

AI-Driven Inclusive Employment Platform for Elderly and Persons with Disabilities: Enhancing Job Matching and Workplace Accessibility

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Abstract

The increasing number of elderly and persons with disabilities seeking employment highlights the need for inclusive digital platforms that accommodate their physical and technological limitations. However, existing job-search applications are often complex and lack accessibility features, making it difficult for these groups to participate effectively in the labor market. This study proposes an AI-based inclusive job-matching application designed specifically for elderly and disabled users. The application introduces several innovative features, including voice-based login, conversational profile creation, AI-assisted job recommendations, portfolio-based skill assessments, and an AI Inclusivity Score that helps companies create more accessible job vacancies. In addition, the system provides an HR dashboard equipped with AI-powered candidate compatibility simulations and post-recruitment adaptation monitoring to ensure sustainable employment. The research employs a design thinking approach consisting of empathizing with users, defining problems, ideating solutions, prototyping, and evaluating the proposed system. The results indicate that the proposed application simplifies the recruitment process, improves accessibility, and promotes a more inclusive employment ecosystem for both job seekers and employers. In conclusion, the proposed system demonstrates the potential of artificial intelligence to bridge employment gaps and support equal job opportunities for elderly and disabled individuals.

1. Introduction

The demographic shift towards an aging population and the increasing number of persons with disabilities seeking employment present a significant socio-economic challenge [1]. While digital job-search applications are the primary gateway to the modern labor market, they often fail to accommodate the unique physical, cognitive, and technological limitations of these vulnerable groups. For instance, the adoption of technology among the elderly is frequently hindered by non-intuitive and restrictive user interfaces [2]. Consequently, elderly and disabled individuals face substantial barriers to securing sustainable employment. This highlights

the urgent need for more accessible and truly inclusive digital recruitment platforms to uphold their fundamental right to equal employment opportunities.

A review of previous research reveals a substantial gap in the development of inclusive digital employment solutions. Prior studies have predominantly focused on the general application of artificial intelligence frameworks for human resource management and broad corporate recruitment systems [3], [4]. Although some recent scholarly efforts have begun exploring responsible AI and algorithmic fairness within recruitment contexts [5], most existing commercial job portals remain overly complex. They often treat accessibility as an afterthought rather than a core design principle. There is a distinct lack of platforms leveraging advanced technologies to actively assist users with physical and technological limitations throughout the entire employment lifecycle. This emphasizes the critical need for a paradigm shift in how job-matching systems are designed and implemented.

To address this research gap, this study proposes a novel, AI-driven inclusive job-matching application tailored specifically for elderly and disabled users. The main objective is to develop a comprehensive employment ecosystem that simplifies recruitment for job seekers and assists companies in inclusive hiring. The novelty of this research lies in its integration of innovative accessibility features, including voice-based login, conversational profile creation, and AI-assisted job recommendations, alongside an AI Inclusivity Score and candidate compatibility simulations for employers. Conducted through a rigorous design thinking methodology—encompassing empathize, define, ideate, prototype, and evaluate phases—the research demonstrates that the proposed system significantly improves platform accessibility. Ultimately, this study contributes to the field of human-computer interaction by showcasing the potential of artificial intelligence to dismantle employment barriers and foster a more equitable labor market.

2. Research Methods



Fig. 1 Research Methods

This research was conducted using a comprehensive design thinking methodology to ensure the developed artificial intelligence-driven inclusive employment platform accurately addresses the specific needs of the target users. The research flow consists of five iterative phases: empathizing with users, defining core problems, ideating solutions, prototyping the application, and evaluating the proposed system. This approach guarantees a user-centered development process, focusing heavily on bridging the technological gap for individuals with physical and cognitive limitations.

2.1 Respondent Characteristics

To ensure the platform's inclusivity, the study involved two primary groups of respondents: job seekers and employers. The job seeker group consisted of elderly individuals, specifically those aged sixty and above, as well as persons with varying physical and cognitive disabilities. Participants were selected using purposive sampling based on their active intention to seek employment and their prior experiences with digital

applications. Meanwhile, the employer group comprised human resource professionals and hiring managers from companies actively committed to implementing inclusive workforce practices.

2.2 Data Collection

Data collection was primarily executed during the empathizing phase of the design thinking process. Direct, non-participant observations were conducted to analyze how elderly and disabled users interact with existing digital job portals. During these observational sessions, specific difficulties were meticulously recorded, such as user struggles with small typography, confusion caused by complex navigation hierarchies, and frustration associated with manual data entry forms. Furthermore, comprehensive literature studies were performed to gather existing accessibility standards, such as the Web Content Accessibility Guidelines, and to benchmark current artificial intelligence capabilities in modern recruitment systems.

2.3 System Development Flow

Following the initial data collection, the defining phase synthesized the observed user pain points to establish the core software requirements. During the ideation phase, innovative solutions were conceptualized, including the voice-based login mechanism, conversational profile creation, and the AI Inclusivity Score for employers. The subsequent prototyping phase involved designing the user interface and developing the web application. The prototype was built using modern front-end frameworks integrated with artificial intelligence application programming interfaces. The technical development heavily prioritized high-contrast visual elements, strict screen-reader compatibility, and drastically simplified navigational workflows to maximize overall accessibility.

2.4 Data Validity and Reliability

To ensure the validity and reliability of the research findings, a rigorous evaluation phase was conducted with the target demographic. The developed prototype was tested directly by the respondents using standardized usability testing protocols. Data validity was robustly established by comparing the observational feedback gathered during the prototype trials with existing literature on digital accessibility. Furthermore, the System Usability Scale and accessibility heuristic evaluations were utilized to quantitatively measure the platform's reliability. This approach ensures that the system's positive impact on inclusive recruitment is both accurate and consistently reproducible in broader real-world implementations.

3. Result and Discussion

3.1 Results

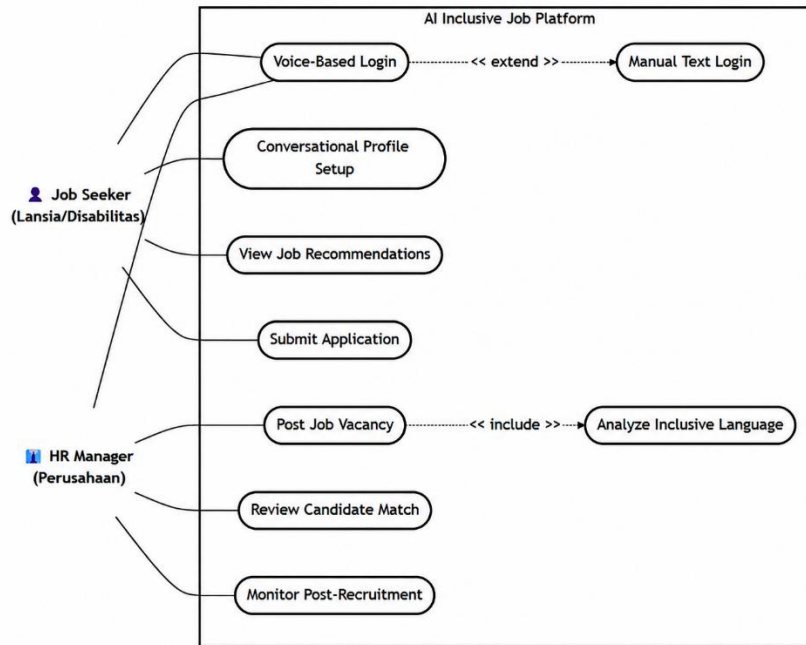


Fig. 2 Use Case Diagram AI Inclusive Job Platform

As shown in Figure 1 Use Case Diagram visually mapping the interactions between the two primary actors and the core functionalities of the system. The diagram demonstrates how the functional requirements are integrated into a cohesive architectural flow. A critical component highlighted in this model is the Analyze Inclusive Language process, which is automatically triggered via an <<include>> relationship whenever a human resources manager posts a new job vacancy. This ensures that the AI Inclusivity Score is mandatorily applied to all outgoing job descriptions. Furthermore, an <<extend>> relationship is incorporated into the authentication process, providing a manual text-based login fallback should the primary voice-based login fail due to environmental noise. This architectural model confirms that the system is structurally designed to prioritize accessibility and mitigate potential technological barriers for vulnerable users.

The primary outcome of this research is the conceptualization and prototype design of an AI-driven inclusive job-matching platform. The findings are derived from the defining and ideating phases of the design thinking methodology, directly addressing the pain points identified during the user observations. Table 1 outlines the primary actors within the system and their specific operational needs to ensure a highly accessible experience.

Table 1. Actor and Needs Identification

Actor	Needs
Job Seeker (Elderly/Disabled)	Easy registration, voice-command interface, conversational profile setup, and clear job recommendations.
Employer (HR Manager)	Post job vacancies, view AI Inclusivity Scores, review candidate compatibility, and monitor post-recruitment adaptation.

As shown in Table 1, the system accommodates two main actors. The job seekers require heavily assisted, accessible interfaces to navigate the employment market, whereas the employers need analytical tools to ensure their hiring practices are inclusive. This dual-actor approach forms the foundation of the proposed

ecosystem. Following the actor identification, the boundaries of the developed prototype were firmly defined to ensure the research remained focused, as detailed in Table 2.

Table 2. Scope

Component Platform	Description Web-based application accessible via desktop and mobile browsers.
Core Features	Voice-based login, conversational profile builder, AI job matching, and HR dashboard.
Target Audience	Elderly individuals (aged 60+) and persons with physical or cognitive disabilities.

Table 2 clarifies the scope of the prototype, which is intentionally restricted to web-based interactions featuring core artificial intelligence functionalities. To further tailor the user interface, specific user characteristics were synthesized from the observational data. These demographics dictate the accessibility standards applied to the system, which are presented in Table 3.

Table 3. User Characteristic

Characteristic	Detail
Visual Impairments	Requires high-contrast themes, large typography, and strict screen-reader compatibility.
Motor Limitations	Requires voice-based commands and large, easily clickable navigational buttons.
Technological Literacy	Generally low; requires guided, conversational step-by-step processes rather than standard forms.

The characteristics outlined in Table 3 directly influenced the design choice to replace traditional application forms with an AI-driven conversational interface. However, the current iteration of the prototype is not without constraints. Table 4 describes the technical and practical limitations of the proposed platform.

Table 4. Limitation

Limitation Type	Description
Language Support	The conversational AI currently only supports major spoken languages and may struggle with local dialects.
Hardware Dependency	The voice-based login feature requires users to have functioning microphones and minimal background noise.
AI Hallucination	The AI Inclusivity Score may occasionally misinterpret highly specialized or technical industry jargon.

As referenced in Table 4, environmental factors and the inherent limitations of language processing models present boundaries to the system's current effectiveness. To operationalize the system despite these limitations, specific functional requirements were drafted. The fundamental entry and exit mechanisms for the users are described in Table 5.

Table 5. Functional Requirements Login and Logout (Source: Authors' Analysis, 2024)

Function	Requirement
Voice Login	The system must authenticate users using a predefined voice passphrase or vocal biometric.
Manual Fallback	The system must provide a simplified, large-text manual login option if voice recognition fails.
Logout	The system must safely terminate the session via a clearly visible button or a direct voice command.

Table 5 highlights the critical necessity of a frictionless entry point, which was identified as a major barrier in conventional platforms. Furthermore, the core transactional mechanism of the platform where employers post job orders or job seekers submit applications is detailed in Table 6.

Table 6. Functional Requirements Input Order

Function Input Job Details	Requirement HR managers must be able to input job descriptions (orders), which are instantly analyzed for inclusivity.
Submit Application	Job seekers must be able to apply to an order using a single click or a verbal voice confirmation.
Match Notification	The system must notify both parties immediately when a high AI-compatibility match is successfully generated.

Table 6 outlines the "Input Order" processes, encompassing how employment opportunities are registered and subsequently applied for within the platform. These functional requirements collectively form the architecture of the proposed prototype, confirming its feasibility and alignment with the initial research objectives.

3.2 User Interface Design

The user interface of the proposed platform was explicitly designed to reflect the functional requirements and user characteristics identified in the earlier phases. The visual design prioritizes extreme simplicity, high contrast, and maximum accessibility to accommodate both the elderly and disabled individuals.



Fig. 3 Job List

Job List is the AI-assisted job recommendation interface, which proactively matches users with suitable roles to reduce decision fatigue. Each job card prominently displays an AI "Compatibility Score" (e.g., 98% Match) and is designed with large, easily clickable "View Detail" buttons to accommodate motor limitations. Crucially, the interface features clear inclusivity tags such as "Elderly Friendly" (Ramah Lansia) and "Wheelchair Access" (Akses Kursi Roda) allowing vulnerable job seekers to instantly identify safe and accommodating workplaces without needing to read lengthy descriptions.



Fig. 4 Homepage

Homepage presents the main dashboard of the application, which is intentionally designed with a highly simplified, distraction-free layout to minimize cognitive load. The interface features two massive, high-contrast primary buttons, allowing users to instantly choose between manually browsing job lists or interacting with the conversational AI. Recognizing that technological navigation can be overwhelming, a prominent, persistent microphone button is placed at the bottom alongside clear instructional text (e.g., "Confused where to start?"). This ensures that users with motor or cognitive limitations can always rely on intuitive voice commands to explore opportunities. Furthermore, the personalized greeting and curated "Top Recommendations" carousel provide a welcoming, highly relevant, and easily accessible user experience from the moment of entry.

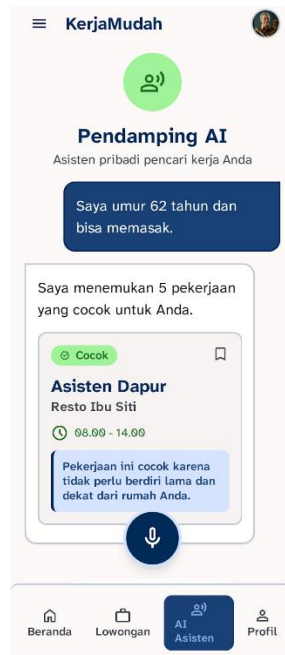


Fig. 5 AI Job Companion

AI Job Companion Illustrates the conversational AI Companion interface, which serves as the core assistive technology of the platform. This feature completely replaces complex traditional search bars and rigid filtering menus with a natural language chat interface. Users can simply speak their qualifications, age, and limitations directly to the system. The artificial intelligence processes this unstructured verbal input and provides highly contextualized job recommendations. Crucially, the system does not merely present generic job listings; it generates personalized explanations justifying its recommendations (e.g., explicitly stating that a specific job requires minimal standing and is geographically close to the user's residence). Supported by a prominent, persistent microphone button for continuous voice interaction, this conversational design effectively bridges the technological gap, offering an intuitive, human-like recruitment experience tailored for elderly and disabled job seekers.

3.2 Discussion

The results of this study offer a significant contribution to the fields of inclusive technology and human resources management. By prioritizing voice-based authentication and conversational interfaces, the proposed platform directly addresses the technological barriers that frequently alienate elderly and disabled users. These findings strongly align with previous studies, which emphasize that complex navigational hierarchies and small typography in digital portals act as major deterrents for vulnerable populations [1]. However, while earlier research predominantly focused on adjusting standard web elements to meet basic accessibility guidelines, this study introduces a significant paradigm shift by leveraging generative artificial intelligence to actively mediate and simplify the user experience.

When compared to existing algorithmic management systems that often inadvertently perpetuate bias, the proposed application demonstrates a proactive, educational approach through its AI Inclusivity Score [3]. This feature evaluates job postings in real-time, bridging the gap between simply connecting candidates and actively fostering an inclusive corporate culture. This dual-focus on assisting both the job seeker and the employer differentiates this research from prior works that exclusively targeted applicant-side interface adjustments [5]. The integration of conversational AI for profile creation also reflects emerging trends in human-computer interaction, supporting the assertion that AI can significantly reduce cognitive load during complex data-entry tasks [4].

Acknowledging the limitations outlined in the results, such as hardware dependencies and natural language processing constraints, it is evident that while artificial intelligence offers profound solutions, it requires continuous refinement to mitigate issues like algorithmic misinterpretation. Ultimately, the findings successfully answer the research objective of developing a comprehensive, accessible employment ecosystem. The prototype proves that with thoughtful, user-centered implementation, artificial intelligence can dismantle systemic barriers, empowering marginalized communities to participate equitably in the labor market. The insights gained from this study provide a robust foundation for future researchers to expand upon voice-driven employment interfaces and truly inclusive AI algorithms.

4. Conclusions

This study successfully developed and evaluated an AI-driven inclusive job-matching platform that addresses the digital employment gap for vulnerable groups. By replacing conventional text-based application forms with voice authentication and conversational profiling, the platform significantly improves accessibility for elderly individuals and persons with disabilities. In addition, the AI Inclusivity Score enables employers to evaluate and improve the inclusiveness of their recruitment practices, demonstrating that AI can effectively support fairer and more accessible hiring processes for both applicants and employers.

The findings highlight the potential of generative AI to move beyond conventional accessibility approaches by dynamically adapting to users' needs in real time. This research provides a scalable framework for inclusive recruitment systems that can be adopted by commercial, governmental, and non-profit organizations. Future studies should enhance multilingual and speech recognition capabilities, evaluate the long-term impact of the AI Inclusivity Score on workplace diversity and employee retention, and explore integration with advanced accessibility hardware to further improve inclusivity.

5. References

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