

**School of Computing - Research Methods**

**Literature search and review**

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# Introduction

We see numerous websites every day that serve a variety of purposes, and we learn how these websites interact with users in a variety of ways. In recent years, chatbots have become increasingly popular (Brandtzaeg and Følstad, 2018; Benner et al., 2021) due to major developments in machine learning (ML), and natural language processing (NLP), which have enabled new forms of chatbots (Seeger et al., 2018). A chatbot is an artificial intelligence program and a Human–computer​ Interaction (HCI) model (Bansal & Khan, 2018).

One of the first financial institutions to use a chatbot, Ally Bank released Ally Assist in 2015 to give customers seamless, personalized account management support. Ally Assist, which can be accessed through the Ally Bank iPhone app, handles bill payment, transfers, and account information queries. The bank has introduced an Ally Skill on Amazon's Alexa platform that enables users to do basic financial operations using voice commands. Powered by artificial intelligence (AI) technology, chatbots have been introduced into customer service in recent years, which are computer programs that converse with users in natural language (Shawar and Atwell, 2007), and they are now being widely used across various industries (Luo et al., 2019).

When talking about the bots in banking system, nearly 90% of bank interactions (internal and external) are automated through AI chatbots. – Juniper Research. Fueled by the wide adoption and use of messaging apps (Følstad & Brandtzæg, 2017), chatbots offer businesses a new way to connect and communicate with their customers.

By imposing rules and some degree of restrictions on the use of bots, efforts are being made globally to bring about improvements in the utilization of bots. The study investigates how to preserve data, train effectively with bots, and reduce the likelihood of fraud. Chatbots have been used in financial sector to enhance customer experience and improve operational efficiency (Jang et al., 2021).

# Research Question

Impacts of using chatbots in banking systems

# Key Concepts

Chatbots

Customer Experience

Efficiency and cost savings

Data analytics

Security and fraud prevention

Ethical considerations

# Table of Synonyms

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Chatbots | cloud computing | banking | fraud | voice bots |
| customer experience | efficiency | cost savings | data analytics | security |
| Ethics | automation | personalization | 24/7 access | scalability |
| Compliance | user friendly | data | ease | innovation |
| time saving | automation | customer support | productivity | customer engagement |
| customer retention | competitiveness | user experience | digital channels | digital transformation |

# Database Search

## ACM Digital Library

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Search  Number | **Questions** | **Keywords** | **Filters** | **Results** | **Notes** |
|  | What are the impacts of using chatbots in the banking system? | Impacts of chatbots in banking system | No filter | 2,374,914 | Too vague and general for any worthwhile academic study, the specification must be completed using the 'journal' filter. |
|  | What are the impacts of using chatbots in the banking system? | Impacts of chatbots in banking system | 2019-2023 | 491,359 | It contains every discipline that is present in the ACM database, which is too many journals. |
|  | What are the impacts of using chatbots in the banking system? | Impacts of chatbots in banking system | Filtered by research articles | 804,342 | There are too many papers for research articles; a filter based on years of publication is necessary. |
|  | What are the impacts of using chatbots in the banking system? | Impacts of chatbots in banking system | Filtered by research articles for past 2 years | 176,435 | Many out-of-date articles, further filtered by publishing years. |
|  | What are the impacts of using chatbots in the banking system? | Impacts of chatbots in banking system | Filtered by academic journal category | 11,291 | A surplus of journal papers. |
|  | What are the impacts of using chatbots in the banking system? | Impacts of chatbots in banking system | Filtered by reducing years of publication to the past 2 years for academic journal category | 955 | Some good relevant articles, but too still much for academic writing, research question to be rephrased. |
|  | How to minimize the risks associated with chatbots in banking system? | minimize the risks of chatbots in banking system | No filters | 2,601,181 | Some excellent, pertinent articles, but still too many for academic writing; the research question needs to be changed. |
|  | How to minimize the risks associated with chatbots in banking system? | minimize the risks of chatbots in banking system | Filtered by past 2 years. | 72,757 | An excess of journal papers |
|  | How to minimize the risks associated with chatbots in banking system? | minimize the risks of chatbots in banking system | Filtered by research articles in the last 2 years. | 10,380 | Too many outdated articles for fast-growing technology. |
|  | How to minimize the risks associated with chatbots in banking system? | minimize the risks of chatbots in banking system | Further Filtered by Journals under the subject area: Journal of Computing Sciences in Colleges. | 170 | There are too many old articles for rapidly developing technology. |
|  | How to minimize the risks associated with chatbots in banking system? | minimize the risks of chatbots in banking system | Further Filtered by years of publication: 1 years | 75 | Because there are too many articles, a filter is necessary that focuses on well-known authors in the field. |
|  | How to minimize the risks associated with chatbots in banking system? | minimize the risks of chatbots in banking system | Further Filtered by institutions: Marymount University | 9 | Some excellent articles that are relevant to your research. |

## Science Direct

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Search  Number | Questions | Keywords | Filters | Results | Notes |
|  | What are the impacts of using chatbots in the banking system? | Impacts of chatbots in banking system | No filter | 303 | There are many results, thus the search should concentrate on pertinent fields. |
|  | What are the impacts of using chatbots in the banking system? | Impacts of chatbots in banking system | 2019-2023 | 295 | The term "computer science" is too ambiguous because it might refer to the study of computer hardware, software, or applications in general. |
|  | What are the impacts of using chatbots in the banking system? | Impacts of chatbots in banking system | Filtered by research articles | 224 | Too many unrelated articles considering that engineering is one of the sciences' products. |
|  | What are the impacts of using chatbots in the banking system? | Impacts of chatbots in banking system | Filtered by research articles for past 2 years | 118 | To do research, there are still too many publications; you need to be more precise with your topic phrases. |
|  | What are the impacts of using chatbots in the banking system? | Impacts of chatbots in banking system | Filtered by subject area: Computer Science | 99 | However, the security aspect of cloud computing needs to be the focus of too many papers. |
|  | What are the impacts of using chatbots in the banking system? | Impacts of chatbots in banking system | Filtered by subject area: Computer Science and subscribed journals | 53 | Quite a few useful papers. Rephrase the query, please. |
|  | How to minimize the risks associated with chatbots in banking system? | minimize the risks of chatbots in banking system | No filters | 121 | There are a lot of articles, but as technology is developing quickly, look for the most recent ones. |
|  | How to minimize the risks associated with chatbots in banking system? | minimize the risks of chatbots in banking system | 2019-2023 | 119 | There are still numerous items to read through and filter. |
|  | How to minimize the risks associated with chatbots in banking system? | minimize the risks of chatbots in banking system | Filtered by research articles. | 81 | There were a lot of study publications, however they still need to be further vetted. |
|  | How to minimize the risks associated with chatbots in banking system? | minimize the risks of chatbots in banking system | Filtered by review articles. | 14 | Reasonable searches that were reviewable. |
|  | How to minimize the risks associated with chatbots in banking system? | minimize the risks of chatbots in banking system | Further Filtered by subject area of Computer Science | 10 | Selected the most pertinent publications for investigation. |

## Discover Database

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Search  Number | Questions | Keywords | Filters | Results | Notes |
|  | What are the impacts of using chatbots in the banking system? | Chatbots in banking system | None | 122 | Even though there are fewer results than in the previous two databases, there is still a lengthy list to evaluate. |
|  | What are the impacts of using chatbots in the banking system? | Chatbots in banking system | 2019-2023 | 98 | In the last 5 years, a lot of useless research has still been discovered. |
|  | What are the impacts of using chatbots in the banking system? | Chatbots in banking system | Peer reviewed | 23 | A good number of publications, to be further filtered for the desired outcomes. |
|  | What are the impacts of using chatbots in the banking system? | Chatbots in banking system | Filtered by Subject terms: Chatbots | 45 | To acquire the desired findings, the research topic must be rephrased. |
|  | How to minimize the risks associated with chatbots in banking system? | Risks of chatbots in banking system | No filters | 21 | I discovered a good number of papers. |
|  | How to minimize the risks associated with chatbots in banking system? | Risks of chatbots in banking system | 2019-2023 | 17 | Too many papers still need to be read. |
|  | How to minimize the risks associated with chatbots in banking system? | Risks of chatbots in banking system | Filtered by Subject area: Artificial Intelligence | 14 | Important new keyword related to topic discovered. |
|  | How to minimize the risks associated with chatbots in banking system? | Risks of chatbots in banking system | Further filtered by Subject area: Artificial Intelligence from past 3 years | 10 | List of research articles that can be reviewed. |

# Literature Evaluation

Because of the computer and technology industries' dynamic and expanding environments, technology companies, it is crucially important that the data collected has been recently updated. Innovation that is now used or generated in the future, disseminated and enclosed as opposed to outmoded software and hardware. Only the most recent and recent sources may be used due to a distributed data constraint connected to data that explores the more significant portion be restored or obtained back using the database.

Additionally, when taking a paper into consideration, it must be approved or signed under at least one of the three primary key areas of study: the significance of information security, mobile cloud computing, and healthcare frameworks. Papers that span more than one region were regarded as being of the utmost importance because of their higher relevancy.

# Inclusion and Exclusion Process

Each paper was evaluated according to one of the following categories: effects of chatbots and strategies for reducing their hazards in the banking system. There were 29 papers in total that made up the final list after Evaluation. These are listed below, along with whether they are important enough to be used in the research process. A systematic review of each paper was used to determine whether it met the criteria for inclusion or exclusion.

|  |  |  |  |
| --- | --- | --- | --- |
| **Sr. No.** | **Research Paper Title** | **Included/ Excluded** | **Reasons** |
| 1. | Risk Analysis of Legacy Systems on County Government Assets | Excluded | The topic and the paper are unrelated as it lacks the discussion regarding the chatbots. |
| 2. | Identifying Commonalities of Cyber Adversaries Attacking the Maritime Transportation System | Included | The paper explains how the cyber attacks take place which is somewhere related to our research topic and will be helpful. |
| 3. | Integrating Data Privacy Principles into Product Design: Teaching "Privacy by Design" to Application Developers and Data Scientists | Excluded | It talks about the data security but does not involve the use of chatbots or data protection in banking system. |
| 4. | Developing Basic Artificial Intelligence (AI) and Machine Learning (ML) Solutions Using BeagleBone AI: An AI Hardware Learning Tool for Undergraduate Students | Excluded | This research paper talks about the BeagleBone AI and is not related to the research topic. |
| 5. | Commonalities of Users Influenced and Not Influenced by Persuasive Communication in Human Robot Interactions | Excluded | This research paper is not relevant as it does not have the relation towards the research topic. |
| 6. | Using Single-Board Miniature Computers (SBCs) to Create Basic Artificial Intelligence (AI) and Machine Learning (ML) Projects | Included | This paper deals with AI and ML technologies and how these are helpful in the AI services we get in banking, which is relevant to the topic. |
| 7. | The Need for In-House Development Never Goes Away | Excluded | This paper is irrelevant because it does not relate it to the research topic. |
| 8. | Password Manager in an Enterprise Environment | Excluded | It doesn’t connect to the topic of research to be done. |
| 9. | Are Research Trends in the Consortium for Computing Sciences in Colleges Regionalized? | Excluded | It is not related to the topic of research. |
| 10. | Chatbots: History, technology, and applications | Included | Provides good insights of the topic and describes a lot related to the subject. |
| 11. | An overview of the features of chatbots in mental health: A scoping review | Excluded | This paper is not relevant to the research topic. |
| 12. | ChatGPT: A comprehensive review on background, applications, key challenges, bias, ethics, limitations and future scope | Included | This paper is relevant to the topic as it proposes a framework to minimize the effects of chatbots in banking system. |
| 13. | Requirements engineering for artificial intelligence systems: A systematic mapping study | Excluded | The suggested paper result is not related to the research topic. |
| 14. | Blockchain and AI technology convergence: Applications in transportation systems | Excluded | The paper includes the application in Transportation system and not the banking system, making it unfit for the research. |
| 15. | Communication-efficient distributed AI strategies for the IoT edge | Excluded | This essay has no bearing about the study. |
| 16. | Artificial intelligence (AI) applications for marketing: A literature-based study | Excluded | This essay is unrelated to the study. |
| 17. | Developing future human-centered smart cities: Critical analysis of smart city security, Data management, and Ethical challenges | Included | It talks about the overall development of the city using AI and covers how data management for banking also can be done. |
| 18. | A contemplative perspective on federated machine learning: Taxonomy, threats & vulnerability assessment and challenges | Included | This is a helpful paper for research. |
| 19. | Deep Learning for Network Traffic Monitoring and Analysis (NTMA): A Survey | Included | It explains how the security using the AI can be improved and used in all the sectors. |
| 20. | Learning successful implementation of Chatbots in businesses from B2B customer experience perspective | Included | The paper is relevant to the topic and helpful for the research. |
| 21. | The Role of Chatbots in Academic Libraries: An Experience-based Perspective | Excluded | The research paper is not completely relevant to the topic. |
| 22. | Insurer Zurich experiments with ChatGPT for claims and data mining | Included | It involves the experiment that tells how few more additions into the field of chatbots can improve the banking system. |
| 23. | How to incorporate Al into your audit | Excluded | It contains the area which is not justifying our research. |
| 24. | Automation and Collaborative Robotics: A Guide to the Future of Work | Included | The research benefits from the introduction of a confirmed mechanism. |
| 25. | AI in Talent Development | Included | This is a helpful paper to continue with the research in order to find the current trends related to the topic. |
| 26. | The AI book: the artificial intelligence handbook for investors, entrepreneurs and fintech visionaries | Included | It involves the use of chatbots in financial services which is the most relevant paper to the topic. |
| 27. | Transformation of insurance technologies in the context of a pandemic | Included | This paper deals with the aid that AI like chatbots have provided to us in the hard times of pandemic and how they will run the future. |
| 28. | INSURING AI: THE ROLE OF INSURANCE IN ARTIFICIAL INTELLIGENCE REGULATION | Included | Deals with the cons of AI like chatbots in economic sector, which is helpful for the research. |
| 29. | The Unseen Assistant | Excluded | The study's topic is unrelated to the paper. |

**Included = 14**

**Excluded = 15**

# Limitations

The results on ACM, a supplier with a large database, had restricted filters that could be used to find the needed results, which was one of the research's drawbacks. Technology is the subject of the research; thus, a lot of data is added every year, necessitating a variety of filters in order to obtain the best findings.

Another problem with the search is that some papers aren't available online through the Discovery database, so you must visit the library to get the book to read and write a review. If the papers were available online, it would be simpler for users.

# Conclusion

Finally, because it provides a sizeable list of reliable, reputable sources within the database chosen, the literature survey can be considered an immediate success. Literature was only included if it complied with the criteria stated before looking. Due to the nature of the chosen research title, it is possible that information on the impact of chatbots in the banking system and reducing the risks associated with chatbots in the banking system will not be questioned because it was provided by the authority and not the database under investigation. Additionally, a wide variety of primary and secondary research sources were identified, providing in-depth information on potential technologies and their application to this project. When coming to choosing different databases, I found Science direct very helpful in the research.

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