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AI-powered chatbots for pharmacy-based patient education and counseling

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ABSTRACT

The increasing demand and use of technology has led to the convergence of technology with health and diagnostic procedures. Digital health is the use of technology and information to enhance and alleviate health issues, as the name suggests. The Indian healthcare industry is changing as a result of wearable technology, telemedicine, genomics, virtual reality (VR), robotics, and artificial intelligence (AI). India is poised for a "digital health" revolution, much like many other economies. (Digital Health Report, 2020: Informa Markets' Indian Health). The use of digital health technologies has become essential to the provision of healthcare. The health technology sector, which includes wearables, telemedicine, e-pharmacies, and other products, has grown recently all over the world. Additionally, a lot of research and development has gone into integrating technology like blockchain, virtual reality, robots, and artificial intelligence with medications and healthcare. Healthcare is the biggest industry in India and has a lot of room to grow. This market is driven by the modern world's increasing need for digital healthcare solutions.

Keywords: Digital health, e-health market, chatbot.

1. INTRODUCTION

The rise of innovative technologies like telehealth and telemedicine solutions, as well as the growth of public and private sector investments in the digital healthcare sector, are some of the reasons propelling the market [1]. The Indian e-health market is projected to reach a valuation of $10.6 billion by 2025. Of the e-Health subsectors, telemedicine has the biggest promise, with a potential market value of $5.4 billion by 2025 (The Economic Times, September 2020). In 2018, India's spending on AI increased by more than 109% to $665 million. AI spending is expected to reach $11.78 billion by 2025, contributing $1 trillion to the nation's GDP. According to a 2017 Accenture Health report, the top three AI-based applications by 2026 will be administrative workflow support ($18 billion), virtual nursing assistants ($20 billion), and robot-assisted surgery ($40 billion). This is based on an anticipated potential yearly benefits analysis [3]. In addition to generating jobs and economic growth, the health care sector is essential to "preserving the nation's health and wealth [2]."
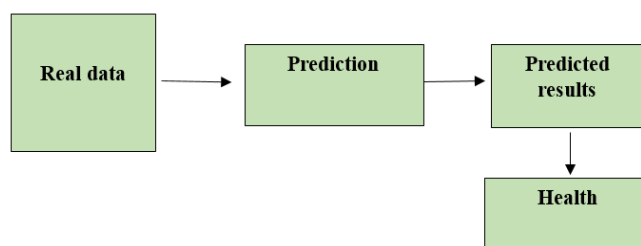
Figure 1: Basic architecture prediction method

2. PROBLEM STATEMENT

One method for automatically analyzing enormous volumes of data is machine learning. The two main subfields of machine learning are supervised and unsupervised learning. Finding precise predictions is the aim of unsupervised learning, while obtaining concise descriptions of the data is the aim of supervised learning [7]. Text classification is a component of supervised learning [5][15]. There is more to text classification than merely differentiating between positive and negative emotions [10]. A more complex classification that incorporates more than two classes is called multiclass classification

[12][14]. Data that has been learned and arranged into specific classifications is required by classification algorithms. The classification recognizes how to better fit a piece of content into a predetermined set of labels. Labels are provided based on a set of sentient groups, making it supervised learning [13]. The supervised learning approach requires a set of training classed examples or a labelled training data collection with related categories. Humans prepared and labeled these examples. It takes longer to tag supervised learning for multiclass text mining than single classification, and it calls for a dependable technique and in-depth subject expertise [4]. Learning is the process of converting experience into knowledge or skill. Training data, or experience, is the input of a learning algorithm, while expertise, or another computer program capable of carrying out specific tasks, is the output [16]. If we wish to have a formal-mathematical understanding of this topic, we will need to be more specific about what we mean by each of the terms involved: Machine learning (AI) is the term used to describe changes made to systems that carry out activities related to artificial intelligence [9][11]. Examples of such tasks include diagnosis, planning, robot control, recognition, and prediction. The "changes" could be either the development of new systems from the bottom up or enhancements to already-existing ones [17].

3. METHODOLOGY

A csv dataset file with student questions, tags, responses, and references columns serves as the chatbot's knowledge base. Using machine learning techniques to develop a model was the next step in this study effort. We'll examine the proposed chatbot paradigm in detail in this chapter, along with its main components and their functions. The entire architecture of the conversation model, including training, testing, and ensemble learning, is also covered in this chapter.

After receiving the student's query, the proposed model forwards it to the spelling checker for revision. ii. Following a spelling check, the input question is sent to module B, the category categorization module, which chooses the type of inquiry (e.g., Academic, Personality, Spiritual, Addictions, and Relationship). iii. The sentence similarity module then looks up a matching answer in the knowledge base after the input question has been transmitted to the sentence encoder module, which ascertains the semantics between words. iv. Lastly, the response module receives the output and forwards it to the user or learner.

The user is prompted to type his query by the Android app's bot. After that, a basic model employing Natural Language Processing processes the student's question, and then a machine learning approach is used. Students will eventually see the results as interfaces on the screen following the classification of the text and the retrieval of answers from the knowledge base.
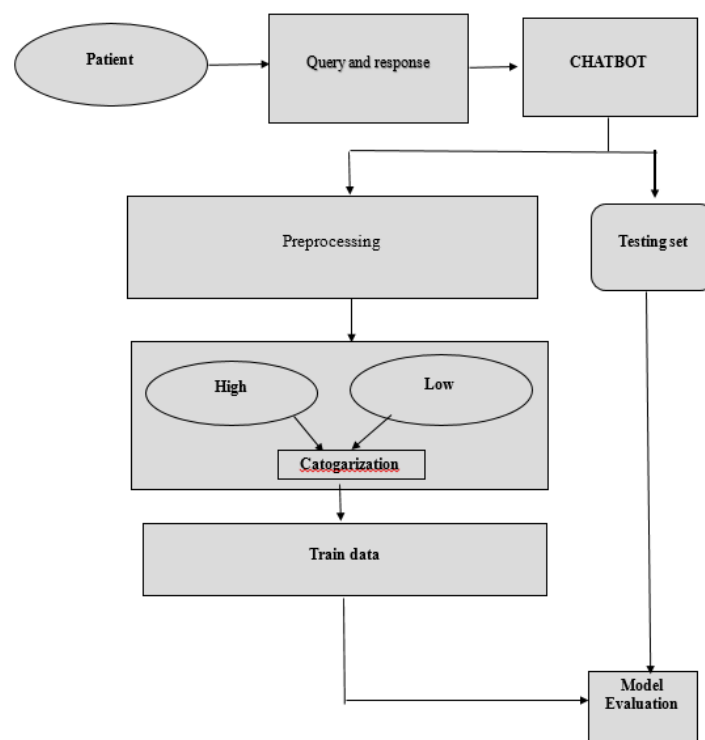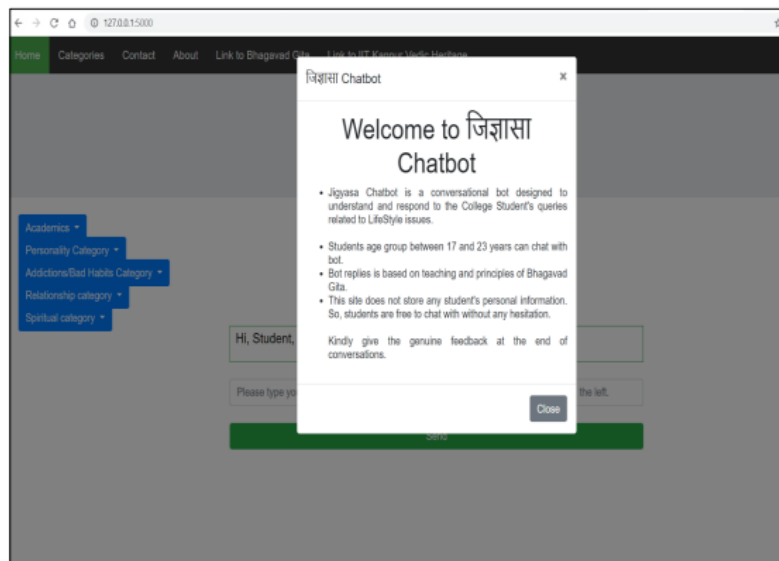

**Figure 2: Proposed architecture of chatbot**

4. EXPERIMENTAL RESULTS

Python is the programming language used to create the chatbot's underlying model. The primary objective of the study was to develop a practical instrument that students could use to access online counseling.
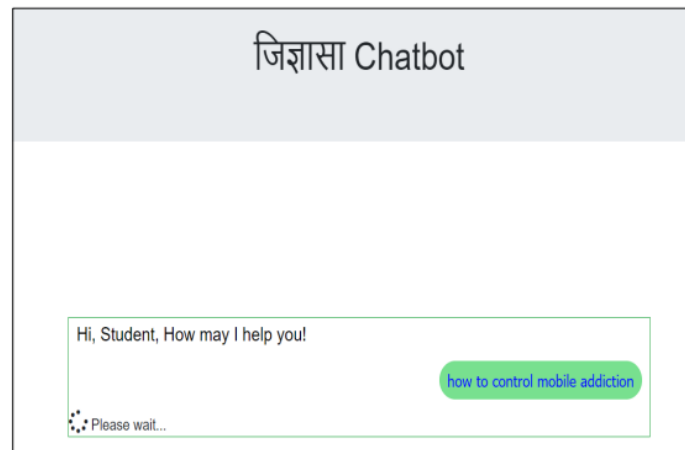
Figure 3: Initial page screen of JIGYASA chatbot with pop-up window

Figure 4: Main home page screen of JIGYASA chatbot (Website)
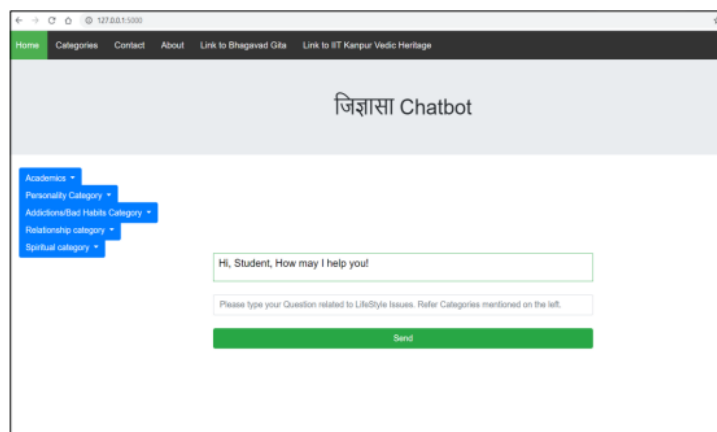
Figure 5: Student submit query in input window

Figure 6: Response returned by JIGYASA chatbot

Our objective was to give students a forum to voice whatever issues they had about their lifestyle. We therefore made the decision to develop two iterations of the chatbot. One version can be accessed online, and the other is an offline Android application.

5. CONCLUSION

Poor company, bad habits, and misuse of social media can lead to trouble. Colleagues and relatives often overlook the lifestyle issues of college students. If worries over the lifestyle of students Anxiety about coursework, distraction, social anxiety, exam stress, academic overload, family responsibilities, career, mental health issues, lack of motivation or support, hopelessness, overanalyzing, low self-esteem, loneliness, stage fear, relationship problems, addiction to social networking, internet porn, eating disorders, and sadness over the loss of a friend, family member, or relationship. The vast majority of Mumbai's college students, who range in age from 17 to 23, are facing these challenges. At this age, every child deserves capable guidance and solid support from their family and teachers. Since many kids may be impacted by inadequate challenges at this age, if they are not addressed promptly and effectively, major problems like depression may worsen, which could result in suicidal behavior and other detrimental effects on students' mental health. Additionally, it will affect the student's overall character and demeanor. Every youngster should therefore have one outstanding parent and one outstanding instructor in their lives to offer guidance and assistance. But with the world moving so quickly these days, parents are too busy with their jobs and other obligations to provide their kids the proper guidance.

REFERENCES

[1] Koley S, Sengupta S, Biswas B, Datta K, Jana M, Mitra A. Applications of artificial intelligence and machine learning-enabled businesses: A SWOT analysis for human society. Artificial Intelligence-Enabled Businesses: How to Develop Strategies for Innovation. 2025 Jan 20:227-61.

[2] Truong HT, Almeida M, Karame G, Soriente C. Towards secure and decentralized sharing of IoT data. In2019 IEEE International Conference on Blockchain (Blockchain) 2019 Jul 14 (pp. 176-183). IEEE.

[3] Kavitha SV, Balasubramanian P. Utilization of e-resources among women faculty members in higher educational institutions in South Tamil Nadu. Indian J Inf Sources Serv. 2022;12(1):28-33. https://doi.org/10.51983/ijiss-2022.12.1.3157

[4] Shafagh H, Burkhalter L, Hithnawi A, Duquennoy S. Towards blockchain-based auditable storage and sharing of IoT data. InProceedings of the 2017 on cloud computing security workshop 2017 Nov 3 (pp. 45-50). https://doi.org/10.1145/3140649.3140656

[5] Blazic BJ, Cigoj P, Blažič AJ. Web-Service Security and The Digital Skills of Users: An Exploratory Study of Countries in Europe. J. Internet Services Inf. Secur. 2023;13(3):41-57. https://doi.org/10.58346/JISIS.2023.I3.004

[6] Hu B, Chen Y, Yu H, Meng L, Duan Z. Blockchain-enabled data-sharing scheme for consumer IoT applications. IEEE Consumer Electronics Magazine. 2021 Mar 17;11(2):77-87. https://doi.org/10.1109/MCE.2021.3066793

[7] Ginni GR, Chakravarthy SL. Efficient Outlier Detection in High-Dimensional Data Using Unsupervised Machine Learning. https://doi.org/10.58346/JOWUA.2024.I4.013

[8] Singh P, Masud M, Hossain MS, Kaur A. Cross-domain secure data sharing using blockchain for industrial IoT. Journal of Parallel and Distributed Computing. 2021 Oct 1;156:176-84.

https://doi.org/10.1016/j.jpdc.2021.05.007

[9] Rahman S, Begum A. Analysis of Structural Integrity in High-Rise Buildings Under Dynamic Load Conditions Using AI: A Computational Perspective. Association Journal of Interdisciplinary Technics in Engineering Mechanics. 2024 Jun 28;2(2):6-9.

[10] Ullah Z, Raza B, Shah H, Khan S, Waheed A. Towards blockchain-based secure storage and trusted data sharing scheme for IoT environment. IEEE access. 2022 Apr 1;10:36978-94. https://doi.org/10.1109/ACCESS.2022.3164081

[11] Karimov Z, Bobur R. Development of a Food Safety Monitoring System Using IOT Sensors and Data Analytics. Clinical Journal for Medicine, Health and Pharmacy. 2024 Mar 29;2(1):19-29.

[12] Blaber M, Rafiq H. What makes agile powerful to boost innovation for larger organizations. Glob Perspect Manag. 2023;1(1):17-31.

[13] Makhdoom I, Zhou I, Abolhasan M, Lipman J, Ni W. PrivySharing: A blockchain-based framework for privacy-preserving and secure data sharing in smart cities. Computers & Security. 2020 Jan 1;88:101653. https://doi.org/10.1016/j.cose.2019.101653

[14] Mayilsamy J, Rangasamy DP. Enhanced routing schedule - imbalanced classification algorithm for IoT-based software defined networks. Int Acad J Sci Eng. 2021;8(1):1-9. https://doi.org/10.9756/IAJSE/V8I1/IAJSE0801

[15] Umran SM, Lu S, Abduljabbar ZA, Nyangaresi VO. Multi-chain blockchain based secure data-sharing framework for industrial IoTs smart devices in petroleum industry. Internet of Things. 2023 Dec 1;24:100969. https://doi.org/10.1016/j.iot.2023.100969

[16] Baggyalakshmi N, Keerthana AR, Revathi R. Procurement with ERP. Int Acad J Innov Res. 2023;10(2):27-35. https://doi.org/10.9756/IAJIR/V10I2/IAJIR1007

[17] Le Nguyen B, Lydia EL, Elhoseny M, Pustokhina I, Pustokhin DA, Selim MM, Nguyen GN, Shankar K. Privacy preserving blockchain technique to achieve secure and reliable sharing of IoT data. Computers, Materials & Continua. 2020 Jan 1;65(1):87-107.