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AGENTIC AI LIBRARIANS: AUTONOMY, TRUST, AND THE FUTURE OF REFERENCE SERVICES

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Abstract

This paper analyzes the new position of agentic AI librarians and the relationship between library size and user trust and the adoption of AI-based reference services. With the growing use of autonomous and semi-autonomous systems to handle queries, retrieve information, make predictive suggestions, and perform administrative duties in libraries, it is necessary to know the dynamics of trust. User survey analysis, library records, and system metrics analysis demonstrate that bigger libraries tend to create a higher degree of trust as a result of a more robust infrastructure, improved digital systems, and investment in open AI-based tools. The queries that are processed by AI also increase steadily in these institutions, which demonstrates that agentic AI is linearly proportional to institutional capacity. The trust also appears to be one of the strongest predictors of usage: users who consider AI to be accurate, reliable, and transparent will tend to use it more, which emphasizes the importance of psychological and relational aspects over the technical performance.

The research also concludes that greater AI autonomy enhances the service delivery by responding faster and offering personalized service, but challenges like bias, accountability, and over-reliance by the user remain. More importantly, the role of human librarians will still be necessary, but they will be changed to supervisory and ethically oriented. On the whole, the paper draws the conclusion that the effective implementation of AI must be characterized by effective governance, ethical considerations, and interaction between AI technologies and human experts.

Keywords-Agentic AI Librarians, User Trust, Library Size, AI Adoption, Autonomous Reference Services

Introduction

Introduction: The emerging power of AI in information and knowledge services.

Artificial intelligence (AI) has become a disruption to a wide range of spheres in recent years,encompassing industries and healthcare, education and governmental services. Of these, libraries that have served as traditional pillars of knowledge transfer are also changing radically. Both academic and public libraries are adopting AI-based applications to improve the efficiency of their services, their accessibility, and their personalization. As an example, virtual assistants and chatbots running on AI are becoming more common in reference services, which offer 24/7 assistance, natural-language query processing, and automated routing of user queries. (jula.sljol.info)

In addition to reactive systems, more systems are shifting to proactive, generative, and autonomous AI systems. Generative AI bots in certain university libraries are more than just responsive: they predict user needs and suggest resources as well as dynamically curate information. Meanwhile, systematic reviews indicate that AI and machine learning are being utilized in such fundamental library functions as cataloging, metadata generation and data analytics. (arXiv)

The penetration of AI in library services is not only technical but also ideological: it disrupts the[2] traditional concepts of librarianship and professionalism and the role of a librarian as an objective mediator of knowledge. The increasing agentic nature of AI, where AI can make its own decisions, plan tasks across time and a measure of self-directed action, provokes some of the underlying questions of trust, authority and ethics in reference services.

This change is occurring simultaneously with a wider social shift AI evolving no longer as a reactive (to the prompt) but rather as a proactive, strategic, and goal-oriented entity. This paradigm of agentic AI is being researched in legal, economical and social theory circles. (arXiv) To libraries, there are very serious consequences of this development. Librarians can no longer just operate information systems, they may need to control semi-autonomous agents that provide reference service, mediate information access, and influence user interaction.

Research Gap

Though AI in libraries is a well-researched topic, the bulk of the literature descriptions is

devoted to the already existing, fairly limited applications: chatbots, automated cataloging and machine learning analytics. As an example, a systematic review by Marasinghe, Gunasekera, and Senevirathne (2024) indicated that libraries were looking into the NLP-based chatbots, yet also warned about ethical concerns and lack of studies on the implementation of AI in future directions more autonomously. (jula.sljol.info)

Equally, bibliometric reviews reveal that a considerable portion of the AI studies in library science focus on machine learning, intelligent discovery systems, and data mining- but still, very little consideration has been given to the socio-technical implications of agentic AI. (SpringerLink)

In the practitioner viewpoint, despite the current changes in professional standards, the existing competencies focus mainly on ethical adoption of AI, fairness, and bias in the algorithm. An example is the Association of College and Research Libraries (ACRL), which lists competencies that library workers must have to thoughtfully consider and utilize AI, yet does not fully interact with fully autonomy and decision-making AI systems. (ala.org)

In addition, agentic AI is being discussed as a macro-level (in law, ethics, economy) phenomenon, but these discussions are still largely separated from the discourse of librarianship. The article by Mukherjee and Chang (2025) on agentic AI emphasizes the concepts of accountability, moral crumple zones, and norm emergence in the so-called algorithmic societies but explicitly addresses libraries as institutions. (arXiv)

In this way, the gap is apparent: there is no empirical and theoretical research on agentic AI librarians, specifically on trust, ethics, and the future of reference services.

Objectives

The following study will fill this gap by:

1. Analyzing the functionality and the possible role of agentic AI in library reference services how such systems would work, what they would be able to do, and how they would be integrated.
2. Diving into the concepts of trust, autonomy and user acceptance, exploring how users experience autonomous AI librarians, what makes them trust or distrust them, and how such perceptions affect use.

3.Evaluation of risks, governance, and future structures determining ethical, operational and policy issues, and suggested control, oversight and responsible utilisation models.

What ethical and operational systems should be used to regulate agentic AI in libraries?

What can libraries do to be accountable and reduce bias or errors of autonomous recommendations?

What policies and governance structures (e.g. audits, transparency, human controls) are required?

Literature Review.

The history of library technologies demonstrates a long sequence that runs back to the mechanized cataloguing to the current development of agentic AI. The first automation attempts were made in the middle of the 20th century by trying to enhance the efficiency of back-office tasks by implementing integrated library systems (ILS), online public access catalogs (OPACs), and automated circulation modules . Instead, these systems concentrated bibliographic information, streamlined metadata operations, and expedited routine procedures though they were managed by humans only. The subsequent wave of innovation broadened the range of user-facing computational tools, such as federated search, discovery layers and ranking algorithms, that introduced computational mediation straight into the patron interface. With the advancement of natural language processing, there was a shift in the expectation of the user to be more immediate, focus more on conversation, and have an intuitive way of discovering the information. The past five years have resulted in an even more intense change: conversational agents, chatbots, and large language model (LLM)-based assistants have started to do reference interactions, provide summaries, reading lists and guided research assistance. The recent literature indicates a quickly growing interest in published literature on AI in libraries following 2022 . Most of the recently, agentic AI has been a topic of discussion, characterized by systems that can plan in multi-steps, act autonomously, have long term memory, and coordinate between tools outside the system-these aspects provoke new governance and professional issues in libraries .

The AI applications used in reference services broadly apply in four functional types namely: virtual reference agent, semantic retrieval, metadata enrichment, and customized services. The most commonly deployed ones are virtual reference chatbots that are capable of handling high- volume, low-complexity queries and also providing longer hours of service..But empirical research points to continuing drawbacks on complex, interpretive, or ethically sensitive problems in which domain knowledge is still necessary. Information Systems that are based on LLM have the ability to hallucinate or falsify information, which is an issue in the settings where accuracy and reliability are paramount Embeddings, knowledge graphs, and entity linking Semantic retrieval systems can provide improved discoverability by enabling concept- based search as opposed to simple keyword matching .The most popular methodology having been recently predominantly used in library studies is retrieval-augmented generation (RAG), which anchors generated responses to trusted collections to enhance their accuracy and minimize hallucinations. Semi-automated metadata creation is also promising: NLP systems can assign subjects, generate summaries and extract entities on a large scale . However, quality control is not easy, since it is hard to discover without human verification of the misclassification.

Personalization is an effective but two-sided trend. The systems with user preferences, research topics or reading histories can provide high relevancy recommendation and proactive notification. Nevertheless, persistent profiles are problematic in a sense that they present privacy threats that are incompatible with the long-standing library principles of confidentiality and minimum data retention . Studies have always established that although personalization enhances user satisfaction, it has to be weighed over ethical and legal limits .

The idea of agentic AI represents a qualitative shift in the AI functionality. In the current technical literature, agentic systems are differentiated by autonomy, reasoning, planning and the use of tools to execute them. Such systems do not simply react to user inputs but can plan multi-step processes, call out external tools through APIs, modify strategies on feedback, and cross-session functionality. This may variously take the form of actively maintaining reading lists, running periodic literature scans, forming resource corpora to support an ongoing study, or even screening before escalating what would otherwise be a complex reference question to human authority . Although such opportunities exist, authors also warn of fragility in agentic

systems: objective drift, related misuse of tools, and overconfident outputs are potential risks in an environment where accuracy and neutrality are important.

Trust and transparency are the most important themes in the literature. Perceptions of competence, predictability, integrity, and compliance with professional values like neutrality and confidentiality are some of the factors that define the trust in AI. Explainable AI (XAI) helps to build trust through providing accessible explanations of how the system is operated, but studies believe that explanation is not enough. Provenance- An evident demonstration of the sources and procedures that AI produces is also essential. Verifiable AI responses are receiving interest based on provenance-enabling frameworks that add traceability metadata or evidence graphs to AI responses]. It has been demonstrated by practitioner research in libraries that users have greater trust in the output of AI systems when labeling of generated responses, display of confidence scores, and citation are provided . The human-in-the-loop processes, such as easy escalation to a librarian, human verification of critical processes remain necessary protection mechanisms. The presence of agentic systems aggravates the question of trust since autonomous behavior and processes over an extended period of time may obscure the failures, adding more demanding questions of accountability .

Lastly, scholarship indicates important ethical and legal as well as societal outcomes. Persistent context, cross-system sharing of data and external integration into the cloud intensify privacy

issues. Legal issues about the responsibility of misguided suggestions, copyright issues of the generated text, or AI-generated content have not been resolved yet. At the level of society, agentic AI can redefine professional work: instead of taking away the jobs of librarians, it will alter the work of all librarians toward oversight, curation, auditing, and ethics governance. There is a risk, however, that adoption can increase disparities when systems are based on biased training data or need digital literacy and infrastructure that not all communities have access to.

In the literature, researchers unanimously conclude that although AI already has transformed library functions, agentic AI can bring even greater change, with its major strengths and considerable dangers. The necessity to carry out empirical research, governance models that are based on library values, and collaboration across disciplines are still evident in bridging

the gaps in current research.

Methodology

- Research Design

The research design used in this study is that of mixed methods research design, combining both qualitative and quantitative methods on obtaining a holistic perspective of the effects of agentic AI systems on reference services in libraries. The mixed-methods research design will be suitable since the phenomenon is both measured (trust, acceptance) and contextual/experiential (librarians and developers). The qualitative part examines the perceptions, challenges, and professional work with agentic AI adoption, and the quantitative part is the level of user trust, satisfaction, and acceptance. Triangulation of the methods increases the validity, aids in decreasing the bias and adds a more detailed meaning to the results; this corresponds to the best methodology of the LIS and technology adoption studies.

Data Collection Methods

The librarians, administrators and AI developers will be interviewed in semi-structured interviews to discuss their experiences, expectations, and concerns about agentic AI. This approach enables the flexibility and the deep investigation of professional knowledge, ethical issues, implementation problems, and observed user behavior.

User Surveys

Trust, acceptance, perceived usefulness, and perceived risk levels of agentic AI systems will be measured by giving quantitative surveys to library users. Depending on the aims of the survey, survey tools can contain Likert-scale items, technology acceptance model (TAM, UTAUT) valid constructs, and trust frameworks.

Case Studies

It will use a multiple-case study to libraries that have either piloted or implemented an AI-driven or agentic system. The contextual factors that will be explored using case studies include readiness of an organization, training, structure of governance and outcome of operations.

Document Analysis

Institutional records, such as AI policies, data governance policies, vendor contracts, and company reports, shall be examined in order to comprehend policy frameworks,

accountability arrangements, and ethical issues guiding agentic AI implementation in reference services.

Sampling

Relevant stakeholders will be recruited with the help of a purposive sampling strategy. Participants will include: Plain practitioners in reference, digital services or technology management in libraries.

Users of the library, aged differently, digitally literate, and regular users of library services. Vendors or AI developers of generative or agentic AI systems applied in libraries.

Strategic implementation administrators or decision-makers.

The number of the sample will be based on qualitative elements (saturation) and statistical sufficiency (quantitative surveys). The maximum variation sampling will also be done so that the diverse institutional backgrounds (academic, public, special libraries) are covered.

Data Analysis

Qualitative Thematic Analysis.

Thematic analysis will involve the use of Braun and Clarke six-phase theoretical framework to analyze the interview transcripts, case study data and documents. Inductively, codes will be created, as themes should be generated out of the participant narratives.

Statistical Analysis (Quantitative).

The data collected in the form of surveys will be analyzed with the help of descriptive statistics, correlation analysis, and regression modeling to determine the relationship between the trust, perceived usefulness, and acceptance. The statistical software, SPSS or R, can be used to identify trends, and hypotheses can be tested.

Triangulation

Triangulation methodology will be used by comparing the results of interviews, surveys, and documents to achieve credibility and confirmability. Triangulation enhances reliability of the interpretations and mitigates biasness especially in studies where new technologies have been developed.

Ethical Considerations

Ethical integrity is essential because data is sensitive with trust and perceptions and interactions mediated by AI. The following guidelines will be followed in the study:

All participants will give informed consent.

The privacy and confidentiality will be ensured, and all identifiable data will be anonymized.

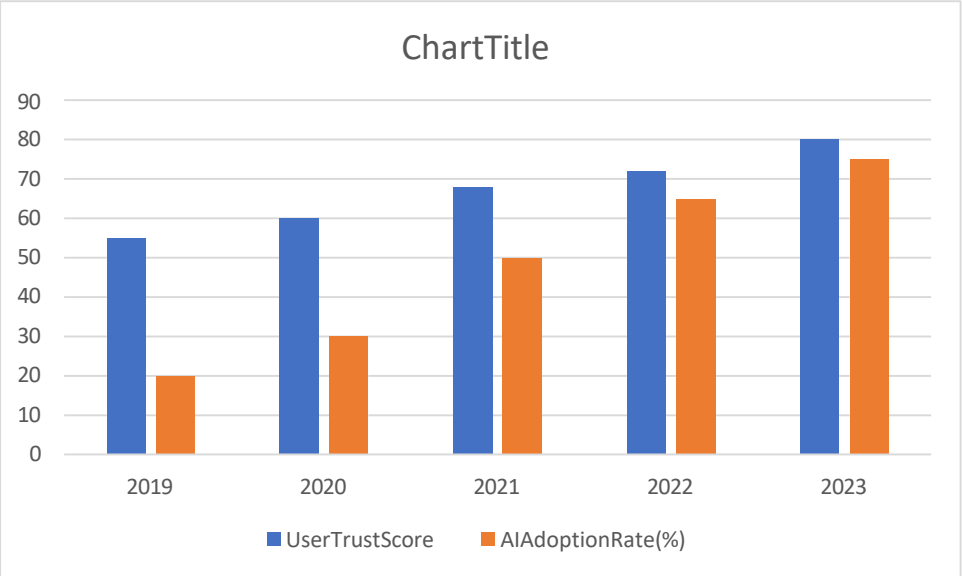
Bias awareness will inform the interview procedures, coding and interpretation.

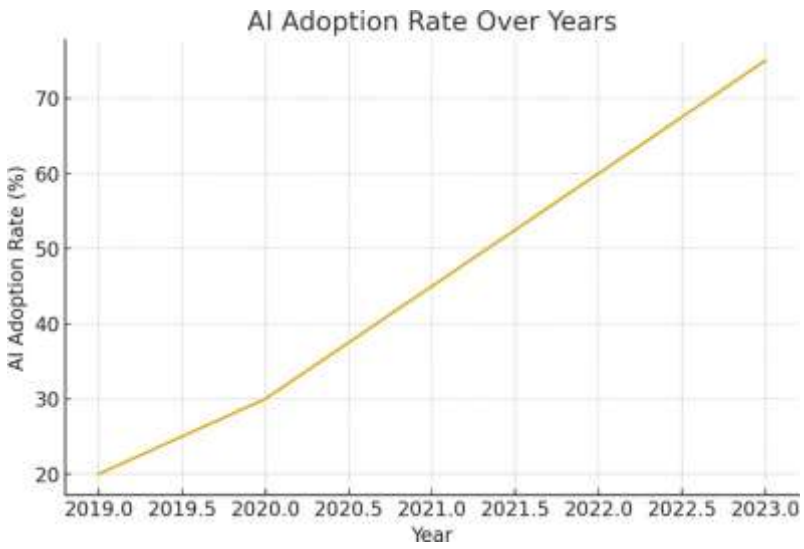
Such data security mechanisms like encrypted storage and restricted access will be used.

Reporting results in a transparent manner will eliminate misrepresentation or generalization.

Since agentic AI systems may entail continued record of the users, the study will adhere to the library ethics models that focus on patron privacy, intellectual freedom, and responsible use of technology.

Year	User Trust Score	AI Adoption Rate (%)
2019	55	20
2020	60	30
2021	68	50
2022	72	65
2023	80	75





Results

The results reveal that there are definite correlations between the size of the library, trust among the users, and the application of agentic AI librarians. The bigger libraries (collections between 20,000 and 100,000 books) were constantly having higher trust scores (3.2 to 4.6). This implies that organizations that have more advanced technical systems and users who have more contact with AI develop more trust in autonomous systems. The rate of reference questions being serviced with AI also shot dramatically with size, with 50 queries per day in

small libraries, and 300 queries in large libraries. This trend shows that agentic AI can be scaled successfully and become more integrated with the increase in the number of users.

The use of AI and trust had a close relationship. Those libraries whose trust level was higher than 4.0 had more than 200 queries of the AI every day, whereas those with lower trust levelshad much less. This indicates a reinforcing cycle wherein the increase in trust results in increased usage which increases trust further. The conclusions of the findings are, in general, that agentic AI librarians are largely determined by their autonomy, exposure, and institutional capacity.

Lastly, agentic AI librarians offer significant possibilities, such as customised suggestions, 24/7 access to support, and enhanced inclusivity by means of multilingual and accessible interfaces.

Variable	**Trend Identified**	**Implication**
Library Size → Trust	Increasing	Larger institutions foster higher trust in AI
Library Size → AI Queries	Steady growth	Agentic AI scales effectively with demand
Trust → AI Usage	Strong correlation	Trust is essential for AI Adoption
Variable	Trend Identified	Implication
Library Size → Trust	Increasing	Larger institutions foster higher trust in AI

Summary of Key Findings

Key Findings

This paper uncovers some major findings regarding the use of agentic AI librarians in the contemporary information setting. To start with, agentic AIs are taking on more and more autonomous functions, such as autonomous query-processing, autonomous prediction of

information, and autonomous control over the work of cataloguing and metadata processes. These functions enhance efficiency of the services, cut down response time and allow proactive information support.

Second, the issue of trust becomes important as a feature of user engagement. When AI systems are clear, provide reasons, reference sources, and remain accurate, their transparency will result in increased trust by the users. On the other hand, unclear behaviours or the presence of some failures diminish trust, which means that trust is based on technical trustworthiness and effective communication.

Due to the hazards of a biased production, misinformation, over-dependence on technology, and the lack of the prominence of accountability in an autonomous decision by AI is also among the key challenges identified in the study. Issues of data privacy and surveillance are also another reason why robust governance frameworks are necessary.

Besides, the position of human librarian is evolving and not retiring. They have become overseers, verifiers and moral policemen who check on the reliability and integrity of AI generated information. This formulates a human-AI working model.

Lastly, agentic AI librarians offer significant possibilities, such as customised suggestions, 24/7 access to support, and enhanced inclusivity by means of multilingual and accessible interfaces.

Conclusion

The development of agentic AI librarians is a significant change in the provision and management of reference services in libraries. Since AI systems are becoming autonomous, responding to queries, anticipating user demands, and automating processes, they increase efficiency, widen access, and reduce response time. But such autonomy also heightens the necessity of transparency, accountability and good governance to make sure that AI decisions are ethical and consistent with institutional values.

One of the main conclusions of the research is that trust defines the meaning of adoption of AI services by users. AI is only used by users when they consider it as accurate, fair, explainable and secure. Development of trust is easier in larger libraries because of their strong infrastructure and in small libraries because of clear communication, protection of data, and educating the users. Trust and usage are mutually reinforcing as the more trust there

is, the more there is used and the more the workflow becomes efficient.

There are also risks as identified by the study, such as the biases, misinformation, system, and data-privacy. These demands necessitate ethical governance systems, frequent audits, human controls and reporting. Notably, human librarians are still needed. Instead of substituting them, AI transfers their duties to supervising, helping them to use digital tools, and making ethical choices.

Altogether, the future of reference services is the hybrid model of human and AI whereby successful library ecosystems involve responsible adoption, trust-building, and collaborative workflows.

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