

# KaamConnect: A Hyper-Local Job Platform for the Unorganized Sector

Akansha Kalidas Darekar<sup>1</sup>, Krishna Madhavrao Machundre<sup>2</sup>,  
Supriya. S. Kale<sup>3</sup>

<sup>1,2</sup>Student of Department of Computer Engineering, Marathwada Mitra Mandal's Polytechnic, Pune, India

<sup>3</sup>Lecturer of Department of Computer Engineering, Marathwada Mitra Mandal's Polytechnic, Pune, India

## Abstract

The unorganized sector forms the bulk of our country's economy by providing essential goods and services on a daily basis, for instance bicycle repairs, television repair shops, domestic help, tuitions, etc. The unorganized sector is characterized by the lack of digital technology that enables them to carry out their jobs efficiently. These jobs are unstructured, vague, inefficient and unreliable.

KaamConnect is a Hyper Local Mobile Job Search Platform. This Portal connects customers with verified and skilled workers from unorganized sector of the economy. We act as an Enabler which bridges the employment mismatch between customers and workers by connecting them through a robust trusted interface.

KaamConnect is built using Flutter for the mobile application and Flask for web services. The mobile application uses JWT for authentication, performs OTP based job validation and uses the geo-location for the job search. The service providers are arranged in a hierarchical structure with clear authority levels. The job lifecycle of KaamConnect is robust and ensures secure job completion by providing features such as arrival confirmation and proof of work completion by asking for a photo.

**Keywords:** Hyper-Local Services, Unorganized Sector, Mobile Application, Flutter, Flask, JWT Authentication, OTP Verification, Geo-Location

## 1. Introduction

- The way we access a range of daily life services has changed with the advent of mobile and internet technology. We are able to buy food, hail a cab, and shop online with just the click of a button. However, there are millions of workers in the unorganized sector who have to depend heavily on social media, spoken communication and local word of mouth to find new job opportunities. Unlike the organized sector which has the benefit of robust digital infrastructure, the unorganized sector does not have a technology platform which makes it easy to carry out their work. As a result, job opportunities are rare, wages are not stable, and there is no accountability and information flow between the employer and the worker.
- The unorganized sector in this study includes every type of skilled worker, be it electricians, plumbers, carpenters, domestic workers, technicians or even tutors, that toils for earning a living in the unorganized sector. The existence of this sector at the grassroots level is very crucial for the economy

of the country. These skilled workers suffer from highly uncertain employment status due to the non availability of platforms that could help in coordinating hyper local services. Similarly, for the customers, there is also a lack of platforms that could help in connecting them with reliable and verified local service providers, thereby leading to uncertainty in service procurement due to the mistrust [4].

- Although there are numerous digital marketplace platforms that facilitate a wide range of transactions and interactions, most platforms are built for constrained scenarios such as the service economy and professional social networks. Most digital marketplaces do not fully address important challenges such as identity management, job lifecycle control and fraud in the context of informal marketplaces for direct individual-to-individual exchange. In addition, most service matching platforms are limited to finding suitable matches between services requested by customers and offered by service providers based on spatial overlap between the request and provider locations and lack adequate workflow validation and job advancement control features. Thus, there is a need for local platforms that make the service economy more accessible and secure.
- KaamConnect is a Hyper-Local Job Platform for the Unorganized Sector that aims to address the social issues mentioned above. KaamConnect will be a mobile-first, highly-robust, server side infrastructure to enable a very efficient Job-Handling Mechanism. Location-Based Job Discovery through GPS, OTP-based Job Assignment through mobile with completion proofs to achieve maximum accountability between Employer & Worker.
- Main purpose of the KaamConnect app is to connect employers with employees in a safe and meaningful way. This multi-platform mobile app has been built using a combination of latest cross-platform mobile development tools, strong level of authentication along with a robust job management system. The project is a first of its kind pioneering initiative to bring a change and revolution in the employment sector at the grassroots level, while at the same time ensuring operational integrity and technical reliability at all times. Reference: [8]

## 2. Related Work

- Mobile apps such as digital service marketplaces of TaskRabbit, Uber and AirBnB are representing a new trend in the digital service economy. This work discusses challenges and solutions related to the on-demand economy and it demonstrates how to achieve on-demand services with high reliability using secure authentication and location-based matching. We believe that identity authentication and protection of the login process in a mobile service platform are of paramount importance in order to achieve a reliable and trustworthy mobile service platform.
- Roles in Gig Economy and their Implications on Access Control: The new studies about gig economy business models show the importance of role-based access control (RBAC) and digital verification process on a platform in order to provide a solution for the increasing disorder. If RBAC and verification process are implemented properly on platforms, it helps to prevent misbehaviors of users and to increase the transparency on the platform. Location Based Services (LBS) are widely used in mobile applications and have become a significant attribute of the service-oriented applications to decrease the response time and to improve the resource allocation.
- Presented solutions are relevant for organized sectors like Retail, Banking and large scale service providers. The unorganized sector has been overlooked in current literature pertaining to workflow validation and job lifecycle security. KaamConnect tackles this gap by bringing in customised security controls, state transitions and verifications applicable to the hyper-local services sector.

### 3. System Architecture

- KaamConnect is a platform that connects millions of job seekers with employers in unorganized sector as well as on-demand services. We are building a highly scalable, secure and maintainable system using microservices architecture with service oriented approach. We are designing the functionalities of the system into well defined layers and breaking them down into individual microservices. This helps us to develop individual components of the system independently, test them easily and is also more future proof.

The overall architecture is divided into three primary layers:

1. Presentation Layer (Mobile Clients)
  2. Application Layer (Backend Services)
  3. Data Layer (Database Management)
- The layered design is used to divide the tasks and functions of the system and to achieve a high degree of independence of the individual system elements. Individual elements can work independently of each other but can communicate with each other in a controlled manner.

#### A. Presentation Layer (Client Applications)-

- The presentation layer of the system has been implemented with Flutter so that it will be cross-platform and the application will run on Android and iOS. The presentation layer is the entry point for users in the system and is responsible for user input and job presentation. It accesses the server through the RESTful APIs in a secure way.
- The presentation layer consists of the Customer Application and the Service Provider Application modules.
- Customer Application is the tool through which the customers raise the service requests. Customer can log in to the system securely, navigate through the different service categories, post the job request along with the location and can have real time status of the jobs assigned to them. The status flow of the job request is clearly defined from the time the job is posted to the time the job is done. The customers can cancel the jobs at any time and also give feedback to the system, thus keeping the system accountable.
- Service Provider Application The Service Provider Application is meant for the unorganized sector workers. They can register by uploading their documents in our portal for the verification of documents. This will help in building the trust with the users of our portal. The verified service providers can apply for the work that matches their skill set and can work at the location nearest to them. The application has the GPS feature which will help in navigation of the service provider to the work location. They can accept or reject the work, start the work by entering the OTP, can upload the proof of work and can also view their earnings in the application. This will make the relation between the customer and the service provider more reliable and less prone to disputes.

#### B. Application Layer (Backend Services)-

- The Application Layer is the actual processing engine of the KaamConnect platform. It is built using Flask framework which is a Python web application framework that is highly focused on quick development, strong typing and extensibility via extensions and plugins. The Flask micro web framework provides a framework to develop web applications by enabling the development of web services based on RESTful APIs to process client requests, enforce business rules and for a secure communication flow.

- API Management System acts as a bridge between the mobile application and database. Apart from bridging them, API Management System is also responsible for the validation of the request, access control, data transformation, result formatting, error handling and much more, especially in cases of high concurrency.
- The Security and Authentication Module is responsible for protecting the user sessions by ensuring that they are not accessed by unauthorized users. It uses JSON Web Tokens (JWT) for authentication and management of user sessions. It also encrypts the password stored in the database. Role Based Access Control (RBAC) is implemented for customers and providers so that they can only access features that have been granted to them in the platform. The security and authentication module also includes a token expiration time in order to avoid inactive sessions from being misused.
- The Job Lifecycle Management Engine is the engine that manages the state transition of jobs on platform. The workflow of jobs defined by the engine includes: Submitted / Accepted / Running / Failed / Cancelled  
Open → Accepted → Arrived → In Progress → Completed → Cancelled

**Figure 1: Job Lifecycle**



- Every transition is validated on the backend. This helps in controlling the flow such as not allowing two or more service providers to accept the same job, not allowing the job to be started before the OTP is not confirmed and not allowing the job details to be edited. The backend validation rules that are enforced on the system ensure that the job execution process is carried out in a very transparent and regulated manner.
- The Location Intelligence Module is an application that integrates the use of GPS-based location service technology for hyper-local job matching. The system enables the real-time location tracking of field service staff and service requests. Location Intelligence is enhanced by guiding the field service staff to premises to carry out service work. Using the Location Intelligence Module helps to filter jobs using distance based filters thereby enabling the most relevant jobs to be found, reducing the time to respond and thus improving customer satisfaction with the service received.
- The Administrative Management System is used for the administration and management of the platform. Mainly for the dynamic monitoring and management of the platform by centralizing the administration of the affairs and the rules of the platform. Such as verifying the business license of the

service providers, checking and dealing with the qualification of the account of the service providers, and dynamically checking the user's status on the platform. In order to prevent illegal transaction in the platform, it is necessary to carry out the restriction of the user's actions.

### C. Data Layer (Database System)-

- The data layer uses SQLite and an Object Relational Mapping (ORM) technique. The data layer contains all the persistent data required to run an application.
- User Database The user database contains the information for all users in the platform such as customers and service providers. It stores information about the verification status, skills, location (latitude, longitude) and ratings of users. Job Database The job database contains all the information related to the job requests made by customers. It stores information such as job description, transitions between job states, timestamp of transitions, payment details and the mapping of the customers and service providers involved in the job. Media Storage This database stores the media files such as ID cards, entry level verification photos and work completion verification photos that are uploaded by customers and service providers.
- Smart contract storage for transaction and verification data is used to achieve accountability, transparency and for dispute resolution.

## 4. System Flowchart and Operational Process

- Work Flow of KaamConnect KaamConnect has worked out the whole work flow in such a way that maximum transparency, security and methodology is maintained. The whole work flow of the portal is structured in a way that the activities carried out on the portal are in sequence one after the other from the time of registration of user up to the completion/cancellation of work. The rules on the back end are built-in for the completion of every activity. Thus ensuring that maximum level of security is maintained for the Buyers and Service Providers alike.

### A. Registration and Verification Process-

- Registration is done by choosing the role of customer or service provider. Customers can start to work immediately after creating their account. For service providers there is an additional verification step which is done by the administrative authority and this verification is done on the basis of documents provided by the service provider. The documents are the identity documents that the service provider has to upload so that they are verified by the administrative authority and so that they can access the job postings. This verification ensures the reliability of the portal and excludes illegal activities that could be carried out through the service provided by the portal.

### B. Job Request and Matching Process-

- Registration on the site begins with the choice of the user role – customer or service provider. After registration, the customer will have access to all the functionality of the site. The registration of the service provider is made in stages. After registration, the service provider will not yet be able to enter the job section. To get access to job postings, the service provider must undergo a verification procedure. To verify the service provider, he must upload an ID photo. The administration of the site will verify the authenticity of the photo. Verification of the site is aimed at ensuring the stability of the site and preventing the uncontrolled provision of services on the site.

**Table 1: Job Request and Matching Process**

Step	Activity	Result
1	Customer posts job	Status “Open”
2	System filters providers	Nearby providers identified
3	Notification sent	Job visible in app
4	Provider accepts	Status “Accepted”

**C. Secure Job Execution Process-**

- Once the job is accepted by the provider, the provider can reach the location through GPS. The provider needs to upload a selfie after reaching the location. The customer shares an OTP with the provider which is verified by the server before moving the job to “In Progress” stage thereby making sure that the job is not initiated fraudulently and both parties are mutually confirmed.

**Table 2 : Secure Job Execution Process**

Step	Activity	Result
1	Provider reaches location	Navigation completed
2	Arrival selfie uploaded	Presence verified
3	OTP shared and validated	Job moves to “In Progress”

**D. Completion and Record Update Process-**

- Once the task has been completed by the service provider, they will then upload the image proof for that task. The task status will then be updated by the system to “Completed” and all the earnings for that task will be captured. All the transactions that take place within the system will also be recorded in the system history for future reference in the event of a dispute.

**Table 3 : Completion and Record Update Process**

Step	Activity	Result
1	Work proof uploaded	Evidence stored
2	Job marked completed	Status updated
3	Earnings recorded	History

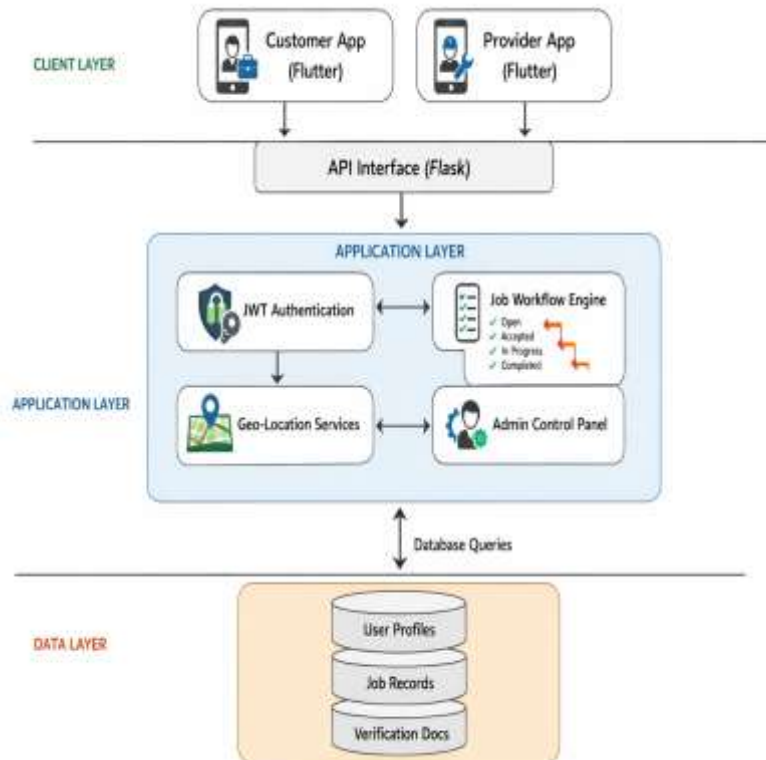
**E. Cancellation Handling Process-**

- Controlled cancellation Cancel a job on Freelancer Cancel a job on Freelancer can be cancelled at any stage of the Freelancer process. A contest can be cancelled by the Contest Holder at any time prior to it being awarded. A Freelancer can also cancel at any time prior to commencement of work on the contest. Once cancelled the Freelancer contest will revert to its original state.

**Table 4 : Cancellation Handling Process**

Actor	Condition	System Action
Customer	Before acceptance	Job cancelled
Provider	Before start	Job reset to “Open”

**Figure 2: Architecture**



## 5. Advantages of the Proposed System

- KaamConnect is an idea proposed by few social entrepreneurs in India. It has numerous benefits for both the customers and the service providers. It increases the efficiency, safety and productivity of the unorganized sector. One of the major benefits of this portal is that it helps in developing a strong bond between the service provider and the service seeker. The service providers and the service seekers need to go through a very simple level of verification process. They have to upload the required documents and then get an approval from the concerned government body. The verification process will ensure that the service provider is credited and the frauds in the unorganized sector are curbed.
- It leads to better infrastructure and employment opportunities for the locals. The idea of hyper-local job matching is a simple innovation which enables the service providers to get jobs from within their local geography. This means that the work providers have lesser travel times and more working hours. In turn, this leads to a faster experience for the customer and better earning opportunities for the unorganized sector workers.
- The system protects the jobs to be executed by making the jobs to be executed to have OTP for execution and also by having real time workflow validation that does not allow the job to be executed or started at anytime by anybody and also a service cannot be started by either party without confirmation from the other party. The arrival verification and work completion proof increases the transparency of the platform.
- Real-time tracking and status updates is another component of the customer experience we are offering and will enable customers to have full visibility of work being carried out, while tradespeople are able to work more efficiently. Real-time tracking and status updates provide an end to end view of work and transactions between customers and tradespeople. Improved visibility of work in progress and

planned work leads to greater operational transparency. Disputes reduced due to real-time status updates between customers and tradespeople.

- KaamConnect is a Digital Social Enterprise that aims to empower local communities through economic development by using digital technology to bring in employment opportunities and by building a robust service delivery ecosystem. KaamConnect aims to act as a platform that is holistic in nature and aims to act as a bridge between the employer and the employee in local communities across India. The proposed platform utilizes mobile technology and links it to a robust server system to bring in high scalability, reliability and ease of deployment in various settings.

## 6. Future Scope

- KaamConnect is a foundational technology that is designed to build all future systems. We have thought of many features and functionalities that we can add in KaamConnect as it develops, in order to make working lives easier, more automated and data-driven.
- Use of Artificial intelligence we can develop system through which the service providers can be suggested to customers based on their choices, their work history, reviews and their locations. This way through the use of intelligent matching algorithms, we can improve the accuracy of matching customers with service providers and hence improve the speed of service and better customer experience.
- The in-app chat and voice feature enables real time communication through a very efficient and effective means. On the spot communication has proven to be very effective and has solved the first and second of the three problems mentioned above. Communication within the app means that less time is spent negotiating when work will be done and explanations are not needed as to the status of ongoing work thereby enabling a very seamless job completion process.
- We can also incorporate advanced performance analytics to measure job completion rates, provider consistency, service quality and overall customer satisfaction trends. The data analysis gained from this functionality will allow for stakeholders to take informed actions to improve the overall operations of the system as well as the clinical quality of care provided.
- We can also train a machine learning based fraud detection model to catch anomalies such as multiple cancellations, spam job postings or other unusual user behavior. An intelligent monitoring system will not only keep our platform safe, but also ensure that it remains robust and reliable for the long term.
- The forthcoming releases will largely enhance the capabilities of KaamConnect and will transform it into a much more sophisticated, dynamic and more flexible service oriented ecosystem, which will be capable of supporting large scale deployments and thus sustaining the business interests in the long term.

## 7. Conclusion

**KaamConnect: A Hyper-Local Job Platform for the Unorganized Sector** A mobile app and backend system for the management of local services using technology. KaamConnect enables a point of contact between customers and service providers through real time job postings, OTP based job acceptance, location-based search and other functionalities. The main idea is to bring about ease in employment for the unorganized sector as well as bring in structure in the workflow thereby increasing reliability and trust among the sector. A fully modular and scalable architecture ready for practice implementation as well as future enhancement.

## 8. Appendix

KaamConnect uses Flutter for mobile application development and Flask for API services. The application uses SQLite database for storage. User authentication is done using JSON Web Tokens. Location Services are used for hyper local job matching. Users are verified through multiple methods such as document approval, OTP and photo proof. The tech stack is robust enough to ensure that the system can scale, is reliable and secure.

## 9. Acknowledgement

We thank Department of Computer Engineering of Marathwada Mitra Mandal's Polytechnic for the various help they provided to us for the completion of this project. We thank our faculty members for their wonderful support throughout the project.

I wish to thank my project guide for the valuable comments, guidance and encouragement he provided throughout the design, development and documentation of the system. I also thank the institution for the provision of the necessary materials required for the completion of the project.

The project was made possible by the good wishes of several friends and relatives

## 10. References

1. A. Banerjee, "Digital Inclusion of Informal Workers Through Mobile Technology Platforms," *International Journal of Social Computing Systems*, vol. 5, no. 3, pp. 45–53, 2020.
2. R. Sharma and P. Kulkarni, "Hyper-Local Service Architecture Using Location-Based Technologies," *Journal of Emerging Trends in Information Systems*, vol. 7, no. 2, pp. 60–68, 2019.
3. M. Hassan and T. Ahmed, "Cross-Platform Mobile Application Development Using Flutter Framework," *International Journal of Advanced Software Engineering*, vol. 11, no. 4, pp. 134–141, 2020.
4. S. Patel and N. Shah, "Design and Implementation of RESTful APIs Using Flask Framework," *Journal of Web Application Engineering*, vol. 9, no. 2, pp. 55–63, 2019.
5. J. Nguyen and R. Brown, "Secure Authentication Systems Using JSON Web Tokens," *International Journal of Information Security Research*, vol. 8, no. 3, pp. 77–85, 2020.
6. S. Iyer and P. Thomas, "Trust and Verification Mechanisms in Gig Economy Platforms," *Journal of Electronic Commerce Technologies*, vol. 12, no. 1, pp. 33–41, 2019.
7. H. Gupta and A. Chatterjee, "Location-Based Services in Mobile Applications: Architecture and Challenges," *International Journal of Mobile Computing*, vol. 6, no. 3, pp. 31–39, 2020.
8. V. Singh and D. Mehta, "OTP-Based Security Models for Mobile Service Applications," *Journal of Cyber Systems and Security*, vol. 8, no. 2, pp. 61–69, 2021.