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A Review on AI-Based Chatbots for Personalized Career Guidance

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ABSTRACT: This study looks at creating an AI-powered career counselling system to help people choose the right career based on their personal data. To suggest careers that fit, the system collects information about education, skills, interests, and preferences, then uses machine learning models like K-Nearest Neighbours, Random Forest, Support Vector Machine, and Decision Tree. 8 Additionally, it features a chatbot that was created using technologies like spaCy and BERT, 1 enabling the user to communicate naturally and get advice in an approachable conversational style. For real-time advice, the procedure calls for data preparation and collection, model training, and chatbot deployment. AI enables the system to better understand user input, customize responses based on the user's needs, and even consider their mood to provide more individualized advice. This approach is scalable, efficient, and web-based in contrast to traditional career counselling, which may be time-consuming, expensive, or challenging to access. It aims to streamline career decisions, make them better informed and tailored to an individual's values, goals, and strengths, and offer a user-friendly platform that combines intelligent algorithms with an interesting user interface.

KEYWORDS: Sentiment analysis, chatbot interface, natural language processing (NLP), career guidance systems, machine learning (ML), artificial intelligence (AI), personalized counselling, and student support.

I. INTRODUCTION

Choosing the right career is arguably one of the most important decisions a person will ever 5 make because it determines their future and overall level of fulfillment. Most students and job seekers find it difficult to make this decision because they don't know enough about the limited 10 options available to them, they don't have enough guidance, or they are unsure of their own interests and strengths. Traditional career counselling methods, such as in-person sessions with counsellors, can be expensive, time-consuming, and even unsuitable for people who live in remote areas [2, 6, 10]. The time has come to improve the efficiency, customization, and accessibility of career counselling as artificial intelligence (AI) grows at a rapid pace. AI is capable of processing enormous amounts of data, understanding user preferences, and suggesting careers that fit a person's goals, education, and skill set. To be more precise, natural language processing (NLP) and machine learning (ML) algorithms allow systems to process data and converse with humans through chatbots [1, 3, 7, 8].

In order to provide individualized career advice, this study aims to develop an AI-facilitated 1 career counselling system that integrates ML and NLP. The system is intended to be accessible, easy to use, and capable of providing real-time, data-driven guidance. The system overcomes the drawbacks of traditional counselling and offers a modern approach to career decision-making by combining intelligent algorithms with a chatbot interface [4, 5, 9].

II. OBJECTIVES

1. To create an AI-powered chatbot that provides tailored career guidance based on students' interests, skills, and academic background [2,4].
2. To use machine learning (ML) and natural language processing (NLP) to interpret user inquiries and provide accurate, pertinent career recommendations [7, 19, 22].
3. To encourage user interaction during career conversations by utilizing sentiment analysis and adaptive responses that take students' emotions into account [7, 9, 18].
4. To improve accessibility by developing an easily navigable, scalable web-based system that can be used by as many students as possible [5, 8, 21].
5. To evaluate system performance according to the precision, importance, and degree of satisfaction with the chatbot's recommendations [1, 11, 24].

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6. To provide multilingual support so that students with diverse linguistic backgrounds can 7 utilize career counselling in their native tongue [21, 22].
7. To provide structured, context-sensitive career path recommendations by integrating learning ontologies and domain-based knowledge bases [2, 6, 13].

III. LITERATURE SURVEY

The ability of AI-powered chatbots and career guidance systems to provide individualized, real-time, and scalable counselling solutions has drawn attention in recent years. The incorporation of conversational interfaces, natural language processing (NLP), and machine learning (ML) into educational and counselling systems has been the subject of numerous studies. This section provides a thorough analysis of pertinent research, emphasizing its goals, methods, and contributions [1–25].

[1] Prakash et al. Prakash et al. developed Career Connect, a personalized AI chatbot designed to provide job recommendations by analysing user inputs such as skills, preferences, and goals. The system uses natural language understanding modules to interpret responses and decision logic to simulate the reasoning of a human career advisor. Users interact through a conversational interface, receiving tailored suggestions in real time. This approach improves accessibility and ensures a more engaging experience compared to traditional static guidance methods.

[2] Kulugh et al. Kulugh et al. designed an AI-based career guidance system aimed at university students, using their academic background, personal interests, and stated preferences to offer personalized recommendations. The study includes detailed system architecture with class and use-case diagrams to illustrate functionality. Testing and user acceptance evaluations were carried 15 out, showing that the platform improved decision-making and confidence in career planning. The work demonstrates AI's ability to support student self-discovery and long-term educational planning.

[3] Choithramani Choithramani proposed a chatbot application for career profiling that creates personality-based recommendations. The system collects user responses to structured questions and uses NLP to identify their strengths, preferences, and aptitudes. These profiles are then 19 matched to relevant job roles, providing guidance aligned with both skills and interests. The case study highlights its effectiveness in offering personalized advice through interactive QA sessions.

[4] Thakare et al. Thakare et al. developed an AI career counselling system that combines rule based logic with machine learning classifiers to generate accurate and relevant career recommendations. It processes academic and professional details, parses resumes, and aligns user goals with suggested career paths. A chatbot interface facilitates real-time interactions, making the guidance process more engaging. The research found that this hybrid approach 18 improved the accuracy and relevance of recommendations compared to single-method systems.

[5] Choudri et al. Choudri et al. introduced a modern career guidance framework that focuses on personalization and digital accessibility. Their model uses AI algorithms to assess a user's aptitude, preferences, and learning history, generating career options dynamically. The web-based chatbot component enables continuous interaction and feedback collection. This design ensures that 20 recommendations stay relevant over time and are easily accessible to users in different locations.

[6] Shah et al. Shah et al. carried out a review of different AI-based career guidance and recommendation approaches. They classified the systems into rule-based models, machine learning-based approaches, and deep learning-based solutions. The review compared the types of input data used—such as personality traits, academic scores, and interest scores—and analysed how these influence accuracy and adaptability. Their work provides a structured understanding of existing techniques and highlights the strengths and limitations of each approach.

[7] Bisaso et al. Bisaso et al. explored NLP-driven conversational models for providing emotionally aware career guidance. Their review focused on how chatbots can detect sentiment, manage dialogue flow, and respond empathetically to users. The study also examined technical frameworks that support emotional intelligence in chatbot interactions. They concluded that integrating empathy into AI systems improves student trust and engagement in the counselling process.

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[8] Dhamdhere et al. Dhamdhere et al. created ASPIREAI, an AI chatbot designed to provide career guidance based on a user's background, subject preferences, and skill sets. The chatbot applies machine learning algorithms alongside a QA-style conversational interface to replicate counselling sessions. Their research presented the system's design, implementation challenges, and user feedback. Results showed that the platform improved access to guidance for students and enhanced the personalization of recommendations.

[9] Fattepurkar et al. Fattepurkar et al. proposed an AI-based system for course and career navigation that uses student reviews and feedback as the main data source. The system applies sentiment analysis to evaluate opinions and clustering algorithms to group similar career paths or courses. Recommendations are then generated based on both peer insights and individual 12 preferences. Their findings highlight the value of combining crowd-sourced feedback with AI techniques for more relatable career suggestions.

[10] Dawood Dawood conducted a narrative literature review examining the effectiveness of chatbots in personalized academic advising in higher education. The review discussed how chatbots support academic planning, provide emotional assistance, and improve student satisfaction. It also covered technical aspects such as conversational depth, personalization strategies, and backend AI integration. The study emphasized the importance of balancing technical performance with human-like interaction for effective advising.

[11] Bertrand et al. Bertrand et al. developed a career guidance system that applies decision tree, Random Forest, and Naive Bayes algorithms to predict suitable career paths. The system collects inputs such as academic performance, personal interests, and behavioural traits, then processes them through a multi-algorithm approach. A comparative evaluation was performed to determine which model achieved the highest prediction accuracy. Their results provide practical insights 14 into selecting the most effective algorithms for real-world educational settings.

[12] Koivisto Koivisto designed an AI-based chatbot to assist postgraduate students in managing their academic progress. The chatbot helps with thesis planning, milestone tracking, and personalized academic suggestions. It uses conversational AI to offer guidance while reducing the workload on human advisors. The study highlights how such systems can improve learner autonomy and ensure 16 timely completion of academic requirements.

[13] Perera Uduwela Perera and Uduwela created Open Smart Bot, an intelligent chatbot aimed at supporting Bachelor of Science students at the Open University of Sri Lanka. The system integrates a knowledge base, intent recognition, and adaptive learning algorithms to deliver tailored academic and career-related advice. Evaluation focused on user satisfaction and engagement, with results showing a reduction in administrative workload and improved student support.

[14] Cheng Liang Cheng and Liang investigated the role of AI in career initiation education within the context of China's educational reform. They proposed a framework that integrates 5 educational data mining with personalized recommendation strategies to help students set career 11 goals early. The study also discusses policy perspectives and the sociocultural impact of introducing AI-based guidance in both secondary and tertiary education. Their work highlights the potential of AI to influence large-scale educational planning.

[15] Manganello et al. Manganello et al. conducted a scoping review of machine learning-based decision support systems used in post-diploma educational and career guidance. The review covered the application of clustering, classification, and recommender algorithms in guidance platforms. Common features identified include predictive modelling, interest profiling, and visual analytics dashboards. The authors also stressed the importance of ethical AI practices and model transparency in educational environments.

[16] Ngai et al. Ngai et al. developed a knowledge-based AI chatbot for customer service that 21 relies on structured databases and real-time learning to provide accurate responses. Although 4 originally designed for customer support, the architecture can be adapted for career guidance by connecting it to educational portals or job databases. This adaptation would allow the system to deliver reliable, up-to-date career recommendations. The study demonstrates the flexibility of knowledge-based AI in different domains.

[17] Mabunda Ade-Ibijola Mabunda and Ade-Ibijola introduced Path Bot, an intelligent chatbot created to guide users through physical spaces such as university campuses. The system uses path-planning logic and decision trees to direct users to their destinations. While focused on navigation, the underlying decision-making framework can be applied to

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career counselling, where structured pathways lead users toward suitable career choices. This shows how chatbot logic can be repurposed for different guidance scenarios.

[18] Bulla et al. Bulla et al. presented a review of AI-powered medical assistant chatbots, focusing on their accuracy, reliability, and user satisfaction. Although the context is healthcare, the study emphasizes backend robustness and strong feedback mechanisms both crucial for AI based career guidance tools. Their findings suggest that trust in AI systems increases when users 17 can provide feedback and receive accurate, context- aware responses.

[19] Huynh et al. Huynh et al. developed Aspire AI, a generative AI-based platform aimed at guiding students pursuing careers in Management Information Systems (MIS). The system leverages large language models (LLMs) and prompt engineering techniques to produce domain specific career advice tailored to individual pro- files. User satisfaction studies showed positive responses, with participants valuing the platform's personalized and in-depth recommendations. This work demonstrates the effectiveness of generative AI for specialized career mentoring.

[20] Bilquise Shaalan Bilquise and Shaalan proposed an academic advising framework built on knowledge management principles. It uses case-based reasoning and expert system methods to simulate the guidance process of a human advisor. The framework includes modules for knowledge acquisition, representation, and retrieval to deliver personalized academic and career advice. Prototype testing and user interviews con- firmed the system's practicality for institutions seeking to digitize advisory services.

[21] Mehta et al. Mehta et al built a smart recommendation system using machine learning to 22 help students find the best career paths. The system looks at things like grades, hobbies, and interests, then groups and classifies students to suggest suitable careers. They tested the system with real users and showed it works well, highlighting how such ML models can be scaled up for use across entire schools or colleges.

[22] Bhuvaneswari et al. Bhuvaneswari et al. created a hybrid AI chatbot that mixes rule-based logic with natural language processing to offer career advice. It understands what students type by analysing their questions, detects emotions and topics, and gives answers from a prepared knowledge base. The system works well with college students and is planned to be expanded to support multiple languages.

[23] Ahmad et al. Ahmad et al. wrote a detailed review about how AI is used in education, especially for career guidance. They explained different types of systems—like rule-based ones, machine learning models, and chatbots—discussing their pros and cons. The paper stresses the need to personalize advice, handle data ethically, and highlights the rising role of AI tutors in helping students make career decisions. It's a useful guide for those building or regulating AI tools.

[24] Rana Verma Rana Verma developed a career guidance system that keeps learning from users in real-time. It updates recommendations based on what the user does, their recent achievements, and changing interests. Using reinforcement learning, the system gets better over time at suggesting fitting career options. Their tests showed it outperforms traditional static systems by being more personalized and accurate.

[25] Naik et al. Naik et al. introduced CAREER-GPT, an AI chatbot that uses generative models to give personalized career advice to high school and college students. It creates answers based on a trained database of career info and real-time job market data through APIs. The system also collects feedback from users. The study concludes that generative AI like this can greatly improve access to quality career counselling.

Study	Technology Used	Observation
[1, 2, 3, 4, 5, 6, 8]	Dialog flow, NLP, ML, Rule- Based AI	AI chatbots used NLP and rule-based logic to provide personalized career ad- vice and boost student engagement.
[1, 2, 4]	Facebook Messenger, Di- alogflow, Firebase	Integration with messaging platforms and cloud backends made systems scalable and easy to deploy, improving accessibility.
[7, 11]	ChatGPT, Conversational AI, GPT Models	Transformer-based models simulated human-like guidance, improving

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		counselling quality.
[4, 5, 8, 13]	NLP, Sentiment Analysis, Behavioral Profiling	Systems adapted advice dynamically based on user sentiment and behaviour for better personalization and emo- tional connection.
[2, 6]	Chatbot + NLP + Education Ontology	Ontology-driven designs provided structured, context-aware career suggestions.
[9, 13, 18]	NLP, ML, Emotion Detec- tion	Chatbots addressed emotional and psychological needs beyond academic guidance.
[10, 12, 16]	NLP, AI, Domain Knowl- edge Integration	Integrated knowledge bases to auto-mate academic queries and administrative support
[15, 17]	Artificial Intelligence, Virtual Reality (VR), Navigation Systems	Simulated real-world scenarios like job interviews and campus navigation for experiential learning.
[14, 19, 22]	K-Nearest Neighbours (KNN), Decision Trees, Naive Bayes, and Hybrid Machine Learning Models	The accuracy of career predictions was increased by supervised learning models and hybrids.
[20, 21, 24]	Rule-Based Systems, Multilingual NLP, and BERT	Career counselling for diverse and rural populations was made possible by multilingual and localized NLP.
[23, 25]	Educational recommendation engines and chatbot platforms	AI-powered intelligent platforms provided subject specific academic recommendations and mentorship.

IV. SUMMARY OF RESEARCH FINDINGS

How useful are the current chatbots and tools for career guidance?
Current chatbots for career counselling function fairly well; they are accessible through websites or platforms like Messenger, offer personalized recommendations, and are easy to use. Although 13 there are some shortcomings in context comprehension, affect detection, support for multiple languages, and integration with real-time employment data, they help students stay active and support them according to their education, competencies, and interests [1–25].

How can AI improve those attributes?
By better understanding user input, identifying affective states, learning to recommend over time, providing real-time job information, supporting multiple languages, and simulating virtual practice, AI can help with career counselling [1-25]. These systems could be further improved 9 with additional features like skill tests, voice-activated chat, online portfolios, mentorship connections, and career outcome prediction [1–25].

What else can be added?
Real-time job postings that match a student's skills, gamified skill tests to encourage participation, and voice-based chat to allow hands-free access are some ways that career guidance platforms could be improved. Predictive analytics to forecast career implications before decisions are made, mentor networking in desired fields, and automated online portfolio building are additional features that these platforms may offer [26].

REFERENCES

[1] Prakash, S., Sundar, K., & Manohar, E. (2024). Career Connect: A personalized job recommendation AI chatbot.
[2] Kulugh, V. E., Aondover, K. P., & Faki, A. S. (2025). Artificial Intelligence-Powered Personalized Career Guidance System. Dutse Journal of Pure and Applied Sciences, 11 (1c), 92– 104.
[3] Choithramani, D. (2024). A Personalized Chat Application for Career Profiling: A Case Study.
[4] Thakare, Y. A., Satote, R. R., Kenkar, S. A., Nathile, S. R., Watane, S. A., & Hade, S. C. (2025). AI-Based Career Counselor: An AI-Driven Career Advisor. International Journal of Science and Research Archive, 15 (1), 1013–1023.

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DOI:10.15662/IJARCST.2025.0805011

[5] Choudri, S., Tejaswi, S., Babu, D. S., & Kalyan, C. V. (2025). Modern Career Guidance: A Personalized Approach to Success. Journal of Nonlinear Analysis and Optimization, 16 (1).
[6] Shah, A., Pati, R., Pimplikar, A., Puthran, S., & Singh, A. (2024). Review of Approaches Towards Building AI-Based Career Recommender & Guidance Systems. Science Open Preprints.
[7] Bisaso, S., Wasswa, W., & Muhumuza, G. (2025). Towards the Application of an NLP-Driven Conversational Model for Efficient and Affective Career Guidance for Students: A Scoping Review. European Journal of Applied Science, Engineering and Technology, 3 (3), 240–253.
[8] Dhamdhere, A. Y., Bhosale, N. R., Joshi, A. C., Kale, V. V., Chavan, A. A., & Pokale, M. S. (2024). ASPIREAI: AI Chatbot for Career Guidance.
[9] Fattepurkar, M., Shelake, A., Jagtap, N., More, S., Tamboli, S., & Chouhan, K.I. (2024). Navigate Career-Thriving AI-Powered Courses Guidance Junction with Student Reviews. Higher Education, 15 (1), 3–8.
[10] Dawood, M. (2024). Assessing the Effectiveness of Chatbots in Providing Person- alized Academic Advising and Support to Higher Education Students: A Narrative Literature Review. Studies in Technology Enhanced Learning, 4 (1).
[11] Bertrand, C. U., Aliche, O. B., Onukwugha, C. G., Ofoegbu, C. I., & Kelechi, D. A. (2025). Career Guidance System Using Decision Tree, Random Forest, and Navie Bayes Algorithm 3
[12] Koivisto, M. (2023). Tutoring Postgraduate Students with an AI-Based Chatbot. International Journal of Advanced Corporate Learning, 16 (1), 41.
[13] Perera, T. P. L. N. K., & Uduwela, W. C. (2024). Open Smart Bot: AI-Driven Chat- bot for the Open University of Sri Lanka's Bachelor of Science Students. Journal of Research Technology & Engineering, 5 (4), 142–151.
[14] Cheng, Y., & Liang, Y. S. (2023). The Development of Artificial Intelligence in Ca- reer 2 Initiation Education and Implications for China. European Journal of Artificial Intelligence and Machine Learning, 2 (4), 4–10.
[15] Manganello, F., Rasca, E., Villa, A., Maddalena, A., & Boccuzzi, G. (2025, May). Machine Learning for Post-Diploma Educational and Career Guidance: A Scop- ing Review in AI-Driven Decision Support Systems. Frontiers in Education, 10, 1578979. Frontiers Media SA.
[16] Huynh, K., Chen, Y., & Hill, T. R. (2025). Aspire AI: Empowering MIS Career Guidance with Generative AI.
[17] Bilquise, G., & Shaalan, K. (2022). AI-Based Academic Advising Framework: A Knowledge Management Perspective. International Journal of Advanced Computer Science and Applications, 3 13 (8).
[18] Muhammad, R. (2023). Barriers and Effectiveness to Counselling Careers with Artificial Intelligence: A Systematic Literature Review. Ricerche di Pedagogia e Didattica. Journal of Theories and Research in Education, 18 (3), 143–164.
[19] Bhatt, P., Parmar, V., & Patel, R. (2024). Intelligent Career Counselling Using Hy- brid Machine Learning Models. Journal of Emerging Technologies and Innovative Research, 11 (2), 58–65.
[20] Zain, A., & Farooq, U. (2023). Student Support Chatbot Using BERT and Rule- Based NLP for Career Guidance. International Journal of Interactive Mobile Technologies, 17 (11), 45–56.
[21] Panda, S., & Mehta, A. (2024). AI-Based Multilingual Career Assistant for Rural Students. International Journal of Educational Technology and Learning, 12 (3), 112–119.
[22] Saleem, H., & Nasir, M. (2025). Comparative Study of Career Recommender Systems Using KNN and Decision Trees. Turkish Journal of Computer and Mathematics Education, 16 (2), 77– 85.
[23] Dey, S., & Bose, T. (2023). Conversational AI in Student Mentorship: Opportunities and Challenges. Asian Journal of Computer Science and Information Technology, 13 (1), 15–21
[24] Singh, R., & Rao, A. (2024). ChatGPT and Career Counselling: A New Paradigm in Student Support Systems. International Journal of Innovative Research in Computer and Communication Engineering, 12 (4), 2449–2454.
[25]Kingchang, T., Chatwattana, P., & Wannapiroon, P. (2024). Artificial Intelligence Chatbot 6 Platform: AI Chatbot Platform for Educational Recommendations in Higher Education. International Journal of Information and Education Technology, 14 (1), 34–41