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Spiritual AI: Exploring the Possibilities of a Human-AI Interaction Beyond Productive Goals

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ABSTRACT

The Human-Computer Interaction community has long endeavored to discuss technologies that go beyond productive goals. We extend this perspective to the realm of Human-AI interaction to explore how AI could consider diverse user values, particularly in users' prayer experiences where minimal productive goals exist. Through diary study, our research identified user goals and behaviors that contribute to satisfying prayer experiences. Then, we conceptualized four distinct AI systems designed to celebrate the identified goals and behaviors of the users. We presented these conceptualized systems in the format of a design workbook and engaged users in evaluating them. Based on our findings, we discuss the potential of novel roles that AI could play in human lives, such as provoking deep reflections or creating indirect communities.

CCS CONCEPTS

- Human-centered computing → Empirical studies in HCI;
Empirical studies in interaction design.

KEYWORDS

Human-AI Interaction, diary study, design workbook, technospirituality

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1 INTRODUCTION

The current field of Human-AI interaction predominantly operates to reach a productive goal, be it reaching the best possible decision [16, 30, 48], creating a desired form of creative work [24, 47], or maximizing learning experiences [25, 41]. However, confining AI's potential to reach an 'optimal result' while overlooking the diverse goals and values inherent to human lives can lead to significant discord between AI systems and their users in real-world applications. Addressing such limitations, existing research dives into

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various facets of human lives where different values and goals are intertwined and discuss how AI could be of use in those instances [9, 26, 30, 31, 49, 52].

Our objective is to contribute to these endeavors and delve into the design opportunities for AI systems that go beyond creating an optimal outcome, to augment diverse human experiences. To do so, we envisioned AI systems that can augment the experience of prayer, a spiritual and purposeful act of communicating with the sacred or the holy [3]. Prayer is a complexly intertwined human behavior with diverse goals including confession, thanksgiving, or supplication [32, 42, 46]. These goals are much in line with the principles of mindfulness, reflection, and other critical elements inherent in the discourse on slow technologies, an example of a design approach focusing beyond productivity [15, 27–29]. An exploration of these objectives and values will allow us to excavate alternative roles that AI could play in the broader human experience.

Therefore, our research aims to: (1) explore user goals and behaviors related to prayer experience and how they could be augmented through AI systems, and (2) discuss design opportunities for AI systems that operate in user experiences beyond productivity. To achieve the research goals, our study took two phases. For phase 1, we conducted a diary study to explore the goals and values related to prayer and discover design opportunities for an AI system to augment such experience. For phase 2, we curated a design workbook containing design proposals based on the result of the first phase and presented it to the users to draw insights.

Our contributions are as follows:

- We envision the new roles that AI could play in human experiences that go beyond productivity based on our exploratory user studies combining diary study and design workbook,
- and discuss how such insight could further enrich the field of Human-AI interaction by shifting focus to experiences surrounding the usage of AI rather than the AI's output itself

2 BACKGROUNDS

2.1 Technologies Beyond Productivity

As technologies ventured beyond workspaces, multiple attempts, including ludic design [13], slow technology and slow design [1, 15, 17, 27], celebratory technology [10, 14], or technology non-use [2, 35] have recognized user experiences that go beyond productive goals. These endeavors, liberating the goal of technology from the utilitarian functionality of productivity and efficiency, envision technologies that acknowledge and augment diverse human goals and behaviors. Our study leverages these concepts to identify diverse user goals during prayer, identifying design opportunities to

augment and celebrate that experience rather than approaching in a corrective, problem-solving nature.

2.2 Human-AI Interaction and User Experience

The field of Human-AI Interaction has explored methods to support collaboration between human and machine intelligence in various areas, including better decision-making [16, 30, 48], creative endeavors [24, 47], or enhanced learning experiences [25, 41]. A notable aspect is how such approach toward AIs often focuses on creating an optimal outcome, rather than recognizing diverse goals, values that comprise that experience, as well as the users' experience in the process of reaching such outcome. Disregarding such diverse values in system design often results in unsatisfactory, conflicting, and sometimes unethical behaviors and interactions, ultimately harming the general user experience [11, 12]. For instance, existing literature discusses how AI usage in human resource management exhibited much repulsion from employees because it evaluates them at the expense of values such as privacy, workplace politics, and contextual situations [30, 31].

Multiple research efforts have worked to integrate various human values and goals in AI systems, such as Value Sensitive Algorithm [51], AI explainability concerning social transparency [9], or ethical and contextual decision making [20, 30, 40]. Some research took a more extreme approach and brought AI systems into human activities where the experience itself is the aim without a tangible outcome, such as gameplay [52] or storytelling [49]. In other words, they brought AI to realms where goals take a more ludic form, rather than a productive one [13]. Our research expand upon these research efforts by discussing the design implications for AI systems for prayer, a realm with minimal tangible goals, to cast light on diverse possibilities of Human-AI interactions that go beyond the goal of productivity [8].

3 STUDY 1: DIARY STUDY

3.1 Method

First, we aimed to identify design spaces of AI systems for prayer by investigating the users' goals and values related to them. To do so, we conducted a 2-week diary study with 9 participants [5, 7, 18, 33].

3.1.1 Recruitment. Nine participants meeting the criteria of (1) praying at least five times a week and (2) expressing significant importance of their beliefs were recruited online [21]. Recruitment was conducted in universities' online communities. We did not constrain the recruitment by specific religious affiliations; however, the participant composition was somewhat imbalanced, with 7 Protestants, 1 Catholic, and 1 Buddhist, and 8 females aged 20 to 28. Despite potential limitations in representativeness, our findings are presented within the exploratory framework of this study.

3.1.2 Introductory Interview. We began our study with in-person introductory interviews, lasting approximately 60 minutes to establish a foundational understanding of their values and praying practices and inform them of the detailed steps of our study [33]. All sessions were recorded with consent, and participants reaffirmed their willingness to engage in the diary study. Participant information is detailed in Table 1.

Table 1: Participant Details for Diary Study and the Number of Diary Entries They Provided

	Religion	Age	Gender	Diary Entries
P1	Protestant	28	Female	26
P2	Buddhist	28	Female	18
P3	Protestant	20	Female	12
P4	Catholic	25	Female	15
P5	Protestant	23	Female	10
P6	Protestant	24	Female	19
P7	Protestant	26	Female	11
P8	Protestant	24	Male	10
P9	Protestant	22	Female	10

3.1.3 Diary Study. Participants were instructed to compose a minimum of 5 diary entries per week over two weeks, recording moments of prayer or perceived divine interactions. Participants were instructed to include information such as the context of the prayer, artifacts used, technological tools or services utilized, prayer content, emotions, and any additional remarks through a shared diary application or mobile messenger platform [7, 37].

3.1.4 Final Interview. For the final interview, personalized questions were formulated based on participants' written diary entries. The objectives of these interviews were twofold: (1) to uncover diverse elements contributing to a fulfilling prayer experience, and (2) to explore potential technological enhancements that could augment the prayer experience. These individual semi-structured interviews, lasting approximately 60 minutes each were also recorded with consent.

3.1.5 Analysis. Utilizing diary entries and transcripts from interviews, we conducted a thematic analysis [6]. We executed both a top-down approach of identifying specific contributors to satisfactory prayer experiences and a bottom-up approach of seeking insights for delineating design spaces and considerations for AI systems in the realm of prayer.

3.2 Result

Here, we introduce the result of our thematic analysis. The identified themes address users' primary values and goals associated with their prayer experiences, as well as specific user behaviors to actualize them [22, 32, 42].

3.2.1 Self-Improvement: Proactive Reflection. A good prayer is perceived as a process of personal and social growth. In terms of personal growth, prayer facilitates self-objectification, allowing individuals to reflect and identify areas for improvement in their daily activities. On the social front, prayer fosters compassionate concern for others, aligning closely with the value of solidarity. This dimension involves seeking divine intervention for individuals they know and addressing broader regional, national, and global issues.

In performing such reflections, participants underscored the significance of proactive prayer, favoring it over reciting pre-written texts or seeking assistance from others. Some participants adopted a proactive approach by compiling a list of moments for future prayer or maintaining a prayer diary for subsequent reflection on personal growth. In doing so, P8 shared insights into the role of technology in shaping prayer experiences. Experimenting with chatGPT to generate complete prayer texts, P8 expressed dissatisfaction, noting that it hindered personal contemplation. Conversely, using a Bible application that posed questions about specific verses proved more fulfilling, prompting deeper thought. The perceived difficulty in this context was also linked to sincerity, as participants viewed the effort invested in overcoming such challenges as a manifestation of their true heartfelt commitment.

"When I used chatGPT it wasn't satisfactory. It wrote everything about my situation for me. Prayer is an experience and we need time to process that while reciting. But when I used the Bible application, it asked questions like 'What do you think about this?' 'What experiences do you have on this matter?' I liked it because it helped me and prompted me to brainstorm about what to think about certain Bible verses." (P8, Final Interview)

3.2.2 Calmness: Voicing Concerns and Recognizing Answers. Participants often found themselves praying in trying situations, prompting either supplicatory (petitionary) prayer, directly requesting the divine to grant their desires, or receptive prayer, seeking guidance from the divine towards the most suitable course of action. In both cases, participants emphasized how the primary objective is not solely to have their desires fulfilled through the divine's omnipotent power. Instead, the most significant satisfaction participants discussed was the relief of disclosure and unburdening their concerns and frustrations to the divine, leading to a tranquil state.

"Even if its an echo to the void without answer, you get a sense of relief just by saying it to a certain figure [...] The feeling of relief would be the biggest purpose (of prayer)." (P3, Introductory Interview)

Another intriguing method through which participants discovered calmness in prayer was by perceiving the 'answers' to their supplications. Participants recalled receiving answers to their prayers from conversations with their friends and families, phrases from the books they were reading, or other serendipitous occasions. In essence, prayer acted as a lens through which participants observed the world, allowing them to actively interpret their everyday experiences to discover unforeseen solutions to their situations and attain a sense of peace.

3.2.3 Spirituality: Communicating with the Divine. Given that the majority of our participants identified as Christian, they viewed prayer as a means to foster a closer connection with the divine. In this context, many participants described prayer as a conversation with God. They drew parallels with writing a letter or an email, where the response might be delayed or absent, yet the act of composing assumes a recipient and can be seen as a form of dialogue.

Table 2: User Behavior to Realize Key Values and Goals During Prayer

Goals	Behaviors
Self-Improvement	Recognizing and remembering what to pray for Recording the prayer and revisiting them
Calmness	Finding peace through disclosure Interpreting the daily 'coincidences' as answers
Spirituality	Privately conversing with the divine
Solidarity	Listening to others' prayer Praying for one another

During discussions on the potential role of technology in enhancing their prayer experiences, participants conveyed a reluctance to embrace the idea of technological intervention in the realm of spirituality and religion. They articulated that involving technology in their communication with the divine seemed to violate the private and sacred nature of their spiritual experiences. One participant stated, "To think that technological or scientific intervention taking place in the realm of prayer, it feels like damaging a part of the nature, or hindering the moment where I go back to that beginning, natural state" (P5, Final Interview).

Nevertheless, participants also highlighted the contemporary reality that many religious individuals and authorities continue to leverage technology for religious purposes, such as utilizing mobile Bible applications and participating in video-call prayer groups.

3.2.4 Solidarity: Presence of the Others. Participants had varied perspectives on the presence of others during prayer. First, positive outcomes were observed in both functional and emotional aspects. In terms of functional enhancement, awareness of others observing their prayers increased diligence, with some using platforms like online chatrooms to share their prayer diary, fostering a "pleasantly forced" prayer routine, prompting commitment and exploration of new prayer topics. In terms of emotional enrichment, sharing prayers deepened understanding within religious communities, fostering a sense of belonging through resonance and unity in collective experiences [19, 36].

"If a community prays together out loud, looking at each others' faces, breathing together, listening to what others are praying, you sometimes are enlightened that you could pray a certain way. And sometimes, we pray for each other in the community. Listening to that heals, and motivates realizing that we all are together." (P1, Final Interview)

Conversely, some participants hesitated to share their prayer experiences, finding that the presence of others hindered complete sincerity and deep self-reflection. The awareness of an audience occasionally led to including content to appease listeners rather than expressing true sentiments, especially in more conservative religious communities where adhering to specific formats or expressions is considered essential for prayer.

4 STUDY 2: DESIGN WORKBOOK

4.1 Design Concepts

We conducted a design workbook study, a method effective in identifying complexly intertwined values and experience, to discover and discuss diverse design opportunities for AI systems beyond productive goals [4, 44, 45]. Based on the identified design opportunities from Study 1 (see Table 2), we came up with four conceptual AI systems that could augment such experiences. In creating our concepts, we took careful measures to celebrate the diverse goals and behaviors of the users, rather than approach in a corrective manner, potentially leading to a design that aims to reach a singular optimal outcome [10, 14].

4.1.1 Daily Thankful: Reflection through AI. *Daily Thankful* collects users' digital footprint - instant messages, social media posts, emails, and other activities - within users' set boundaries. At day's end, the system compiles an inventory of noteworthy events for which users could express gratitude – ranging from heartwarming messages received from friends and family to the beautiful sunset they took a picture of. This compilation serves as a resource from which users can draw to engage in prayerful acts of thankfulness.

Utilizing computer vision and Natural Language Processing (NLP), the system aims to expand the reflective praying experience by systematically identifying diverse moments they could appreciate. The concept was inspired by users actively recording their daily lives to find moments to be thankful for, which they later consulted during reflective prayer.

4.1.2 Prayer of the Past: Calmness and Reflection through AI. *Prayer of the Past* randomly prints out a prayer journal that the user wrote in the past. When writing their prayer journal that day, users input their reflections and feedback on the received past journal together. This feedback loop enhances the AI's understanding of the types of journal prints that users find satisfying, contributing to continuous improvement in its recommendations.

Utilizing NLP and Machine Learning (ML), this system aims to create serendipitous encounters that can provoke deeper reflective prayers. The concept was inspired by (1) how users actively interpreted random daily encounters as responses to their prayers, ultimately finding peace or a solution to their situation, and (2) how they delve into past prayer journals to reflect upon how much they have grown personally and spiritually.

4.1.3 Question for Your Prayer: Sincerity and Reflection through AI. *Question for Your Prayer* is a conversational system for users seeking to deepen their reflective prayer experience. When a user feels their prayer is superficial or lacking earnestness, they can input their prayer's content into the system. Subsequently, the AI engages the user in a series of probing questions to delve deeper into the essence of the prayer. Sample inquiries may encompass: "What prompted those feelings?", "How could you enhance the situation?", or "This particular religious text discusses scenarios requiring increased effort – how do you perceive its relevance to your circumstances?"

Utilizing Large Language Models (LLM), this system aims to provoke sincere prayers through deep reflections. The concept was inspired by how users confront their difficulties during prayer, such

as the shame that follows disclosing their wrongdoings or doubting their beliefs, ultimately to have a deeply honest and sincere prayer experience.

4.1.4 Prayer of the Other: Solidarity through AI. *Prayer of the Other* displays the prayer journals of fellow praying individuals, which align with their own entries for the same day. Upon sharing their prayer journal, the AI discerns related prayers (similar in topic, could expand what the user wrote about, give answers to what the user prayed for, etc.) and presents them.

Utilizing NLP, this system allows users to enrich their personal prayer experiences based on others' journals, as well as find emotional resonance among those with the same beliefs. The concept was inspired by moments that users found appreciative in praying with others. These include finding those with similar concerns and thoughts, gaining insight into social problems they were unaware of, or learning novel prayer methods.

4.2 User Interview and Analysis

The online workbook was distributed to 21 participants (11 female, 10 male, aged 22–39) who then took part in structured online interviews. Our questions included: their inclination to use the proposed service, positive aspects, drawbacks, and additional comments for each system. Participants were compensated with a 4,500 KRW (3.41 USD) gift card. All user responses were transcribed with consent.

We conducted a qualitative analysis of participant transcripts. We first identified specific points that users found pleasing, leading to the discovery of potential design implications for AI systems beyond productivity goals. After establishing these design implications, we revisited participants' comments to uncover critical points associated with each implication. This process allowed for a more comprehensive discussion on how AI could either enhance or hinder spiritual experiences, as well as the general user experience in areas beyond productivity.

4.3 Design Implications for AI Beyond Productivity

4.3.1 AI that Provokes Rather than Give Answers. Based on the user reactions to *Daily Thankful*, it was evident that users generally appreciated the notion of engaging in comprehensive reflection facilitated by AI. They found value in the AI's ability to exhaustively identify and highlight the finer details they might have otherwise missed, enabling thorough reflection. Conversely, some were less receptive to the idea because took away their chance of proactive reflection. They believed that the process of discovering moments for gratitude and reflection themselves is what matters. Consequently, users exhibited a preference for *Questions for Your Prayer*, since it stimulates their reflective thought processes, rather than conducting reflection on their behalf. These findings reveal a spectrum of user emotions when it comes to using AI for reflection.

On that note, *Questions for Your Prayer* and *Prayer of the Past* provided a plausible design implication to reconcile these contrasting needs is the development of AI systems that provoke users. Here, the AI's role remains as a catalyst for thought and reflection, refraining from dictating conclusions or telling users how their reflections should unfold. The essence lies in AI serving as a thought-provoking agent, fostering deeper introspection and understanding.

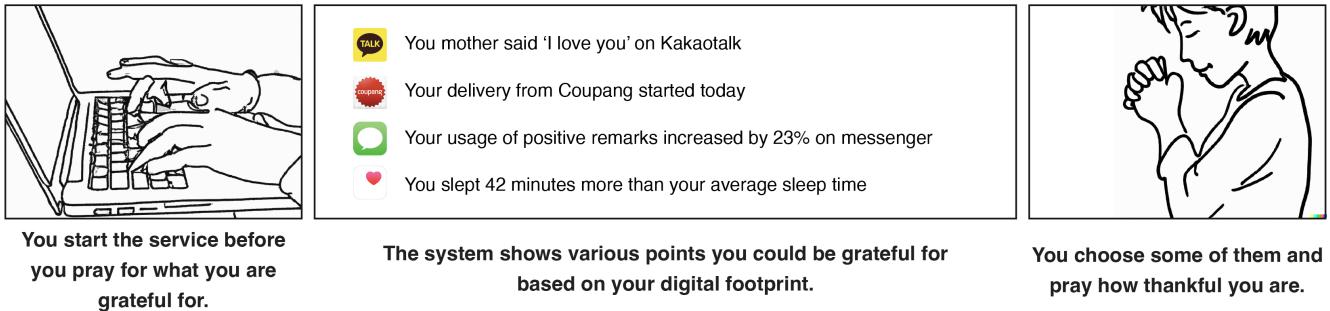


Figure 1: Use Case Storyboard for Daily Thankful

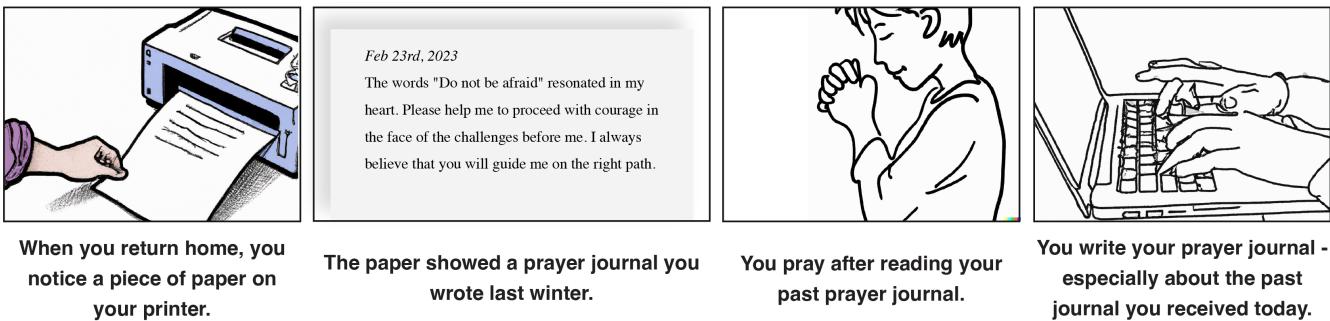


Figure 2: Use Case Storyboard for Prayer of the Past

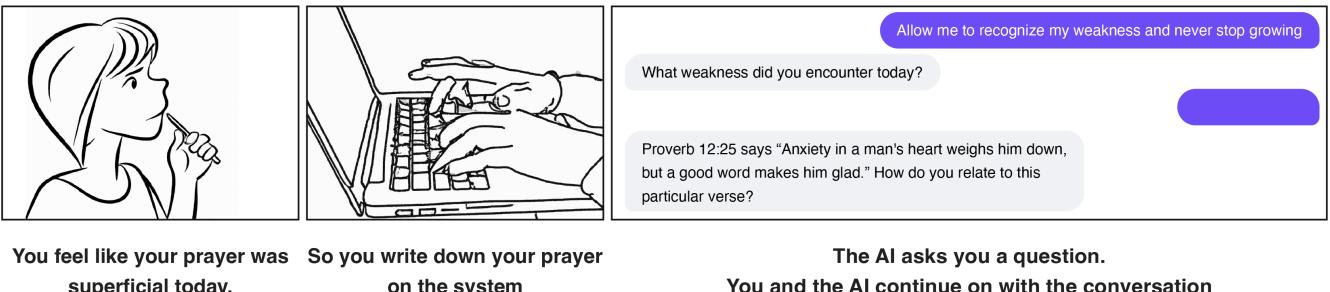


Figure 3: Use Case Storyboard for Question for Your Prayer

4.3.2 Potential Danger of "Surveillance-Friendly" Data Collection of AI Systems. Unlike how users selectively choose to store on their hardware or cloud systems, data input to diverse AI systems is often done without the user's awareness, causing surveillance issues. Even in our concepts such as *Daily Thankful* or *Prayer of the Past*, collection of user data is crucial to function. Existing studies already discuss the potential harm that AI may pose to users' privacy in diverse domains, such as workplace or healthcare, through unprecedented forms of surveillance and impacts [34, 39, 43]. Interestingly, however, some of our participants expressed a level of acceptance when AI operated for religious purposes. Users themselves were surprised to say how comfortable they were with

the idea of AI monitoring and archiving their data while discussing *Daily Thankful* and *Prayer of the Past*.

We interpret this acceptance as being caused by a bigger notion than simply having religious purposes. For one, our systems simply identified relevant data and presented it in an unaltered form, rather than interpreting or analyzing them to draw certain meanings. The interpretation of this data was entirely left to the users; they could reflect on it, experiment with different prayer methods, disagree with the presented data, and so on. In other words, the AI assumed a relatively value-neutral stance and refrained from imposing any particular actions, values, or directions on the users. It is conceivable

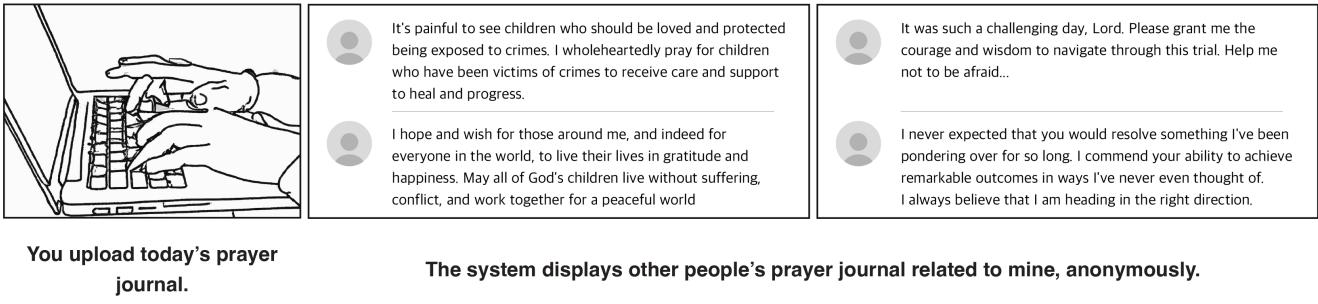


Figure 4: Use Case Storyboard for Prayer of the Other

that this rather vague AI goal and the autonomy granted to users reduced users' aversion to AI's data surveillance and storage.

However, the prospect of creating an AI that appears more "surveillance-friendly" must be approached with caution. Even if a proposed system doesn't have malicious intent for user data, there remains the risk of third parties exploiting it. If users begin to trust AI systems more due to certain design choices, they may willingly share extremely sensitive and personal data with what could be an insecure system. Therefore, when discussing the potential role and design decisions of AI in data collection and management, it is imperative to engage in careful ethical considerations.

4.3.3 AI Fostering a Sense of Belonging through Data Sharing Mediation. In discussing, *Prayer of the Other*, we discovered the potential of AI systems fostering a 'loose' online community among its users. This community functioned without direct interaction or a conventional online space, as individuals could partake in the sense of belonging and reap the benefits solely through indirect connections facilitated by the AI system. In using the system, they expected novice believers to consult the prayer journals of more experienced counterparts, learn from others' solace-seeking methods, and apply them. They also anticipated emotional solidarity, finding strength in reading about others facing similar challenges. These experiences align with our findings from Study 1, discussing the positive prayer experience of praying with fellow believers (see 3.2.4).

Despite the absence of a tangible 'space' for direct interaction, it appears that the AI system holds the potential to effectively imitate the functions of a community through the sharing of users' experiential data. This phenomenon prompts further exploration into the possibility of AI becoming a space-less, connection-less social technology fostering positive and healthy interactions, contributing to the ongoing conversation on the AI's role in human-human communication [38, 50].

5 LIMITATIONS

As previously noted, our research sample comprised predominantly Christian female participants in their twenties, reflecting a potential skew in the population. This skew is likely a result of our recruitment efforts being conducted in an online environment, coupled with the Korea's predominant Christian population (approximately 66% of religious population), and the comparatively lesser emphasis on prayer in Buddhism (approximately 33% of religious population)

[23]. Acknowledging these limitations, we look forward to future research endeavors to broaden our scope and include participants from other faiths, such as Islam, Judaism, Hinduism, and beyond.

6 CONCLUSION

Our study explored the possibility of Human-AI relationships that go beyond creating a singular optimal result, to envision the AI system's potential in augmenting user experiences that operate under diverse goals and values. In doing so, we utilized prayer, a realm where complex human values intertwine, as an experimental ground to explore such concepts. We emphasize a shift in Human-AI interaction studies to focus on diverse user experiences including reflection or solidarity, as well as experiences surrounding the process of using AI rather than solely focusing on the AI systems' outputs. We sincerely hope the Human-Computer Interaction community to further expand such efforts, exploring novel AI systems that celebrate diverse facets of human lives.

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