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KaamKhojAI: AI-Driven Employment Accessibility for Low-Literate Job Seekers

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Abstract - *India's working population comprises individuals from a wide range of professional and skill-based categories, including unskilled laborers, service workers, technicians, and educated professionals. Despite technological advancements, many job platforms still lack accessibility features to support diverse user groups who struggle with language barriers, digital literacy, and complex registration processes. Artificial Intelligence (AI), Natural Language Processing (NLP), and conversational technologies are transforming the recruitment sector by enabling AI-driven assistance, automated interactions, and personalized job recommendations. This review paper analyzes the evolution of AI-assisted job portals designed to support all categories of workers in India, examining their architectures, features, and usability components that simplify employment access. The study identifies key limitations such as insufficient multilingual support, weak contextual job matching, and limited regional employment integration, while emphasizing the need for inclusive and scalable AI solutions for employment accessibility.*

Key Words: AI Assistant, Job Recommendation, Speech Recognition, MERN Stack, Workforce Inclusion, Employment Accessibility

1. INTRODUCTION

Nagpur, being a rapidly developing metro city and a major logistics hub of Maharashtra, hosts a diverse workforce ranging from daily wage laborers and manufacturing workers to retail staff, technicians, and service professionals. However, most popular job portals such as LinkedIn, Indeed, and Naukri remain oriented toward urban white-collar job seekers, limiting their usage among Nagpur's semi-skilled and informal workers who may not be comfortable with digital interfaces. An AI-based job portal specifically designed for the Nagpur region can bridge this gap by offering **regional language guidance, simplified registration, and AI-assisted job searching**, making employment discovery effortless for all categories of job seekers. This review consolidates previous research on AI-enabled employment systems and analyzes how these technologies can be successfully adapted for Nagpur's local employment ecosystem.

2. Methodology of Review

This review is based on academic research published between 2014 and 2025, sourced from Google Scholar, IEEE Xplore, ResearchGate and Many more. Studies were selected according to three major criteria: they must address technologies that improve job searching, include AI-based user interaction features, and discuss accessibility for workers with limited digital proficiency. A broad range of research papers were reviewed to understand the development of AI-assisted job platforms. Among them, several studies were found highly relevant due to their emphasis on conversational AI support, intelligent recommendation systems, and solutions tailored for users with limited technical skills. These selected works were examined to compare emerging technological trends, architectural approaches, user experience improvements, and the existing limitations affecting the adoption of AI-driven employment portals.

3. Literature Review

3.1 Job Portals for Blue-Collar Workers

Sudam Fegade, Priya Biradar, Vivekanand Dukare, and Nivedita Rawate (2022) presented a job portal specifically designed for blue-collar professionals to address employment challenges faced by semi-skilled and uneducated workers. The platform enables job posting, job search, application tracking, and recruiter–job seeker interaction through a simplified mobile application. The study emphasizes reducing time, cost, and accessibility barriers for workers from small towns seeking employment in urban areas. While the system effectively improves outreach and usability, it relies on conventional matching techniques and lacks intelligent automation, personalized job recommendations, and AI-driven decision-making features.

3.2 Intelligent Job Recommendation Systems

Priyanka Singla and Vishal Verma (2025) introduced an intelligent job recommendation system based on semantic embeddings and machine learning techniques. Their proposed hybrid approach performs bi-directional matching between job seekers' CVs and job descriptions, overcoming

issues such as static and false recommendations found in traditional systems. The methodology employs natural language processing techniques, Sentence-BERT (SBERT), cosine similarity, and clustering algorithms to generate accurate and explainable job recommendations. The system was validated using multiple real-world datasets, demonstrating improved robustness and adaptability. Despite its effectiveness, the authors note challenges related to computational complexity and limited accessibility for non-technical or low-literacy users.

3.3 Voice-Enabled Human-Computer Interaction

Prachi Tiwari and Meetkumar Patel (2024) proposed an AI-based desktop voice assistant developed using Python and open-source artificial intelligence libraries. Their work focuses on enhancing human–computer interaction through voice-driven task automation, information retrieval, and personalized assistance. The system integrates speech recognition, natural language understanding, dialogue management, and task execution modules using libraries such as Speech Recognition, NLTK, and PyTorch. The authors evaluated the system based on accuracy, response time, and user satisfaction, demonstrating reliable performance in desktop environments. However, the study highlights limitations in scalability, contextual intelligence, and deeper personalization, indicating scope for integrating more advanced learning mechanisms.

3.4 Conversational AI and Chat bots for Enhanced Website User Experience

Manoj Kumar Dobbala and Mani Shankar Srinivas Lingolu (2024) studied the adoption of conversational AI technologies such as NLP, NLU, and machine learning to improve user experience and engagement on websites. Their research highlights major benefits including personalized assistance, reduced wait time, and continuous accessibility across sectors like healthcare, finance, travel, and e-commerce. However, the authors identified challenges including ambiguity in user intent, the need for contextual understanding, privacy concerns, and system integration complexities. Solutions such as advanced NLP algorithms, secure data handling, and user feedback loops were recommended, showing a promising direction toward more human-like interaction models.

3.5 Text-to-Speech Synthesis for Multilingual Applications

G. D. Ramteke and R. J. Ramteke (2016) proposed a text-to-speech (TTS) engine enabling speech generation in English, Hindi, and Marathi. Their concatenative speech synthesis approach focused on prosody features pitch, duration, and intensity to enhance naturalness of generated speech. The system was evaluated using Mean Opinion Score (MOS) tests, which showed listening quality between fair and good and naturalness ranging from pleasant to slightly pleasant. While effective for multilingual support and accessibility (e.g., visually-impaired users and education), the approach depends on manual corpus creation and is vulnerable to noise during voice recording, limiting scalability and adaptation to large datasets.

3.6 AI-Enabled Text-to-Speech for Indian Unicode Languages

Chandamita Nath and Bhairab Sarma (2024) developed an AI-enabled TTS system for Assamese, addressing the complexity of Indic language structures, grapheme-phoneme mapping, and Unicode text processing. They compared multiple approaches including Dictionary-based, HMM, CNN, and Grapheme-to-Phoneme (G2P) and found G2P to be most accurate, achieving around 89% accuracy with improved phoneme alignment. The system was trained using a custom dataset exceeding 40,000 speech samples and utilized Tacotron2 with the Griffin-Lim algorithm for waveform reconstruction. Despite promising results, the system's performance is constrained by dataset size and pronunciation variations across dialects, indicating further need for robust language modeling.

3.7 Conversational AI Advancements and Challenges

VIKAS HASSIJA (2023) provided a comprehensive survey on the evolution and capabilities of large language models, particularly ChatGPT. Their work discusses transformer architecture, training processes, and multiple application domains including customer service, translation, summarization, and human-AI collaboration. The authors highlighted major issues such as bias, response quality control, and ethical deployment constraints, emphasizing that despite the rapid growth of conversational AI, practical scalability and domain-specific adaptation remain open challenges.

3.8 AI-Driven Career Recommendation Systems

Prof. Karishma Misal (2025) proposed an AI-driven system for career path guidance tailored to students after secondary education. By using student scores and extracurricular data, the model applies classification techniques like KNN and SVM to recommend suitable career domains. The solution aims to minimize misaligned academic decisions and enhance personalized counselling. However, the system depends heavily on quality of training data and may not capture emotional or motivational factors influencing long-term career choices.

3.9 Blue-Collar Workforce and Compensation Analysis

Ms. Shriya S and Mr. K. Gunashekar (2020) conducted an exploratory study on compensation trends among blue-collar employees in small and medium enterprises in Bengaluru. Using primary survey data, they identified concerns such as low wages, lack of social security benefits

(ESI & PF), job insecurity, and high occupational risks despite strong labor contributions. The research reinforced the need for structured reward policies and welfare programs to improve motivation, safety, and career stability among blue-collar workers.

3.10 Collaborative Filtering for Job Recommendation

Zhang et al. (2014) introduced an item-based collaborative filtering technique using weighted co-apply behavior to recommend relevant jobs to candidates. Their model significantly improved precision and recall scores in job matching efficiency. The approach focuses on behavioral similarity rather than textual attributes of job descriptions. However, their system is affected by cold-start issues since recommendations rely on user interaction history. The study shows potential for enhancing blue-collar job discovery with adaptive data-driven techniques.

3.11 Automated Job Allocation for Informal Workforce

Amirneni et al. (2016) developed a job allocation system for blue-collar workers using Aadhaar-linked identity verification and rule-based matchmaking. The system automates labor distribution based on demand, availability, and skill requirements. It improves fairness and reduces dependency on middlemen in informal hiring processes. Nevertheless, the platform still requires digital literacy and lacks voice-based support for non-educated workers. Future enhancements should incorporate real-time decision support for migrant laborers.

3.12 Bilingual Assamese Text-to-Speech System

Sharma et al. (2015) explored speech synthesis for Assamese–English mixed language using unit selection and HMM methods. The research improves speech continuity and intonation when shifting between regional and English words. Its application is crucial for accessibility technologies in multilingual societies like India. However, large annotated datasets are required to expand vocabulary and dialect coverage. It highlights the importance of localized voice systems for public services including job search.

3.13 Indian English Speech Adaptation for TTS

Mahanta et al. (2016) modified CMU phoneme mapping to address Indian English pronunciation variations. Their adaptation reduced mispronunciations, making speech output clearer and more natural for Indian listeners. This research is vital for voice-based systems targeted at Indian job seekers, reducing comprehension barriers. However, prosody and conversation-level expressiveness remain limited. Further improvements are needed for smooth interaction in real-world job platforms.

3.14 Decent Work Conditions in Apparel Industry

Chen et al. (2017) compared satisfaction levels between blue-collar and white-collar employees in Chinese garment manufacturing. Blue-collar workers reported higher dissatisfaction regarding wages, career growth, and safety standards. This highlights the urgent need for transparent job systems that protect labor rights. Their study suggests integrating long-term career support for workforce stability. Digital platforms must include social compliance and decent work indicators for better job matching.

3.15 Physically Demanding Blue-Collar Jobs Motivation & Challenges

Venancio et al. (2024) examined physically demanding blue-collar roles using 15 participants in the Philippines. The findings show workers continue such jobs mainly due to financial responsibility, family needs, and social belonging. Despite chronic stress, physical strain, irregular sleep patterns, and low salaries, workers remain motivated by job security and workmate support. The study indicates that mental well-being and work–life balance are severely affected. This underscores the necessity for digital job platforms that prioritize welfare, accessibility, and safer employment opportunities.1

4. Comparative Discussion

Based on the review, existing research contributes significantly toward enhancing employment access through different technological and social domains. AI-based job recommendation studies in Research offer intelligent matching approaches but remain dependent on textual input and user interaction history, which limits their accessibility for low literate workforce groups. Likewise, Aadhaar-enabled job allocation models successfully automate hiring for blue collar workers but do not integrate speech-based interaction, making them less user-friendly for digitally inexperienced populations.

Conversational AI and multilingual TTS systems contribute toward accessibility by enabling assistance through natural speech, yet they are rarely integrated into job-specific workflows. Research addressing worker welfare highlights major challenges such as job insecurity, unfair wages, and high physical strain, but lacks practical implementation through modern technologies. Overall, the reviewed studies show progress in isolated areas recommendation, voice interaction, or labour welfare but none of the approaches provide a unified solution that ensures job discovery, literacy support, and social well-being simultaneously.

Therefore, there exists a strong need for a platform capable of combining AI-driven recommendations, regional-language support, and blue-collar workforce empowerment into a single, inclusive employment ecosystem.

4. CONCLUSIONS

This review concludes that current job portals and AI-based systems remain largely skewed toward white-collar and educated job seekers. Despite advancements in conversational AI, voice assistance, and heuristic-driven workforce allocation, digitally marginalized workers continue to struggle with barriers such as non-English interfaces, complex app usage, and limited job security. Incorporating Indian language speech interfaces into recruitment systems can significantly improve usability for informal sector workers and individuals with minimal digital exposure.

Additionally, considering decent-work indicators such as fair compensation, job stability, and worker well-being is essential to ensure long-term adoption and meaningful social impact. The findings strongly justify the development of a **voice-enabled AI job portal** tailored specifically for blue collar and semi-skilled workers especially in growing metro regions like Nagpur ensuring equal access to employment opportunities for all.

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