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Research on the Design Strategy of Digital Religious Service System in the Post COVID-19 Pandemic Era

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ABSTRACT

In light of the challenges posed by the COVID-19 pandemic and China's stringent quarantine measures, personal religious practices have faced significant constraints in China, which has led to a surge in the preference for online prayer. However, there's a noticeable scarcity of user-friendly religious online prayer platforms in the country, leading to subpar digital prayer experiences for believers. To address this, an empirical examination of 43,191 online prayer texts from the Nanputuo Temple website, spanning over a decade, was conducted. Utilizing user-generated content, latent dirichlet allocation, and sentiment analysis, this research elucidates the primary concerns of online worshippers and offers interface design principles and strategies to enhance their digital prayer experience.

Keywords: online prayer, user-generated content, latent dirichlet allocation; sentiment analysis; online prayer interface design

1.INTRODUCTION

Face-to-face contact in religious activities has accelerated the spread of the coronavirus pandemic in many countries (Hartley, Reisinger, and Perencevich 2020). Keeping a social distance of two meters is only effective when everyone is adequately protected (Setti et al. 2020). In general, direct contact with respiratory droplets of patients and close contact with the surface of contaminated objects are primarily accepted methods of virus transmission. Buddhist temples may have cases of infection caused by communication among believers or by touching religious objects. Moreover, aerosols are regarded as a propagation path (Hwang et al. 2021). It is possible for COVID-19 to spread in poorly ventilated rooms (Zhang et al. 2020, Noorimotlagh et al. 2021). Viruses are easily transmitted by particles generated indoors, including those generated by cooking, lighting mosquito coils, burning candles, or burning incense (Chen, Jia, and Han 2021). In Buddhist temples, these behaviors are prevalent. Several religious service organizations have begun shutting down offline venues and suspending the organization of religious gatherings in order to prevent the spread of the coronavirus pandemic (Yezli and Khan 2021). Using the Internet to pray online may become a trend for Buddhist temples.

A study from China indicated that 28.8% of respondents experienced more than moderate anxiety and 16.5% had more than moderate depression when the epidemic continued (Zhang et al. 2020). The ongoing epidemic has negatively impacted the mental health of the community. An analysis of the psychological conditions of the people during the coronavirus pandemic indicated that religious belief is one of the most important factors affecting mental health (Lawal et al. 2022). Religion can alleviate negative psychological emotions to some degree. For psychological comfort and stress relief, many believers seek religious assistance(Thomas and Barbato 2020). As a consequence, religious service interventions without full consideration of cultural background have been resisted by believers in many countries and have proven ineffective (Tan, Musa, and Su 2022). In order to prevent the epidemic from spreading, online worship can actively reduce the likelihood of virus transmission and reducing the psychological impact of the cancellation of religious activities. In some religious institutions, online prayer services are available (Ben - Lulu 2021). During the COVID-19 pandemic, religion services shifted from face-to-face to extensive online prayer. A large number of interviewees said that online prayer helped strengthen their religious beliefs (Dein et al. 2020).

In spite of the popularity of online prayer, there is still little study regarding user interface design for Internet religious services. User interface is one of the most influential factors that influence how users use and evaluate the features of a website. To a great extent, the user's evaluation of the service quality of the website is influenced by the user interface (La Rotta, Usuga, and Clavijo 2020). People are more likely to respond positively to an interface that is well designed than one that is poorly designed (Oyibo and Vassileva 2021). At the present time, Buddhist temples offering online prayer do not provide an interface based on the perception of believers. Users-centered interface design can have an emotional impact on people who are using digital programs for psychological relief (Hardy et al. 2018). As a consequence, it is important to fully consider the Buddhist believers' experiences with online prayer during the epidemic. By using big data to analyze the sentiments of prayer texts, Buddhist temples can quickly adjust and upgrade their online prayer pages. To obtain a higher level of satisfaction by meeting the user's expectations of the user interface (Alshurideh, Al Kurdi, and Salloum 2019). Assuming that the user interface and believers' emotions match, it provides psychological comfort and encouragement to people in need of religious services.

At the current time when the COVID-19 pandemic is still ongoing, some Buddhist temples have made the decision to reduce or discontinue offline religious services and move to online. This method helps to prevent the spread of the epidemic. In addition, it can continue to serve as a form of religion and offer psychological support to believers. It is very important to design and study the online prayer user interface of Buddhist temples from the perspective of believers, since the user interface plays an important role in user behavior and perception. Using machine learning algorithms and big data analysis of prayer texts, this study makes suggestions from the viewpoint of user interface design in order to improve online prayer services and make religion an active part of society. Text classification and sentiment analysis is used to assist Buddhist temples in designing their online prayer pages on a regular basis, thus providing more faith assistance to people in need of religious services.

2. LITERATURE REVIEW

2.1 Online prayer

Prayer is an essential element of religious activities (Woroniecki 2018). It is considered to be a contract between people and their religious beliefs (Eikelboom et al. 2013). Furthermore, this type of behavior may serve as both a chance for dialogue between humans and gods, as well as a method for self-edification and encouragement (Ławreszuk 2014). The process of praying can be described by keywords such as need, action, direction, time, place, method, and effect (Ap Siôn 2007). Praying for believers can provide emotional rewards. Previous research has shown that praying can lead to happiness for believers (Szałachowski and Tuszyńska-Bogucka 2021b). In addition, it can assist believers in reducing their feelings of fear (June and June 2021). Pray, especially for COVID-19, to help alleviate concerns about the pandemic (Szałachowski and Tuszyńska-Bogucka 2021a). Since COVID-19 cannot be effectively controlled in many parts of the world, offline prayer poses an infection risk. Praying online, as an Internet service that transfers prayers online, has become a significant substitute for praying in practice. It is noteworthy that believers reduce negative emotions through prayer behavior as a result of rituals, norms, social relationships, and system convictions employed in the praying process (Meza 2020). By using online prayer, people have overcome the limitations of time and space by leaving a message on the website. The research of Ap Siôn and Edwards (Ap Siôn and Edwards 2012) shows that when believers pray online, they differ from traditional prayers in terms of their intention and type of prayer objects. It illustrates that different ways of praying may lead to different behaviors and emotions in believers. Studies have shown that people are more likely to pray when they are unable to solve the problem through their own means (June and June 2021, Sinding Bentzen 2019). This would explain why during the coronavirus pandemic, the overall pattern of prayer behavior has been increasing (Dein et al. 2020, Bentzen 2021). So with the demand for prayers increasing, and offline prayers being at risk of infection, religious institutions should consider how to improve the quality of online prayer services from the perspective of believers.

2.2 Latent dirichlet allocation

Having been proposed by Blei et al. (Blei, Ng, and Jordan 2003) in 2003, latent dirichlet allocation (LDA) has become a widely used tool for analyzing large amounts of data. LDA is particularly useful in the social sciences since it can improve the efficiency of data processing and reveal hidden topics within a data set (Blei 2012) for further analysis or decision-making. LDA combines inductive approach with quantitative measurements, making it particularly suitable for exploratory and descriptive analyses (Elgesem, Steskal, and Diakopoulos 2015, Koltsova and Shcherbak 2015). The LDA method involves several key concepts: the text collection to be modeled is referred to as the corpus； one item within the corpus is a document, with words within a document called terms (Maier et al. 2018). LDA has two operating processes. One is the generative process of LDA, which generates corpus data or a set of documents through a known latent variable. The other is the inference process of LDA, which is to obtain the latent variable from the known corpus data as an observed variable, including word distribution over theme (topic). LDA was originally proposed to resolve the problems in PLSA model (Probabilistic Latent Semantic Analysis). The input in the PLSA model is only determined by one hyper parameter value symbolized as (β). However，the LDA model solves this problem by adding hyper parameter alpha (α), which makes both values produce latent variables of theta (θ) and phi (φ). In linguistic theories，themes（topics）can be seen as factors that consist of sets of words，and documents incorporate such factors with different weights (Lötscher 2011).To grasp the thematic structure of a document， it is sufficient to describe its distribution of words (Grimmer and Stewart 2013). The inference process of LDA is used in this study for the extraction of key information such as theme and word distribution within the corpus.

3. Method

Previous studies have shown that online messages can be useful and meaningful in helping marketers or researchers to understand user experience (Tussyadiah and Zach 2017). In the prayer, believers describe their emotions and expectations. The

understanding of these factors and the development of interfaces that correspond to them can assist religious organizations in effectively comforting the feelings of believers as well as meeting their expectations. Therefore, the content of the prayer has reference value for the website design of the online prayer function of religious institutions. As a source of the text, the Nanputuo Temple in Xiamen, China is selected. As a prominent temple in southern China, Nanputuo Temple was chosen, as it is an ancient temple with a rich history and a large following. Moreover, it began to integrate the function of online prayer into the homepage of its website at an early stage, and it has gathered a large amount of prayer data over the past decade. The use of big data avoids the inference issues that may exist with small samples of data (Xiang et al. 2015). Nanputuo Temple's online prayer is available to the public. All prayer activities are conducted with the understanding that those who are participating will see the message.

The research process is illustrated in Figure 1. Five stages were involved: data crawling, data cleaning, sentiment analyses, modeling analyses, and themes discussion.

In the first stage, the data collection uses the requests package based on the Python language to crawl the prayer wall pages on the Nanputuo Temple network. The Requests is written in Python, based on Urllib and utilizes the Apache2 licensed open-source HTTP protocol. In this article, message data is collected from all users who prayed between January 2011 and September 2021 (http://nanputuo.com/charity/PrayWall.aspx). Original content crawled from the user database includes a user ID, a user name, a blessing object, prayer content, and a message time. For the sake of protecting users' personal information, only the content of the prayer is extracted for subsequent analysis.

In the second stage, after checking the original message, it is found that there are blank messages and single-word messages, and the message content is mixed with various symbols, such as "/", "*", and "#". Therefore, the data needs to be cleaned prior to further analysis. Data cleansing is primarily concerned with removing blank messages, single-word messages, and any symbols other than letters, numbers, and Chinese characters.

In the third stage, sentiment analysis is applied to identify whether the wishes of believers are positive or negative. By extracting and analyzing people's subjective information, sentiment analysis is able to measure the emotional content of text (Ma, Cheng, and Hsiao 2018). User experience can be improved through sentiment analysis (Bouma 2009). It illustrates that the main expectation of believers is mentioned in both the positive and negative contexts of the prayer. Based on our observation of the content of the prayers, we believe the prayers can be classified into different groups: blessings, avoiding disasters, obtaining good luck, and dispelling diseases etc. The messages with different contents contain different emotional tendencies. In order to facilitate analysis of the prayer themes of the texts that have different emotional tendencies, after collecting the message data in plain text, we first perform a sentiment analysis on the texts using the SnowNLP package. Inspire by TextBlob, SnowNLP is a Python class library that is capable of handling Chinese text easily. Since most of the existing natural language processing libraries is focused on English, SnowNLP is a library that fills the gaps in Chinese natural language processing. In contrast to TextBlob, Natural Language Toolkit (NLTK) is not used here. All algorithms are implemented independently, and several well-trained dictionaries are also included.

In the fourth stage, it is divided into two sections: segmentation of Chinese text and formal topic analysis. First, in order to perform topic modeling, the message text needs to be segmented into individual words through word segmentation. This research relies on the Jieba library to segment text messages. Jieba library is a very popular third-party library for Chinese word segmentation. This library uses a basic thesaurus to determine the correlation probability between Chinese characters, and the words with high correlation probabilities are used to segment words. Moreover, since the majority of the data for this study was obtained from the Buddhist believers' network prayer wall, three scholars from the Buddhist field were invited to hand-mark the terminology found in the message, as well as the corresponding part of speech. In order to more accurately segment the message text, the Jieba library's user-defined dictionary is further defined based on vocabulary and part of speech. Before formal topic modeling was performed, the common stop words were removed from the message text in order to avoid the influence of meaningless words or characters. Stop words refer to specific words or phrases that are automatically filtered out before or following the processing of natural language data in order to create more space and improve search efficiency in information retrieval. Stop words are manually entered rather than automatically generated, and the generated stop words will form a stop word list. However, there is no universal stop word list that can be applied to all tools. This study integrates several stop word databases commonly used in Chinese natural language processing (including those of Harbin Institute of Technology, Baidu, the Machine Intelligence Laboratory of Sichuan University, and the Commonly Used Chinese Stop Vocabulary). Second, utilize latent dirichlet allocation (LDA) for the analysis of subjects. LDA occupies a significant position within the topic model, and it is frequently used to classify texts. The LDA method was proposed by Blei, David M., Ng, Andrew Y., and Jordan in 2003 as a way to verify the topic distribution of documents (Blei, Ng, and Jordan 2003). In the form of a probability distribution, it may indicate the topic of each document contained in the document set. Therefore, after extracting the topic distributions of the documents by analyzing some documents, topic clustering or text classification may be performed in accordance with the topic distributions.

In the fifth stage, based on the results of sentiment analysis and topic analysis, summarize and discuss believers' expectations and their emotional responses when they use online prayer. Consequently, an interface design proposal for the online prayer functions of Buddhist temples is presented in order to better satisfy believer’s needs with online religious services.

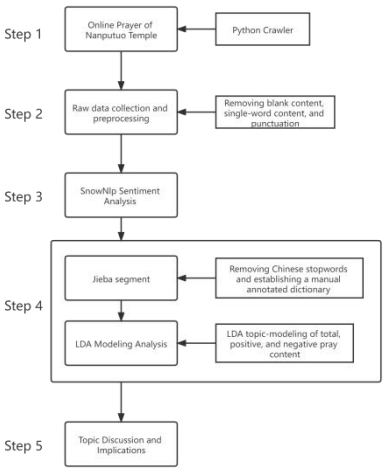

Fig.1. Research flow chart

4. RESULT

4.1 Basic information of the data

The number of comments obtained through the crawler totaled 43,191. A total of 43,141 effective messages remain after blank messages and single-word messages are removed. According to the survey, the longest message is 467 words, the shortest message is 2 words, and the average message length is 30.8984 words (SD=32.33477). A total of 3925 messages have a message length of 8 characters. Figure 2 demonstrates the distribution of messages with different word length.

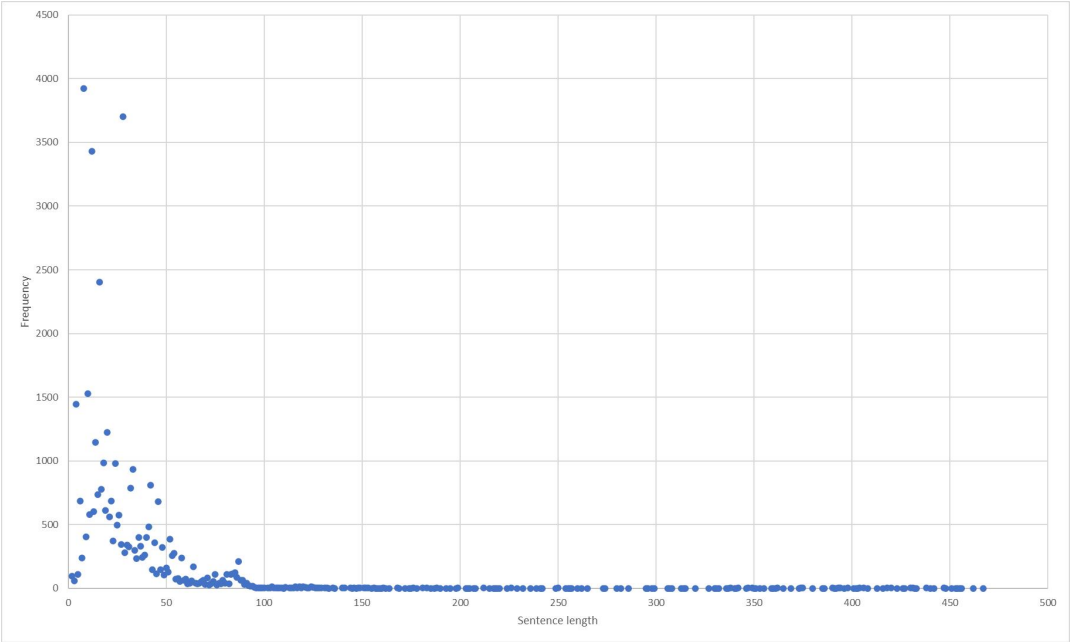

Fig.2. Distribution of the word length

4.2 Sentiment analysis results

In this study, the emotional tendency of the message is examined based on the return value of the sentiment analysis function in SnowNLP. The return value ranges from 0 to 1, which closer to 1 indicates positive sentiment and closer to 0 indicates negative sentiment. Generally, emotions fall into three broad categories: positive emotions, negative emotions, and calm emotions in between. As the sentiment return value for SnowNLP is between 0 and 1, this study classified the message text with a return value greater than 0.72 as positive sentiment, and the message text with a return value less than 0.28 as negative sentiment. As a result of the operation, we received 37241 message texts that were deemed to have positive emotional tendencies and 1056 message texts that were deemed to have negative emotional tendencies. Therefore, the data in the topic analysis will be divided into three parts: overall message text, positive sentiment message text, and negative sentiment message text.

4.3 Theme analysis results

As the number of topics modeled by LDA must be manually selected, this study investigates two parameters, perplexity and coherence, to explore the optimal topic range of the topic model, and uses the pyLDAvis package for drawing assistance.

Perplexity is only a crude measure, it is helpful (when using LDA) to get "close" to the appropriate number of topics in a corpus, judging from the derivation formula for perplexity (Equation 1), the lower the value the better.

$$Perplexity(D_{test}) = \exp\{-\frac{\sum_{d=1}^{M}\log p(w_d)}{\sum_{d=1}^{M}N_d}\} \quad (1)$$

（Note：M represents the number of texts in the test corpus, Nd represents the length of the d-th text (i.e. number of words), and P(Wd) represents the probability of the text） (Blei, Ng, and Jordan 2003)

The calculation of the value of coherence is illustrated in Figure 4. Firstly, segmentation of the data into word pairs. Secondly, calculation of word or word pair probabilities (Equation 2). Thirdly, calculation of a confirmation measure that quantifies how strongly a word set supports another word set. The NPMI (Equation 3), which contrasts with point wise mutual information (PMI), shows a higher correlation with human topic ranking data. Finally, the coherence value is the arithmetic mean of all confirmation measures ϕ (Equation 4).

$$\vec{v}(W') = \left\{\sum_{w_i \in W'} \mathrm{NPMI}\left(w_i, w_j\right)^{\gamma}\right\}_{j=1,\ldots,|W|} \quad (2)$$

$$\mathrm{NPMI}\left(w_i, w_j\right)^{\gamma} = \left(\frac{\log\frac{P\left(w_i,w_j\right)+\epsilon}{P\left(w_i\right)\cdot P\left(w_j\right)}}{-\log\left(P\left(w_i,w_j\right)+\epsilon\right)}\right)^{\gamma} \quad (3)$$

$$\phi S_i(\vec{u},\vec{w}) = \frac{\sum_{i=1}^{|W|} u_i \cdot w_i}{\|\vec{u}\|_2 \cdot \|\vec{w}\|_2} \quad (4)$$

(Note: W: the set of a topic's top-N most probable words W = {W1...WN}. Si: a segmented pair of each word W' ∈ W paired with all other words W* ∈ W. S: the set of all pairs defined as S = {(W', W*)|W' = {wi}; wi ∈ W; W* = W}. P (wi): probabilities of single words. P (wi,wj): the joint probabilities of two words. ϵ: coefficient account for the logarithm of zero. γ: coefficient to place more weight on higher NPMI values.) (Bouma 2009)

Figure 3 illustrates the change trend in perplexity values following the calculation of the LDA model with a range of 1 to 15 topics. When the number of topics is seven, the perplexity value is the lowest (p=28.846). On the basis of the broken line trend in the figure it can be concluded that there are less than 31 topics in the range 4 to 10. Based on preliminary findings, it was determined that four to ten topics are the most appropriate range. Furthermore, topic consistency is also used to assess the quality of the model. A higher consistency score is considered to be better. In this study, the consistency values of the LDA model were calculated with a number of topics ranging from 1 to 15. The consistency change trend is presented in Figure 4. The broken line trend in the figure suggests that when the number of topics is 4, it reaches a maximum value within an array, which is close to c=0.3. When the number of topics exceeds 11, the consistency score is c=0.45, but the improvement is not significant. It is ideal to have as few topics as possible and the consistency score should be as high as possible.

Once again, theme consistency results confirm that the optimal number of themes is between four and eleven.

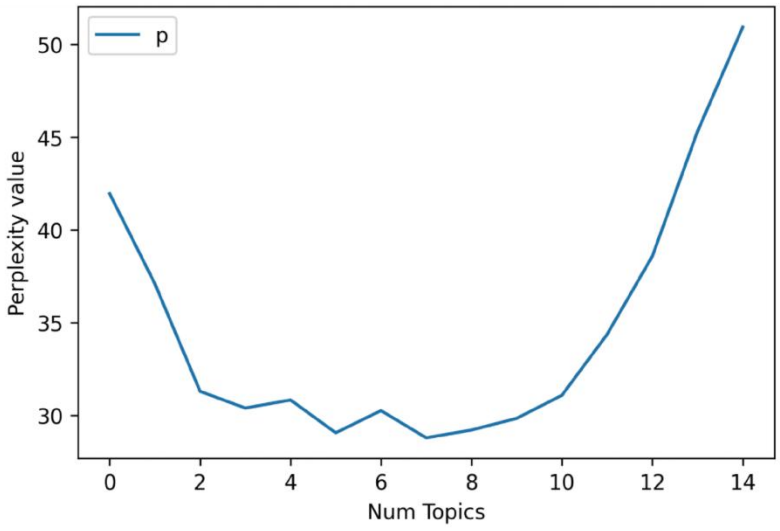

Fig.3. Perplexity change trends

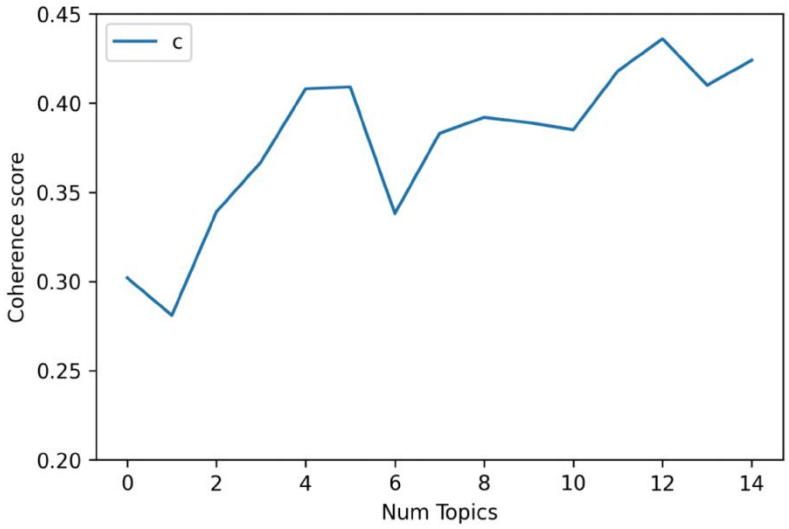

Fig.4. Consistency change trend

Comparing the LDA-visualization models of different topics allows determining the optimal number of topics. In the visualization results of the model with different numbers of topics, the number of topics is optimal at 4, meaning that there are no duplications. When there are five or more topics, there will be overlaps between topics. Thus, the optimal number of topics in the model is 4. Figure 5 illustrates the comparison result of the visualization model.

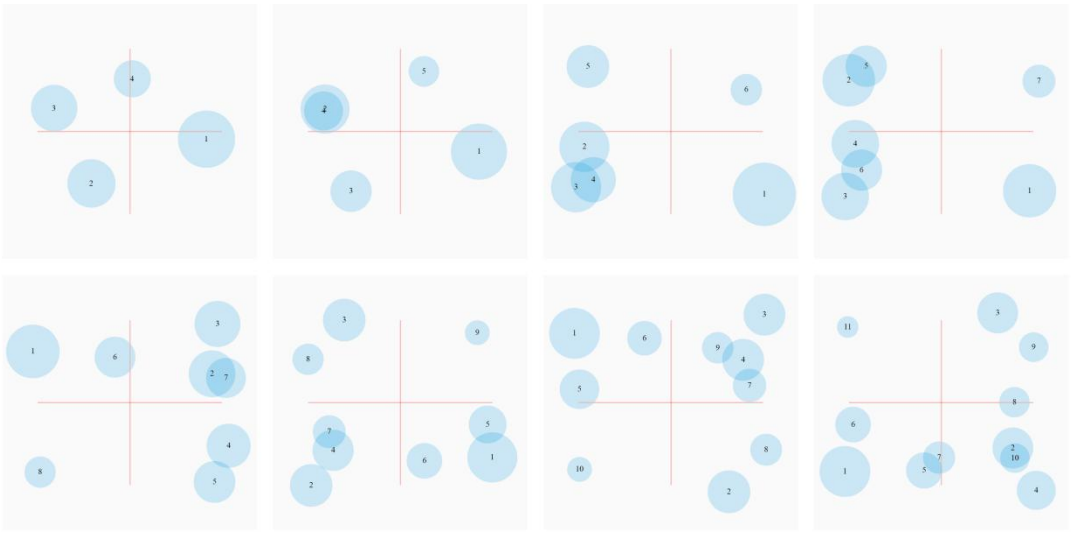

Fig.5. Results of comparisons between 4 and 11 group models

Figure 6 displays the distribution pattern of the top 100 high-frequency words in different topics when the number of topics is 4. If a vocabulary belongs to multiple topics, it will be marked in the figure with the topic color of higher Probability Value (PV). LDA represents topics by word probabilities. Given a vocabulary with words, { 1, 2, ⋯ , } , the LDA model probabilities =((1), (2),⋯ , ( )) form a representation of the h topic (= 1,2, ⋯ ,) (Cai et al. 2016). Even after the text has been segmented, since the original language of the prayer text is Chinese, many words can only be translated into English as phrases.

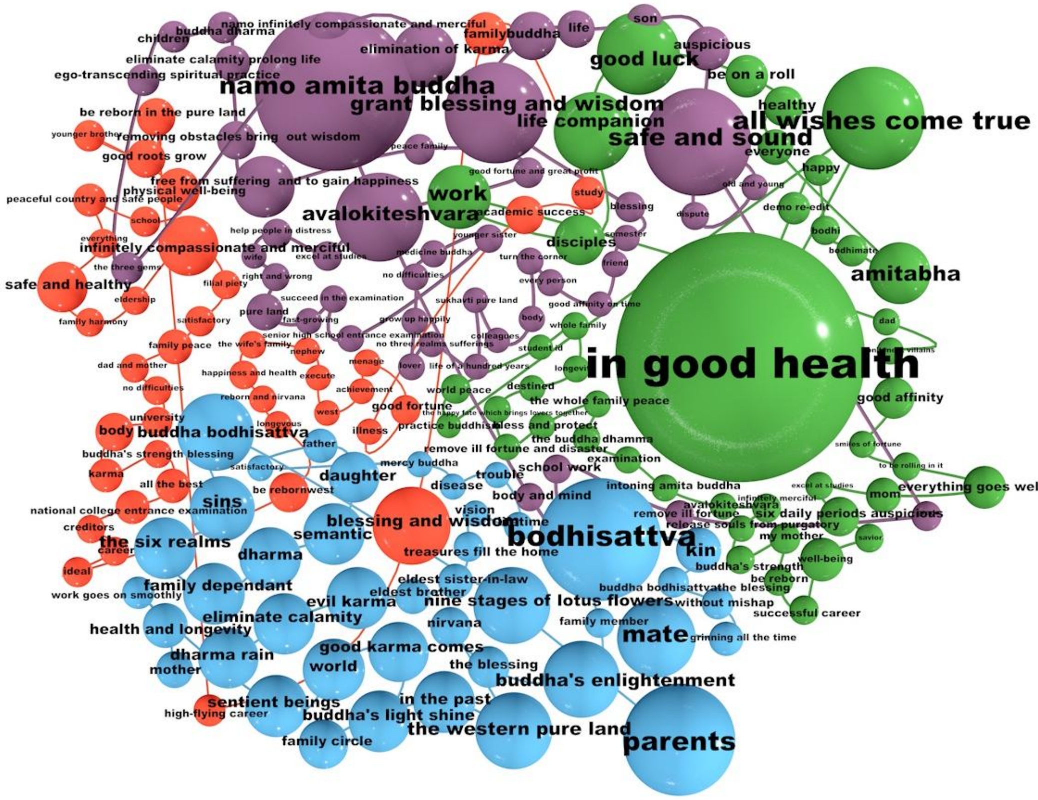

Fig.6. Conceptual map of the themes and concepts

Table 1 shows the top ten PV vocabularies for each topic along with the corresponding word frequencies. Results reveal that theme 1 composing the green sphere repeatedly emphasizes the desire for health. For example, words such as " in good health", " life companion" and "healthy " directly express expectations for health. In addition, the words "all wishes come true", "good luck", and "everything goes well" are all positive emotions that are associated with wishing to be healthy. Therefore, theme 1 was named "health". Safety is the main expectation of theme 2, composed of red spheres. Among them, "safe and healthy" and "family peace" is direct expressions of prayer. The terms "body", " vigorous " and "family" expressed hope for safety from a physical perspective. Moreover, " blessing and wisdom", "good roots grow", and " academic success " express the hope that wisdom can be obtained smoothly. Therefore, theme 2 was named "safe and sound". Theme 3 comprised of blue spheres conveys strong feelings for relatives, including "parents" and "mate". In Buddhism, “nine stages of lotus flowers” is used as a term that symbolizes the desire to live in a pure land with parents, expressing the desire of taking the nine stages of lotus flowers as parents. Despite the fact that theme 3 also discusses the hope for enlightenment after deep thinking, such as " Buddha's enlightenment" and "the western pure land". On the other hand, “evil karma”, “in the past” and “world” is sentimentally attached to the genuine feelings and reactions. Thus, theme 3 was named "family affection". A purple sphere composes the theme number 4. The meaning of the word as a whole conveys hope that bad fortune will turn into good fortune. For example, words such as "great blessing and wisdom", "safe and sound", and others directly convey the expectation of good fortune.

The words "elimination of karma", "free from suffering and to gain happiness", "eliminate calamity and prolong life", "remove obstacles and bring out wisdom" all indicative of go through hard times and bring about positive changes. Therefore, theme 4 was finally named change of fortune.

Table 1 Results of the importance of words in the topic

Theme No.	Theme	Concept	Count	PV
1	Health	in good health	13548	.099
		all wishes come true	4829	.056
		good luck	3668	.038
		life companion	3332	.035
		amitabha	2426	.026
		work	2437	.021
		good affinity	1097	.016
		everything goes well	1171	.014
		disciples	1709	.012
		healthy	1025	.012
2	Safe and Sound	blessing and wisdom	3234	.020
		infinitely compassionate and merciful	2243	.015
		safe and healthy	1700	.015

		good roots grow	925	.013
		be reborn in the pure land	876	.011
		body	875	.010
		family peace	680	.010
		vigorous	1133	.010
		family	1159	.009
		academic success	956	.008
3	Family Affection	parents	5219	.045
		bodhisattva	6006	.041
		mate	3313	.030
		buddha's enlightenment	3269	.029
		nine stages of lotus flowers	3266	.029
		the western pure land	3158	.029
		buddha bodhisattva	3188	.021
		evil karma	2349	.020
		in the past	2315	.020
		world	2342	.020
4	Change of fortune	namo amita buddha	8062	.081
		grant blessing and wisdom	4734	.048
		safe and sound	5048	.043
		avalokiteshvara	3860	.030
		elimination of karma	2474	.026
		free from suffering and to gain happiness	2192	.018
		namo infinitely compassionate and merciful	1204	.017
		buddha	1441	.017
		eliminate calamity prolong life	744	.012
		removing obstacles bring out wisdom	858	.012

4.4 Themes

4.4.1 Health

Health is regarded as a particularly important topic in online prayers. The prayers of the health theme, believers pray for relief from the diseases they have suffered, as well as the hope to avoid possible diseases and maintain the current state of health. Studies have indicated that religion is a good factor in coping with stress and depression, especially when facing life-threatening stressors (such as advanced cancer), which contributes to promote positive mental health (Sharif et al. 2018). Patients and their families may be able to relieve negative emotions such as anxiety through religious activities in the case of incurable diseases (Peteet and Balboni 2013, Thuné - Boyle et al. 2013). Effective treatment is not the only motive and demand of believers for online prayer, as we can also discover that quick healing is one of the factors that motivate online prayer. A skin disease, for example, may result in patients feeling low in self-esteem and depressed (Ahmad et al. 2020). Long-term negative emotions have been proven to aggravate skin diseases (Dixon, Witcraft, and Perry 2019). Some patients pray to cure their disease as quickly as possible and break the vicious cycle. Various negative health-related prayers actually demonstrate concern for one's own or another's well being. For example, believers can state the diseases that cause concern to them and make efforts to improve their lifestyle so as to prevent it. According to sentiment analysis, the representative prayer content of health themes can be divided into positive and negative emotions as follows:

Positive: Pray number 14458: I wish the great mercy and compassionate Bodhisattva blessings. The red rash on my nose and chin can be treated within a few days, without the need for ointment or hospital treatment.

Negative: Pray number 36855: Don’t take a cold shower anymore, you will feel miserable if you fall ill, fool.

4.4.2 Safe and sound

Safe and sound is one of the main expectations of believers in online prayer. The theme of safe and sound is divided into three categories: praying for oneself, praying for others, and praying for the entire area. If individuals pray for themselves and for others, it is usually a wish that one might go smoothly through a certain period, become successful in overcoming a certain challenge, or even to avoid unknown bad fortune. As can also be seen in the text, many believers pray for the safety of the city or country. In the case of a major disaster, for instance, believers may hope to lessen its impact by praying. On the other hand, a negative wish represents the release of negative energy. There are some believers who get into trouble due to the influence of others. By praying online, they hope that those who cause their troubles will also experience similar difficulties. It is an expression of vengeance. Through sentiment analysis, the following are the representative prayers on the theme of safe and sound, which are categorized into positive emotions and negative emotions:

Positive: Pray number 11379: I pray that all the people of Xiamen will be safe from the typhoon. Bodhisattva bless and Nanmu Amitabha.

Negative: Pray number 36734: A group of bastards disturbed placing orders on the Dec 12th shopping gala. I cursed that there were cockroaches in the food they ate, mice in the bed when they slept, and there was no hot water in the bathing water heater every day.

4.4.3 Family affection

There are a number of prayers that emphasize the theme of family affection. In addition to praying for themselves, believers also pray for those around them. Several kinds of feelings are involved in the theme of family affection, including: feelings between a husband and wife, feelings between siblings, feelings between parents and children, feelings between uncles and nephews, and even important friendships etc. Moreover, believers extend the content of their prayers in relation to a range of topics related to career, economy, family, etc. For example, some believers wish for the well being of their family and friends, economic improvement, or gaining wisdom and making progress in learning. There are also many prayers concerning family relations, with the hope of restoring the damaged relationship and a better future. Therefore, family affection can be considered as an important element of prayer, and people may expand the content of their prayers based on family relationships. The content of some negative prayers appears to be more of a farewell and a comfort to oneself. By making prayer, it has been decided to end a particular relationship, and this decision is recorded and witnessed by the way of prayer. Based upon sentiment analysis, the following prayers represent the positive and negative emotions associated with family affection:

Positive: Pray number 26981: I hope to repair the rift between my husband and his brothers and to be filial to parents and brothers. I wish the family harmony and relatives are united. It is possible to repair friendships that have been adversely affected by economic circumstances and to maintain good interpersonal relationships.

Negative: Pray number 20336: I have a lot to say. You never contact me and there is no reply when I try to contact you. We are no longer in contact with each other. It is a bitter relationship. My heart belongs to the Buddha, so I desire to return it to the Buddha and prevent myself from falling into hell and suffering.

4.4.4 Change of fortune

Change of fortune is also an important theme in the content of the prayer. It is suggested that believers do not feel satisfied with their current state or those around them and hope that prayer will enable them to change their fortunes in a positive direction. A good luck wish relating to matters such as economy, health, career, study, etc. is of particular importance to the wisher. Wishing for good luck before tackling important matters, to some extent, alleviate the psychological pressure of believers (Belding et al. 2010) and thus help them achieve better psychological state. There is a tendency among believers to differentiate objects when it is related to the theme of the change of fortune. In the case of themselves or close relatives, they will wish them good luck. The wish may, however, have negative implications for the disconnected or those who are against them. Based upon sentiment analysis, the following prayers represent the positive and negative emotions associated with change of fortune:

Positive: Pray number 41863: The Buddha，in the coming days, I will be taking the IELTS exam, which will determine how my fate will unfold. Please bless my exam. I believe in you.

Negative: Pray number 32477: Don't ever leave me, baby. Always stand by me and stay away from the bitch. The bitch is shameless. Everybody hates them. Every day is an evil day for the bitch.

5. DISCUSSION

This article examines the prayer content of believers from a positive and negativity-oriented perspective by using sentiment analysis. A sentiment analysis is an important tool organization use to gain a better understanding of their users. Making adjustments in response to the needs of the user contributes to improving the user satisfaction (Yang et al. 2020, Yadav and Vishwakarma 2020). A wide variety of products, hotels, websites, and social media utilize sentiment analysis (Haque, Saber, and Shah 2018, Singla, Randhawa, and Jain 2017). Using the sentiment analysis of online prayer, this study expands the application domain of sentiment analysis to provide user interface design suggestions for online religious services. In addition, the study analyzes the overall message text and outlines four key themes (health, safe and sound, family affection, change of fortune) regarding the application of online prayer by believers. These themes represent, to some extent, the behavior of Chinese Buddhist believers who use the online prayer function. It shows their main motivation for using the online prayer function. In order to make the overall layout and details of the prayer website more consistent with these four themes, Buddhist temples should consider adding elements containing these themes to the design of the prayer website. Text, icons, images, videos, or interactive elements may be provided. With these improvements, it will be able to meet the needs of users on an emotional level. The following are specific suggestions from the three perspectives of interaction, layout, and sharing.

Interaction

Buddhist prayers traditionally take the form of meditation in the heart or whispering. On contrast, online prayer requires the use of keyboard or voice recognition software. Online prayer is inefficient in terms of input efficiency. A study of consumer behavior for different levels of piety suggests that more religious consumers place a high value on efficiency and convenience (Taylor, Halstead, and Haynes 2010). It indicates that it is necessary to pay attention to the perceived convenience of users when providing religious services. Hence, when designing the online prayer system, consider providing the user with presets for the theme of the prayer. Provide preset methods for users to complete online prayers more conveniently. We suggest that it can be set from two angles. One suggestion would be the preset of the object. Since many believers perform online prayer for someone or a group of people who are close to them, not just for themselves. In order to better match assemble and expanded characteristics of the theme of family affection, online preying websites can predefine wishing objects based on the different types of emotions. For example, include the following main options: "self", "husband and wife relationship", "sibling relationship", "parent and child relationship" and may also include a secondary menu of sub-options such as "husband", "wife", "fiancé" and "fiancée" based on the main option "husband and wife". Clicking allows the user to reduce input work and increase convenience. Further, previous study indicates that the level of interaction between religious websites and users should be emphasized (Tan 2013). Therefore,

when a user selects an emotion type object, the web page can display images or provide motion feedback that corresponds to the selected emotion type.

The other suggestion is to preset the text. To preset some quick prayer vocabulary based on the four proposed themes, making it easier for users to formulate and input the content of the prayer. For instance, “in good health”(health theme), “a peaceful life”(safe and sound theme), “the whole family enjoy happiness”(family affection theme), “out of the depth of misfortune comes bliss”(change of fortune theme). Only a few and random words from each topic can be displayed at the beginning of the vocabulary display in order to enhance the orderliness of the display. After selecting a vocabulary associated with a particular topic, the alternative vocabulary provided will change, so that most of the alternatives become vocabulary related to that subject, thereby enabling the user to express prayer content more easily.

Layout

The online prayer pages of the Nanputuo Temple and Mount Emei Buddhism, shown in Figure 7, offer suggestions for the design of online prayer websites from the perspective of interactive logic. On the online prayer page, the primary elements include the page title, past user prayer displays, and button area (online prayer entry, page turning, other related link navigation, web page information, etc.). A simple arrangement of the overall page can meet the basic requirements for online prayer, but the user experience needs to be improved. When designing a page layout, designers can start with the themes presented in this study and take the users' needs into account. First of all, only the obvious wish function link buttons appear on the first level prayer page. A complete online prayer service can be accessed by clicking on the link image to jump or automatically drop down to the exclusive area of the page. As a result, richer preset content can be provided to assist and guide users while simplifying the layout of the page. It can also give users more feedback through the additional interactive effects provided. As an example, before going to the prayer main page, users are given the option to choose from several prayer themes, such as "health", "safe and sound ", "family affection", and "change of fortune". Once the user has made their selection, enter the corresponding page or area. The system provides matching content from a variety of perspectives at this time, such as predefined vocabulary and predefined multimedia content, so that users can perform online prayers more conveniently.

Fig.7. Mount Emei Buddhism (left) and Nanputuo Temple (right) online prayer page

Sharing

Interactions with others lead to more positive emotions (Lim and Putnam 2010). Sharing and participating in religious group activities can further enhance positive emotions (Collins 2014). Praying is a type of social interaction that emphasizes the interactional nature of social support (Sharp 2010). It is clear that social interaction plays a significant role in religious praying behavior, and the design of online praying should take the willingness of users into account. The results of studies on user behavior have indicated that social interaction and sharing may increase user satisfaction (Choi and Mantik 2017). In the online wishing function, some believers may find that sharing their prayers with friends after praying increases their sense of satisfaction. It is important to note that some studies have demonstrated that social interaction and satisfaction are not directly correlated (Murphy and Sashi 2018, Elmashhara and Soares 2019). It indicates that believers or parts of believers are unwilling to share their prayers with others. Thus, the online prayer pages provided by Buddhist temples should include a section asking whether believers are willing to have their prayers publicly available. As long as believers are willing to make the information public, they should also add features to facilitate sharing. After a successful publishing, for example, it is possible to generate picture greeting cards with the theme of "health", "safe and sound ", "family affection", and "change of fortune", and share them on social networks with a single click. Additionally, the prayer website may add search, like, and sort functions to some texts that are willing to open the prayer's content. The search function is particularly helpful to those who receive blessings, as it allows them to quickly find the target. In addition, the use of likes and sorting (sorted by the number of likes and sorted by time) enhances the social and interactive aspects of online prayer. Believers may use likes as a means to encourage one another. Lastly, the temple staff can choose to display the previous prayers of users. According to the four themes of "health", "safe and sound ", "family affection", and "change of fortune", select prayer texts with excellent writing, deep emotion or liked by many. Launching an online display channel dedicated to interacting with believers and encouraging emotional involvement.

6. CONCLUSION

Key themes of believers' online prayers include "health", " safe and sound ", "family affection" and " change of fortune ". Online prayer can help believers who need to pray online by presetting prayer texts related to these themes. Currently, temples offering online prayer may not be able to further meet users' needs due to a lack of design basis. The findings of this study contribute toward the design of user interface used to provide online prayer services in practice. So, the existing online prayer and the online prayer constructed in the future can improve the user experience of believers from the three dimensions of interaction, layout and sharing to help users pray online better. This study believes that online prayer is an important part of the of religious institutions' digitalization, which can also benefit from the results of this study.

The limitations of the study are that data collection was restricted to the Nanputuo Temple in China and user behavior in other regions or in other religions was not analyzed. It is possible to find out whether believers will feel positive emotions more easily in the future by comparing the original and modified user interface on the basis of the four themes presented in this study. Online prayer processes are worth further exploration for the perceived convenience, the role of social interaction, and other positive constructs. In light of the importance of the UTAUT model and UTAUT2 model in studies of user perceptions and preferences of interactive functions (Dwivedi et al. 2019, Palau-Saumell et al. 2019). The SEM model can be used in the future to quantify the path relationship in order to verify user behavior regarding online prayers to Buddhism.

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