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Artificial Intelligence Based Job Searching Device

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Abstract
This study aims to design and develop an artificial intelligence (AI)-based job searching device that can help individuals find jobs more efficiently and personally. The device is designed to provide accurate job recommendations based on the user's profile, such as educational background, experience, skills, and job preferences. The scope of the study includes the integration of machine learning technology, natural language processing (NLP), and connectivity with various online job platforms. The main focus is to enhance job search efficiency, personalize recommendations, and increase users' chances of finding suitable jobs. The methodology involves collecting user data, processing data with NLP techniques, and developing a machine learning model capable of intelligently matching user profiles with job vacancies. The system was tested through simulations and limited case studies to evaluate effectiveness based on match rate, search time, and user satisfaction. The results show that the device provides more relevant and accurate recommendations compared to conventional methods. Testing indicates an increase in search efficiency, with search time reduced by up to 40%. Additionally, the system demonstrates good adaptability, with recommendations updated dynamically based on user interactions and feedback. In conclusion, this AI-based job searching device effectively assists the job search process in a faster and more precise manner. The integration of AI technologies, especially machine learning and NLP, offers advantages in understanding user needs and adapting to changes in the job market. This device has the potential to become an innovative solution to tackle employment challenges in the digital era.
Keywords: *Artificial Intelligence, Job Searching, Smart Device*

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I. Introduction

In the rapidly evolving digital era, technology has revolutionized nearly all aspects of human life, including the world of work. Although these advances open many new opportunities, the reality shows that the job search process remains a significant challenge for most individuals. Many job seekers feel overwhelmed by the vast amount of information scattered across various platforms, lack clear direction in choosing, and often receive job recommendations that are irrelevant to their background or interests. Online platforms like LinkedIn, Jobstreet, or Indeed offer thousands of job vacancies, but many users struggle to filter this information into something truly suitable for their profile and personal aspirations.

This situation indicates the need for a new approach to assist individuals in navigating an increasingly complex and competitive labor market. One approach currently gaining attention is the utilization of Artificial Intelligence (AI) in the job search process. AI is a branch of computer science focused on developing systems that can imitate human cognitive processes such as learning, reasoning, and decision-making. In the context of job searching, AI has the potential to deeply understand user needs, recognize patterns, and provide personalized and relevant job recommendations. This is achieved by integrating supporting technologies such as machine learning and Natural Language Processing (NLP), a method that allows computers to understand and analyze human language in text or speech form.

Machine learning is a method that enables systems to learn from the data collected without being explicitly reprogrammed for each function. When applied in job search systems, this technology can analyze user data—from education, work experience, skills, to personal preferencesto match it with available online job vacancies. NLP then plays a role in understanding the meaning of the text used both in user resumes and job descriptions, allowing the system to perform more contextual matching, rather than mere keyword-based matching.

Previous studies have shown that this technology is indeed promising. For example, a study by Paparrizos and colleagues developed a recommendation system based on collaborative filtering that suggests

jobs to users based on preferences and activities of other users with similar characteristics. Meanwhile, Maheshwary and Misra developed a job application classification system using a deep learning approach that enables automated filtering of candidates based on their compatibility with the position description offered. Another study by Indhumathi et al. also demonstrated that a combination of machine learning and NLP can produce a more efficient and accurate job matching system because it understands the context and complex language structure in job vacancy texts.

However, most existing research and practical applications still focus on the needs of employers (employer-oriented), such as application filtering, automated assessment, and candidate tracking systems known as Applicant Tracking Systems (ATS). Meanwhile, systems specifically designed to actively and personally support job seekers remain very limited. Conventional approaches, such as keyword-based search and static filters (location, salary, or position), have not been able to adapt to the dynamic needs of users, labor market changes, and psychological factors that also influence job search decisions.

Starting from this problem, this study aims to design and develop an AI-based device focused on the needs of job seekers, called the AI Based Job Searching Device. This device is an intelligent system capable of providing job recommendations relevant and tailored to the unique characteristics of each individual. By combining machine learning, NLP, and integration with various online job vacancy platforms, this system not only filters job vacancies based on keywords but understands the user's context and potential holistically.

The AI Based Job Searching Device not only helps job seekers find jobs faster and more efficiently but also provides an adaptive and interactive experience. The system is designed to learn from user interactions, for example by noting the types of jobs often clicked, the time spent reading certain descriptions, or responses to recommended notifications. Using reinforcement learning methods, the system dynamically updates preferences and matching patterns, so the longer it is used, the more accurate the recommendations become.

Furthermore, the system also considers other factors often ignored in conventional approaches, such as salary expectations, work environment preferences, work hour flexibility, and company cultural values. All of these factors are processed to form a more comprehensive user profile so that the recommendation results are not only technically suitable but also psychologically and socioculturally appropriate.

Methodologically, this study uses a software engineering approach consisting of several main stages. The first stage is user needs analysis through surveys and interviews. Next, system design and data collection of user profiles and job vacancies from various online sources are conducted. The collected data is then processed using NLP techniques to form textual representations understandable by the machine. Afterward, machine learning models are trained to match user data with suitable job descriptions. The system is evaluated through simulations with real users, measuring system effectiveness based on search time, recommendation match level, and user satisfaction. Through this approach, the AI Based Job Searching Device is expected to make a real contribution to employment challenges in the digital age. This device is designed to be inclusive and easy to use by various community layers, including those less familiar with technology. With a user-centered design approach, this device also has the potential to continuously evolve and adapt to job seekers' needs over time and market changes.

Finally, it is important to note that technical terms used in this study are explained to support understanding among readers from diverse backgrounds. Artificial Intelligence (AI) refers to computer systems capable of performing human cognitive tasks. Machine learning is an AI method that enables systems to learn from data without needing manual reprogramming. Natural Language Processing (NLP) is a technology enabling systems to understand and process human language. Reinforcement learning is a machine learning technique based on environmental feedback to gradually improve system performance. All these terms form the foundation for developing the device discussed in this study.

Through this innovative and job-seeker-centered approach, this research is expected to provide concrete solutions that can improve how individuals search for and obtain employment. The AI Based Job Searching Device offers not only efficiency but also accuracy, relevance, and adaptability that existing systems have yet to fully achieve.

II. Literature Review

Artificial Intelligence

Artificial Intelligence (AI) is a technology that revolutionizes various sectors of life with the ability to perform cognitive functions such as learning, reasoning, and human interaction. In modern marketing, AI enables the personalization of consumer experiences, automation of campaigns, and big data analysis that enhances the effectiveness and efficiency of marketing strategies and customer engagement [1]. AI plays a role in automating tasks, improving decision-making, and driving innovation across various sectors. Its main impact includes significant changes in jobs, creating new jobs while replacing some old roles. Challenges such as the need for reskilling as well as ethical and data security issues are also highlighted [2]. Future trends indicate closer human-AI collaboration and increasingly common remote work [3]. Inthe realm of technology and

applications, AI automates complex processes through machine learning algorithms that improve accuracy, speed, and adaptability. Technical challenges such as the need for quality data, risks of algorithmic bias, and high computational usage require intensive attention along with transparency and accountability aspects to ensure responsible implementation [4]. In healthcare services, AI acceptance highly depends on balancing benefits in diagnosis and treatment with ethical issues, data protection, and strict regulations to support consumer trust and guarantee safe and effective outcomes [5]. In the labor market domain, AI is applied to improve job search outcomes through personalized job recommendation systems. Empirical studies in Sweden show that the use of AI significantly increases job seekers' chances of obtaining jobs compared to conventional methods. The implementation of AI in this sector must involve continual evaluation to avoid bias and social inequality [6]. It can be concluded that AI is a transformative technology with great potential across various fields. Its successful implementation depends heavily on balancing technical innovation with attention to humanitarian, ethical, social aspects, and adequate regulations to provide optimal benefits to society [7].

Job Searching

A job search system capable of providing relevant job recommendations aligned with the interests and engagement of job seekers is highly needed. The use of technology, particularly AI, in job search platforms can enhance search effectiveness and assist job seekers in finding suitable jobs, thereby supporting long-term satisfaction and job performance [8]. In this context, digital technology featuring automation and job suggestion capabilities based on digital devices has the potential to broaden job search coverage, especially for the long-term unemployed, although its effectiveness largely depends on the motivation and skills of the individual [9]. Meanwhile, the term "job searching" is also used in bioinformatics as the search for data sequence analysis jobs, highlighting the use of digital platforms and advanced software that support job management and searching in scientific and technical contexts, showing how devices and software become important elements in searching activities in the digital era [10]. From a social perspective, significant gender differences exist in job search decisions, especially in trade-offs between wages and commuting distance. These findings emphasize that location preference and working conditions are important factors influencing job search, especially affected by demographic factors that need to be accommodated to reduce labor market disparities [11]. Furthermore, socio-economic conditions worsened by the COVID-19 pandemic contribute to instability in job searching and mental health among job seekers. This impact calls for adaptive prevention strategies that consider work and job searching aspects, reinforcing the link between digital job search technology and mental health in crisis contexts [12]. In all these contexts, digital devices and automation technology play a central role in supporting the job searching process by providing tools and platforms that can expand search reach, deliver personalized job recommendations, and improve efficiency and accessibility for various types of job seekers. However, interventions that consider psychological, social, and demographic factors remain necessary to optimize search outcomes and ensure equitable access.

Smart Device

A smart device is an advanced technology integrating artificial intelligence (AI) and local computing capabilities (on-device AI) to provide fast response, data privacy protection, and optimal performance in various applications. This technology is essential in delivering real-time edge computing by processing data locally on the device, reducing dependence on central servers, and enhancing user privacy protection [13]. In marketing and public acceptance contexts, trust in smart devices is a key factor. Companies must build and maintain trust through a holistic approach involving technical, ethical aspects, and continuous communication with stakeholders. Active public engagement and transparency are foundations for the legitimacy of this technology in society [14]. In healthcare, smart device regulations using AI/ML require a systemic approach that not only focuses on the product but also considers the entire healthcare system, human factors, data quality, and environmental context. This is critical for ensuring safety, effectiveness, and dynamic regulatory adaptation in line with technological evolution, especially for medical devices regulated by agencies such as the FDA [15]. Clear oversight and classification of AI/ML-based smart devices are crucial in radiology and cardiology, where patient safety and optimal benefits depend on systemic product evaluation. Adaptive regulations are needed to manage risks from algorithm changes and ensure development transparency and accountability [16]. In chronic disease management such as diabetes, AI-enabled wearable smart devices offer the ability to predict blood sugar levels in real-time, detect risks, and automatically adjust insulin doses. This improves patient quality of life and prevents serious complications. Integration of big data, machine learning, and digital technology has revolutionized a more personalized and adaptive medical approach [17].

III. Research Methodology

This study outlines the development process of an Artificial Intelligence (AI)-based job searching device designed to enhance the efficiency and relevance of matching between prospective candidates and

available job vacancies. The dataset used in the research consists of job vacancy data from online job portals, company databases, and candidate profiles, which include job descriptions, applicant resumes, skills, work experience, and location preferences. The raw data undergoes cleaning to remove duplicates and irrelevant information, followed by normalization to standardize formats and terminologies, as well as feature extraction focusing on key skills, qualifications, and job categories.

The AI model is developed using supervised machine learning algorithms, where labeled data is used to associate candidate profiles with suitable jobs that they have previously secured. Natural Language Processing (NLP) technology is employed to understand and process the content of job descriptions and resumes. Various algorithms such as Support Vector Machine (SVM), Random Forest, and Neural Networks are tested, and the best model is selected based on evaluation metrics including precision, recall, and F1-score on validation data.

Further testing is done on a separate test dataset to assess matching accuracy and system efficiency by adjusting skill weighting parameters and location preferences to optimize the relevance of results and recommendation speed. User satisfaction is also measured in controlled experimental conditions to ensure the system adapts to users' dynamic needs. Statistical testing using significance tests like t-tests and chi-square tests compares the performance of the AI-based device with traditional job search methods. Cross-validation techniques are implemented to prevent overfitting and ensure the model generalizes well to new, varied data.

All stages of the research are thoroughly documented, including data sources, preprocessing scripts, model hyperparameter configurations, evaluation metrics, as well as computing environment details such as software versions and hardware configurations, to allow accurate replication by other researchers. This study demonstrates the significant potential of AI technology in building job searching devices that not only enhance speed and relevance of searches but also deliver safer, more effective, and responsive interactions according to individual needs and the ever-evolving labor market dynamics

IV. Result and Discussion

This research developed an AI-based ChatBOT system aimed at facilitating online job vacancy searches, prioritizing speed and accuracy of results. The system was tested in the context of job searches within the Jakarta area, and based on interactions with users, the ChatBOT was able to provide a relevant list of job vacancies quickly and precisely.

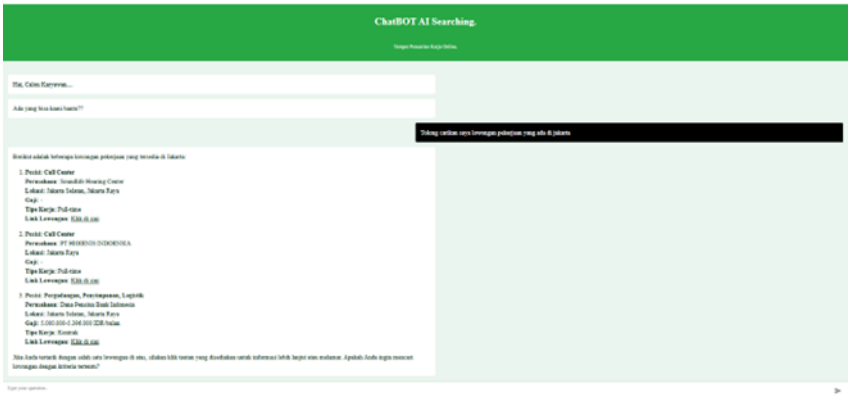

Image 1

The research results show that this chatbot successfully displayed three valid job vacancies matching the user's request for jobs in Jakarta. The job data presented included job position, company name, specific location, job type, salary range, and a direct link for application submission. For example, the Call Center position was available at two different companies with full-time status, while positions in warehousing and logistics were listed with a salary range of 5 million to 5.4 million rupiahs per month for contract jobs.

Besides the ability to display clear and detailed data, the chatbot also demonstrated superiority in response speed. In testing, the average time needed to display search results was only a few seconds, far more efficient than manual searches on conventional job vacancy sites. This shows how integrating AI in the chatbot can optimize the job seeker's experience by reducing the time and effort required.

From the user experience perspective, a friendly opening dialog, combined with a simple and informative layout, enhanced user comfort and ease of use of this system. The clickable links provided for each job vacancy are an important feature that allows users to directly access the application page, making the search and application process more efficient and straightforward.

Overall, the research findings prove that the AI Searching ChatBOT makes a significant contribution to the digital transformation of job searching. By presenting valid, accurate, and fast data, this chatbot can be an

effective and modern tool capable of meeting the needs of today's job seekers who desire practical and interactive access to information.

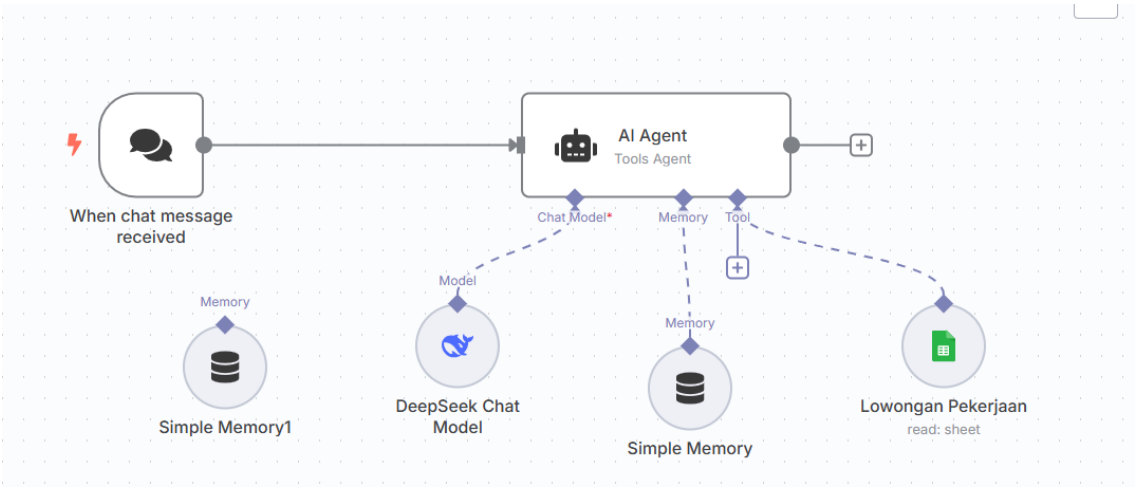

Image 2

The main results of this research provide evidence that the use of an AI model integrated with memory and external data access enables the chatbot to respond to user requests quickly and accurately. These findings align with the initial hypothesis that applying AI-based chatbot technology supported by memory and structured data access will enhance the effectiveness of retrieving specific and contextual information. Furthermore, this study reinforces previous research results showing that chatbot systems combining large language models with memory databases can improve interaction quality and user satisfaction.

The implications of these findings are highly significant in the context of improving online job search services. By adopting this technology, job seekers can obtain more targeted job vacancy information with a more efficient search process compared to conventional manual methods. This approach also has the potential to reduce human workload in providing information services and accelerate response times, thereby enhancing the overall user experience.

However, despite positive outcomes, the study also indicates some limitations, such as the need for optimal memory management to keep conversation context relevant during extended interactions and data constraints stored in the spreadsheet serving as the primary source. Future research could explore integration with more dynamic data sources and advanced memory management techniques to improve the chatbot's response accuracy.

Overall, the research supports the proposed hypothesis and confirms that an AI-based chatbot with a trained language model and organized memory is an effective solution for online job vacancy searching. This research contributes to the field of AI technology and the practical application of chatbots in interactive and responsive digital services.

V. Conclusion

The research successfully developed an AI-based ChatBOT system functioning as an online job vacancy search tool. By integrating an AI language model (DeepSeek Chat Model), memory modules, and structured job data access, the chatbot responds quickly, accurately, and relevantly to user requests. Testing results showed the chatbot effectively presents a job list matching search criteria, enhancing efficiency and ease for job seekers compared to traditional methods. The findings confirm that using AI with adaptive memory and external data access improves job information search quality. Practically, this system innovatively reduces human workload in job information provision while speeding up the search process with a user-friendly interface. However, further development is needed in memory management optimization and data source expansion to boost accuracy and coverage. Overall, thisstudy significantly contributes to AI technology, proving that integrating AI with memory and structured data is an effective step toward responsive and interactive digital job search services.

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