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TimeBank - Hourly Job Posting & Hiring Platform

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Abstract- In this paper, we present TimeBank, which functions as a web application that enables Indian employers to establish and fill hourly employment positions. This initiative aims to address the problems associated with temporary labor. The service provides open-access structured hourly employment services which differ from Uber and Swiggy that limit their work to assigned tasks and Indian gig portals which primarily offer full-time job and long-term contract and project-based freelance work. The application uses a secure MERN stack architecture and includes features like real-time job posting and smart search and filtering and built-in time tracking and secure wallet-based payment gateways and a transparent rating and review system. The platform serves as the primary resource for student freelancers and employers who need to hire workers on an hourly basis with quickness and responsibility.

Keywords— Gig Economy, Job Matching, Time Tracking, Secure Payments, MERN Stack, Hourly Jobs

I. INTRODUCTION

The gig economy has experienced rapid expansion which has caused people to change their working methods. People today seek employment opportunities which provide them flexibility through short work assignments instead of full-time jobs. Business digitization together with affordable internet access and widespread smartphone usage have created this technological transformation. In India gig jobs serve as the preferred choice for students and freelancers and part-time workers because they enable better management of academic requirements and family obligations and financial responsibilities.

Current job platforms do not provide adequate support for hourly and short-term employment because they fail to meet the needs of increasing gig work demand. The main focus of many platforms centers on particular services which include ride-sharing and food delivery whereas traditional job portals primarily showcase full-time job openings. Users face difficulties when they search for organized hourly work opportunities because existing platforms lack proper structures to present available jobs which include event assistance and temporary services and academic support and local tasks. The hiring process requires social media and personal contacts for informal recruitment which results in problems including delayed payments and lack of accountability and diminished trust between parties involved.

TimeBank solves these problems by offering a specialized platform which enables users to create and fill hourly job openings. The system allows job seekers to connect with job posters directly while maintaining an unbiased system which operates with clear rules. The system provides essential functions through its verified user profiles and automated time tracking and secure wallet-based payments and transparent rating and review system. The system uses these features to minimize payment disputes while maintaining accurate work records and establishing trust between users.

The TimeBank platform is developed using the MERN technology stack, which supports real-time job discovery and intelligent job matching within a scalable web environment. The system benefits students and freelancers and small businesses who need to hire workers for flexible short-term positions that do not require extended employment. Overall, TimeBank provides a simple, secure, and scalable solution for hourly employment and responds directly to the increasing demand for flexible work opportunities in India and similar regions.

II. PROBLEM STATEMENT

Rapid growth of Gig economy in India is witnessing a major shift in people's employment patterns with most of digital job platforms still catering to full-time or long-lasting contract jobs mainly. This situation has created a challenging scenario for the people wanting to work absolutely in a short period or with flexible timings. This in turn has created a situation for the job seekers where there is a lack of payment methods, unreliable employers, and transparency in the hiring process. The same scenario is faced by the job posters who are no longer to connect quickly with the reliable and trustworthy workers for the urgent or short-duration tasks.

Moreover, these problems are further enhanced by informal hiring methods like social media posts or word-of-mouth referrals. These approaches while being convenient, lack accountability, often have no verification, and disputes over work-hour or payment issues are common in these cases. Besides, many existing platforms still do not have user-friendly rating systems, secure payment options, or smart job-matching features tailored for hourly work.

Thus, there is a strong need for a single platform that can provide real-time job discovery, accurate matching between workers and jobs, secure wallet-based payments, transparent time tracking, and verified user profiles. TimeBank is developed to fulfill this requirement through a structured, reliable, and user-friendly platform which simplifies and secures the process of posting and hiring hourly jobs.

III. LITERATURE REVIEW

The academic community has widely studied the rapid expansion of the gig economy through digital platforms that create new employment opportunities. Popular platforms such as Uber and Swiggy mainly provide service-specific work like transportation and food delivery through platform-controlled task assignment [6]. In India, many job portals focus on permanent or contract-based employment rather than short-term hourly work. TimeBank addresses this gap by enabling users to work across multiple job categories through a flexible hour-based system instead of restricting them to a single service.

Previous research indicates that gig platforms function as digital systems that allow workers to shift from traditional employment to task-based work arrangements [1]. The platforms provide students, young professionals, and part-time workers with flexible schedules and extra income possibilities [2]. Indian online job platforms experienced their fastest growth during the past ten years because affordable internet access and widespread smartphone usage improved digital employment platform accessibility [12].

Research demonstrates that current gig systems face multiple operational challenges. The majority of platforms either provide complete support for full-time jobs or establish strict controls over gig work, which creates difficulties for handling hourly work assignments [3]. Trust issues arise because clients fail to pay their bills on time and they make errors in calculating wages [4]. Employers also face difficulties in finding dependable workers quickly for short-term tasks. The existing limitations demonstrate the necessity for TimeBank, which functions as an organized platform that enables businesses to monitor their hourly worker usage.

The literature presents algorithmic management as an essential concept according to which automated systems control job assignments, monitor worker performance, and determine employee evaluations [5], [9]. These systems enhance operational performance; however, their decision processes can create confusion and lead people to view systems as unjust when their decision-making methods remain hidden [10]. TimeBank addresses this issue by implementing transparent job matching systems, visible rating systems, and documented working hour records, which eliminate the need for hidden automated processes.

Successful gig platforms require trust-building mechanisms that include verified user profiles, secure payment systems, transparent review systems, and dispute resolution processes according to research findings [7], [11]. Platforms that lack these elements often rely on informal operating methods similar to social media-based hiring systems, resulting in payment delays and insufficient accountability. TimeBank uses verification methods, digital time tracking, and established payment systems to minimize these risks.

Research shows that payment system reliability functions as a primary factor determining worker satisfaction and retention in digital labor platforms [8], [13]. The system provides payment proof through digital wallets, automated payment calculations, and clear earning records, which also help to avoid payment disputes. TimeBank creates a trustworthy system for temporary work through its implementation of these system components. Flexibility in work scheduling and transparent time management systems are essential for improving trust between job posters and job seekers while enhancing overall platform efficiency [14]. Current research identifies three primary obstacles in present gig platforms: lack of structured hourly employment regulation, insufficient operational transparency, and weak trust mechanisms. TimeBank provides a practical solution by offering flexible work opportunities through transparent processes and dependable systems that fulfill the requirements of the Indian gig economy.

IV. METHODOLOGY

The TimeBank system uses structured methods to manage hourly work while maintaining transparency in employee time records. The platform supports open recruitment through transparent job matching, accurate time tracking, and secure digital payments. The short-term employment system achieves

fairness and scalability through trust mechanisms and algorithmic transparency.

Requirement Analysis
The requirement analysis identified limitations in existing gig platforms, particularly the lack of proper hourly work management and reliable trust systems. Most platforms focus on full-time or predefined services and do not effectively support short-term employment.

The system requirements included user registration, job posting and searching, automated job matching, time tracking, digital payments, and a rating system. The project established both functional and non-functional requirements to achieve system scalability and security and efficiency and good user experience.

System Architecture
The TimeBank system implements its components through a layered architecture which enables them to function separately while maintaining their ability to expand.

- Application Layer: This layer delivers the user interface to users.
- Business Logic Layer: The system handles authentication processes together with job management tasks which include matching and time recording and payment processing operations.
- Data Layer: The system stores user data and job information and time records and transaction details and user ratings in a secure manner.

The structure of the system leads to better operational efficiency and simpler system upkeep and increased capacity for growth.

User Registration and Profile Management
Users register as either job seekers or job posters by providing details such as skills and availability. Role-based access control enables users to use only the specific system functions which match their job responsibilities which helps to protect system security. Users can modify their profile information which assists them in enhancing their matching capabilities.

Job Posting and Job Discovery
Job posters create hourly job listings which include details about required skills and job duration and job location and payment rate. Job seekers can search and filter jobs based on skills and location and availability and wage range which helps them find suitable opportunities quickly.

Job Matching Process
The system uses predefined rules to evaluate candidate suitability and calculate matching scores. The system ranks candidates automatically to create a selection process that operates both fairly and transparently. The system includes automatic time tracking which records start times and end times while preventing overlapping sessions and providing accurate payment calculations to decrease payment disputes.

Payment Processing
TimeBank uses a prepaid payment system that operates through wallets to provide users with secure transaction methods. Job posters deposit funds before work begins to guarantee payment. The system calculates payments automatically by using verified working hours which are then sent to the job seeker's wallet. The system maintains a complete record of all transactions to achieve both transparency and auditing purposes.

Rating and Review System
Users complete job work that leads to them providing ratings and feedback about their experience. The system updates reputation scores to reflect performance and promote professional behavior which helps build trust among users.

Security and Privacy
The system implements security measures which include authentication and role-based access control together with data validation methods and secure storage solutions. The system protects personal and financial data while creating a safe and reliable employment platform.

V. ALGORITHMIC SPECIFICATIONS

This section explains TimeBank job matching through its mathematical enhancements that handle time tracking, payment computation, dispute resolution, analytics, and system validation processes. The algorithms operate to maintain transparent and fair processes which can expand their usage across multiple workplaces for assessing employee performance throughout their scheduled hours.

Job Matching Algorithms
The job matching mechanism uses a multi-factor weighted scoring model to evaluate compatibility between a job seeker and a job posting.

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Skill Matching with Exact Match Bonu The system calculates skill compatibility through an advanced Jaccard Similarity model which includes an exact match reinforcement mechanism.

$$\left(\frac{|\text{UserSkills} \cap \text{JobSkills}|}{|\text{UserSkills} \cup \text{JobSkills}|}\right) 0.8 + \left(\frac{|\text{UserSkills} \cap \text{JobSkills}|}{\max(|\text{UserSkills}|, |\text{JobSkills}|)}\right) 0.2$$

The first term ensures proportional overlap, while the second term rewards stronger exact alignment. The hybrid structure achieves its purpose through two matching systems which prevent any overestimation issues that result from partial matches.

C. Location Matching – Multi-Level Scoring

Location compatibility is evaluated using a categorical scoring system:

- Exact location match = 1.0
- Same city = 0.8
- Same state = 0.6
- Different location = 0.2

This structured scoring allows flexible geographical matching while maintaining preference for proximity.

D. Time Tracking Algorithms

The complete system includes time tracking mechanisms that use validation rules, overlap detection, efficiency monitoring, daily work limits, and performance evaluation.

2.1 Manual Entry Validation

The system requires all time entries to satisfy the following conditions:

$$\text{EndTime} > \text{StartTime} \quad (2)$$

$$(\text{EndTime} - \text{StartTime}) \leq 12 \text{ hours} \quad (3)$$

Overlap Detection Condition: The system verifies that no time slots conflict with existing entries:

$$\neg((\text{NewEnd} \leq \text{Existing Start}) \vee (\text{NewStart} \geq \text{Existing End})) \quad (4)$$

Daily Work Limit Enforcement:

$$\sum(\text{AllDurations}) \leq 12 \text{ hours} \quad (5)$$

2.2 Live Timer and Efficiency Calculation

The system calculates effective work time by deducting all pause durations from total working hours:

$$EWT = (T_{end} - T\text{start}) - \sum P\text{pause} \quad (6)$$

Efficiency percentage is computed as:

$$\text{Efficiency} = \left(\frac{\text{Effective Work Time}}{}\right) \times 100 \quad (7)$$

The system achieves precise productivity measurements that establish appropriate payment connections between work output and financial compensation.

E. Payment Processing Algorithms

TimeBank implements a tiered commission model with statutory GST inclusion.

3.1 Commission Calculation:

$$\text{Commission} = \text{Amount} \times \text{Commission Rate} \quad (8)$$

3.2 GST Computation:

$$\text{GST} = \text{Commission} \times 0.18 \quad (9)$$

3.3 Net Payable Amount:

$$\text{Net Amount} = \text{Gross Payment} - (\text{Commission} + \text{GST}) \quad (10)$$

3.4 Platform Revenue:

$$\text{Platform Revenue} = \text{Commission} + \text{GST} \quad (11)$$

The tiered commission structure enables the platform to model revenue growth according to different transaction thresholds.

F. Analytics Algorithms

The analytics module tracks user engagement, platform expansion, and operational efficiency.

5.1 User Engagement Score

$$\text{Engagement Score} = 0.2 \text{ Login Frequency} + 0.3 \text{ Application Rate} + 0.2 \text{ Profile Completion} + 0.15 \text{ Response Time} + 0.15 \text{ Success Rate} \quad (16)$$

Metric normalization is defined as:

$$\text{Normalized Metric} = \min\left(1.0, \frac{\text{Actual Value}}{}\right) \quad (17)$$

5.2 Platform Performance Metrics

User Growth Rate:

$$\text{User Growth} = \frac{\text{Current Users} - \text{Previous Users}}{} \times 100 \quad (18)$$

Churn Rate:

$$\text{Churn Rate} = \frac{\text{Churned Users}}{} \times 100 \quad (19)$$

Application-to-Hire Ratio:

$$\text{Application To Hire} = \frac{\text{Applications}}{\text{Job Postings}} \quad (20)$$

Profit Margin:

$$\text{Profit Margin} = \frac{\text{Total Revenue} - \text{Commission}}{\text{Total Revenue}} \times 100 \quad (21)$$

Net Promoter Score (NPS):

$$\text{NPS} = \%\text{Promoters} - \%\text{Detractors} \quad (22)$$

VI. SYSTEM DESIGN

The system design of TimeBank uses a multilayered structure which enables effective interactions among users and system functions and database elements. The system diagram displays two primary user groups who use the platform through its organized frontend design. The system design enables better system growth and increased system dependability and enhanced system efficiency while protecting confidential information through open verification of hourly work activities. The system architecture operates through three fundamental architectural components.

Application Layer (Frontend)
The Application Layer provides the user interface through which job posters and job seekers interact with the system. The system includes three modules which are Job Posting & Discovery and User Dashboard and Ratings & Reviews. The system enables users to create job postings and search for job opportunities and monitor their income and deliver feedback through an interface which operates in a straightforward and intuitive way.

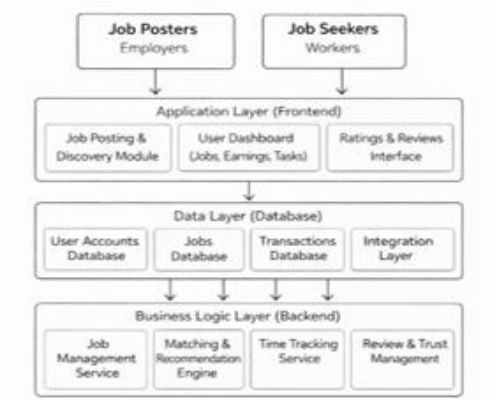

Fig. 1. System Architecture of the TimeBank Platform

The Data Layer uses secure storage methods to handle all system database information protected by its security measures. The system stores user account information and job related data and transaction records in its databases which also support external service integration. The system maintains data integrity through its secure data storage methods which provide users with dependable access to system records.

Business Logic Layer (Backend)
The Business Logic Layer manages the essential system functions which determine system behavior. The system offers multiple services which include job management and matching and recommendation engine and time tracking and review management. The system processes user requests while applying system rules to achieve precise job matching and time recording and payment handling results.

Privacy and Security
The TimeBank platform uses advanced security protocols to safeguard both user information and financial transaction data. The security system utilizes multiple protective measures which include user authentication and role-based access control (RBAC) and data encryption and secure session management. The system protects sensitive data which includes personal information and payment details through secure storage methods that restrict unauthorized access and build user confidence.

Overall Summary
The TimeBank system design which includes multiple security measures and scalable features and a reliable framework for managing hourly job posting and matching and time tracking and payment processing. The system components work together through layered architecture which ensures system components operate smoothly while users maintain full system transparency and system efficiency and their trust in the platform.

Limitations
The platform delivers transparent job matching and secure payment processing and organized hourly work management through its TimeBank system. The rule-based matching system delivers clear and fair results but fails to handle complex personal preferences and working styles and sudden availability changes. The system generates occasional mismatches because its work conditions require dynamic adaptation.

The system needs users to provide accurate and honest information about their skills and availability and their ratings. Users who provide incomplete or incorrect data will create

problems that affect the quality of recommendations. The rating system needs users who post jobs and job seekers to give authentic feedback about their experiences.

Stable internet access is essential for accurate time tracking. People who work in areas with weak network connections will experience slight synchronization problems that need manual checking. The system requires third-party payment gateways to process secure payments which creates temporary delays during high traffic times.

The existing architecture can efficiently handle small to medium workloads. The system needs load balancing and distributed databases and advanced monitoring tools to handle deployment operations across multiple regions.

The platform maintains its operational effectiveness while creating possibilities for upcoming enhancements which will introduce smarter matching methods and offline time synchronization capabilities and advanced fraud detection and infrastructure development for large-scale system use.

VIII. EXPECTED RESULTS

The TimeBank platform will create an organized and transparent system to provide reliable hourly work solutions for users. The platform operates as an open marketplace which enables businesses to search for temporary employees who can perform work across multiple industries.

The platform aims to make short-term job opportunities more accessible to students, freelancers, and part-time workers. The system will create structured job listings which reduce organization dependence on informal hiring methods that use social media and personal contacts while helping organizations achieve their hiring goals with reliable and efficient methods.

The system will improve transparency in job matching through rule-based and explainable mechanisms which show users the process for calculating compatibility scores. The automated time tracking system will decrease work hour disputes because it provides exact proof of finished tasks which leads to accurate payment calculations.

The secure wallet-based transaction system will stop payment problems and financial disputes because it makes job posters pay upfront before their work starts. A mutual rating and review system will create professional behavior among users while establishing long-term trust between users.

The TimeBank project develops a user-friendly platform which increases trust and improves hourly work management while decreasing payment disputes and developing transparent matching processes for India's short-term labor market.IX.

IX. CONCLUSION

TimeBank serves as an essential solution for structured hourly job posting and hiring to meet the growing needs of the gig economy. Existing platforms provide full-time and domain-specific services but they leave hourly workers with no choice except to use informal employment methods. The open digital system of TimeBank provides short-term and hourly work employment rules which enable organized payments and transparent hiring processes.

The platform provides a secure hiring environment through verified user profiles and wallet-based payments and accurate time tracking and open rating systems that build trust among users. The system includes three main components which are the frontend interface and backend processing and secure data storage to deliver system reliability and scalability while supporting new feature implementation without interrupting core functions.

TimeBank creates positive social and economic impact in India through its formal employment opportunities which it provides to students and freelancers and part-time workers and economically disadvantaged individuals. The platform enables financial inclusion through proper payment record management which users can access via their smartphones in both urban and semi-urban areas.

The system uses cloud-based infrastructure to achieve scalability through its ability to process high transaction volumes across multiple locations. The solution provides digital systems for both hourly work and microtask management which can be used across global markets. The transparent algorithms and secure wallet systems increase user confidence while providing organizations with operational control.

The TimeBank system faces three main difficulties which include peak-time scalability and network dependency and matching accuracy problems. The TimeBank system provides a solid base for future development which includes machine learning matching and offline time tracking and distributed system operation and advanced fraud detection capabilities. The TimeBank system enables trustworthy hourly work hiring which decreases disputes while expanding job access through its clear and responsible digital processes which support

sustainable growth in the Indian gig economy and other regions.

REFERENCES

1. A. Sharma and R. Sharma, "The Gig Economy and the Evolving Nature of Work in India," Journal of Digital Economy, India, pp. 156–167, 2025.
2. I. Kadolkar, S. Kepes, and M. V. Subramony, "Algorithmic Management in the Gig Economy: A Systematic Review," Journal of Organizational Behavior, USA, pp. 1057–1080, 2024.
3. M. De Los Santos, K. Do, M. Muller, and S. Savage, "Designing Sousveillance Tools for Gig Workers," in Proceedings of the CHI Conference on Human Factors in Computing Systems (CHI '24), Honolulu, Hawaii, USA, pp. 1–19, Article 384, 2024.
4. J. Hsieh, O. Adisa, S. Bafna, and H. Zhu, "Designing Individualized Policy and Technology Interventions to Improve Gig Work Conditions," in Proceedings of the ACM Symposium on Human–Computer Interaction for Work (CHIWORK '23), Oldenburg, Germany, pp. 1–9, Article 12, 2023.
5. F. Faras, B. S. Mehta, and A. Datta, "Platform-Based Gig Work in India's Labour Market," The Indian Journal of Labour Economics, India, pp. 323–337, 2025.
6. A. Rosenblat and L. Stark, "Algorithmic Labor and Information Asymmetries: A Case Study of Uber's Drivers," International Journal of Communication, vol. 10, pp. 3758–3784, 2016.
7. V. De Stefano, "The Rise of the 'Just-in-Time Workforce': On-Demand Work, Crowd Work, and Labor Protection in the Gig Economy," Comparative Labor Law & Policy Journal, vol. 37, no. 3, pp. 471–504, 2016.
8. M. Wood, M. Graham, V. Lehdonvirta, and I. Hjorth, "Good Gig, Bad Gig: Autonomy and Algorithmic Control in the Global Gig Economy," Work, Employment and Society, vol. 33, no. 1, pp. 56–75, 2019.
9. S. Mateescu and A. Nguyen, "Algorithmic Management in the Workplace," Data & Society Research Institute, New York, USA, Tech. Rep., 2019.
10. A. Gandini, "Labour Process Theory and the Gig Economy," Human Relations, vol. 72, no. 6, pp. 1039–1056, 2019.
11. H. Deng, L. Huang, and X. Xu, "Trust-Based Mechanisms for Online Labor Platforms," IEEE Access, vol. 8, pp. 142134–142145, 2020.
12. S. Rani and S. Furrer, "On-Demand Digital Platforms and Worker Protection: An Indian Perspective," Economic and Political Weekly, vol. 56, no. 12, pp. 45–53, 2021.
13. P. V. Katti, R. K. Gupta, and S. Verma, "Secure Digital Payment Systems for Gig Economy Platforms," International Journal of Information Security, vol. 20, no. 4, pp. 567–580, 2021.
14. M. Lehdonvirta, "Flexibility in the Gig Economy: Managing Time, Trust, and Income," Oxford Internet Institute, Oxford, UK, Working Paper, 2018.