



# Short-Term Job Hiring With Hourly Payments

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**Abstract:** The rising need for short-term work arrangements has created a requirement for an organized system to handle part-time job openings. The research study introduces TimeBank which functions as a web-based platform created to enable safe and efficient process of hourly job requests and candidate selection. The system was built using the MERN technology stack and offers various functions including user authentication, job matching, time tracking, secure payment processing, and a rating system. The testing of the developed system used functional test cases to assess both performance and reliability. The platform demonstrates its capacity to handle short-term work management needs by delivering a complete and expandable solution which enhances trust between job seekers and job posters.

**Index Terms** - Gig Economy, Web Application, Job Matching, Time Tracking, Secure Payments, MERN Stack.

## I. INTRODUCTION

The gig economy expansion has created new methods for people to search for job openings and handle their workforce tasks. Flexible work arrangements that permit short-term employment during available times are the preferred choice of many workers particularly students and people who work part-time. The combination of increased smartphone usage together with better internet access and digital platform development has made online job services accessible to most people. Existing job platforms which concentrate on full-time positions and specific service tasks restrict their users from accessing supervised hourly employment opportunities. Job seekers and job posters depend on social media together with personal contacts as their main hiring methods which results in payment delays and accountability issues and a decline in trust.

TimeBank operates as a web-based platform that enables organized hourly job posting and hiring through its successful implementation to solve these problems. The system establishes a safe and easy-to-use interface which enables job seekers to discover temporary employment and employers to choose dependable staff members. The platform includes important features such as user registration and authentication, job posting and searching, automated job matching, time tracking, secure payment processing, and a rating and review system. These features establish transparent work hour tracking systems which ensure payment accuracy and foster professional conduct among users.

The TimeBank system was developed using modern web technologies, which include React for the frontend and Node.js with Express for backend processing and MongoDB for database management. The system implements a layered architecture design, which divides its user interface and business logic and data storage elements into separate components to achieve optimal system operation and expansion capabilities. The development team conducted testing of the system through various functional test cases, which assessed its performance across different real-world scenarios while checking its accuracy and usability and reliability.

The TimeBank platform implementation provides an effective method to handle hourly work through its organized and transparent system. The system meets the increasing requirement for adaptable work

options while establishing higher levels of trust and operational efficiency and better service access in today's gig economy.

## II. SYSTEM IMPLEMENTATION

The TimeBank system was successfully implemented as a complete web solution which enables structured job posting and recruiting for hourly positions. The system was built using the MERN technology stack which allows users to interact with the system in real time while the system processes data and executes safe financial transactions. The system uses a modular architectural design which enables its components to execute their functions while the system remains operational and performance improvements and system expansion will be possible in the future.

The system consists of three main components which include the frontend interface backend services and database management system. These components work together to ensure smooth communication between users and the system while maintaining data integrity and security.

### 2.1 User Authentication and Registration Module

The User Authentication and Registration module was built to give platform users secure access management capabilities. The system enables people to create accounts as job seekers or job posters by providing their name, email address, password, and skills details. The system checks user input during registration to verify data accuracy while it protects user credentials through encrypted password storage methods.

The login functionality verifies user credentials before granting access to the system dashboard. Role-based access control mechanisms were developed to restrict users from accessing system features which do not belong to their assigned roles. This module functions as a vital security measure which stops unauthorized users from entering the system while it protects the complete system from security threats.

### 2.2 Job Posting and Job Management Module

The Job Posting and Job Management module enables job posters to create, manage, and monitor hourly job listings within the platform. Job posters provide all necessary information about the job through details which include job title and job description and required skills and job location and working hours and payment rate. Job seekers can access stored information because the system keeps it in the database while making it instantly available to them.

The module gives job posters the power to change existing job postings or delete them whenever they need to do so. The implementation maintains consistent accuracy for job information which stays current throughout the system. The system enhances job management operations through its organized data structure which also improves platform accessibility for users.

### 2.3 Job Search and Job Matching Module

The Job Search and Job Matching module helps job seekers find suitable job opportunities through its efficient search capabilities. The system enables users to find current job openings through its search function which uses skills and location and payment rate as search criteria to deliver effective job results.

The system uses its predefined matching criteria to assess candidate suitability for job openings which leads to better recommendation results. The system retrieves relevant job records from the database and presents them in a structured format. The module enables users to quickly find suitable job openings while it streamlines the entire process of recruiting new employees.

### 2.4 Application Review and Selection Module

The Application Review and Selection module was developed to handle the complete evaluation of job applications which job seekers submit for employment positions. The system tracks application information when a job seeker submits an application while it alerts the job poster about the incoming application.

The job poster examines the job seeker's profile which contains skills and experience and ratings to determine whether to hire the candidate. The job poster uses the evaluation results to choose between accepting or rejecting the applicant. The system moves to the job execution phase after the application receives approval. The system sends a decision notification to the job seeker when their application

receives rejection. The module establishes an organized and open recruitment process through its design.

### 2.5 Payment Processing Module

The Payment Processing module was developed to handle financial transactions between job seekers and employers who post job openings. The system uses a secure wallet-based payment mechanism in which job posters deposit funds before the job begins. The system determines total payment after work completion by calculating the payment amount based on documented working hours, which it then transfers to the job seeker's account.

The database securely archives all payment transactions to provide transparent and accountable recordkeeping. The module guarantees users will receive their payments on schedule, which decreases the likelihood that payment conflicts will arise between users.

### 2.6 Rating and Review Module

The Rating and Review module was developed to evaluate user performance and maintain service quality within the platform. After completing a job, both job seekers and job posters can submit ratings and feedback based on their experience.

The system stores rating information and calculates an average rating score for each user. The module promotes professional conduct, which enables users to make choices based on data, while it establishes trust between users who utilize the TimeBank platform.

### 2.7 The Notification and Activity Management Module

The Notification and Activity Management module was developed to provide users with information about critical system events and system updates. The system produces notifications when job application status changes or when users accept or reject jobs or when payments are confirmed or when jobs are finished.

The system uses activity logs to record both user movements through the system and all system functions which take place throughout the day. This functionality enables better system monitoring while it helps to find and fix technical problems which require immediate attention.

### 2.8 System Integration and Deployment Module

The System Integration and Deployment module was created to establish efficient communication between different system components. Application programming interfaces (APIs) were used to connect the frontend interface with backend services and database systems, which enabled smooth data transfer and operational system integration.

The TimeBank platform was established in a cloud-based environment which guarantees 24/7 system operation and system growth and user access to the platform. The system underwent testing with actual user scenarios to determine its operational capabilities and system stability and its complete range of features. The TimeBank system now operates as a complete tool which enables users to handle hourly job postings and recruitment processes after its successful launch.

### III. SYSTEM FLOW

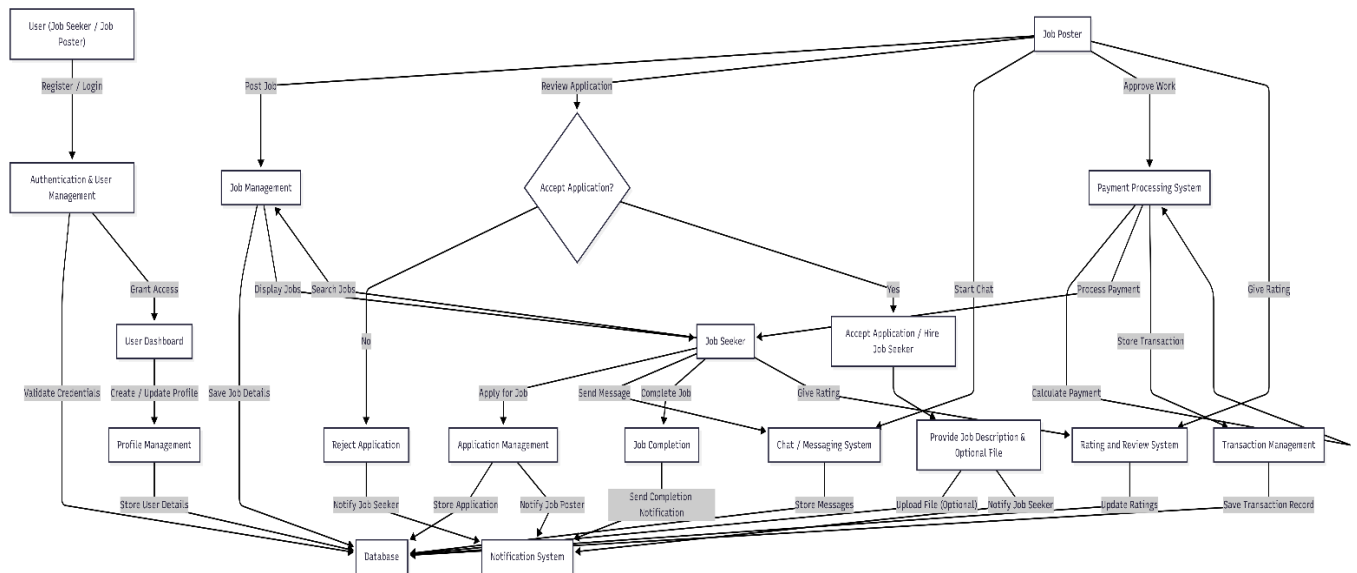


Figure 1. System Flow

The TimeBank system functions as a structured web-based platform which allows job posters and job seekers to post hourly job openings and hire candidates for those positions. The system workflow starts with user authentication and proceeds through the stages of job management and communication and job execution and payment processing and feedback mechanisms. The system workflow demonstrates how a job poster reviews an application before accepting it and then provides a detailed job description along with an optional file attachment which must be completed before job execution begins.

The system starts with the user registration and login process which enables both job seekers and job posters to create accounts using secure credentials for authentication. The authentication module checks user information against the database and permits access to the user dashboard after the user successfully logs in. The dashboard enables users to handle their profile management through personal detail updates and secure storage of their account information which the system database maintains.

The job poster creates and publishes job listings on the job management module after logging in. The module stores job details which include job title and category and required skills and hourly rate and job duration in the database. The system shows published jobs to job seekers who can search for jobs that match their preferences and qualifications after the job gets posted.

The application management module enables job seekers to submit their job applications. The system records the application details in the database and automatically sends a notification to the job poster. The job poster evaluates the job seeker's profile together with their qualifications and previous ratings before making a hiring decision.

The system sends a rejection notification to the job seeker when the job poster chooses to reject the application. The system enters its next phase when the job poster accepts the application because the job poster must now supply a complete job description and any optional documents which may include instructions or essential materials required for the job. The job seeker needs this step to understand the job requirements before beginning work.

The system provides a chat and messaging module which supports instant communication between job seekers and job posters. This communication feature allows users to clarify job requirements, discuss progress, and resolve any issues during the job execution phase. The database maintains secure storage for all user messages which establishes a permanent record while ensuring transparency.

The system creates a completion notification which it sends to the job poster after the job seeker finishes their designated tasks. The job poster assesses the work which has been submitted to check whether it satisfies the established requirements. The job poster approves the job completion after verifying that the work meets required standards and then the system begins payment processing.

The payment processing module calculates the total payment amount based on the agreed hourly rate or job terms and securely transfers the payment to the job seeker. The system records the transaction details in the transaction management module, ensuring accountability and maintaining a financial history for both users.

The system provides a rating and review module which allows job posters and job seekers to present their feedback regarding all aspects of their work together. The database stores ratings and reviews, which together establish a reputation system that assists upcoming users in choosing their job partners. The updated TimeBank workflow establishes a transparent structured job hiring process through its implementation of secure authentication job posting application management job description sharing system with file attachments and communication and payment processing and feedback systems. The design enhances system reliability while creating better user experiences and enabling users to manage short-term hourly job positions which they can find through the platform.

#### IV. MATHEMATICAL MODEL FOR JOB MATCHING AND PAYMENT CALCULATION

The TimeBank system uses mathematical models to automate job recommendation and payment processing. The models establish precise connections between job seekers and job postings which enable payment calculations to be performed transparently through verified working hours. The implementation of these formulas improves system efficiency, reduces manual errors, and supports fair decision-making within the platform.

##### 4.1 Skill Matching Formula

The Skill Matching mechanism was established to match job seekers with appropriate job openings through an examination of their skills and the requirements of available positions. The system compares the set of skills stored in the job seeker's profile with the required skills specified in job postings. A similarity-based scoring method is used to calculate the compatibility between the two skill sets.

The matching score is calculated using the ratio of common skills to the total unique skills between the job seeker and the job posting. The method guarantees that actual skill compatibility serves as the basis for job recommendations.

Skill Matching Formula :

$$\text{Skill Match Score} = \frac{| \text{UserSkills} \cap \text{JobSkills} |}{| \text{UserSkills} \cup \text{JobSkills} |}$$

Where:

UserSkills = Set of skills of the job seeker

JobSkills = Set of skills required for the job

$\cap$  = Intersection (common skills)

$\cup$  = Union (total unique skills)

Match Score Percentage :

$$\text{Match Score (\%)} = \left( \frac{| \text{UserSkills} \cap \text{JobSkills} |}{| \text{UserSkills} \cup \text{JobSkills} |} \right) \times 100$$

The system applies its established threshold criteria to evaluate job compatibility assessment. The system notifies the job seeker about a valid match when the matching score reaches 0.4 (40%) or higher.

Matching Condition: Skill Match Score  $\geq$  0.4

The formula enables organizations to generate job recommendations while enhancing their ability to match candidates with job openings.

##### 6.2 Payment Calculation Formula

The Payment Calculation Formula helps organizations calculate total payment amounts through Time Tracking module. The payment system automatically determines total payment after job completion by using the hourly job rate and confirmed work hours.

Automated calculations manage financial transactions between job posters and job seekers to maintain fairness and transparency while achieving accurate results.

Basic Payment Formula

Total Payment = Hourly Rate  $\times$  Total Working Hours

Where:

Hourly Rate = Payment rate defined by the job poster

Total Working Hours = Time recorded by the time tracking system

### Example Payment Calculation

If: Hourly Rate = ₹300 per hour

Working Hours = 6 hours

Then: Total Payment=300×6

Total Payment=₹1800

## V. TESTING AND RESULT ANALYSIS

The Testing and Result Analysis phase assessed how well the TimeBank system operates for its scheduled job posting and employee recruitment functions while also testing its system reliability and functionality. The system underwent multiple functional and performance tests which confirmed that all system modules functioned according to their detailed specifications. The testing process validated user authentication and job posting and application management and job description sharing with optional file upload and user communication and payment processing and rating mechanisms. The results show that the system operates efficiently during standard conditions while it handles user requests with secure and accurate processing.

The testing methodology used three testing types which included functional testing and integration testing and user acceptance testing. The testing process confirmed that each system module executed its designated functions as intended. Integration testing verified that all system components including authentication and job management and payment processing could exchange data without issues. The user acceptance testing process showed that users could navigate the system interface without difficulties while they interacted with job posters and job seekers. The testing process identified all existing problems which testers fixed during testing to create a system that operated with stable performance and quick response times.

Table 1 Test Cases

No.	Test Type	Description	Results
1	Login Testing	It will validate the correctness of the login mechanism, user authentication, session management, and secure access.	All login functionalities worked correctly; users authenticated successfully and sessions maintained.
2	Registration Testing	Ensures users can register with valid data and proper validation.	Registration successful; validation worked correctly and user data stored in database.
3	Invalid Login Testing	Checks system behavior for incorrect login credentials.	Error messages displayed properly; unauthorized access prevented.
4	Job Posting Testing	Validates job creation, editing, and storage by posters.	Jobs created successfully and displayed in listings.
5	Job Viewing Testing	Ensures users can view job details correctly.	Job details displayed accurately with all required information.
6	Job Application Testing	Confirms seekers can apply for jobs and submit applications.	Applications submitted successfully; status updated and notifications sent.
7	Application Acceptance Testing	Tests poster's ability to accept applications.	Applications accepted successfully; seekers notified.
8	Application Rejection Testing	Ensures poster can reject applications properly.	Applications rejected correctly; status updated.
9	Messaging Testing	Verifies sending and receiving messages between users.	Messages delivered successfully with real-time updates.
10	Message History Testing	Ensures users can view previous messages.	Messages displayed correctly in chronological order.
11	Profile Viewing Testing	Checks if user profile details are displayed correctly.	Profile information shown accurately.

12	Profile Editing Testing	Validates updating user profile information.	Profile updated successfully and changes reflected.
13	Profile Picture Upload Testing	Tests image upload functionality.	Images uploaded and displayed successfully.
14	Payment Processing Testing	Ensures payments are processed correctly.	Payments completed successfully and recorded.
15	Payment History Testing	Verifies transaction history display.	Payment records displayed accurately.
16	Dashboard Testing (Seeker)	Tests dashboard functionality for seekers.	Dashboard displayed correct data and activity.
17	Dashboard Testing (Poster)	Tests dashboard functionality for posters.	Job stats and applicant data displayed correctly.
18	Notification Testing	Ensures notifications are triggered and displayed.	Notifications received and redirected properly.
19	Responsive Design Testing	Tests UI responsiveness on mobile and tablet devices.	Layout adjusted correctly across devices.
20	Session Management Testing	Verifies session persistence and token handling.	Sessions maintained securely without issues.
21	Unauthorized Access Testing	Ensures restricted pages cannot be accessed without login.	Unauthorized users redirected to login page.
22	Performance Testing	Measures system performance and page load time.	Pages loaded within acceptable time; performance stable.
23	Database Performance Testing	Tests query execution and scalability.	Queries executed efficiently without delays.
24	Network Error Testing	Checks system behavior during connectivity issues.	Proper error messages shown; system recovered after reconnect.
25	Input Validation Testing	Ensures invalid inputs are handled properly.	Validation messages displayed; invalid data prevented.

## VI. CONCLUSION

The TimeBank system was successfully implemented as a full-stack web application designed to support structured hourly job posting and hiring activities. The platform includes fundamental components which enable users to create accounts, handle job postings, conduct job searches with skill matching, assess applications through job seeker profiles, process payments securely, send messages through chat, and establish ratings and review systems. The system operates through combined modules which create a trustworthy system for administrating short-term work assignments.

The implementation of automated skill matching and profile-based application acceptance improves the accuracy of candidate selection and reduces the time required for job allocation. The payment calculation mechanism guarantees transparent compensation which corresponds to defined job parameters and mutually accepted working arrangements. The notification and messaging capabilities of the system improve communication between job posters and job seekers which leads to effective coordination during the entire hiring process.

The TimeBank platform shows how contemporary web technologies can build a secure and scalable system which enables hourly job management. The system enhances operational effectiveness while ensuring complete transparency and building user confidence through automated procedures that handle job matching, communication, and payment processing. The TimeBank system can effectively support flexible work arrangements because it operates as a trustworthy system which handles hourly job posting and hiring through real-world operations.

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