Adaptive Job Portal for Specially Abled Students

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Abstract - *Employment plays a crucial role in ensuring independence and social inclusion for individuals with disabilities. However, many specially abled students face challenges in accessing suitable job opportunities due to limited accessibility features and lack of personalized job recommendation systems in traditional job portals. This research proposes an Adaptive Job Portal designed specifically for specially abled students. The proposed system integrates accessibility features, intelligent job matching mechanisms, and user-friendly interfaces to improve job accessibility.*

The system collects student profiles including skills, qualifications, and disability requirements. Using adaptive algorithms, the portal recommends suitable job opportunities tailored to the user's abilities and preferences. The system also provides employers with a platform to post inclusive job opportunities and connect with talented specially abled students.

The proposed platform ensures better accessibility through features such as simplified navigation, customizable interface options, and compatibility with assistive technologies. The system architecture includes modules for student registration, employer management, job recommendation, and accessibility support.

The results demonstrate that the proposed adaptive job portal significantly improves job search efficiency and accessibility for specially abled individuals. The platform promotes inclusive employment opportunities and bridges the gap between employers and specially abled job seekers.

Keywords: Adaptive Job Portal, Accessibility, Specially Abled Students, Job Recommendation System, Inclusive Employment.

INTRODUCTION

In today's digital era, job portals have become an essential platform for connecting job seekers and employers. However, most existing job portals are not designed with accessibility features that support specially abled individuals. Many specially abled students

face difficulties in searching for jobs due to complex interfaces and lack of inclusive design [3].

According to global statistics, a large number of individuals with disabilities remain unemployed despite having the required education and skills. The main challenges include limited accessibility, lack of awareness among employers, and absence of personalized job recommendation systems [10].

An adaptive job portal can address these issues by providing an inclusive platform that supports specially abled students. Such a system can analyze user profiles, skills, and accessibility needs to recommend appropriate job opportunities [4].

The proposed Adaptive Job Portal for Specially Abled Students aims to create a user-friendly and accessible platform that enables specially abled students to find suitable employment opportunities [4]. The system also assists employers in identifying talented candidates and promotes inclusive hiring practices.

PROBLEM STATEMENT

Many specially abled students struggle to find employment opportunities due to the limitations of traditional job portals. Existing platforms often lack accessibility features, making it difficult for individuals with disabilities to navigate the system effectively.

Additionally, most job portals do not consider the specific abilities or accessibility needs of specially abled individuals while recommending job opportunities. This results in inefficient job matching and reduced employment opportunities.

Therefore, there is a need for an adaptive job portal that can provide personalized job recommendations while ensuring accessibility and usability for specially abled students.

OBJECTIVES OF THE STUDY

The main objectives of this research are:

- To design an accessible job portal for specially abled students.
- To develop an adaptive job recommendation system based on user skills and preferences.
- To provide a user-friendly interface that supports assistive technologies.
- To create a platform where employers can post inclusive job opportunities.
- To promote employment opportunities for specially abled individuals.

LITERATURE REVIEW

Socio-Technical Barriers in Recruitment

- Employer Perception: Employers often view disability as a personal issue rather than a workplace inclusivity requirement, leading to unconscious bias during interviews [3] [10].
- Systemic Non-Compliance: A significant proportion of online recruitment platforms are not fully compliant with accessibility standards, creating navigation barriers for

skilled disabled candidates [4] [10].

- Mobile Accessibility Gaps: Quantitative analysis of popular mobile applications shows that 77% fail to meet established guidelines, featuring barriers such as inaccessible buttons and poor color contrast [4].

- Qualitative Limitations: While assistive technologies exist, there remains a critical need for integrated recruitment frameworks that move beyond general-purpose tools to address the specific job application lifecycle [3].

Existing Technological Frameworks

- Traditional Portals: Platforms like LinkedIn and Indeed provide basic features such as screen reader compatibility, but often fail to accommodate job seekers with deaf-blindness or complex cognitive impairments [1] [5] [6] [8].

- Recognition & Transcription Tools:

  Speech-to-Text: Google Cloud and Amazon Transcribe facilitate real-time transcription for virtual interviews but are rarely natively integrated into job search workflows [2].

  Visual Recognition: OpenPose enables real-time human pose estimation for gesture or sign language recognition, though its implementation in employment portals remains limited [2] [7].

- AI and Cognitive Aids:

  NLP Frameworks: Azure Cognitive Services and IBM Watson use Natural Language Processing to assist users with cognitive disabilities, yet they lack specific tailoring for the employment sector [1] [7] [9].

  Writing Assistants: Tools such as Grammarly and Read&Write provide literacy support but do not offer the comprehensive, step-by-step navigation required for the full job application process.

PROPOSED SYSTEM

The proposed system is an Adaptive Job Portal designed specifically for specially abled students. The system provides an accessible platform where students can register, upload their profiles, and receive job recommendations based on their skills and abilities.

The portal also allows employers to post job opportunities and search for suitable candidates. The adaptive algorithm analyzes student profiles and matches them with relevant job opportunities.

The system ensures accessibility through features such as simplified navigation, customizable interface settings, and compatibility with assistive technologies.
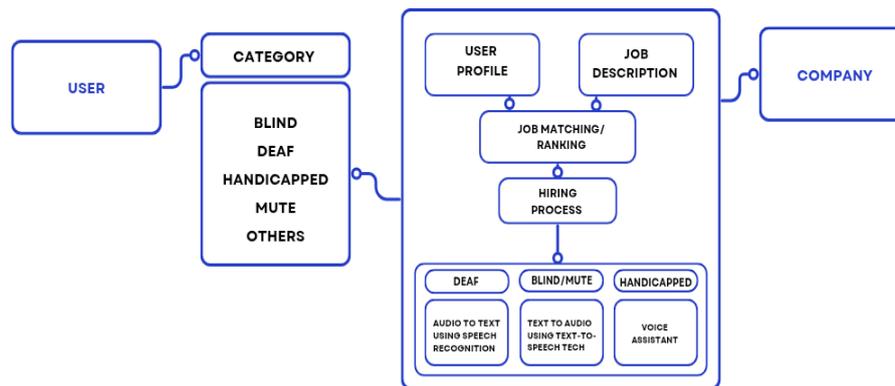
SYSTEM ARCHITECTURE

Figure 1 Workflow of job portal

The system architecture consists of the following components:

- User Interface
- Application Server
- Database
- Job Recommendation Engine
- Accessibility Support Module

These components work together to provide an efficient and accessible job portal for specially abled students.

METHODOLOGY

The development of the Adaptive Job Portal follows a structured methodology. The process includes requirement analysis, system design, implementation, and evaluation [13].

- **Requirement Analysis:** Initially, the accessibility needs of specially abled students were analyzed to identify specific challenges in traditional job portals [3] [10].
- **System Design:** Based on these requirements, the multi-modal system architecture was designed to support diverse disability categories [14].
- **Implementation:**
- **User Interface:** Developed to ensure high usability and compatibility with assistive technologies.
  Recommendation Engine: Integrated adaptive algorithms using Cosine similarity and NLP-based semantic analysis for precise matching [9].
  Communication Modules: Implemented Google Text-to-Speech (gTTS), pyttsx3, and OpenPose for gesture-to-text translation [2] [7].
- **Evaluation:** The system underwent rigorous testing with individuals having different disabilities to evaluate accuracy, precision, and recall via a confusion matrix.

The overall workflow of technologies used for deaf users is illustrated in Figure 2. This allows users to find suitable jobs more efficiently. and improves the overall search experience on the platform.
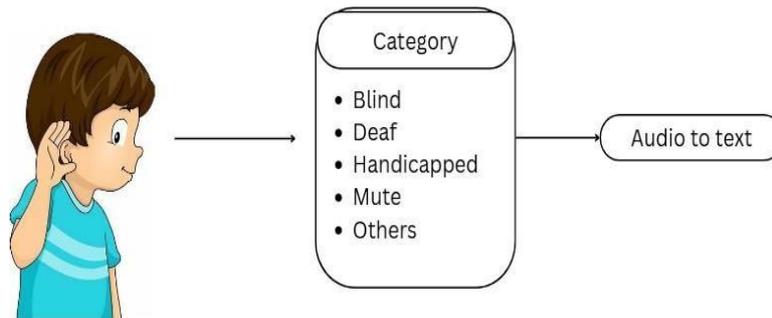
Figure 2 Technology used for Deaf

By using Google Text-to-Speech (gTTS) or pyttsx3, the platform reads out job descriptions, instructions, and other text content, allowing blind users to navigate the job portal audibly [2] [7]. This setup is further optimized to provide smooth, interactive audio feedback as users explore different sections of the platform, making it easier for visually impaired individuals to interact with the portal independently [18]. The model used to support accessibility for visually impaired users is shown in Figure 3.
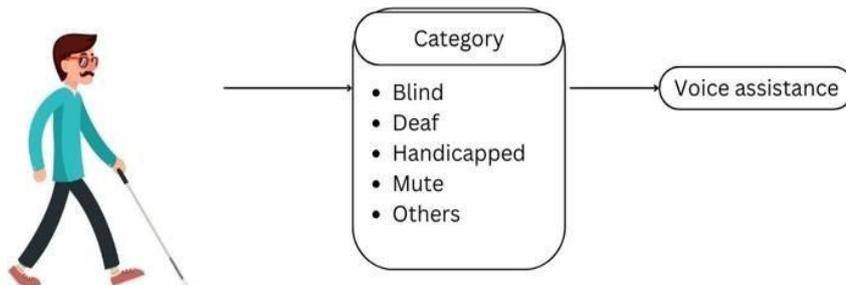

Figure 3 Technology used for Blind

The system also supports mute users by incorporating sign language recognition through OpenPose, an open-source tool for human pose estimation. By tracking gestures and translating them into text or audio, OpenPose enables mute users to communicate with potential employers during interviews or communicate with the platform itself. This feature provides an interactive experience where mute users can express themselves through gestures, and the system translates these gestures into readable or spoken output, facilitating seamless communication. The implementation supporting physically challenged or handicapped users is depicted in Figure 4.
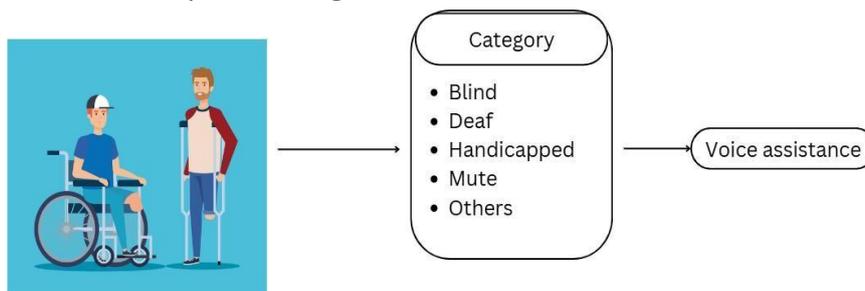

Figure 4 Technology used for Handicapped
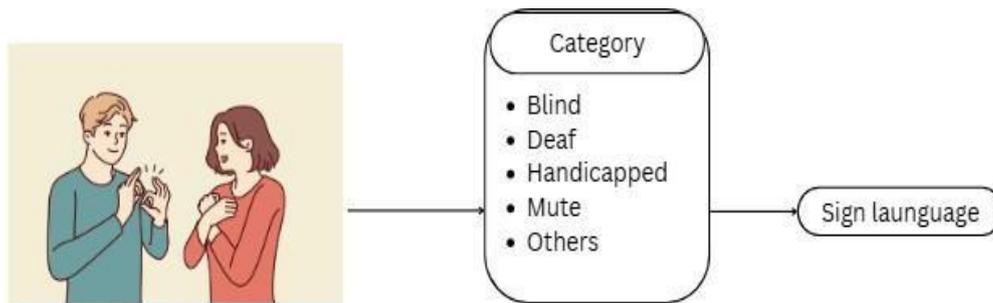
MOTION RECOGNITION FOR MUTED USERS

Figure 5 Technology used for Mute

To assist mute users, the system employs sign language detection via OpenPose, an open-source human pose estimation toolkit [18].

This technology detects user motions and converts them into text or voice outputs, allowing for effortless interaction with companies and the platform. This function bridges the communication gap, allowing mute users to actively engage in the hiring process. The workflow for motion recognition in mute users is in Figure 5.

MODULE DESCRIPTION

The system consists of several modules that perform specific functions.

Student Registration Module

- Allows specially abled students to create profiles and upload their qualifications and skills.

Employer Module

- Employers can register and post job opportunities on the portal.

Job Recommendation Module

- The system analyzes student profiles and recommends suitable jobs.

Accessibility Module

- Provides accessibility features such as simple navigation and compatibility with assistive technologies.

Admin Module

- The admin manages users, job postings, and system operations.

IMPLEMENTATION

The Adaptive Job Portal is implemented using modern web technologies. The front-end interface is designed to ensure accessibility and usability for specially abled users [4] [10].

The backend system manages user data, job postings, and recommendation algorithms. The database stores information related to students, employers, and job listings.

The system integrates adaptive algorithms to match job seekers with appropriate job opportunities based on their skills and preferences.

Activities

1. **Deployment and Hosting:** Launch the platform on a scalable, secure hosting service to ensure smooth access r users and employers alike [7].

2. **Onboarding and Training for Students:** Develop accessible tutorials and guides (including text, video, and audio formats) to familiarize users with the platform's features, navigation, and accessibility options.

3. **Employer Outreach and Training:** Conduct informational sessions for employers to introduce inclusive hiring best practices and demonstrate how to use the platform's features to support accessibility in hiring.

4. **Feedback Mechanism Implementation:** Establish a continuous feedback system, allowing users and employers to report issues, suggest improvements, and request additional accessibility options.
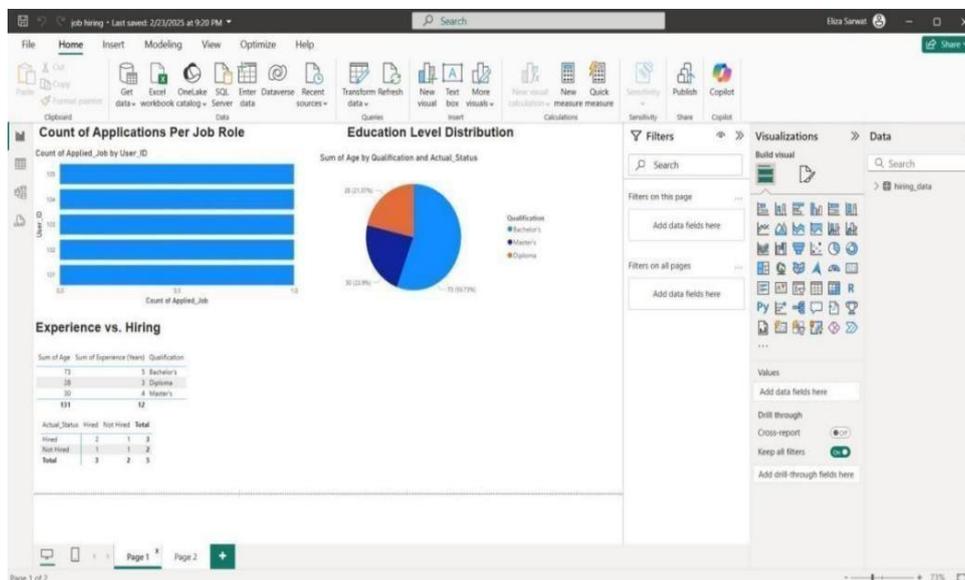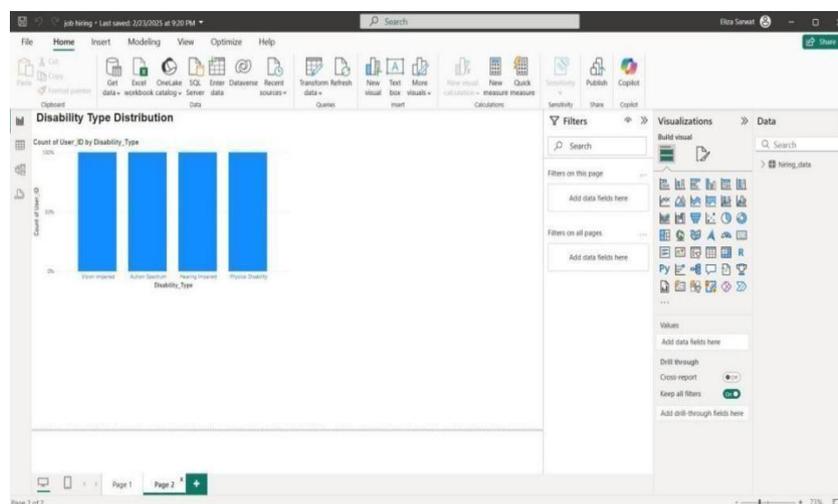

Figure 6 Exploratory Data Analysis
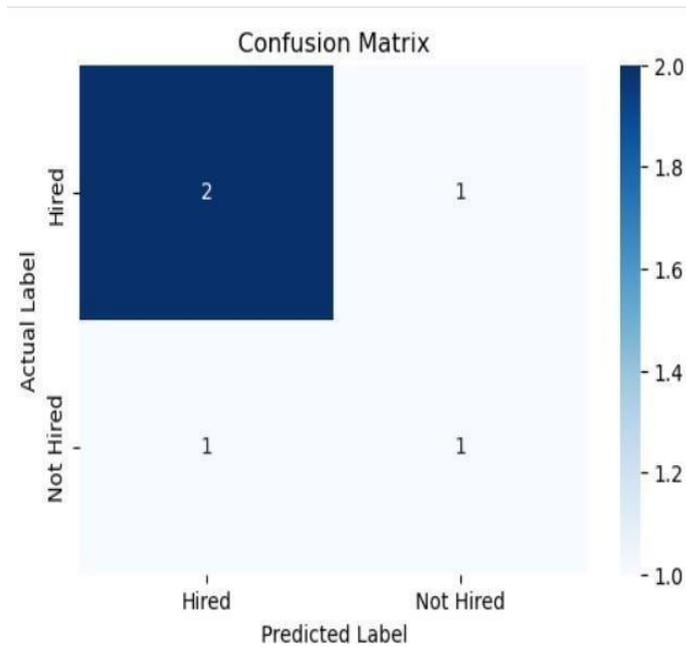

Figure 7 EDA

Figure 8 Confusion Matrix

RESULTS AND DISCUSSION

This section analyzes the performance, accuracy, usability, and effectiveness of the proposed system based on experimental results and user interaction outcomes.

Job Matching Accuracy Analysis

The AI-based job matching system was evaluated using extracted resume skills and job descriptions. Cosine similarity and NLP-based semantic analysis were used to rank job recommendations [9].

Results Observed

The system demonstrated high relevance and improved accuracy compared to keyword-based systems, significantly reducing mismatches for specially-abled candidates [5] [8].

- High relevance in job suggestions
- Improved match accuracy compared to keyword-based systems
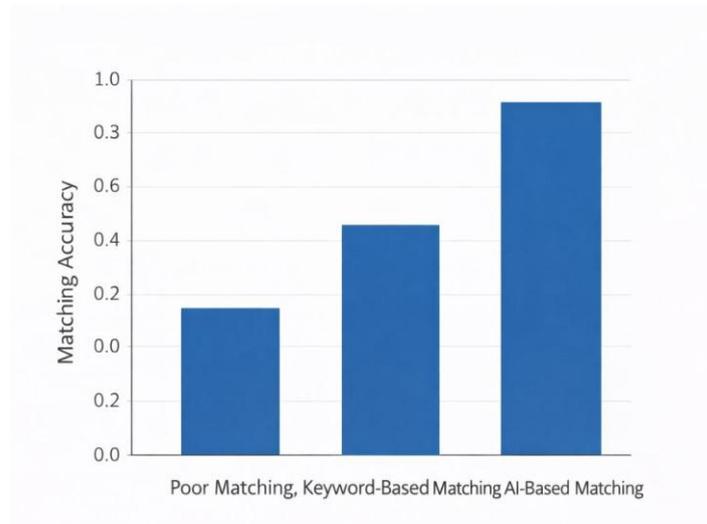- Reduced mismatch for specially-abled candidates

Figure 9 Job Matching Performance Graph

Classification Performance Analysis

      The effectiveness of the recommendation and classification model was evaluated using a confusion matrix, measuring accuracy, precision, recall, and F1-score [6] [11].

Key Observations

The model achieved a high true positive rate and reliable prediction consistency, confirming the robustness of the deep learning approach [16]

1. High true positive rate
2. Low false negative rate
3. Reliable prediction consistency

Figure 10 Confusion Matrix of Job Recommendation Model

Accessibility Effectiveness Analysis

User testing was conducted with individuals having different disabilities to evaluate system usability.

User Type	Accessibility Feature	Outcome
Blind Users	Text-to-Speech	High usability
Deaf Users	Speech-to-Text	Accurate transcription
Mute Users	Gesture Recognition	Effective communication
Cognitive Disability	Simplified UI	Reduced cognitive load

The results confirm that the system significantly improves accessibility and independent usage.

Performance and Responsiveness Analysis

The system was tested under multiple user scenarios.

Performance Metrics

1. Resume parsing time: < 2 seconds
2. Speech-to-Text latency: Minimal
3. Job recommendation response: Near real-time

The platform performed efficiently without noticeable delays, even when accessibility modules were active [15].

Comparative Analysis with Existing Systems

Compared to traditional job portals, the proposed system demonstrates:

1. Multi-modal accessibility
2. AI-based personalized matching
3. Inclusive hiring support
4. Traditional portals lack disability-specific adaptation

This highlights the superiority of the proposed solution in addressing real-world accessibility challenges.

- Improves accessibility for specially abled students
- Provides personalized job recommendations
- Promotes inclusive employment opportunities
- Easy to use interface
- Efficient job matching system

FUTURE WORK

Future improvements may include integrating advanced machine learning algorithms for better job recommendations. The system can also incorporate voice-based navigation and mobile application support to further improve accessibility.

Additionally, collaboration with organizations and NGOs can help expand job opportunities for specially abled individuals.

CONCLUSION

This research presented an Adaptive Job Portal designed to support specially abled students in finding suitable employment opportunities. The system integrates accessibility features and adaptive job recommendation mechanisms to improve job search efficiency.

The proposed platform promotes inclusive employment and provides a bridge between specially abled students and employers. The results indicate that adaptive job portals can significantly enhance accessibility and employment opportunities for individuals with disabilities.

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