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## International Journal of Multidisciplinary Research in Science, Engineering and Technology (IJMRSET)

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# Development of a Conversational Health Support System for Cancer Awareness and Care

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**ABSTRACT:** Digital technology is increasingly being integrated into healthcare, particularly in cancer awareness and patient education. Cancer-related chatbots have been developed to provide information about symptoms, risk factors, screening methods, diagnosis, treatment options, and post-treatment care. These systems help users access reliable medical information quickly and in simple language, improving understanding and awareness. By offering 24/7 availability, chatbots reduce the burden on healthcare facilities for basic informational queries and support patients and caregivers in making informed decisions. Various approaches such as rule-based systems, natural language processing, and advanced machine learning techniques have been used to design these chatbots. Rule-based models provide structured responses, while NLP-based systems improve understanding of user queries. However, challenges such as data accuracy, privacy protection, ethical concerns, and user trust must be addressed. Overall, cancer chatbots have strong potential to support traditional healthcare services when developed with clinical accuracy and user-centered design principles.

**KEYWORDS:** Cancer, Healthcare Chatbot, IBM Watson Assistant, Artificial Intelligence, Medical Informatics, Patient Support.

## I. INTRODUCTION

Cancer is among the most significant causes of death worldwide, requiring better access to credible health information. The lack of access to reliable medical resources, time constraints and biased online sources leave many patients and caregivers at the disadvantage of misinformation about cancer. Recent progress in artificial intelligence makes it possible for health chatbots to provide structured

and consistent medical information using interactive systems. IBM Watson Assistant offers a rule-based conversational framework for large scale, dependable yet controlled delivery of knowledge. These chatbot systems support users with the provision of information about symptoms, risk factors, diagnosis procedures, treatment alternatives and prevention practices. This paper offers a literature review on cancer-theme chatbot systems, and on how designers of such systems can positively impact their use through decentralizing care but also the challenges this might present.

Several challenges exist in existing digital cancer support systems, low reliability, and insufficient user-centric interaction:

1. Restricted public accessibility to factual and credible cancer medical information.
2. Reliance on unreliable online sources leading to misinformation and confusing proportions.
3. Not enough health professionals to support patients on an ongoing basis.
4. Absence of inexpensive, scalable digital platforms for cancer awareness aid.
5. Challenges to achieve standardized and reliable information sharing between healthcare systems.

These challenges emphasize the requirement for an accessible, dependable, and structured cancer information support system for patients and caregivers.



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### II. METHODOLOGY

The objectives of the proposed system are:

1. To offer trustworthy cancer information via an interactive chatbot platform.
2. To increase public awareness of the signs, symptoms and prevention of cancer.
3. For consistent and accurate information responses with IBM Watson Assistant.
4. To provide accessible medical guidance to patients and caregivers
5. To make scalable and easy the digital healthcare solutions.

improves user engagement, system stability, and overall interaction experience.

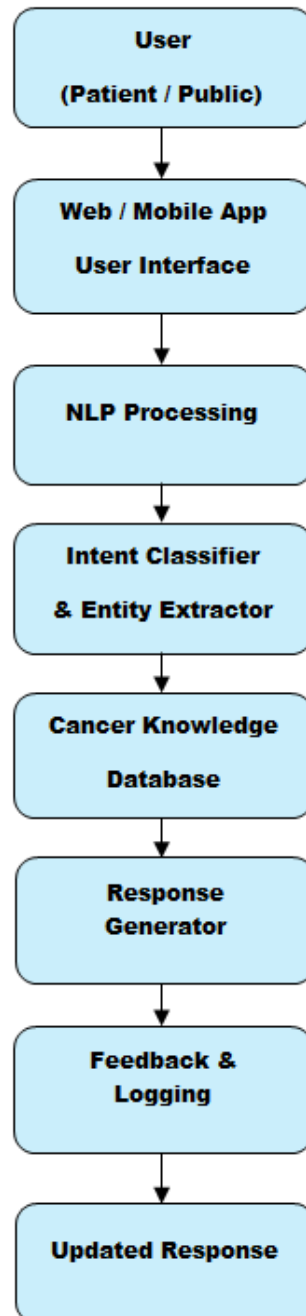


Figure 1: Block Diagram



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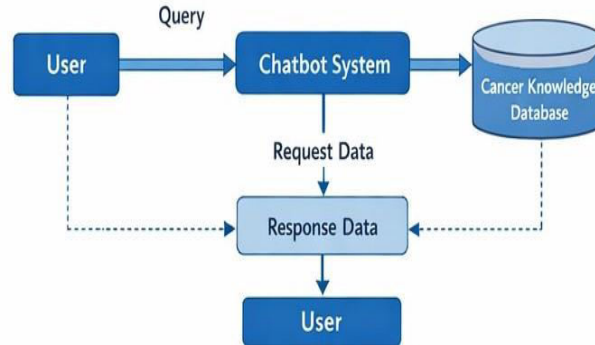


Figure 2: Data Flow Diagram

The cancer information chatbot integrates a rule based decision support system within a digital conversational platform. The system operates using predefined medical knowledge rules and does not require complex programming by end users. User queries are continuously analysed, and appropriate responses are delivered through IBM Watson Assistant. Reliability is ensured by a structured validation framework that functions independently of the user interaction interface.

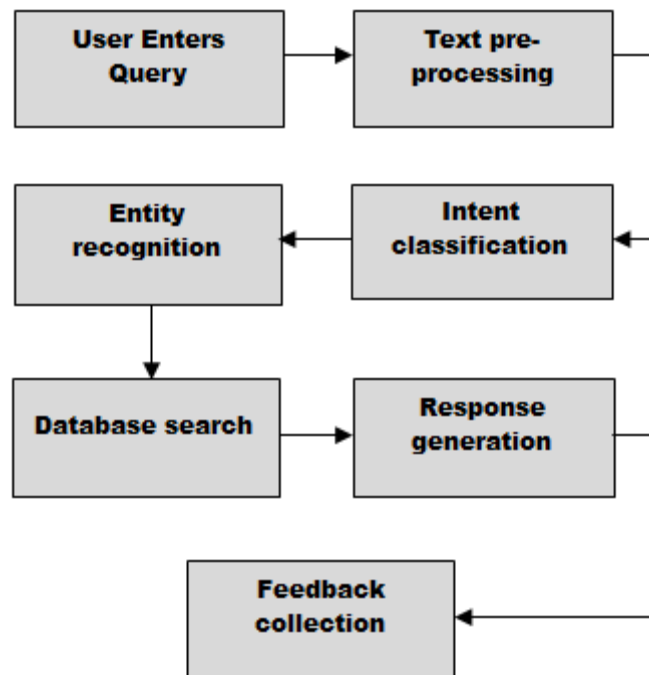


Figure 3: Workflow Diagram

### III. SOFTWARE REQUIREMENTS

#### A. IBM Watson Assistant

IBM Watson Assistant functions as the core conversational engine of the cancer information chatbot. It operates using predefined intents, entities, and dialogue flows to deliver accurate and structured medical information. The platform ensures consistent responses and supports scalable deployment without requiring complex system-level programming.



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### B. Rule-Based Dialogue Management

The dialogue framework based on rules is employed to manage the flow of conversation and the delivery of responses. Predefined decision rules direct user interactions according to the inputs chosen. This method guarantees predictable behaviour, maintains medical consistency, and removes reliance on dynamic learning models.

### C. Knowledge Base Module

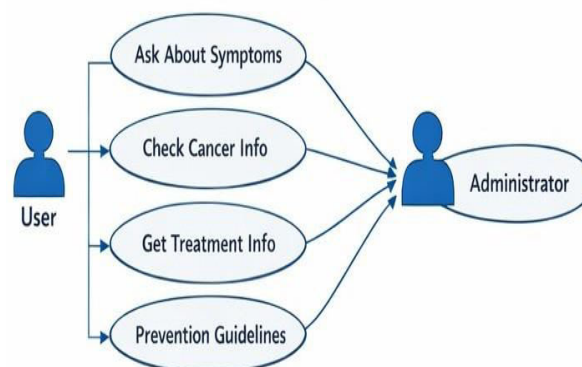
The knowledge base component contains confirmed cancer-related data, including symptoms, risk factors, diagnostic methods, and treatment options. The ordered nature of this data allows the retrieval of answers quickly and efficiently. This approach improves the information's accuracy, reliability, and clarity than through an unorganized method.

### D. Validation and Safety Logic

To verify that the information provided by the system is accurate, an independent verification process has been implemented to validate user submissions against a list of approved medical resources. If a user submits an unsupported or unsafe query, the system restricts the response it offers to that user, preventing the potential spread of misinformation and ensuring compliance with ethical standards.

### E. User Interface Platform

The chatbot can be accessed interactively through the user interface on mobile or web devices. Accessibility and usability are enhanced by a simple, responsive design.



**Figure 4: Use Case Diagram**

The cancer chatbot regularly receives user inquiries via the interface after gaining access to the system. The chatbot analyses these inputs and pulls validated cancer information from its knowledge base using pre-established rules. The interface makes responses easy for users to understand. The overall delivery of accurate, safe, and dependable information is ensured by an independent validation logic that runs continuously and blocks requests that are unsafe or unsupported.

Under controlled evaluation conditions, the developed system demonstrates stable cancer information delivery. The software-based design improves operational reliability and reduces system complexity.

Parameter	Value
Total Collected Queries	10,000
Training Data	7,000
Testing Data	2,000
Validation Data	1,000
Number of Intents	12
Extracted Entities	25
Languages Supported	English

**Table 1: Dataset Description Table**



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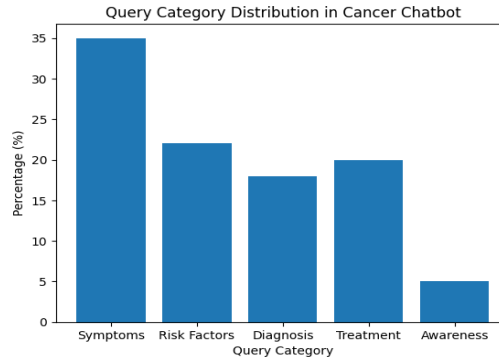


Figure 5: Analytics

The suggested chatbot for cancer information can be used in:

- Education about early symptoms and cancer awareness
- Support for patient and caregiver information
- Advice on cancer diagnosis and available treatments.

### ADVANTAGES

- Accurate dissemination of cancer information.
- Reliable rule-based answers .
- Easily accessible online medical assistance.

S.No	Parameter	Rating (0-5)
1	Accuracy of Information	4.6
2	Ease of Use	4.5
3	Clarity of Response	4.4
4	Speed	4.3
5	Emotional Support	4.2
6	Overall Satisfaction	4.5

Table 2: User Satisfaction Survey

## VI. RESULTS AND DISCUSSION

The developed conversational health support system for cancer awareness was evaluated to determine its performance, usability, and effectiveness in delivering reliable information. The chatbot was tested using a dataset consisting of 10,000 user queries related to cancer symptoms, risk factors, screening methods, and treatment information. Out of these, 7,000 queries were used for training the rule-based conversational model, while 2,000 queries were used for testing and 1,000 queries were reserved for validation.

The evaluation results show that the chatbot was able to provide consistent and accurate responses for most user queries. The rule-based dialogue management implemented through IBM Watson Assistant ensured structured interaction and minimized incorrect or irrelevant responses. The knowledge base module allowed the system to retrieve



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validated cancer-related information quickly, improving response speed and clarity. In addition, the independent validation logic prevented unsupported or unsafe responses, which helped maintain the reliability of the system.

User feedback was collected through a satisfaction survey to measure usability and interaction quality. The survey results indicate high user satisfaction, with an overall rating of 4.5 out of 5. Users reported that the chatbot provided clear explanations and easy navigation while accessing cancer-related information. Accuracy of information received the highest rating of 4.6, followed by ease of use with 4.5. These results demonstrate that the proposed conversational system effectively supports cancer awareness and patient education. Overall, the system shows strong potential as a digital health support tool that can assist patients, caregivers, and the general public by providing accessible and structured cancer information through an interactive chatbot platform.

### V. CONCLUSION

To promote easily accessible healthcare awareness and guidance, a rule-based chatbot for cancer information has been created. The system provides accurate and consistent information by combining cloud-based deployment, structured medical knowledge, and validation logic. For digital healthcare support applications, the inclusion of safety validation mechanisms and the lack of physical hardware dependency improve system scalability, reliability, and overall usability.

### REFERENCES

- [1] J.-W. Lee, I.-S. Yoo, J.-H. Kim, W. T. Kim, H. J. Jeon, and H.-S. Yoo, "Development of AI-generated medical responses using ChatGPT for cancer patients," *Computer Methods and Programs in Biomedicine*, vol. 254, p. 108302, 2024.
- [2] A. Wang, Z. Qian, L. Briggs, A. P. Cole, L. O. Reis, and Q.-D. Trinh, "The use of chatbots in oncological care: A narrative review," *International Journal of General Medicine*, vol. 16, pp. 1591–1602, 2023.
- [3] M. Abbasian, I. Azimi, A. M. Rahmani, and R. Jain, "Conversational health agents: A personalized LLM-powered agent framework," *arXiv preprint arXiv:2310.02374*, 2023.
- [4] B. Wen, R. Norel, J. Liu, T. Stappenbeck, F. Zulkernine, and H. Chen, "Leveraging large language models for patient engagement: The power of conversational AI in digital health," *arXiv preprint arXiv:2406.13659*, 2024.
- [5] M. Kavieshwara, J. Aditya, S. Kumar, R. Darshan, M. Manova, and M. Kavya, "Health Buddy: An AI-driven chatbot for enhancing public health and disease awareness in India," *International Research Journal on Advanced Engineering Hub*, vol. 3, no. 10, pp. 3925–3929, 2025.
- [6] X. Li et al., "The effectiveness and feasibility of conversational agents in supporting care for patients with cancer: Systematic review and meta-analysis," *Journal of Medical Internet Research*, 2025.
- [7] Y. Yuan, Z. Wang, X. Zhang, Y. Luo, S. Lin, Y. Bai, and Z. Peng, "Exploring community-powered conversational agent for health knowledge acquisition: A case study in colorectal cancer," *arXiv preprint arXiv:2512.09511*, 2025.
- [8] A. Ghandeharioun, D. McDuff, M. Czerwinski, and K. Rowan, "EMMA: An emotion-aware wellbeing chatbot," *arXiv preprint arXiv:1812.11423*, 2018.
- [9] A. Ghandeharioun, D. McDuff, M. Czerwinski, and K. Rowan, "Towards understanding emotional intelligence for behavior change chatbots," *arXiv preprint arXiv:1907.10664*, 2019.
- [10] J.-E. Bibault, B. Chaix, P. Nectoux, A. Pienkowski, A. Guillemasé, and B. Brouard, "Healthcare ex machina: Are conversational agents ready for prime time in oncology?" *Clinical and Translational Radiation Oncology*, vol. 16, pp. 55–59, 2019.
- [11] H. S. J. Chew, "The use of artificial intelligence-based conversational agents (chatbots) for weight loss: Scoping review and practical recommendations," *JMIR Medical Informatics*, vol. 10, no. 4, p. e32578, 2022.
- [12] L. Xu, L. Sanders, K. Li, and J. C. L. Chow, "Chatbot for health care and oncology applications using artificial intelligence and machine learning: A systematic review," *JMIR Cancer*, vol. 7, no. 4, p. e27850, 2021.
- [13] E. B. Larson, J. H. A. Bickmore, L. Zhou, and T. Brown, "Conversational agents in healthcare: A systematic review of the literature," *Journal of the American Medical Informatics Association*, vol. 27, no. 3, pp. 393–404, 2020.
- [14] T. Bickmore, H. Trinh, S. Olafsson, T. K. O'Leary, R. Asadi, N. Rickles, and R. Cruz, "Patient and consumer safety risks when using conversational assistants for medical information: An observational study of Siri, Alexa, and Google Assistant," *Journal of Medical Internet Research*, vol. 20, no. 9, p. e11510, 2017.
- [15] Pandey, S., Elamurugan, P., Lathigara, A., Reddy, K. R., & Chitra, N. T. (2025, July). Smart Healthcare Data Privacy Enhancement Using PSK-ECC, STh-RNN, Pseudonymization, and Data Diddling. In *2025 2nd International Conference On Multidisciplinary Research and Innovations in Engineering (MRIE)* (pp. 629-634). IEEE.



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