather, it is

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[62]   Daelemans: Sacred Emptiness, 7. Daelemans cites the church architect Rudolf Schwarz, to whom Tillich also referred: Schwarz, Rudolf: The Church Incarnate. Chicago 1958, 78.

[63]   See Daelemans: Sacred Emptiness, 5.

[64]   Ibid. Daelemans cites: Tillich, Paul: Contemporary Protestant Architecture. In: Tillich, Paul: On Art and Architecture. Edited by Dillenberger John and Jane Dillenberger. New York 1989, 214–220, here 217.

[65]   Daelemans: Sacred Emptiness, 5.

[66]   Lecture 'Gott zur Sprache bringen' held by Prof. Dr. Reinhard Feiter, winter semester 2013/2014, University of Münster. Feiter refers to Sigmund Freud's 'Die Zukunft einer Illusion' ('The Future of an Illusion', 1927).

communication that remains beyond the limit of language: '*Exceeding the limit* and remaining *below the limit* of the linguistic canon is the fate of speaking of God'.[67]

Therefore, religious experience includes that which is overwhelming, that which engages, prepossesses or captures us, that which amazes us, that which is removed from us, withdraws or eludes and is not controlled by us. The gaps and the emptiness create space for religious experience, thought and thoughtful meditation, and the development and experience of stories. Other forms of religious experience may emerge through religious robotics. The many dimensions outlined that are important for religious robotics make it clear that it requires the participation of theologians in their development and design.[68] Although many aspects of religious robotics have been mentioned, it is important to note that religious robotics is not merely a design and development process but a complex interaction between user and robot. What is perceived as religious and whether it leads to a religious experience or successful interaction with the robot is subjective and also depends on the user.[69]

4 Conclusion and Outlook

The use of religious robotics differs greatly according to the specific religion. From a Christian theological perspective, the use of religious robotics is possible and plausible in principle, but it will be decided based on different concepts (e.g. human, life), religious teachings, culturally traditional attitudes and subjective attitudes. The purposes for which the religious robots are used will also be relevant. Religious robots could take on very different tasks, such as administrative tasks, explaining and disseminating religious teachings, giving church tours, arousing interest in religion, facilitating religious and spiritual experiences, accompanying prayers, conducting conversations and other social interactions. Future research needs to reflect on specific fields of application for religious robots: What should robots be used for and what should they not be used for? Robots can contribute to an inclusive church, for example, by providing access to religious ceremonies via digital transmission or augmented reality for those who cannot participate. The relationship to technology is subject to, among other things, time-dependent religious and cultural negotiations. Historically, our relationship with technology and robotics has always changed. Therefore, it is probable that robotics will also become more acceptable in

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[67] HEMMERLE, Klaus: Von Gott sprechen. Online at: https://www.klaus-hemmerle.de/de/werk/von-gott-sprechen.html#/reader/0 (as of: 04.01.22), III. Own translation. Original: 'Überschuss sein *über* die Grenze und Bleiben *unter* der Grenze des Sprachkanons ist das Geschick des Sprechens von Gott.'

[68] See LÖFFLER et al.: Blessing Robot BlessU2, 573 f.

[69] See DAELEMANS: Sacred Emptiness, 14; TROVATO et al.: Religion and Robots, 549.

a religious context as our relationship to robotics changes as the technology develops, as robots become more familiar to us, and we develop a closer relationship with them.

This paper has argued that robots in themselves are not disqualified as religious media because of their quality, condition, constitution, material or technicity. Religions always use mediums, and various entities are suitable as divine representations. Why does Christianity mostly reject religious robots? Robots are just another medium. However, media differ greatly in their type and function and not every medium is suitable for every activity. In the case of highly developed robots, the question arises as to what extent they are actually media and how much agency can be attributed to robots. Exploring this Christian scepticism towards technology and robotics further promises important insights into the conception of and relationship to technology.

This paper has suggested, perhaps surprisingly, that design is a high priority. The example of electric candles has shown that technology must open very specific spaces, enable spaces of imagination or appeal to the senses. Certain movements, mechanisms and automatisms seem mechanical and worthless to us. In contrast, other technologies can, for example, evoke a play of colours that fascinates us (as with fireworks) or change the spatial experience with augmented reality. Several findings can be drawn from the research on the design of robotics. Why do we reject technology over other religious entities? The differences are not in the technology itself but in certain mechanisms, material compositions or functions. The differences are partly phenomenological.

However, since technologies bring many advantages to religious experience and communication, it follows that, rather than designing technology that imitates humans, the particular strengths of technologies should be exploited (e.g. the technological effects outlined above, endurance and repetition, personalised offers, and the fact that one is less ashamed in the presence of technology than with humans). Another result is that religious robots (like other religious objects, places, or buildings) are fundamentally about construction. Religious robotics is not a divine and passive issue, remote from the human being, but is essentially about construction and design. How do we construct technology to open spaces and enable religious experience? The design guidelines have made it clear that the rules for religious robots are different from those for other human–robot interactions. The question of design is a question that should not be underestimated since the identity of the robot depends on it, as does the facilitation of the interface, the relationship and the emotions of the human (respect, trust, fear, authority), religious experience, its acceptance and the comfort it offers. Furthermore, ethical aspects in design need to be investigated in further research (e.g. values in design).

Consequently, it has emerged from this study that the involvement of theologians in its design and conceptualisation is central and that it is a highly interdisciplinary endeavour. Al-

though religious robots are not just a matter of design, the design is relevant and needs scientific debate.

In addition, the study has also explored theological engagement with robotics. By pursuing various questions concerning religious robotics, we ask about the 'values in religious communication' (elaborated by the example of religious robotics),[70] the 'understanding of religious communication',[71] and the meaning of religious media and religious practices (e.g. the blessing robot makes us think about blessing). Religious robots allow us to question and reflect on religious concepts. Furthermore, technology will create new religious and spiritual access, transforming the religious and spiritual experience and leading to new religious practices. In addition, some misconceptions and prejudices have been addressed. Robotics must be demystified. God-like, omnipotent robots with apparent magical abilities (or 'strong AI') that can replace humans are not the goal of religious robotics. The absent should be kept present as the absent.[72] The paper has identified specific relevant questions. It is a matter of asking the right questions and working out issues. Particularly important for theological study will be the anthropological and ethical questions concerning robotics, which could not be dealt with here. These include questions about responsibility, anthropomorphism, personhood, status and relationships to non-human entities (e.g. are animals, angels and robots included in the concept of 'creation'?), moral actors and moral patients, discrimination and manipulation or positive effects.

Theology provides a specific, fruitful approach to robotics. The theological approach has already made it clear that technological success is about more than effectiveness and speed.[73] There are also other influences on technology (i.e. important cultural factors) and certain other dimensions such as values, psychological comfort, spiritual experience and imaginative spaces promoting the success of the technology. It also became clear that, especially with older people who find it difficult to access technology, the religious dimension can facilitate the interaction because it provides familiarity and comfort. It can also be a strength of theology in that it combines robotics with existential questions and can thus offer a hitherto special form of human–robot interaction. The enduring task of theology is to constantly search for new approaches to robotics and reflect on its own concepts in the process.

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[70]   See LÖFFLER et al.: Blessing Robot BlessU2, 584.

[71]   See ibid, 571.

[72]   FEITER, Reinhard: Lecture 'Gott zur Sprache bringen'. Original: 'Das Abwesende als Abwesendes anwesend halten'. Feiter refers to WINNICOTT, Donald W.: Übergangsobjekte und Übergangsphänomene. In: Psyche 23 (1969); engl. Transitional objects and transitional phenomena. In: International Journal of Psycho-Analysis 34/2 (1953), 89–97.

[73]   See TROVATO et al.: Religion and Robots, 549.

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