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JOB BRIDGE : Web Based Migrant Labour Management and Job Assistance System

P.Saranya[1]
[1]Assistant Professor, Department of Computer Science and Engineering,
Government College of Engineering Srirangam, Tamil Nadu, India
saranyap@gces.edu.in

A Asha [2], R Jayadharshini [3], P Keerthana [4], V R Srinithi [5]
[2,3,4,5]UG Student, Department of Computer Science and Engineering,
Government College of Engineering Srirangam, Tamil Nadu, India

Abstract - Migrant workers in Tamil Nadu often face limited job opportunities, unstable employment, and low wages, with little access to benefits like healthcare or housing. This instability makes it difficult for them to improve their living conditions. To address this issue, our platform provides a structured way for migrant workers to find suitable jobs. It allows both workers and employers to create profiles, enabling employers to post job listings with key details such as location, salary, and requirements. A built-in recommendation system (RS) matches workers with relevant opportunities based on their skills and preferences. Additionally, the platform features a community dashboard, where users can interact, share job posts, seek assistance, and communicate with others. Key sections like Home, Feedback, Grievances, and Help foster a supportive environment for workers. By bridging the gap between job seekers and employers, this platform aims to enhance employment accessibility and improve the livelihoods of migrant workers.

Keywords-Post job listings, Recommendation System, Community Dashboard, Feedback.

1. Introduction

In recent years, the movement of migrant laborers from rural to urban areas has increased significantly due to economic pressures and the search for better livelihood opportunities. However, despite their critical contribution to various industries such as construction, manufacturing, and agriculture, migrant workers continue to face numerous challenges in securing stable employment. These include a lack of access to job information, communication barriers, exploitation due to unregulated hiring practices, and limited technological literacy.

The traditional modes of employment, such as word-of-mouth or informal contracts, often fail to provide job transparency. Furthermore, the absence of a centralized digital platform tailored specifically for the needs of migrant laborers hinders their ability to find appropriate job opportunities that align with their skills and preferences.

To address these issues, we propose **Job Bridge**, a web-based system developed to bridge the gap between job seekers and employers in an organized, transparent, and efficient manner. The system is designed to simplify the job search process for migrant laborers while providing employers with access to a large, categorized pool of workers.

At the core of **Job Bridge** is a **content-based filtering** techniques to deliver accurate, personalized job suggestions. This ensures that workers receive recommendations not only based on their own profile and skillsets but also on the preferences and behaviors of similar users.

In addition to job recommendations, **Job Bridge** offers several integrated features such as user registration, employer dashboards, real-time job alerts, and administrative reporting. These functionalities aim to streamline the hiring process and promote better interaction between laborers and employers.

Through this system, we aim to enhance the visibility of employment opportunities, reduce job mismatch, and ultimately contribute to the socioeconomic development of migrant workers by empowering them with the right tools and access.

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2. Literature Survey

Recommendation systems have grown in significance across industries ranging from e-commerce to education, due to their ability to personalize user experiences and optimize decision-making. This literature survey reviews research work focusing on content-based filtering, collaborative filtering, hybrid models, and algorithmic enhancements such as Hidden Markov Models (HMMs) in recommendation systems.

Early systems focused on **collaborative filtering** (CF), which utilizes user behaviour such as ratings or purchase history to recommend items. Content-based filtering (CBF), on the other hand, depends on item attributes and user preferences to deliver recommendations. **Hybrid models** have since emerged to combine the strengths of both, mitigating limitations such as the cold-start problem and data sparsity.

Several studies demonstrate the effectiveness of hybrid approaches. Tewari et al. [3] integrated content filtering, CF, and association rule mining to enhance book recommendations. Claypool et al. [8] explored a newspaper recommendation system combining user opinions with content-based preferences, achieving better personalization.

Keyword filtering and opinion mining techniques further improved accuracy. Bhure and Adhe [6] analysed user feedback for recommendations, while Sharma and Gera [13] identified challenges and future research opportunities, particularly in dynamic environments.

In academic and campus contexts, Karbhari et al. [18] proposed a placement recommendation system based on academic profiles and certifications. This approach tailored job suggestions using a **content-based filtering strategy**, efficiently matching candidates with employer criteria.

Advanced algorithmic models such as **HMM-based filtering** have been explored by Hui Li et al. [19], showcasing higher precision than traditional vector-space models due to probabilistic learning and clustering based on genre sequences.

These works highlight a consistent trajectory toward **personalization**, scalability, and real-time adaptability in recommendation systems.

3. Proposed Model

The system enables both workers and employers to register and create profiles, facilitating effective job matching. Employers can post job opportunities, making them more visible and accessible to workers. Based on individual profiles, skills, and qualifications, the system provides personalized job recommendations to workers. Additionally, a community dashboard allows workers to engage with one another, share posts, seek support, and collaborate, enhancing user interaction and support within the platform**.**

Registration - The system provides distinct registration processes tailored for both employers and workers to ensure a smooth and organized onboarding experience.
For workers, the registration process involves the collection of essential personal information, including full name, gender, age, residential address, mobile number, job interests, and educational qualifications. This data plays a crucial role in building a well-rounded profile that reflects the worker's skills, preferences, and employment background. On the other hand, **employers** are required to register by providing their name, contact information.

Job Openings - The system allows employers to post job openings with all the necessary details to attract the right candidates. During the job posting process, employers can specify key information such as the **job title**, **location**, **salary**, **working hours**, **type of employment** (e.g., full-time, part-time, contract), and a brief **job description** outlining the required skills and responsibilities. Providing this detailed information helps create transparent and informative job listings, which significantly improves the chances of attracting suitable and qualified workers. For workers browsing through opportunities, these clear and structured listings make it easier to assess whether a job aligns with their preferences, skills, and availability.

Recommendation - The system features an intelligent job recommendation mechanism designed to connect workers with job opportunities that closely match their skills, preferences, and interests. This functionality analyses various factors such as the worker's profile information—including job interests, qualifications —as well as their search history and overall interaction patterns within the platform. Using this data, the system dynamically suggests job openings posted by employers that align with the worker's qualifications and preferences. For example, if a worker frequently searches for construction jobs, the system prioritizes showing similar openings.

Community Dashboard - The platform includes a dedicated Community Dashboard designed to foster interaction, support, and knowledge sharing among workers. Through this feature, workers can become part of an online community within the website where they can connect with others, ask questions, share experiences, and

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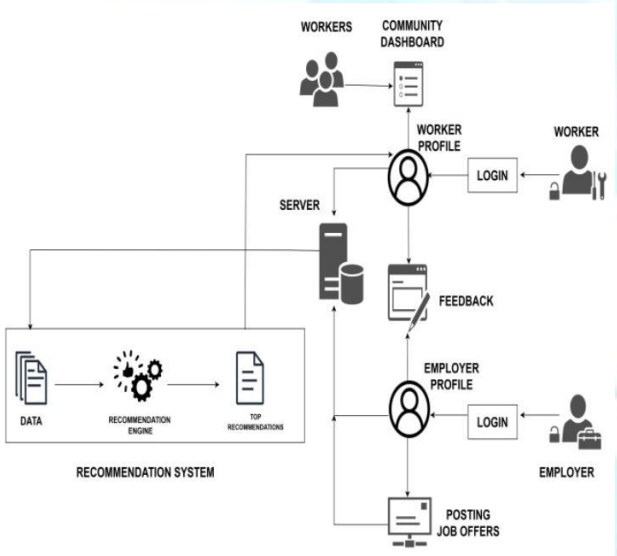
exchange useful information related to job opportunities, workplace experiences, skill development, and more.

Feedback - The platform includes a dedicated **Feedback Section** where both workers and employers can share their opinions, experiences, and suggestions regarding the website's functionality and services. This feature allows users to express their satisfaction levels, report issues, or recommend improvements, ensuring the platform remains responsive to their needs. **Workers** can use the feedback section to comment on the job-matching experience, ease of navigation, usefulness of the job recommendations, or any challenges they faced during registration or application processes. **Employers** can provide feedback on the quality of candidate profiles, the efficiency of the job posting process, and their overall hiring experience on the platform.

SYSTEM ARCHITECTURE



4.System Architecture

The **Job Bridge** is thoughtfully designed to cater to the needs of both migrant workers and employers, providing them with distinct user experiences through **separate login interfaces** and **individual profiles**. Once registered and logged in, **employers** gain access to a personalized dashboard where they can manage their information and **post job opportunities** directly from their profiles. These job postings are stored and managed in a **MongoDB database**, ensuring fast and efficient data handling.

On the other hand, **migrant workers** can log in to their dedicated profiles where they can **update their personal and professional details**, search for jobs, and view job offers posted by employers. This separation of roles ensures clarity, personalization, and secure access for each user type.

A key component of the system is the **Feedback Dashboard**, which is accessible to both workers and employers. Here, users can **submit suggestions, report issues, and provide general feedback** about their experience with the portal. This feedback is crucial for the continuous improvement of the platform, enabling administrators to identify common concerns and implement necessary enhancements over time.

Another important feature is the **Community Dashboard**, a collaborative space designed specifically for migrant workers. This area allows workers to **interact with one another**, share experiences, **seek emotional or professional support**, and even **discuss job opportunities**. Workers can also share job posts originally uploaded by employers, fostering a sense of mutual help and community-building among users.

To enhance job discovery and make the job search process more efficient, the system incorporates an intelligent **Recommendation System**. This system analyses data such as the **worker's profile information, job search history, selected interests, and behavioural patterns** to suggest **personalized job listings** that align with their preferences. All relevant data is drawn from the MongoDB database, which acts as the central repository for storing worker profiles, job listings, feedback entries, and interaction logs. The recommendation engine ensures that workers are exposed to the most relevant job opportunities without needing to search extensively, ultimately increasing the chances of successful job matches.

In summary, this system architecture supports a **robust, interactive, and intelligent platform** that not only connects workers with potential employers but also nurtures a supportive community, encourages user feedback, and uses data-driven recommendations to enhance the overall user experience.

5.System Implementation

The **front-end** of the Job Bridge focuses on creating an intuitive and responsive user interface using technologies like HTML, CSS, and JavaScript. Separate login and registration forms are provided for migrant workers and employers, allowing each to access personalized dashboards. Workers can update their profiles, browse job

listings, and interact in the community section, while employers can post job offers . The interface also includes sections for submitting feedback and viewing recommendations, all designed with user-friendly navigation and accessibility in mind.

The **back-end** is responsible for handling the application's core logic and data processing, built using either Node.js with Express.js. It manages all API endpoints for user authentication, profile management, job posting, feedback collection, and community features. The back end ensures processes data, and communicates with the database, maintaining a secure and efficient connection between the front end and the data layer.

The **database** uses MongoDB to store and organize the platform's data. It contains collections such as users (for worker and employer profiles), jobs (for job listings), feedback (for user suggestions and complaints), and community feeds (for worker interactions). Each collection is structured to support quick access and scalability. Relationships are defined logically, such as linking job posts to employer accounts and feedback to user profiles.

The **recommendation system** is designed to personalize the job-seeking experience for workers. It analyses each worker's profile details, job search history, preferred job categories, and browsing behaviour to suggest the most relevant job opportunities.

This can be achieved using basic filtering algorithms like content based filtering based on tags and preferences, or more advanced machine learning techniques if required. The system retrieves job data from the MongoDB database, compares it with the user's profile and activity logs, and dynamically displays the best-matched job offers on the worker's dashboard. This not only saves time for users but also improves job matching accuracy, enhancing the overall effectiveness of the platform.

By matching the attributes of available job postings with the information provided in a worker’s profile. This method focuses on the content or characteristics of the job listings—such as required skills, job category, and job type—and compares them to the worker’s preferences, skills, and past behavior. For example, if a worker has listed skills like "carpentry" and "painting," and the system filters job listings in the database that include these keywords or tags. It then ranks and recommends those that best align with the user's profile.

This filtering is done by querying the MongoDB database, where both user data and job listings are stored in structured formats. The backend service (built using Node.js or Python) retrieves the worker’s profile and uses conditional logic or simple matching algorithms to compare it with each job post. The jobs that meet the highest number of matching criteria are considered the most relevant and are shown on the worker's dashboard. This approach ensures that each worker receives job suggestions tailored to their individual qualifications and interests, without relying on external factors or other users' data, making it an efficient and straightforward method for personalized recommendations.

6.Conclusion

The Job Bridge is a comprehensive and impactful platform designed to bridge the gap between migrant workers and potential employers by offering a secure, interactive, and user-friendly digital environment. Through separate login systems and personalized dashboards, it effectively caters to the unique needs of both workers and employers. Key functionalities such as job posting, profile management, feedback submission, and community interaction promote transparency, collaboration, and continuous improvement of the portal.

The integration of a recommendation system further enhances the user experience by providing personalized job suggestions based on individual preferences and behaviour, thereby increasing the chances of suitable job matches.

The system's architecture is supported by a robust backend, a scalable MongoDB database, and a responsive frontend interface, ensuring

Overall, this project not only addresses the employment challenges faced by migrant workers but also empowers them by providing equal access to opportunities and a sense of belonging through digital connectivity. It stands as a meaningful step toward inclusive employment solutions in today’s digital age.

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