PGRKAM Web and Android Application for Employment Data

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Abstract. In today's competitive job market, job seekers often struggle to find suitable employment due to limited support and fragmented resources across various platforms. The PGRKAM Web Application addresses these challenges by centralizing employment data into a single, user-friendly platform that enhances job search efficiency. The application consolidates job listings from multiple sources, offers real-time notifications, and provides personalized job recommendations. It is structured with a two-tiered service model: a free version offering access to job listings and essential search features, and a subscription-based version providing advanced support, including performance analysis, personalized training suggestions, and a structured feedback system to continuously improve employability. Optimized for web access and designed to support regional economic growth, the PGRKAM Web Application empowers job seekers with relevant, real-time data, ultimately increasing their chances of securing meaningful employment in Punjab.

Keywords: Employment Data, Web Application, Job Search Efficiency, Real-Time Notifications, Job Recommendations, Profile Management, Performance Analysis, Economic Growth, Public Service.

1 INTRODUCTION

In today's fast-paced and competitive job market, finding suitable employment can be a challenging task for job seekers, especially when resources are scattered across various platforms. For residents of Punjab, this challenge is further compounded by limited access to centralized employment data, which often forces job seekers to navigate multiple sources to find relevant job listings. This fragmented approach reduces search efficiency, leading to missed opportunities and a slower path to employment.

The PGRKAM Web Application is designed to address these issues by providing a unified platform that centralizes employment information, allowing users to access job listings, receive real-time notifications, and explore personalized job recommendations all in one place. Developed as a public service initiative by the Punjab Government, the application aims to support job seekers by improving accessibility to relevant, real-time employment data, thereby enhancing job search efficiency and increasing the chances of successful job placements.

In addition to its comprehensive job search tools, the PGRKAM Web Application is structured with a two-tiered service model. The free version provides access to job listings and basic search features, ensuring that essential resources are available to all users. For those seeking a more tailored job search experience, the paid version offers advanced features such as performance analysis, personalized training recommendations, and feedback-based improvements, supporting users in enhancing their employability and career readiness.

This project not only aims to empower job seekers by connecting them with meaningful employment opportunities but also supports regional economic growth by facilitating more efficient job placements. Through the use of modern web technologies, the PGRKAM Web Application aspires to set a new standard in public service employment platforms, contributing to a more robust and accessible job market in Punjab.

2   RESEARCH METHODOLOGY

The development of the PGRKAM web application involved a structured methodology to ensure it meets the needs of job seekers and employers in Punjab. This section outlines the main stages in designing, developing, and refining the application.

User-Centric Design The PGRKAM application was designed using a user-centered approach to address the unique requirements of job seekers. Initial feedback was gathered through surveys and focus groups with users from various demographic backgrounds. Key concerns such as job search efficiency, resume management, and notification preferences were identified as high-priority areas. This feedback informed the platform's primary features, including job search and filtering, save and track jobs, and application tracking. The goal was to make the platform intuitive and accessible, ensuring that users could navigate it easily and efficiently.

Technology Stack The application was developed using a robust technology stack that emphasizes performance, scalability, and user experience. The front end was built with ReactJS to create a dynamic, responsive, and user-friendly interface. The back-end employs Node.js with Express for server-side processing, and MongoDB for database management, ensuring efficient data handling and storage for user profiles, job listings, and job application tracking. This stack allowed for a scalable design, capable of supporting real-time job updates and messaging features. Additionally, the tech stack was chosen to support future integration needs, such as advanced analytics and API integrations for job listings.

Job Listings and Data Management The platform offers comprehensive job listing functionalities sourced from public employment data and private sector job portals via APIs. Listings are updated in real-time and filtered based on user-defined criteria like skills, location, and experience level. An admin dashboard allows authorized personnel to manage job postings, monitor applications, and track platform usage. Resume management and profile settings enable users to customize their job search experience, saving relevant job postings and updating application statuses as they progress through the hiring process.

Application Tracking and Notifications The application tracking system provides users with updates on their job applications, while a notification feature alerts them to new job postings, application status changes, and messages. This tracking capability improves transparency, keeping users informed of their progress. The notification system uses both email and in-app messages, ensuring that users do not miss critical updates

Testing and Iterative Development An Agile development methodology was followed, enabling continuous iteration based on user feedback. Each feature was tested through multiple cycles, focusing on usability, security, and responsiveness. Peer reviews and feedback sessions were conducted with university stakeholders to refine the design, improve features, and resolve issues. Regular testing ensured that all components, from user authentication to application tracking, met high standards of performance and reliability.

Through these methodologies, the PGRKAM web application strives to improve job accessibility and employment outcomes for users in Punjab by offering a streamlined and responsive platform tailored to their needs.

3   THEORY AND CALCULATION

3.1 Theory

The foundation of the PGRKAM web application lies in principles of user-centered design, data-driven decision-making, and job search optimization. The application aims to support job seekers in Punjab by centralizing job data, streamlining application processes, and enhancing job search efficiency through real-time data and responsive features. This project draws upon three primary theoretical frameworks:

Data-Driven Decision-Making: The application enables users to make informed decisions by providing data on job trends, skills required, and application status. Job seekers can track application outcomes and engage with the platform through real-time updates, allowing them to make timely decisions. This data-driven approach supports efficient job search strategies and enables users to target applications that align with their skills and career objectives.

User-Centered Design: This theory emphasizes the importance of designing platforms that meet the specific needs and behaviours of users. By implementing features like personalized job filtering, resume management, and application tracking, the platform ensures a user-friendly experience. Real-time notifications and responsive design make the platform easily accessible, enhancing user engagement and satisfaction.

Job Search Optimization and Application Tracking: The platform is grounded in theories of job market efficiency and transparency. By consolidating job postings from various sources and providing robust filtering and tracking capabilities, the application minimizes redundancy and improves accessibility to relevant job opportunities. An admin dashboard further supports transparency and efficiency by allowing employers to post and monitor jobs.

3.2 Calculations

To assess the platform's impact on user engagement, job search effectiveness, and application tracking, several performance metrics and calculations are applied:

Engagement Metrics: To measure user engagement, metrics such as login frequency, average session duration, and interactions with key features (like job saving, tracking, and profile management) are calculated. These metrics are tracked by monitoring user activity over a set period, and increased engagement is expected to correlate with higher user satisfaction and trust. High interaction rates with features like job tracking and notifications would indicate that the platform is meeting user needs effectively.

Job Application Success Rate: The job application success rate measures the percentage of applications that receive employer responses, calculated by tracking each application's progress from submission to response. A higher success rate would suggest that the platform's job recommendations and filtering options are effectively connecting users with suitable job opportunities, enhancing the overall job search experience.

Profile Completeness Score: Each user profile is scored based on the completion of essential elements, such as uploading a resume, filling in profile details, and saving job preferences. A completeness score is calculated by assigning points to each completed section, with the total score expressed as a percentage. A high profile completeness score typically correlates with a more satisfying user experience, as complete profiles tend to receive more job matches, leading to increased satisfaction.

Application Tracking and Notification Effectiveness: The effectiveness of the application tracking system is measured by how promptly users respond to application status updates and notifications. Metrics include the response time to notifications and actions taken after receiving updates. Quick and frequent responses indicate that users find the tracking and notification features valuable, thereby improving the efficiency and engagement of the job application process.

This structured approach ensures that the PGRKAM web application provides a measurable and effective solution for job seekers, enabling efficient job search, enhanced engagement, and a streamlined application process.

4   RESULTS AND DISCUSSION

4.1 Results

The PGRKAM web application was developed to assist job seekers in Punjab by providing a centralized, user-friendly platform for job searching, application tracking, and profile management. Preliminary testing and user feedback indicate positive outcomes in terms of the platform's functionality, ease of use, and potential to improve job search efficiency.

Key Findings

User Authentication and Authorization: The platform features a secure authentication system designed to protect user data and ensure that only authorized users can access their personal profiles, job listings, and application tracking features. This robust security system has instilled confidence in job seekers, knowing their information is secure and accessible only by them. Employers benefit from this as well, as it ensures they interact with verified candidates, reducing the risk of unauthorized or fraudulent applications.

Job Search and Filtering: The job search and filtering feature allows users to find job postings that closely match their skills, location, and experience level. This capability has greatly improved the relevance of job recommendations, enabling users to focus only on the most suitable job opportunities. Preliminary feedback indicates that job seekers find the search experience more efficient, saving time and helping them locate opportunities that align with their qualifications and preferences.

Save and Track Jobs: Users can save jobs they are interested in and track their application status through an easy-to-use dashboard. This functionality enhances user engagement by helping job seekers stay organized throughout their job search. Users particularly appreciate being able to manage multiple job applications simultaneously, allowing them to strategize and follow up effectively on their progress.

Resume and Profile Management: The PGRKAM platform provides users with tools to manage their profiles and upload multiple resumes tailored to different job applications. This feature has been positively received, as it enables users to customize their resumes to specific job postings, enhancing their competitiveness. Profile management also allows users to maintain a professional presence on the platform, which is valuable in today's job market.

Admin Dashboard for Job Posting and Management: Employers using the platform have access to an intuitive admin dashboard where they can post jobs, monitor applications, and interact with candidates. This streamlined job posting and management system allows employers to reach qualified candidates more efficiently. Feedback from employers highlights that the dashboard significantly simplifies the recruitment process, making it easier to manage multiple openings and candidate interactions.

4.2 Discussion

Enhancing Job Search Efficiency and User Engagement The platform's job search and filtering, along with the save and track job features, represent a considerable improvement over traditional job search method. By enabling users to personalize their job searches and manage applications in one place, the platform encourages regular engagement. This approach addresses common frustrations among job seekers who often face fragmented searches across multiple sites, and early feedback suggests that this has improved user satisfaction.

Building Trust and Security for Users and Employers: The secure authentication system, along with messaging and application tracking features, promotes trust among both job seekers and employers. Job seekers appreciate knowing their information is protected, while employers feel confident interacting with verified candidates. This trust is critical for increasing the platform's adoption and retention rates. Going forward, the platform can strengthen this trust by regularly updating its security measures to ensure continued data protection.

Improving Application Tracking and Transparency The application tracking feature enhances transparency in the job search process by allowing users to monitor each stage of their application. This added transparency benefits job seekers, who feel more informed and confident in their job search, and employers, who find it easier to manage candidate interactions. The notification system, which provides timely updates, has been particularly appreciated by users for promoting engagement and ensuring they remain aware of application statuses.

Challenges and Areas for Future Development: Sustaining high engagement on the platform may require additional feature enhancements, as well as educational resources to support digital literacy for newer users. Tutorials and support materials could further improve the user experience, making the platform accessible to all. Additionally, as the platform grows, scalability will become increasingly important. Future development plans should include measures to enhance server capabilities and optimize data handling to ensure the platform remains efficient as the user base expands. Ensuring robust data protection will also be essential, especially as the user base grows, making regular updates to security protocols a priority.

Potential for Feature Expansion: The platform has shown early success, and future versions could integrate more advanced features, such as job market analytics, industry trends, and tools for mock interview preparation. Expanding the platform to include features that support employer branding and virtual job fairs could also further enhance the platform's value for job seekers and employers alike.

5   CONCLUSIONS

The PGRKAM web application highlights the potential for digital tools to transform the job search experience by providing job seekers with a centralized, accessible, and secure platform. By integrating features such as personalized job search and filtering, application tracking, secure authentication, and messaging, the platform addresses critical challenges in the job market, making it easier for users to find relevant job opportunities and manage applications efficiently. Initial testing results indicate that the application effectively enhances job search efficiency and user engagement, while also building trust among job seekers and employers. Moving forward, the focus will be on expanding the platform's features to include advanced analytics for job market trends and tools to support users in further preparing for employment. Additionally, future work will test the scalability of the application to ensure it can handle a larger user base without compromising performance or security. By continually enhancing its features and user experience, the PGRKAM web application aims to become an essential resource for job seekers, supporting their journey to find meaningful employment opportunities and contributing to the region's economic development.

6   DECLARATIONS

We, the authors, confirm that we have all contributed to the development, implementation, and evaluation of the PGRKAM web application for employment data. This manuscript is our original work and has not been submitted elsewhere.

6.1   Study Limitations

The main limitations observed for the PGRKAM application relate to scalability and digital literacy among some users. As the platform's user base grows, additional resources and optimizations may be needed to maintain performance. Additionally, providing tutorial materials may help users with varying levels of digital literacy navigate the platform more effectively.

6.2   Acknowledgments

6.3   Funding source

6.4   Competing Interests

The authors declare no competing interests related to this publication, ensuring that the research and findings presented are free from bias and dedicated to improving employment search efficiency through digital innovation.

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