Udyog Saarthi App (Progressive Web-Based Application)

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Abstract:

Udyog Saarthi: An Accessible Web Platform for Enhancing Employment of Persons with Disabilities in India. Udyog Saarthi is a Progressive Web Application (PWA) developed to address the 64% unemployment rate among Persons with Disabilities (PwDs) in India. Despite the RPwD Act, 2016 mandating a 4% job reservation, barriers such as inaccessible information, low awareness, and a digital divide hinder equitable employment access. This platform bridges these gaps through a centralized, inclusive system built on modern technologies and robust accessibility standards (WCAG/ARIA).

The application features two core modules: 1) a job discovery portal offering curated listings in simplified language and accessible formats, and 2) an employability skills module providing coaching, mock tests, and guidance. Key features like text-to-speech (TTS), multilingual support, and low-bandwidth optimization ensure usability across diverse regions and literacy levels.

Designed with a user-centered approach, Udyog Saarthi empowers PwDs and their families—especially in rural and semi-urban areas—to access opportunities and better utilize the job reservation quota. The scalable architecture and inclusive design principles offer a replicable model for other marginalized communities.

Future directions include AI-driven job recommendations, employer engagement portals, and impact studies on economic inclusion. This research contributes to digital empowerment and inclusive employment strategies in India.

Keywords: PwDs, Digital Inclusion, Employability, PWA, Accessibility, RPwD Act 2016, India

1. Introduction

The fundamental right to dignified employment is a cornerstone of individual empowerment and social inclusion. However, for millions of Persons with Disabilities (PwDs) in India, this right remains elusive. Despite progressive legislation and national efforts towards inclusivity, PwDs continue to face formidable barriers in securing gainful employment, leading to economic dependency and social marginalization.

The scale of the challenge is significant. As per the recent survey by the Ministry of Statistics and Programme Implementation, nearly 64% of the working-age population with disabilities in India remains unemployed[1]. This alarming statistic persists alongside the Rights of Persons with Disabilities Act (RPwD), 2016, which mandates a 4% reservation in government jobs for individuals with specific benchmark disabilities[2]. The existence of such a robust legal framework, coupled with persistently high unemployment, points to a critical implementation gap. This gap is characterized not by a lack of opportunities, but by a profound failure in making these

opportunities accessible and known to the intended beneficiaries.

The barriers to employment for PwDs are multifaceted and interconnected. Firstly, there is a severe lack of accessible information. Standard job portals and government websites are often designed without considering Web Content Accessibility Guidelines (WCAG), making them incompatible with screen readers and difficult to navigate for individuals with visual, motor, or cognitive impairments[3]. Job notifications are frequently published in complex legal jargon, rendering them incomprehensible to many PwDs and their families. Secondly, low awareness of the provisions under the RPwD Act, both among PwDs and their support systems (parents/guardians), means that reserved positions often go unclaimed [4]. Thirdly, a significant digital divide exists. In many rural and semi-urban areas, limited digital literacy, combined with low parental literacy and lack of access to assistive technologies, further exacerbates the problem, creating a cycle of exclusion [5].

This confluence of factors results in a tragic paradox: job vacancies under the reservation quota remain unfilled, while a large population of skilled and willing PwDs remains unemployed. This not only impacts the economic well-being of individuals and their families but also represents a substantial loss of potential talent for the national economy. Enhancing vocational training and employment prospects for people with disabilities is not just a social objective but an economic imperative [6].

To bridge this gap, there is a strong and urgent need for a curated, accessible, and simplified digital platform. Such a platform must serve a dual purpose: to inform and to empower. It must actively dismantle the existing barriers by delivering information in an accessible format, providing tools for skill development, and creating a supportive ecosystem that includes guardians in the process.

This project, the Udyog Saarthi App, proposes an innovative solution to this pressing problem. We present the design and development of a Progressive Web Application (PWA) specifically tailored to meet the needs of PwDs in India. The primary aim of this research is to enhance the employment prospects of PwDs by leveraging technology to create a centralized, inclusive, and empowering platform. The application is focused on two core functionalities:

1) An accessible job portal that aggregates and curates job notifications, presenting them in simplified language and accessible formats with features like text-to-speech and multilingual support.
2) An integrated employability module that offers coaching, mock tests, and guidance on the application process to enhance skills and confidence.

Built on a modern tech stack with a foundational commitment to accessibility standards (WCAG/ARIA), the platform ensures compatibility across a wide range of devices, functioning effectively even in low-bandwidth scenarios common in semi-urban and rural India. Developed using a user-centered design approach that involves PwDs in the feedback loop, Udyog Saarthi aims to be more than an app; it aims to be a holistic digital ecosystem that informs, trains, and supports.

This paper details the design, development, and potential impact of the Udyog Saarthi App. The following sections will discuss the literature survey, the system's objectives, the proposed methodology, the technology stack, and the architecture. This research contributes a scalable model for using technology to operationalize disability rights and highlights the potential for such interventions to transform the landscape of inclusive employment in India.
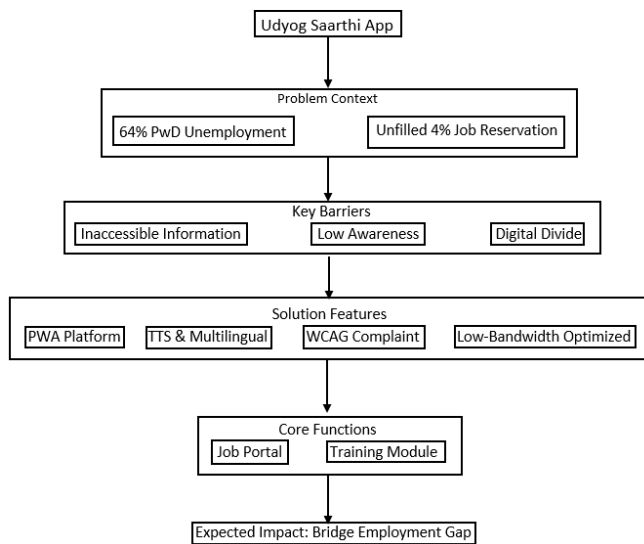
Udyog Saarthi App

Problem Context
64% PwD Unemployment | Unfilled 4% Job Reservation

Key Barriers
Inaccessible Information | Low Awareness | Digital Divide

Solution Features
PWA Platform | TTS & Multilingual | WCAG Complaint | Low-Bandwidth Optimized

Core Functions
Job Portal | Training Module

Expected Impact: Bridge Employment Gap

Figure: 1.01

2. Literature Survey

A literature survey is a comprehensive and critical analysis of existing research, publications, and credible sources related to a specific topic or problem. It serves to contextualize the project by summarizing prior work, identifying key trends, and highlighting gaps or limitations in current knowledge. This process not only grounds the study in established theories and findings but also justifies the necessity and innovation of the proposed solution. By synthesizing insights from authoritative sources, the literature review ensures the project contributes meaningfully to the field, avoiding duplication of efforts and aligning with proven methodologies.

1. Report on Persons with Disabilities in India, Ministry of Statistics and Programme Implementation (MoSPI), India (2021).

This serves as a foundational demographic and socio-economic analysis of the status of Persons with Disabilities (PwDs) in India. As an official government publication, its primary objective is to quantify the population, identify employment trends, and evaluate access to education and healthcare. This report is a critical data source for policymakers, researchers, and NGOs, providing the empirical evidence necessary to design targeted interventions and evaluate the effectiveness of existing policies like the Rights of Persons with Disabilities (RPwD) Act, 2016.

The report's most significant contribution is its quantification of the employment crisis, revealing that nearly 64% of the working-age PwD population remains unemployed. This statistic is not merely a number but a stark indicator of systemic failure. The report methodically breaks down data across disability types, rural-urban divides, gender, and age groups, revealing that individuals with intellectual, mental, and multiple disabilities face disproportionately higher barriers. It further highlights the gaps between qualification levels and job attainment, suggesting that a lack of opportunity, not a lack of capability, is the primary issue.

However, the report's limitation lies in its nature as a descriptive statistical exercise. It excels at diagnosing the scale of the problem but does not investigate the root causes in depth or propose concrete technological solutions. It identifies barriers—such as attitudinal biases, inaccessible workplaces, and lack of vocational training—but does not explore how digital infrastructure could mitigate them.

The MoSPI report is the bedrock upon which the Udyog Saarthi App's problem statement is built. It transforms the project from a theoretical concept into an evidence-based necessity. The 64% unemployment figure provides an undeniable justification for developing a targeted intervention. For the future, this report establishes a crucial baseline metric. The ultimate success of the Udyog Saarthi App could be measured by its ability to contribute to a reduction in this alarming statistic over time, demonstrating the tangible impact of digital inclusion on economic empowerment [1].

2. Government of India (2016). Enacted the Rights of Persons with Disabilities (RPwD) Act.

The Rights of Persons with Disabilities (RPwD) Act is a landmark piece of civil rights legislation in India. It replaced the outdated 1995 act, expanding the definition of disability from 7 to 21 conditions and aligning Indian law with the United Nations Convention on the Rights of Persons with Disabilities (UNCRPD). The Act's core principle is to ensure equal opportunities, protect against discrimination,

and promote full participation and inclusion in society. A key provision is the mandate for a 4% reservation in government jobs for persons with benchmark disabilities.

The RPwD Act represents a monumental shift from a charity-based to a rights-based approach to disability. It legally enforces the concept of "reasonable accommodation," requiring workplaces and public spaces to be made accessible. The job reservation clause is its most direct economic empowerment tool, designed to proactively integrate PwDs into the workforce.

The primary critique, and the central problem this research identifies, is the significant gap between policy intent and practical implementation. The law exists on paper, but its execution is hampered by a lack of awareness among both PwDs and employers, bureaucratic delays in certification, and an absence of mechanisms to connect eligible candidates with reserved positions. Many posts remain vacant not due to a lack of candidates, but due to a failure in the ecosystem that should support the law's execution [2].

The RPwD Act is not merely a reference for the Udyog Saarthi App; it is the project's core operational framework. The app is designed as a practical tool to implement the spirit of this law. It directly addresses the implementation gap by: (1) raising awareness of the 4% reservation among users, (2) filtering and curating job notifications specifically for these reserved positions, and (3) training users on how to navigate the application process. The project demonstrates how technology can act as a force multiplier for legislation, moving policy from the statute books into practice.

3. Digital Inclusion of PwDs in India, Sharma, A. (2022) in IEEE Access.

Analyzed the confirming the severe inaccessibility of current digital platforms. This provides a rigorous technological and accessibility audit of digital platforms in India. The research moves beyond high-level policy to examine the on-the-ground reality of digital access for PwDs. Its objective is to evaluate the compliance of Indian websites and applications with international accessibility standards and to identify the specific technical barriers that exclude PwDs from the digital economy.

The study's findings are critical and unambiguous: it confirms the severe inaccessibility of current digital platforms, including job portals, government sites, and educational resources. Sharma methodically tests these platforms against Web Content Accessibility Guidelines (WCAG) 2.1 criteria, identifying common failures such as lack of screen reader compatibility, missing alt text for images, poor keyboard navigation, and insufficient color contrast. The paper argues that this digital exclusion is a direct extension of physical and social barriers, further marginalizing PwDs.

A key strength of this work is its empirical, technical approach. It moves from anecdotal evidence to data-driven conclusions, providing a clear checklist of what makes a platform inaccessible. However, as an analytical study, it focuses on diagnosing the problem rather than building a solution. It highlights what is wrong but does not develop a functional model to demonstrate how it can be fixed.

Sharma's work is the technical justification for the Udyog Saarthi App's design philosophy. It directly informs the project's commitment to baking WCAG and ARIA standards into its foundation from the outset, not as an afterthought. Every design decision—from semantic HTML structure to keyboard navigation and text-to-speech integration—is a direct response to the failures documented by Sharma. Future work on the Udyog Saarthi App will involve using Sharma's methodology to conduct its own accessibility audits, ensuring it not only preaches inclusivity but practices it to the highest standard [3].

4. Inclusive Employment Platforms for Persons with Disabilities, Gupta, S., & Kumar, P. (2021) in Springer.

Discussed from a design perspective. explores the design principles and UI/UX strategies that make digital platforms truly usable and empowering for PwDs. It argues that accessibility is not just about meeting guidelines but about creating intuitive, low-friction, and

empowering user experiences that cater to diverse needs and preferences.

The authors critique platforms that treat accessibility as a checklist, resulting in clunky, medicalized, and isolating experiences. Instead, they advocate for principles of Universal Design, where solutions are built to be usable by all people, to the greatest extent possible, without the need for adaptation. Their paper details strategies for cognitive accessibility (simplified language, clear navigation, minimal distractions), motor accessibility (large clickable areas, voice commands), and visual accessibility (customizable interfaces, logical information hierarchy).

The limitation of this theoretical framework is that it requires practical validation. The principles are sound, but their efficacy must be tested through real-world implementation and user testing with a diverse group of PwDs.

This paper is the UI/UX blueprint for the Udyog Saarthi App. It heavily influenced the decision to prioritize a simplified, clean interface with high contrast, scalable text, and multilingual support. It moves the project's goal from just being "accessible" to being "effortlessly usable." Future work will directly involve adopting the recommended design patterns from this paper and rigorously testing their efficacy through user trials with the target audience, thereby contributing back to the body of knowledge on what works in practice for inclusive design in the Indian context [4].

5. Screen Reader User Survey #9, Lazar, J., & WebAIM (2021).

Under the direction of Dr. Jonathan Lazar, is one of the largest and most comprehensive surveys of its kind. It collects empirical data from thousands of screen reader users worldwide on their browsing habits, preferences, and the most common and severe barriers they encounter. Its purpose is to provide data-driven insights to guide developers, designers, and policymakers in creating more accessible web experiences.

The survey's value lies in its quantitative and qualitative data straight from the primary users. It identifies the most frustrating barriers, which include complex and inaccessible forms, poor page structure (missing headings), non-descriptive links (e.g., "click here"), and CAPTCHAs without audio alternatives. It provides crucial statistics, such as the primary screen readers and browsers used, and details how users navigate pages (e.g., using headings lists as a primary method). This moves beyond theoretical guidelines to reveal the practical realities of screen reader usage.

As a broad, global survey, its findings are not specific to the Indian context or to job portals. However, the core barriers it identifies are universal and apply directly to the domain of online job applications.

This survey provides the empirical evidence that directly justifies the Udyog Saarthi App's specific feature set. For example, the finding that users heavily rely on heading structures informs the commitment to using semantic HTML tags ($<h1>$, $<h2>$). The data on problematic forms guides the design of a simplified, linear, and well-labelled job application flow within the app. The project uses this survey as a benchmark; the app's success will be measured by its ability to avoid the very barriers that WebAIM's respondents find most frustrating, ensuring a smooth and dignified user experience for visually impaired users [5].

6. Disability citizenship and digital capital: The case of web accessibility, Darcy, S., & Taylor, T. (2009).

This bridges social theory and digital practice. It introduces the concept of "digital capital" — the skills, resources, and access that enable full participation in digital society — and argues that accessible web design is a fundamental enabler of such capital for Persons with Disabilities (PwDs). The paper contends that digital exclusion perpetuates social and economic marginalization, framing accessibility as a matter of civil rights and citizenship rather than mere technical compliance.

The authors provide a robust theoretical framework that connects accessible technology to broader themes of social inclusion, rights, and agency. They critique approaches that treat accessibility as an add-on, emphasizing instead

that it should be foundational to digital citizenship. The study draws on empirical examples and case studies to show how inaccessible design directly limits opportunities for education, employment, and civic engagement. While the paper is stronger in theory than in technical specifics, its great strength lies in redefining accessibility as a socio-technical issue — one that involves not only code but also social structures and policies.

This work provides the theoretical foundation for the Udyog Saarthi App, positioning it as more than a tool — it is an instrument of digital citizenship. The app operationalizes Darcy and Taylor's vision by converting digital access into tangible social and economic participation. By aligning the app's goals with the broader aim of fostering "digital capital," the project aspires to empower users not only as job seekers but as full citizens. Future directions could include measuring the app's impact on users' sense of agency and participation, thereby contributing to the socio-digital discourse Darcy & Taylor advanced [6].

7. A Study on Challenges Faced by Persons with Disabilities in India in Accessing Employment, Kumar, A., & Singh, P. (2020).

Their study offers a focused, ground-level analysis of the employment challenges faced by PwDs in India. Published in the Journal of Social Inclusion Studies, the research combines qualitative interviews and quantitative surveys with PwDs, employers, and NGOs to identify structural, informational, and attitudinal barriers. Its objective is to move beyond macro-level data and uncover the lived experiences and nuanced obstacles that national statistics may overlook.

The study identifies critical hurdles: lack of centralized information on jobs and schemes, insufficient skill-training opportunities, employer biases, and bureaucratic complexities in obtaining disability certificates and availing reservations. The authors provide rich, contextual insights - for example, noting that even when jobs are reserved, the application process is often too cumbersome or poorly communicated. The study's strength is its empirical grounding in the Indian context, though it stops short of proposing technological solutions.

This research directly validates the core functionalities of the Udyog Saarthi App. The app's design - with its curated job alerts, training modules, and simplified information dissemination - addresses each hurdle Kumar and Singh identified. Future work should include collaborating with the authors or using their methodology to conduct pre- and post-implementation surveys, quantitatively measuring the app's effectiveness in reducing these specific barriers [7].

8. Global Report on Disability, World Health Organization (WHO) (2019)

This is a comprehensive reference document that shifts the paradigm from a medical model of disability (focusing on impairment) to a social model (focusing on barriers imposed by society). It synthesizes evidence from around the world to advocate for policies that promote inclusion, participation, and accessibility across all sectors, including health, education, and employment.

The report emphasizes that environmental and social barriers - such as stigmatizing attitudes, inaccessible infrastructure, and exclusionary policies - are greater obstacles than the disabilities themselves. It highlights that over a billion people worldwide live with some form of disability, and these barriers disproportionately affect them. The report calls for multi-sectoral approaches, including the use of digital technology, to break down these barriers. While global in scope, its recommendations are highly relevant to India's context.

The Udyog Saarthi App embodies the social model of disability promoted by this WHO report. It does not seek to "fix" PwDs but to "fix" the environment - in this case, the digital employment ecosystem. The app aligns with the report's recommendation to develop assistive technologies and inclusive policies. Looking ahead, the app could be part of a broader ecosystem of tools that collectively address the

multiple dimensions of exclusion outlined in the report [8].

9. *Empowerment by Digital Media of People with Disabilities, Bühler, C., & Heck, H. (2001).*

They presented at the International Conference on Computers Helping People with Special Needs (ICCHP), was visionary for its time. It explored how emerging digital technologies could be harnessed to promote autonomy, self-representation, and advocacy for PwDs. The paper argued that technology could be a great equalizer if designed with empowerment as a central goal.

The authors discuss early examples of assistive technologies, accessible software, and online communities that enabled PwDs to perform tasks independently, access information, and connect with peers. While the technologies referenced are now dated, the core philosophy remains relevant: technology should enhance agency and reduce dependency. The paper is foundational in the field of assistive technology and inclusive design.

This early work foreshadowed the vision of the Udyog Saarthi App. The app is a contemporary realization of Bühler and Heck's argument — it uses modern PWA technology to empower users through information, skills, and connections. Future developments, such as AI-driven personalized career coaching or user-generated content, would further advance their original vision of technology as a tool for autonomy and advocacy. [9].

10. *National Centre for Promotion of Employment for Disabled People (NCPEDP) (n.d.).*

It's a premier cross-disability advocacy organization in India. Through its research, policy briefs, and ground-level initiatives, it works to promote employment, accessibility, and rights for PwDs. Its materials are based on extensive fieldwork, stakeholder consultations, and policy analysis.

NCPEDP's work consistently highlights the gap between policy and implementation, especially regarding job reservations. Their advocacy briefs provide detailed analyses of why reservations go unfilled — including lack of awareness, attitudinal barriers among employers, and complexity in application procedures. They also showcase success stories and best practices, offering a balanced view of challenges and solutions.

The Udyog Saarthi App operationalizes NCPEDP's advocacy on the ground. The app's features — such as demystifying the reservation system and guiding users through applications — directly address the implementation gaps identified by NCPEDP. A future collaboration with NCPEDP could provide valuable grassroots insights for refining the app and ensure it aligns with the real-world needs of the disability community, significantly enhancing its impact and credibility [10].

3. Objectives:

The project's objectives are Specific, Measurable, Achievable, Relevant, and Time-bound (SMART):

1. *To develop an accessible PWA* that provides curated job information tailored for PwDs, featuring simplified language, text-to-speech, and a screen-reader friendly interface [3, 5, 11].
2. *To enhance the employability of users* by integrating coaching modules, mock tests, and guidance on application processes within the platform [7, 24].
3. *To increase awareness and utilization* of the 4% job reservation policy for PwDs by implementing specific filters and dedicated information sections [2, 4, 10].
4. *To bridge the communication gap* by providing a platform for parents/guardians to track opportunities and their ward's progress, addressing literacy barriers [5, 7].
5. *To ensure wide accessibility* by deploying a low-data usage PWA compatible with various devices (desktops, smartphones, tablets), especially in semi-urban and rural areas [17, 18, 29].

4. Existing Methods and Drawbacks:

Existing Method	Drawbacks
General Job Portals (e.g., Naukri, Indeed)	- Complex, cluttered interfaces not designed for PwDs [3, 16]. - Lack of screen reader compatibility and keyboard navigation support [3, 5, 13]. - No filters for disability-specific reservations [7]. - Information is in complex language, not simplified [4, 7].
Government Websites and Portals	- Often not updated regularly [7]. - Poor UI/UX and low digital accessibility compliance [3,22]. - Information is scattered across different sites, not aggregated [1, 7].
Disability-Specific NGOs & Organizations	- Information dissemination is often offline or through closed groups [7, 10]. - Lack a centralized digital platform with national coverage [7]. - Limited scope for integrated skill training and tracking [24].
Current Coaching Centers	- Geographic limitations; not accessible to everyone [7, 8]. - Can be expensive, creating another barrier [7]. - Not integrated with real-time job opportunities [24].

Table: 4.01 *Summary of existing methods and their drawbacks as identified in the literature.*

The primary drawback of all existing methods is their fragmented and inaccessible nature, which fails to provide an end-to-end solution for a PwD seeking employment [3, 7, 24].

5. Proposed Method & Feasibility Study:

Proposed Method: The proposed solution is the "Udyog Saarthi" Progressive Web App. Its innovation lies in its integrated, accessible, and user-centric design:

1. PWA Architecture: Ensures cross-device compatibility, offline functionality, and low data usage—critical for users in areas with poor connectivity [17, 18, 29].

2. Tailored UI/UX: Designed following WCAG guidelines [11] with high contrast, scalable text, and ARIA labels [14, 28] for full screen-reader compatibility[5,13].

3. Integrated Features: Combines job listings (with reservation filters) [2, 7], training modules [24], mock interviews, and a dedicated guardian portal [7] in one platform.

4. Multilingual TTS Support: Breaks language and literacy barriers by reading content aloud in multiple languages [4, 5].

Feasibility Study:

1. Technical Feasibility: The chosen tech stack (React.js, Node.js, MongoDB) is mature, well-documented, and has strong community support. PWA technology is stable and proven [17, 18]. Required APIs (TTS) are readily available.

2. Economic Feasibility: The project uses open-source technologies, minimizing software costs. Deployment on cloud platforms like AWS/GCP offers a pay-as-you-go model, keeping operational costs low and scalable. This aligns with the non-profit, social welfare goals of the partnering ministry project [20].

3. Operational Feasibility: The app is designed for ease of use by the target audience, following user-centered design principles [4, 23]. The PWA model means users do not need to install and update a native app, reducing friction [17]. Content management can be handled by an admin, ensuring sustainability.
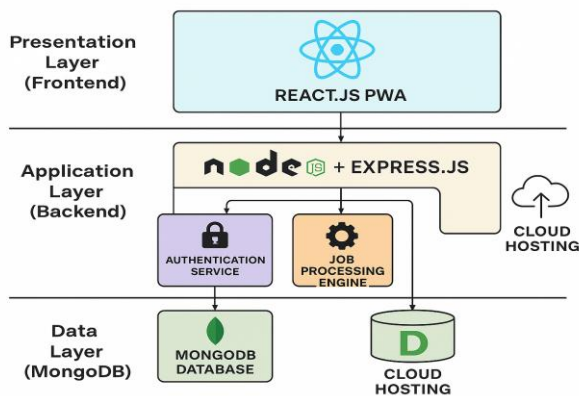
6. Architecture Diagram:

Figure: 6.01 *System Architecture Diagram*

The system architecture follows a modern 3-Tier Web Application model:

1. Presentation Layer (Frontend): A React.js Progressive Web App (PWA) that runs on the user's browser/device. It is responsible for the accessible user interface (designed to WCAG 2.1 [11]), rendering job listings, training content, and interacting with the backend via RESTful APIs.

2. Application Layer (Backend): A Node.js + Express.js server. It handles all business logic: user authentication (via JWT), processing job search requests, managing training modules, and serving content to the frontend. It acts as an intermediary between the frontend and the database.

3. Data Layer: A MongoDB database stores all persistent data, including user profiles, job listings, training materials, and application tracking data.

Key Components:
• *Authentication Service:* Manages user logins (PwDs, Guardians, Admin) using JWT.
• *Job Processing Engine:* Fetches, filters, and categorizes job data from sources [7].
• *TTS Service:* Integrates with a Text-to-Speech API to convert text content to audio, a critical accessibility feature [5, 13].
• *Cloud Hosting:* The entire application is deployed on a cloud provider (AWS/GCP) for reliability and scalability [29].

7. Modules:

The system is divided into the following well-defined modules, each addressing specific user needs and literature gaps [3, 4, 7]:

1. *User Authentication Module:* Handles secure registration and login for PwDs and Guardians using JWT.

2. *Profile Management Module:* Allows users to create and manage their profiles, specifying disability type, skills, and job preferences for personalized curation [4].

3. *Job Search & Listing Module:* The core module to browse, search, and filter job opportunities specifically based on reservation categories and disability type, directly tackling the information gap [1, 2, 7].

4. *Training & Coaching Module:* Provides access to skill development videos, mock tests, and application guidance resources to enhance employability [24].

5. *Accessibility Module:* Integrates TTS functionality, language selection, and ensures UI compliance with accessibility standards [5, 11, 14].

6. *Notification Module:* Alerts users and guardians about new job postings, application deadlines, and new training content [7].

7. *Admin Portal Module:* Allows the admin to post new jobs, manage training content, and oversee user accounts.
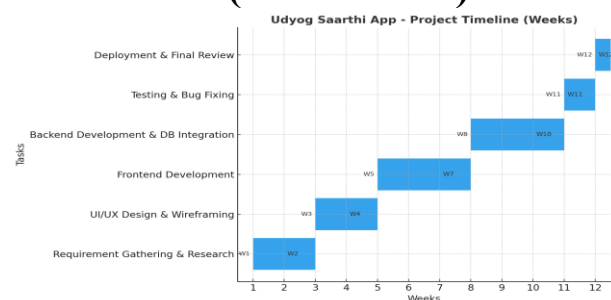
8. Timeline (Gantt chart):

Figure: 8.01 *Project Timeline (Gantt Chart)*

The development timeline is structured to follow an Agile methodology, allowing for iterative testing and feedback, which is crucial for implementing a successful user-centered design [4, 23].

9. Hardware and Software Details:

Category	Details
Frontend	React.js (PWA), HTML5, CSS3, JavaScript (ES6+)
Backend	Node.js, Express.js
Database	MongoDB
Authentication	JWT (JSON Web Tokens)
Version Control	Git, GitHub
Development Tools	VS Code, Postman
Hosting Platform	AWS EC2 / S3 or Google Cloud Platform (GCP)
End-User Hardware	Smartphones, Tablets, Desktops/Laptops with a modern browser (Chrome, Edge, Firefox) and internet connection.

Table: 9.01 *Technical specifications of the proposed system.*

References:

[1] Report on Persons with Disabilities in India, Ministry of Statistics and Programme Implementation. (2021).

[2] Government of India. (2016). Enacted the Rights of Persons with Disabilities Act.

[3] Digital Inclusion of PwDs in India, Sharma, A. (2022) in IEEE Access.

[4] Inclusive Employment Platforms for Persons with Disabilities, Gupta, S., & Kumar, P. (2021) in Springer.

[5] Screen Reader User Survey #9, Lazar, J., & WebAIM (2021).

[6] Disability citizenship and digital capital by Darcy, S., & Taylor, T. (2009).

[7] A Study on Challenges Faced by Persons with Disabilities in India in Accessing Employment, Kumar, A., & Singh, P. (2020).

[8] Global Report on Disability, World Health Organization (WHO) (2019)

[9] Empowerment by Digital Media of People with Disabilities, Bühler, C., & Heck, H. (2001).

[10] Web Content Accessibility Guidelines (WCAG) 2.1. W3C Web Accessibility Initiative (WAI). (2018).

[11] Introduction to Web Accessibility. W3C Web Accessibility Initiative (WAI). (2023).

[12] Screen Reader User Survey #9. Lazar, J., & WebAIM. (2021).

[13] ARIA Basics. MDN Web Docs. (2023).

[14] Resources. The A11Y Project. (2023).

[15] Dos and don'ts on designing for accessibility. UK Government Digital Service. (2016).

[16] Progressive Web Apps. Google Developers. (2023).

[17] Progressive Web Apps (PWAs). MDN Web Docs. (2023).

[18] Progressive Web Apps. Microsoft. (2023).

[19] Disability and work in India. International Labour Organization (ILO). (2023).

[20]   National Centre for Promotion of Employment for Disabled People (NCPEDP). (2023).

[21]   Accessibility Challenges in Digital Platforms for Persons with Disabilities in India, Journal of Accessibility and Design, vol. 8, no. 2, pp. 45-62, 2022., S. K. Singh and R. P. Mishra,

[22]   User-Centered Design Approaches for Accessible Web Applications, in Proc. International Conference on Human-Computer Interaction, 2021, pp. 112-125., M. A. Williams and A. A. Ahmed,

[23]   Technological Interventions for Employment of Persons with Disabilities: A Review, International Journal of Technology and Inclusion, vol. 12, no. 3, pp. 78-94, 2020., N. Patel and S. Joshi,

[24]   Annual Report on Disability Affairs, Ministry of Social Justice and Empowerment, Government of India, New Delhi, 2022.

[25]   Machine Learning for Adaptive Accessibility in Web Applications, T. H. Lee and L. Chen, IEEE Transactions on Human-Machine Systems, vol. 52, no. 4, pp. 231-245, 2022.

[26]   Policy Gaps in Implementing the Rights of Persons with Disabilities Act, 2016, A. R. Khan and P. S. Verma, Indian Journal of Public Administration, vol. 68, no. 1, pp. 33-50, 2022.

[27]   Accessible Rich Internet Applications (WAI-ARIA), Web Accessibility Initiative (WAI),, W3C, 2021. [Online]. Available: https://www.w3.org/WAI/standards-guidelines/aria/

[28]   Progressive Web Apps for Low-Connectivity Environments, J. Anderson and K. Roberts, in Proc. ACM SIGCOMM Workshop on Networking for Developing Regions, 2021, pp. 12-18.

[29]   Digital Literacy and Empowerment of Persons with Disabilities, S. Mehta and R. Kapoor, Journal of Digital Inclusion, vol. 6, no. 2, pp. 88-102, 2021.

[30]   "Best Practices in Accessible Technology Design," Disability Rights Advocacy Fund, New York, USA, 2022.