Communication in Physical Sciences 2023, 9(4): 909-921

Comprehensive Review of Artificial Intelligence Contributions to Understanding Music, Religion, and Influencing Future and Emerging Global Trends

Robinson Ogochukwu Isichei

Received: 17 July 2023/Accepted: 07 September 2023/Published: 19 September 2023

Abstract : This review considers the rapidly forming intersection of artificial intelligence (AI), music and religious studies and how computational processes are changing both what it means to study as well as engage with these domains. It discusses the present use of AI in musical analysis, composition and performance, along with its novel use in the understanding of sacred texts, rituals and for supporting spiritual practices. The paper lists significant developments in technology such as the application of Machine Learning for pattern discovery, natural language processing used to interpret religious content and generative models used to promote creativity. It also discusses the methodological question and ethical issue, as well as future works in the cross position of AI, musicology and religious studies. Overall, the review emphasizes that even when AI serves as a source for insight and newness, cultural sensibility following the limits of interpretation is necessary and human has to be preserved.

Keywords: *Artificial Intelligence (AI), Musicology, Religious Studies, Machine Learning, Computational Analysis*

Robinson Ogochukwu Isichei

1.0 Introduction

The increased application of artificial intelligence in the various interdisciplinary fields and also in humanities, are one of the most remarkable changes in the recent research practices (Omefe *et al*., 2021; Ufomba & Ndibe, 2023; Ademilua & Areghan, 2022; Okolo, 2023; Abolade, 2023; Ademilua, 2021; Lawal *et al*., 2021.). These two aspects (music and religion) are the most essential components of human culture and spirituality that present opportunities and threats to AI-based inquiry and cognition (Burgess, 2020; Campbell, 2021). The synthesis of literature in the intersection of AI, music and religious studies is reviewed and examines the possibility of change and the nature of constraints of computationalism in these deeply human phenomena.

The recent development of computational tools, especially the language processing and pattern detection, has created new possibilities to explore complex cultural traditions and practices (Chen *et al*., 2022). Digital systems have now found application, in musicology, to perform such tasks as automatic transcription, to analyze style, or even to compose new music (Miranda, 2021). Similarly, scholars in religious studies are also resorting to them in order to study sacred texts, follow patterns of rituals, and compare practices in diverse cultures (Graham and Milligan, 2019).

Recent literature has discussed the interaction of AI and religion in the moral and cultural context. explored the way generative AI applications portray religion by highlighting the moralistic aspects of its interpretation, where the ways of AI responding tend to replicate the generalized ethical discourses, ignoring the theological context. They warn it is easy to over-simplify understandings of religion in this way, and that issues of authenticity, authority and cultural sensitivity in AI-mediated religious discourse should be questioned. It highlights the necessity of the critical consideration of the role of AI in religious interpretation and practice.

A systematic review of AI-based music generation was done by Civit *et al*., (2022). They examined 139 articles to map the technological techniques, applications, and

emerging trends in the field, and identified that AI methods (symbolic, audio, and hybrid models) are being broadly used in composition, performance, and music education, and the future directions of the field suggests the integration of multiple modalities and emotion-aware models to generate more expressive and context-dependent music, which offered a general framework of AI in music generation.

1.1 AI in Music: Historical Development and Current State

Since the initial attempts made in the 1950s, the analysis of artificial intelligence and the creation of music have become more advanced. The innovative contribution of Hiller and Isaacson (1959), the Illiac Suite, formed the basis of the algorithmic composition principles that have continued to have an impact on the current AI music systems. Table 1 demonstrates how the AI strategies in the sphere of music have developed during the past several years. Subsequent developments of machine learning have made musical AI applications far more complex.

The modern AI music systems use a range of methods, among them being rule-based systems, evolutionary algorithms, and deep learning networks (Briot *et al*., 2020). Convolutional neural networks have been especially useful in giving audio signal processing and music information retrieval tasks (Dieleman & Schrauwen, 2014). Initially, transformer architectures evolved in natural language processing have been applied to music generation successfully, with systems such as OpenAI MuseNet and Google Magenta able to generate musical compositions in a wide variety of styles (Huang *et al*., 2019) and coherence. The evolution of AI approaches as illustrated in table 1.

Table 1: Evolution of AI Approaches in Music

Period	Technology	Key Applications	Representative Systems
1950s-1970s	Rule-based systems	Algorithmic composition	Illiac Suite, MUSICOMP
1980s-1990s	Expert systems	Style analysis, harmony	CHORAL, Experiments in Musical Intelligence
2000s-2010s	Machine learning	Music information retrieval	Pandora, Spotify recommendations
2010s-Present	Deep learning	Generation, transcription	MuseNet, Magenta, AIVA

Music Information Retrieval (MIR) has been a beneficial field to the development of AI, as the advances have been used across automatic chord recognition to genre classification and mood detection (Schedl *et al*., 2021). Practical implications of these developments with regard to music recommendation systems, digital music libraries and musicological research are seen.

1.2 Computational Approaches to Religious Studies

Computational approaches of religious studies sometimes known as digital religion or cyber-religion, includes studying religious practices in digital contexts as well as using digital tools in religious studies (Campbell, 2021). The initial efforts were more concentrated at literary techniques of textual analyses of religious books with simple statistical tools and concordance software.

Current AI methods in religious studies utilize advanced natural language processing methods in the analysis of religious texts, sermon, and devotional literature (Birnbaum *et al*., 2019). They have been found by topic modeling algorithms (most notably, Latent Dirichl*et al*location (LDA)) applied to large religious corpora (Underwood, 2012). Sentiment

analysis systems offer information on affective aspects of religious rhetoric, whereas named entity systems can be used to conduct cross-ref of religious persons and ideas (Fig. 1).

The new opportunities presented by big language models (LLMs) have created the possibility of interpreting religious texts and comparing them in new ways. Nevertheless, the use of such applications casts considerable doubts on the essence of hermeneutic knowledge and the place of human interpretation in religious studies (Foster, 2023).

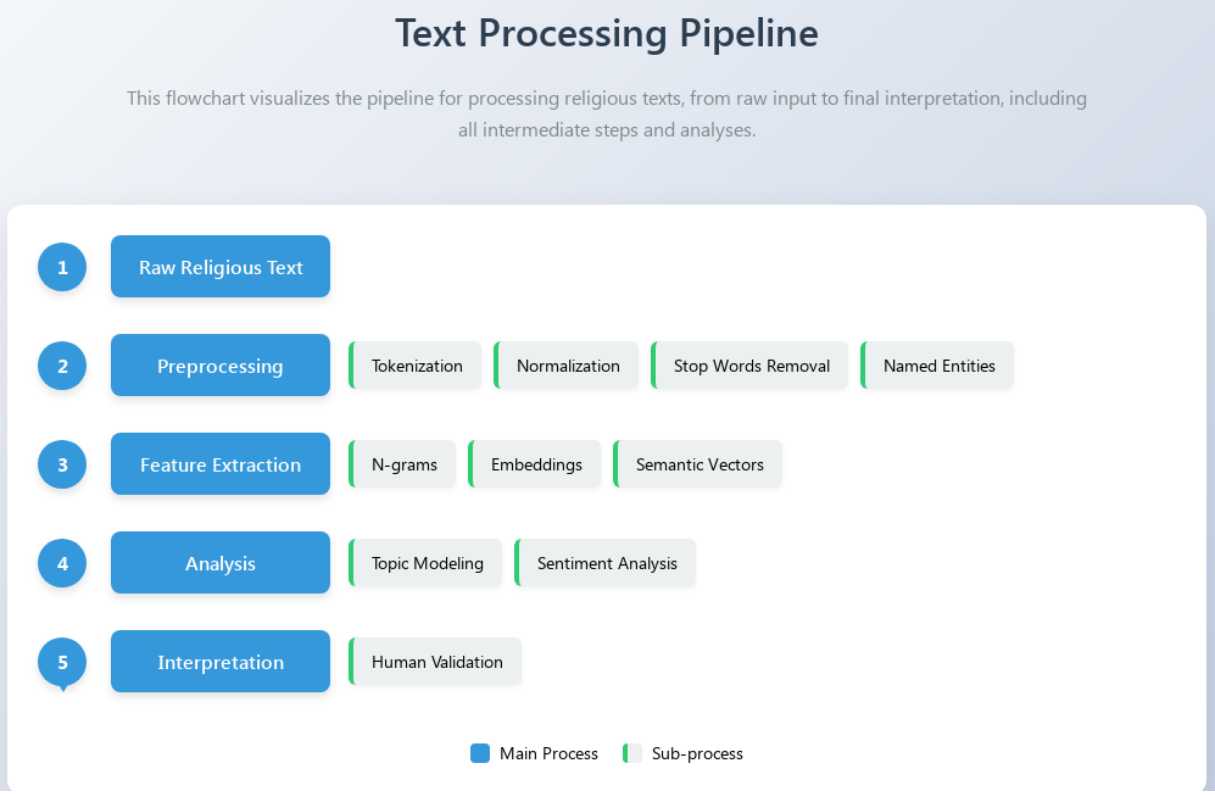

Fig. 1: Computational methods in Religious Studies

1.3 Theoretical Foundations and Methodological Considerations

When AI is used in music and religion, underlying theoretical assumptions concerning the culture, meaning, and interpretation should be carefully considered. Computational methods can be based on structural and statistical regularities that do not always reflect the full diversity of human experience and sense-making (Moretti, 2013).

In the field of musicology there are still controversial arguments concerning the connection between structural analysis and experience. As much as AI systems are effective in recognizing the pattern within the musical data, there is an issue of whether they can capture the cultural context, history and aesthetics (Cook, 2013). The same situation applies to religious studies, in which computational analysis has to contend with sacred-meaning, spiritual-experience, and interpretive-tradition issues.

2.0 Current Applications and Case Studies

2.1 AI in Musical Analysis and Composition

Recently, AI use in music has been in various fields, including music analysis and transcription, to music composition and performance (table 2). Machine learning algorithms have been highly successful at automatic music transcription, which is the process of converting audio records into symbolic notation with high accuracy (Benetos *et al.*, 2019). These systems make use of deep neural networks that are trained using datasets

of paired audio and score information that are large.

Another important application area is the style analysis. The AI systems are now able to recognize composers, genres and periods in history with great precision by analyzing musical characteristics of a score or an audio recording (van Kranenburg *et al*., 2020).

Generative AI systems such as the Amper Music and AIVA by MUSAI generate compositions in many different genres, including classical, contemporary pop, and so on through transducer configurations or recurrent neural networks, which have been trained on large music collections (Carnovalini and Rodà, 2020).

Table 2: AI Applications in Music Analysis and Generation

Application Domain	AI Technique	Accuracy/Performance	Limitations
Audio Transcription	Deep Neural Networks	85-95% note accuracy	Complex polyphony, noise
Style Classification	CNN/RNN	90-98% genre accuracy	Cultural bias, hybrid styles
Composer Attribution	SVM/Random Forest	80-90% classical works	Limited training data
Melody Generation	LSTM/Transformer	Human-like coherence	Long-term structure
Harmonic Analysis	Rule-based + ML	75-85% chord accuracy	Jazz, contemporary harmony

Case Study: MuseNet and Stylistic Analysis

The MuseNet openAI that was trained on various styles, such as pop, jazz, classical, and world music, demonstrates that AI has the ability to create music combining multiple instruments and musical genres (Payne, 2019). Even though it can creatively combine these elements to generate original compositions, the algorithm not always can sustain its consistency on a longer work.

2.2 AI Applications in Religious Studies

Some of the applications of AI in religious studies are textual analysis on an enormous scale and recognition of ritual patterns, which can be used to identify dominant themes, language structures, and the formation of inter-religious doctrine (Fig. 2). The mapping metaphor digital humanities project used a computational approach to metaphorical linguistic analysis of religious texts, which showed cross-cultural trends in spiritual expressions (Anderson *et al*., 2015). Equally, the project of the Seshat: Global History Databank involves computational analysis of the development of religious beliefs and practices in human societies (Turchin *et al*., 2018).

Religious social media content has been subject to sentiment analysis, which offers information about the modern religious discourse and community building within online space (Cheong *et al*., 2012). Through these studies, the digital platforms are found to transform religious communication and community building.

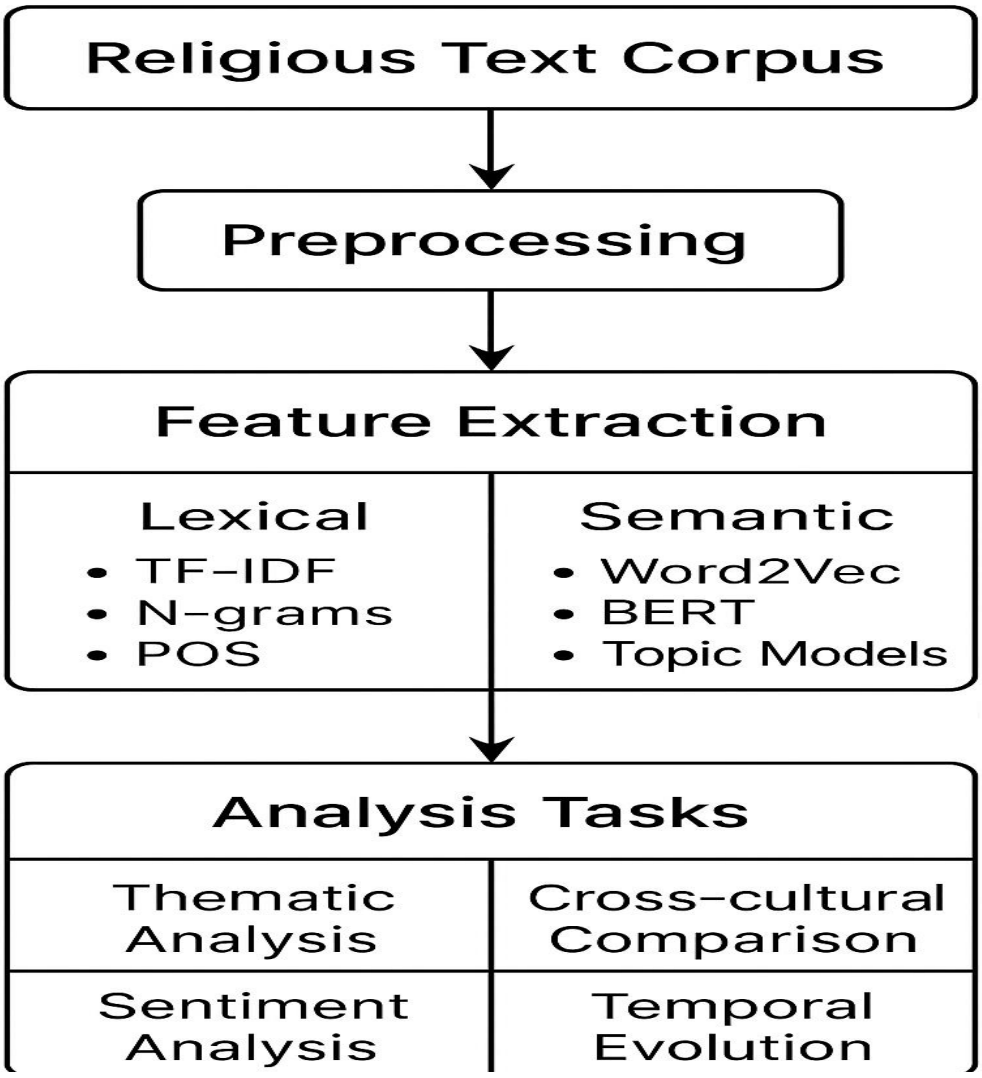

Fig. 2 : AI applications in Religious text analysis

Case Study: AI Analysis of Biblical Texts

Recent studies of biblical texts have applied natural language processing, such as the study of linguistic regularities, authorship, and theme development. The bible and AI project would use machine learning algorithms to understand the difference in style of biblical books adding to the discussions of authorship and textual composition (Johnson *et al*., 2021). Although these works offer a useful information, they also draw attention to the shortcomings of the computational methods of treating the texts believed to be holy by a believer.

2.3 Cross-Domain Applications

The interface of AI and music with religious studies creates some of the most innovative applications. Both musicological and religious studies in the context of projects that analyze the traditions of religious music are supplemented by AI technologies (table 3).

The Corpus Musicae project uses machine learning to study the traditions of chants in various religious communities and determine the general structural patterns as well as the regional differences (Martinez and Brown, 2020). The present work shows that AI can be used to support comparative research across cultures and religious borders.

Other uses of AI systems include analyzing the association between the structure of music and religious role. Hymn traditions are also studied using natural language processing, which involves the examination of the lyrical meaning, as well as the musical examination of melodies and harmonic structures (Thompson *et al*., 2019).

Table 3: Cross-Domain AI Applications

Project	Religious Tradition	Musical Elements	AI Methods	Key Findings
Corpus Musicae	Multiple chant traditions	Melodic patterns, modes	Clustering, classification	Universal structural patterns
Hymn Analysis	Christian denominations	Text-music relationships	NLP + MIR	Denominational stylistic markers
Quranic Recitation	Islamic tradition	Prosodic features	Speech recognition	Regional variation patterns
Buddhist Chant	Tibetan Buddhism	Tonal psatterns	Spectral analysis	Meditation-specific structures

3.0 Methodological Challenges, Ethical Considerations, and Implications

3.1 Data Quality and Representation

The quality and representativeness of training data is crucial to the effective operation of the AI systems. The digital datasets that can be accessed in music and religion fields tend to be biased and culturally restricted in history (Fig. 3). Most datasets are dominated by Western classical music, Christian literature, and this could reduce the applicability of AI models (Sturm, 2014).

There are also biases in digitalization as the choice of what to place in digital collections promotes the institutional interests and limitations of resources. These biases become embedded in the AI models that are trained on such data and might perpetuate the current inequality in the representation and understanding.

3.1.2 Cultural Sensitivity and Interpretation

Application of AI to religious text raises some significant concerns on matters of culture sensitivity and appropriate interpretation. The implications of religions and religion practices are of great essence to the person who believes and the computational analysis must navigate through the issues of respect, accuracy, and interpretive authority (Campbell and Vitullo, 2016).

It occurs the same with the music analysis where the cultural background and the traditional knowledge systems are not always well-modeled by the computational models. The risk of misunderstanding or simplifying is particularly great with the use of AI systems when the system is applied to the music that belongs to other cultures, like non-Western ones.

3.1.3 The Problem of Meaning and Context

AI systems are very effective in recognizing patterns but do not understand contexts or interpretation of meanings. Meaning in the arts (especially in music) and in religion can be relative to cultural context, historical

background, and interpretive tradition that cannot be computed.

The gap in semantics between the low-level features which can be identified through the use of AI systems and the meaning of the semantics is also a major problem (Smeulders *et al*., 2000). Although AI is capable of recognizing structuring patterns within a piece of musical work or a religious text, the meaning of such a pattern cannot be explained without the human knowledge and cultural competence.

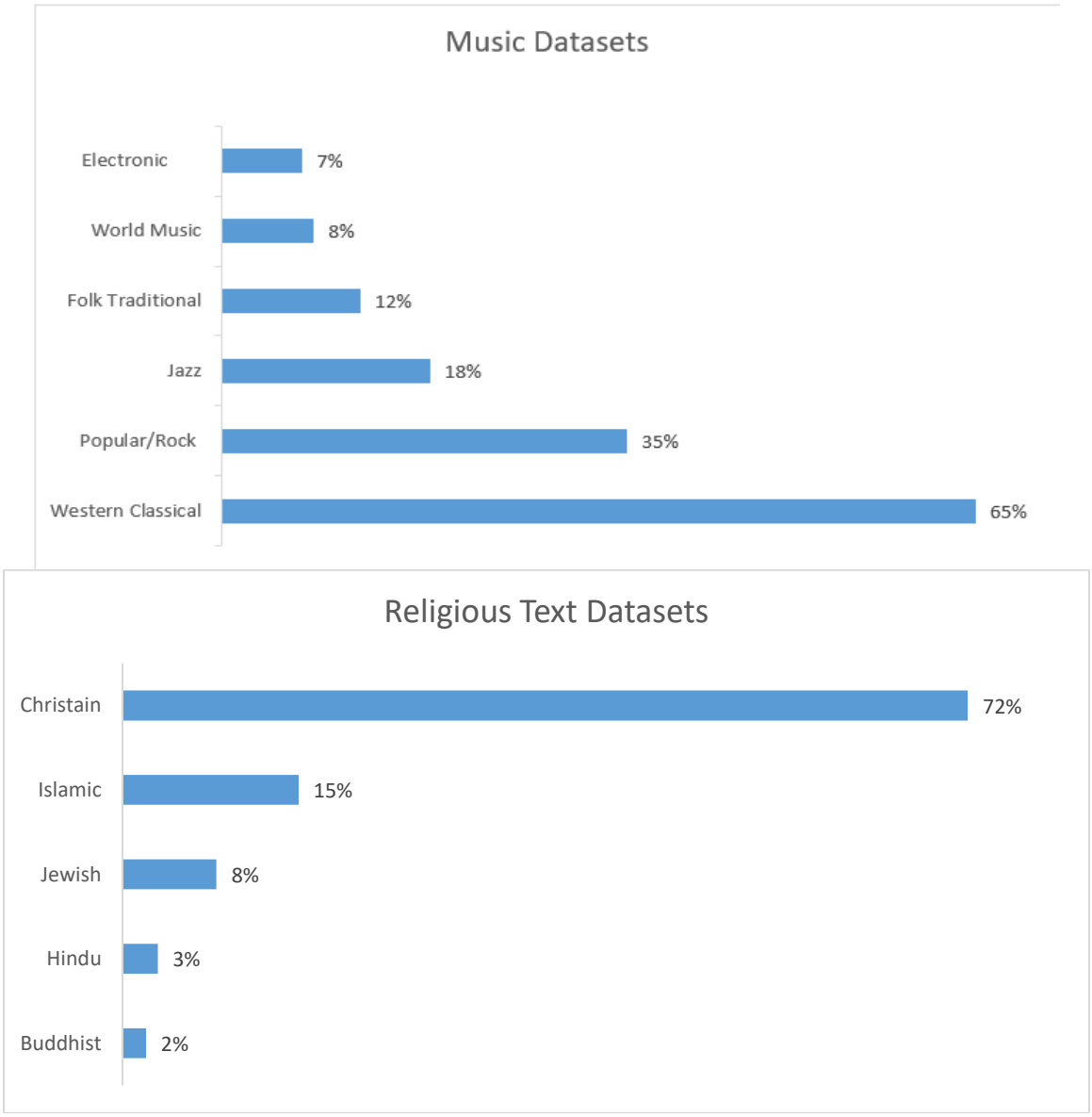

Fig. 3: Representation bias in cultural AI datasets composition

3.2 Ethical Considerations

3.2.1 Algorithmic Bias and Representation

AI systems are bound to be biased by the training data they are provided with, and how they are designed. This poses the issue of theological bias, the preference of a specific denomination, and even cultural assumptions within computational models in the field of religious studies (Noble, 2018). Likewise, AI musical systems can propagate genre, cultural and aesthetic biasing.

The solution to these biases involves various and non-discriminatory data creation, collaboration between multiple disciplines, and

continuous critical dialogue of the results of AI systems. Research on the creation of fairness metrics in the specifics of cultural and religious areas is in progress.

3.2.2 Intellectual Property and Sacred Materials

Intellectual property laws and religion are complicated issues due to the use of copyrighted music pieces and religious books in AI training datasets. The majority of religious organizations have some steps in handling religious materials that may be incompatible with the regular AI development efforts. Authorship and copyright of AI produced creative prose is already a significant challenge, especially when the systems receive training on culturally relevant materials when ethical and legal systems are in their infancy.

Table 4: Ethical framework for AI in cultural domains

Ethical Principle	Music Applications	Religious Applications	Implementation Strategies
Cultural Sensitivity	Respect traditional knowledge	Honor sacred text protocols	Community consultation
Representation	Include diverse musical traditions	Balance religious perspectives	Inclusive dataset construction
Transparency	Open algorithmic processes	Clear interpretation methods	Explainable AI techniques
Human Agency	Augment creativity	Support scholarly inquiry	Human-in-the-loop design
Privacy	Protect performer rights	Respect community boundaries	Consent mechanisms

3.2.3 Human Agency and Creativity

The technology is expanding its capabilities in the creative fields to ignite philosophical debates over whether the AI systems in reality create or simply generate patterns during human contributions (Table 4). Although AI is exceptionally fine at creating music and interpreting words, its application should be interpreted as an amplification and not as a substitution of human creativity and comprehension.

3.3 Implications for Scholarship and Practice

3.3.1 Transforming Research Methodologies

Artificial Intelligence (AI) is transforming the world of music and religious study because it is now possible to locate patterns and links in big data sets that cannot be analyzed manually. This development underpins more in-depth and detailed comparative research. The application of computational strategies, however, is not to be considered a replacement of the traditional ways of academic activity, but rather as its supplement. The future scholarship is filled with opportunities and challenges because of the synthesis of quantitative and qualitative approaches, digital and analog, computational and interpretive analysis.

3.3.2 Democratizing Access to Cultural Heritage

By making tools of analysis and online collections more available, the introduction of AI technologies can be used to make musical and religious heritage more democratic. Transcription, translation, and analysis tools that allow cultural materials to be made accessible to wider audiences and facilitate new types of cultural exchange are automated. Nonetheless, democratization should be done in moderation without disregard to cultural protocols and intellectual property rights. Certain traditions of religion and music believe that there are limitations on access to some materials that should be respected in the digital setting.

3.3.3 Preserving and Revitalizing Traditions

The applications of AI provide new opportunities to record, preserve, and renew musical and religious culture. In order to preserve the endangered musical traditions, machine learning methods can help to analyze and record the practices of the performance. On the same note, the computational studies of historical religious texts may help to explain the dynamics and continuation of religious traditions.

Higher-quality digital preservation work augmented with AI would not only aid in preservation of cultural heritage to the future generations but also allow a wider range of scholarly research and community participation in its work.

4.0 Future Directions and Emerging Trends

4.1 Technological Developments

A number of technological trends will tend to influence the future of using AI in music and religious studies. The multimodal AI systems that will process the text, audio, and visual information in parallel introduce new opportunities in the research of the complex cultural phenomena that will cross multiple media. Fig. 4 indicates that the multimodal AI architecture incorporates text, audio and visual modalities.

The complexity of massive language models continues to grow, and there is a possibility that the analysis of religious texts and theological concepts will be more precise. However, with all these developments, a new set of inquiries, regarding the interpretive authority and the role of human expertise in religious studies, emerges.

The advancement of unsupervised learning might permit AI systems to discover patterns in musical and religious data without the need to have a significant part of human annotation and might also discover other connections and structures that were not traditionally recognized.

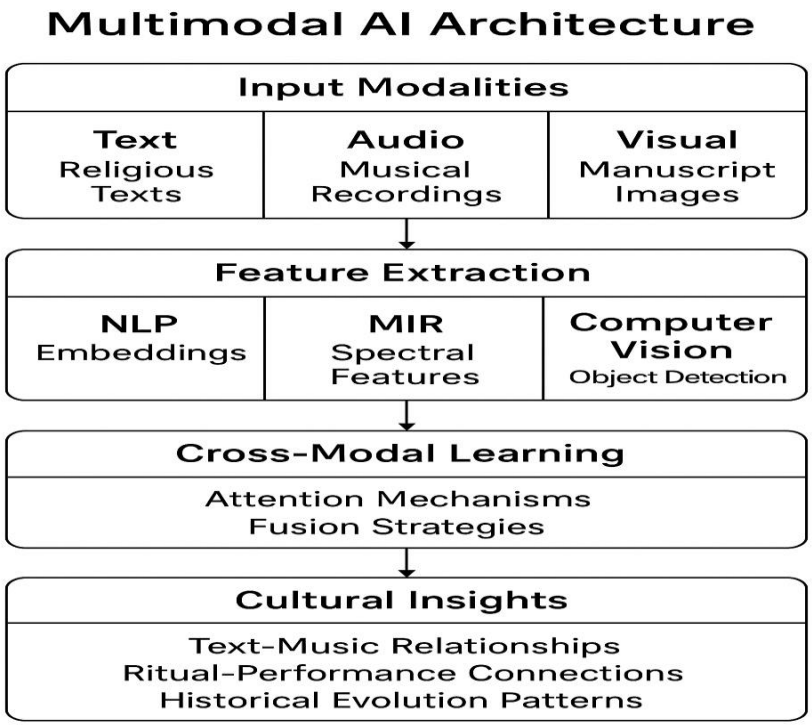

Fig. 4: Emerging AI technologies for cultural analysis

4.2 Interdisciplinary Collaboration

Perhaps, in the future the application of AI in music and religion will involve more partnership between technologists, humanists and religious practitioners. This form of cooperation is essential towards the development of culturally sensitive and academically viable procedures of computational analysis.

The first steps of digital humanities working on the cooperation of computer scientists with musicologists and religious studies scholars have already provided new research. Enhancing the pertinence and validity of AI applications by involving practitioners and community members of different religious backgrounds may be possible.

Table 5: Emerging Collaborative Models

Collaboration Type	Participants	Focus Areas	Expected Outcomes
Academic Consortiums	Universities, research institutes	Methodology development	Standardized frameworks
Community Partnerships	Religious communities, scholars	Cultural preservation	Community-driven projects
Industry Collaborations	Tech companies, cultural institutions	Tool development	Accessible applications
International Networks	Global research teams	Cross-cultural studies	Comparative insights

4.3 Educational Applications

The educational potential applications of the AI technologies in the field of music and religious studies are gigantic. The intelligent tutoring systems can be customized to suit various styles and cultures of learning music. Similarly, AI-inspired tools can also prove useful in a comparative examination of different religious practices by offering an analysis of multiple religious practices in a convenient way.

However, education applications ought to be designed with care to education applications and culture sensitivity. The simplification or bias threat is of great concern particularly in the education field.

4.4 Community-Centered Approaches

The upcoming trends of AI in music and religion must focus on the community-based approaches to involve the practitioners and tradition bearers in the design and analysis of computer tools. The practices can help in ensuring that AI applications satisfy expectations and interests of communities whose cultural contents they analyze.

Participatory design methods, where religious groups and musical cultures are integrated into the design process, may bring more culturally appropriate and useful AI technology applications into existence.

4.5 Recommendations for Future Research

On the basis of this review, a few recommendations are made regarding future studies in the intersection of AI and music and religious studies:

To begin with, the emphasis should be made on interdisciplinary cooperation, assimilation of knowledge in the fields of computer science, musicology, religious studies, and other cultural groups of people. This co-operation is imperative in coming up with culturally sensitive and scholarly AI technology applications.

Second, bias and representation in datasets and algorithms are to be a key issue in any AI application. This involves conscious attempts to consider a variety of answers and resources in computer-based models and continuous review of system outputs on the issue of cultural bias.

Finally, the longitudinal research is required to track the long-term effects of AI on students and academia, religious practices, and musicians. These types of insights will be essential in understanding the academic practice changes, community dynamics, and cultural transmission, and will also play a crucial role in shaping the future regulatory decisions.

Table 6: Research Priority Matrix

Priority Level	Research Area	Timeline	Resource Requirements
High	Ethical frameworks	1-2 years	Interdisciplinary teams
High	Bias mitigation	Ongoing	Technical + cultural expertise
Medium	Educational applications	2-3 years	Educational partnerships
Medium	Community tools	3-5 years	Community engagement
Low	Advanced AI integration	5+ years	Significant funding

5.0 Conclusion

The present study has demonstrated that the Agent-to-Agent Validation (A2AV) framework offers a promising pathway for mitigating hallucinations and enhancing the reliability of large language models. By employing multiple autonomous agents that iteratively generate, critique, and refine responses, the framework decentralizes trust and improves factual grounding across diverse application areas such as healthcare, legal practice, and scientific research. The Python implementation further illustrates the feasibility of embedding inter-agent verification in practical workflows. While the approach shows clear benefits, challenges such as computational cost, possible agent collusion, and real-time bottlenecks must be addressed. Looking ahead, integration of A2AV with explainable AI, retrieval-augmented generation, and symbolic reasoning holds the potential to create robust multi-agent consensus systems supported by standardized evaluation metrics. In conclusion, A2AV not only strengthens the credibility of AI-generated knowledge but also represents an important step toward building trustworthy, transparent, and socially responsible AI systems.

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Declaration

Consent for publication

Not applicable

Availability of data

Data shall be made available on demand.

Competing interests

The authors declared no conflict of interest

Ethical Consideration

Not applicable

Funding

There is no source of external funding.

Authors' Contribution

All aspects of the work were carried out by the author.