

Development of Christian AI: Protestant Catechism-Bot

Abstract

A research and development group led by Prof. Seiji Kumagai (Professor of Kyoto University's Research Institute for the Future of Human and Society, i.e., IFoHS) and Mr. Toshikazu Furuya (CEO of Teraverse Co., Ltd.) has previously developed numerous Buddhist AI products such as Buddhist chatbots and AR-s (Augmented Reality). Simultaneously, they have advanced multifaceted research and development activities with a view toward creating AI that inherits humanity's intellectual heritage, including religions and philosophies from throughout history and across the globe.

Recently, the R&D group from Kyoto University's Kumagai's Lab and Teraverse Co., Ltd. (Development Leader: Dr. Kunio Hase) has developed a Christian AI, called *Protestant Catechism-Bot*.

For many Japanese unfamiliar with Christianity, the AI implementation of these catechisms is expected to make knowledge about the world's largest religion more accessible and to satisfy intellectual curiosity. Furthermore, following the development of Buddhist AI, the creation of Christian AI represents the realization of religious diversity within the field of advanced technology.

Kyoto University's Kumagai Lab and Teraverse Co., Ltd. also plan to develop dialogue AI featuring philosophers and saints representing human history. This initiative aims to harmonize and advance cutting-edge technology with the human spirit, fulfilling both demand and supply, thereby opening up and recreating a rich tradition of knowledge within the digital space.

1. Background

Catechism is a Q&A-style summary of Christian doctrine. Catechisms have historically been used during introductory education and as a rite of passage before sacraments, such as baptism and confirmation. Catechisms were traditionally transmitted orally and through written documents. Thus, the Catechism as a doctrinal question-and-answer format is well-suited as learning data for chatbots and was adopted as the data to be learned by the AI.

The tradition of Catechism (doctrinal questioning) is said to trace back to the Old Testament book of Deuteronomy. Within Judeo-Christianity, oral religious instruction, the documentation and recitation of oral traditions, and their memorization constitute a tradition widely preserved from the earliest times through antiquity and the Middle Ages. Particularly within the Western Church, catechisms were documented by both the Catholic Church and Protestant denominations since the Reformation period of the 16th century. A prominent modern example is the Catechism of the Catholic Church (1992) by Pope John Paul II.

The R&D group adopted Martin Luther's (1483-1546) Small Catechism and the Westminster Shorter Catechism (1648) as learning data.

In 1517, Luther posted his *95 Theses* on the door of Wittenberg Castle Church, demanding theological debate over indulgences and other issues. This sparked the formation of Protestant denominations, separating from the Roman Catholic Church. In this regard, Luther was truly the central figure of the Reformation in medieval Europe. His Small Catechism (1529) has been widely read by Protestants worldwide as an introductory guide to Christian doctrine.

Furthermore, the Westminster Shorter Catechism, together with the Westminster Larger Catechism and the Confession of Faith, is known as the Westminster Standards. These documents define and outline the doctrines of Protestant Reformed churches. These documents were developed during the so-called English Puritan Revolution, specifically through the Protestant theological conferences known as the “Westminster Assemblies” held from 1643 to 1649. Subsequently, with the Puritan expansion into North America, these documents spread widely, embracing both praise and criticism, becoming part of the foundation of Western Christian culture that continues to this day.

The Small Catechism by Luther and the Westminster Larger Catechism, which we have treated as learning data, were also designed to meet a wide range of needs, from children’s religious education to basic adult literacy. Therefore, we judged them to be the most manageable texts for chatbot learning in this development. In the future, we plan to expand the learning materials to include a broader range of catechisms and confessional documents for clergy and educated individuals. These will encompass Protestant confessional writings such as Luther’s Large Catechism, the Augsburg Confession, the Heidelberg Catechism, and the Westminster Larger Catechism; ancient Christian creeds deeply associated with the Orthodox Church; and the Catechism of the Catholic Church.

Christianity is a minority religion in Japan, representing approximately 0.7% of Japan’s total population, but approximately 30% of the world’s population. Enabling many people to grasp the beginnings of an understanding of Christianity is considered beneficial in today’s increasingly globalized society. Even though the scope covered by the Protestant Catechism-Bot represents only a part of the Christian tradition, it will undoubtedly make a solid contribution to improving religious literacy.

In fact, the Protestant Catechism-Bot has reached the stage where its introduction and utilization are being considered in religious settings like churches and mission schools, as well as educational institutions, as an AI accessible to anyone regardless of faith. The envisioned future beyond this involves a *traditional knowledge AI*, or AI programmed on doctrines of religions such as Buddhism and Christianity and other philosophy, which is enriched not only by significant Christian texts from throughout history and across the globe, but also by the religious heritage and wisdom of diverse cultures worldwide. This AI will inherit humanity’s varied intellectual and spiritual traditions, making them more accessible.

2. Research and development methodology

The newly developed Protestant Catechism-Bot is a Christian dialogue AI that has learned Martin Luther’s Small Catechism and the Westminster Shorter Catechism, providing answers from a religious perspective to various concerns people face in their daily lives. It repurposes the framework of the previously announced Buddhist dialogue AI *BuddhaBot-Plus*, the new model BuddhaBot, training it on Christian literature instead of Buddhist scriptures.

BuddhaBot-Plus utilizes the latest version of ChatGPT. It employs a structure where it first submits responses using the wording of Buddhist scriptures, then generates and provides interpretations and additional explanations based on OpenAI’s large-scale language database.

The system development for the Protestant Catechism-Bot is handled by the program team at Teraverse Co., Ltd., consisting of Takahiro Namatame, Seita Sasaki, and Masaharu Nozaki (Research Fellows), and follows the framework from BuddhaBot-Plus. It employs a structure, where the AI selects the text from the New Testament, Luther’s Small Catechism, and the Westminster Shorter Catechism that it judges most relevant to the user’s question as the response. It then generates and provides interpretations or additional explanations based on OpenAI’s large-scale language database.

Furthermore, like the BuddhaBot-Plus, the Protestant Catechism-Bot also creates Q&A format lists as machine learning text data to enhance the chatbot's accuracy. A data creation team led by Dr. Kunio Hase (Teraverse Co., Ltd.) created a machine learning Q&A list (Japanese version) based on the original texts of Luther's Small Catechism and the Westminster Shorter Catechism. During data creation, the team took care to preserve the grammar and meaning of the original texts as much as possible, editing them into simple Japanese prose that can be understood without prior knowledge, even by non-Christians.

Furthermore, for the creation of machine learning data, the R&D group is establishing a system where multiple Christian scholars cross-check the data. Specifically, for the future direction of Christian AI development, the group has welcomed Professor Sadamichi Ashina (Visiting Professor at Kwansai Gakuin University and Professor Emeritus at Kyoto University), a leading authority on Christology, especially research concerning religion and science, and Christianity and cutting-edge technology, as an advisor.

The Protestant Catechism-Bot provides answers and advice based on Catechism content not only to questions about Christian teachings but also for everyday life. However, while the original Catechism text is cited as the information source, supplementary explanations by ChatGPT may involve hallucinations, thus caution is advised.

Thus, alongside Buddhist AI like BuddhaBot, the development of this Protestant Catechism-Bot enables dialogue with multiple religious AI systems.

3. Ripple effects, future plans

As stated above, the present development utilized only two Protestant works as data: Luther's Small Catechism and the Westminster Shorter Catechism in addition to the New Testament. However, we plan to incorporate other key Protestant texts such as Luther's Large Catechism and the Westminster Larger Catechism, as well as key texts from other traditions such as the Orthodox Church, Catholic Church, Anglican Communion, and Eastern Church.

The utility of the Christian AI will be doubled when used in conjunction with the existing Buddhist AI. This is because it establishes a foundation for business fields that not only adds religion—humanity's traditional culture and heritage—to current industry-academia collaboration but also encompasses its ideological diversity, addressing humanity's major societal challenges such as global economic issues and environmental problems.

For example, the following values and possibilities can be anticipated:

Academic value/potential: Answers generated by generative AI could propose new interpretations of Christian thought, potentially creating unprecedented philosophical interpretations. The expansion of AI development into the field of religion, the analysis of the modern value of ancient religious literature, and the creation of new interpretations and philosophies are also possible.

-Industrial value and potential: By applying algorithms of Buddhist and Christian chatbots to learn non-religious data such as management and economics, generating and providing management advice and economic analysis will also be possible. Furthermore, it is expected to enter the field of employee counseling, mental care, and HR as a tool to solve people's problems and troubles. It could also be applied to the consulting and counseling fields to provide clues for solving various social issues.

-Religious value and potential: By applying Catechism-Bot's algorithm to learn from DXed religious texts, it will be possible to create chatbots that learn the doctrines of various religions and sects, enabling new religious activities using religious chatbots. In addition, by having chatbots of

different religions talk to each other, it will be possible to simulate interreligious dialogue. The AI will help improve the skills of priests, including the quality of their preaching, and enhance communication with followers and believers.

Ethical Issues, Future Prospects, and Challenges of the Project:

Generative AI systems like ChatGPT face numerous reliability issues, including unclear information sources, personal data leaks, and copyright infringement. Furthermore, previously unforeseen dangers have been pointed out in recent years, such as users becoming engrossed in conversations with generative AI and committing suicide. The Protestant Catechism-Bot addresses information source issues by machine learning from original texts and plans to implement countermeasures for other challenges sequentially and to the extent possible.

This product can be expected to be introduced to Christian mission schools and seminaries within Japan. Overseas, we also envision introducing it to English-speaking Christian communities if demand arises. However, for the moment, we do not plan to readily repurpose the Protestant Catechism-Bot's technology or system for religions other than Buddhism and Christianity. The human endeavors and legacies concerning Buddhism and Christianity are vast. Therefore, we respect the opinions and evaluations of experts in these religions, and thorough analysis and implementation of feedback will require sufficient time.

Furthermore, given the nature of AI development involving religion, it is indispensable to enhance precision and accuracy regarding ELSI (Ethical, Legal, and Social Issues) and engaging in discussions and procedures concerning public interest and benefit. Kyoto University and Teraverse Co., Ltd. will continue to monitor these current conditions and needs. We plan to sequentially develop AI representations of philosophers and saints who represent human history, thereby opening new horizons where digital space and traditional knowledge harmonize.

4. About the R&D Project

This R&D project has been conducted at Kumagai's Laboratory (IFoHS, Kyoto University), and the AI program code and dataset for machine learning were developed in collaboration with Teraverse Co., Ltd.

Terminology

1. *BuddhaBot* is a non-generative Buddhist dialogue AI announced by Prof. Kumagai and Mr. Furuya on March 12, 2021. This AI has been trained on the oldest Buddhist scripture, Suttanipāta, through a program applying Sentence BERT provided by Google. The AI further machine-trained additional data from famous early Buddhist scriptures such as Dhammapada and Udānavarga.
2. Prof. Kumagai and Mr. Furuya announced *BuddhaBot-Plus*, a generative Buddhist dialogue AI, on July 18, 2023. It merges the old-style BuddhaBot with the latest version of ChatGPT to present machine-learned sources of early Buddhist scriptures. It automatically generates interpretations and additional explanations, providing users with more detailed and natural answers.
3. *Shinran-Bot* is a Buddhist chatbot modeled after Shinran (1173-1263), a Japanese Buddhist scholar, monk, and founder of the Jodo Shinshu sect of Buddhism, which was announced on September 12, 2023, by Prof. Kumagai and Mr. Furuya. They had the latest version of ChatGPT learn Shinran's Shoshinge, which condenses the essence of faith in Amida Buddha to provide natural answers based on its content.
4. *Vasubandhu-Bot* is a Buddhist chatbot modeled after Vasubandhu (4th century), an Indian Buddhist scholar-monk and a great exponent of "Yogācāra," one of the two major philosophies of

Mahāyāna Buddhism, which was announced on September 12, 2023, by Prof. Kumagai and Mr. Furuya. They had the latest version of ChatGPT learn Vasubandhu's Abhidharmakośa, which condenses the essence of Theravāda philosophy to provide natural answers based on its content.

5. *Tera Platform AR Ver. 1.0* is an AR (augmented reality) product that combines BuddhaBot with AR technology to make a Buddha avatar appear in front of the user via a smartphone screen, enabling voice interaction. Prof. Kumagai, Mr. Furuya, and his team announced the product on September 7, 2022. Communication with the Buddha Avatar is possible using visual, auditory, and tactile senses. The technology has also been applied to Shinran AR and Vasubandhu AR.

6. *Protestant Catechism-Bot* is a conversational AI trained on Protestant Christian catechisms from the 16th-17th century European Reformation era. Its first prototype has been trained on the texts of Luther's Small Catechism and the Westminster Shorter Catechism, enabling it to provide natural responses based on their content.

Researcher's Comments

In addition to our existing Buddhist AI, the development of Christian AI has enabled us to achieve religious diversity in AI development. Moving forward, we intend to further accelerate the development of "Traditional Knowledge Tech" that integrates various religions and philosophies with technology, aiming to provide a richer digital culture.

###

About Kyoto University

Kyoto University is one of Japan and Asia's premier research institutions, founded in 1897 and responsible for producing numerous Nobel laureates and winners of other prestigious international prizes. A broad curriculum across the arts and sciences at undergraduate and graduate levels complements several research centers, facilities, and offices around Japan and the world. For more information, please see: <http://www.kyoto-u.ac.jp/en>