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Revolutionizing Freelancing: A Blockchain-Powered Paradigm for Security, Transparency, and Efficiency in the Digital Age

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ABSTRACT

The Decentralized Freelancing Web Application revolutionizes freelancing by leveraging blockchain for trust and transparency. Addressing issues prevalent in centralized platforms, it eliminates high fees, ensuring fair compensation for freelancers while advocating for fair treatment, anti-fraud measures, and transparent dispute resolution. This paradigm shift fosters a dynamic and empowering global freelancing community, overcoming the pitfalls of unreliable platforms and arbitrary policies.

KEYWORD'S

Blockchain, Decentralized, Smart contracts, Next.js, IPFS, Centralized freelancing.

I. INTRODUCTION

The history of freelancing growth mentions that initially freelancer was referred as "Boundaryless Worker" in the 1970s at the Massachusetts Institute of Technology (Tams & Arthur, 2010). This name was given because freelancers have no boundaries to get jobs, the client may belong to any part of the world. Most of the jobs are done online, one computer with webcam and high-speed internet connection is sufficient to get job done[1]. Centralized freelancing platforms like Upwork, Fiverr, and Guru, while facilitating connections, suffer from critical shortcomings. A central issue is the lack of trust, exacerbated by operational opacity, high fees, and susceptibility to data breaches. Upwork strives to be invisible in the transaction, in part to achieve transactional efficiency and ease of usage. However, its policy may be regarded as an attempt to reduce risk for itself. Upwork represents an aggressive extension of Harvey's (1989) flexible accumulation; the marketplace appears to benefit the few, the skilled, and the experienced[2]. Freelancing or 'freelance worker' are terms used to describe someone who is self-employed and does not have a long-term contract with one company. Since the 1990s, economic instability and technical growth in the online world have resulted in the loss of thousands of jobs and the closure of multiple organisations in various parts of the world. As a result, schools, media, and academia have advocated entrepreneurship as a realistic and necessary method of survival in the digital age, with the "freelancer" being one type of "entrepreneur". Observing this vast change, many individuals on Facebook/YouTube, NGOs, and government departments started teaching freelancing as a course; to date, thousands of youngsters have been trained to start their careers as freelancers[3]. Freelancing has become a dominant force in the contemporary workforce, driven by the digital age's transformation. The flexibility it offers, allowing workers to choose projects and clients, coupled with a global reach, has reshaped the employment landscape. Specialization, cost-efficiency, and the ability to connect with a diverse talent pool globally contribute to its appeal. Clients and freelancers who have never met in person or over the phone are working together to create and execute projects for the first time. Freelancers have

a diverse skill set to draw from and may work from anywhere in the globe while sitting at home. This is especially beneficial to people in countries with a high service sector, such as India [4]. Technology plays a pivotal role, and remote work fosters job satisfaction. Global freelancing is seen as a platform for entrepreneurship, prompting discussions on policy implications. Future research may explore trends, including the impact of AI, while considering the social and environmental aspects of remote work.[5] However, challenges persist within centralized freelancing systems. Trust deficits, high costs, operational opacity, and vulnerability to data breaches hinder the efficiency of platforms like Upwork. Furthermore, online workers confront considerable instability, such as income or insurance or reliance on feedback and rating systems, as well as restricted and entirely digital communication channels with existing information asymmetries. These conditions underline the importance of taking a social perspective on online labour marketplaces and how digital labour platforms affect working conditions, equity, and employee satisfaction[6]. The Decentralized Freelancing Web Application, a forward-thinking solution, aims to address these challenges through blockchain and biometrics. Blockchain in the freelancing system decentralises contracts, allowing no one to control the interactions and transactions between customers and sellers. Biometric signatures on smart contracts in the freelancing system help to ensure the legitimacy and legality of buyer-seller agreements. Our decentralised freelancing system is a blockchain-enabled online web platform. It makes the interaction and deals between buyers and sellers via the innovative approach of smart contracts [7]. Smart contracts' decentralisation, auto-enforcement, and verifiability allow for the execution of business rules in a peer-to-peer network. Each node is "equal" and has no special authority, without the need for a trusted authority or central server.Thus, smart contracts are expected to revolutionize many traditional industries, such as financial, healthcare, energy, etc[8]. By eliminating intermediaries and reducing the complexity of transactions, blockchain can significantly reduce costs associated with freelancing platforms. This, in turn, benefits both freelancers and clients. Blockchain technology used to a supply chain substantially decreases manufacturing enterprises' verification costs while also preventing distortions of product quality through real-time transparency. Applying blockchain technology to a remittance system lowers the commission fees on the trading and intermediate goods of manufacturing firms, leading to decrease in variable costs.[9] In conclusion, this groundbreaking platform not only addresses the limitations of centralized freelancing systems but sets a new standard for the industry. It is not merely a tool for freelancers and clients; it is a catalyst for change, symbolizing the evolution towards a future where freelancing is characterized by security, transparency, and efficiency in the digital age of work.

II. RELATED WORK

The Decentralized Freelancing Web Application presents a forward-thinking solution to address the limitations of centralized platforms, exemplified by industry giants such as Upwork and Fiverr. Centralised systems are typical (client-server) IT systems in which a single authority controls the system and is exclusively responsible for all system activities. All users of a centralised system rely on a single source of service. Online service providers, such as eBay, Google, Amazon and the majority of other providers, use this common model of delivering services.[10]

Freelancing has revolutionized the modern workforce, offering flexibility and access to global opportunities. Freelancer is a freelance job that works without being tired to a company contract for an extended period.[11] On the one hand, freelancers are employees because the company almost always hires them for periods that do not sell other than intangible professional knowledge [12]. Globally, India has the second-largest freelance workforce after the United States [13]. Freelancing marketplaces are websites that match buyers of services sent electronically with sellers or freelancers who offer services on a per-job basis or at a fixed hourly rate.[14]. The most popular freelance marketplaces are Elance, Guru, vWorker, ODesk, and Freelancer, and the most popular categories of jobs are Web development, programming, writing, translation, design, and multimedia. [15]

Centralized platforms, however, face trust issues, high fees, and security vulnerabilities. One major drawback of Web2 systems is that they provide little to no control over data ownership and use. Buyers' data is frequently exploited by targeted advertising corporations, making it a commodity for centralised Web2 freelancing platforms.These platforms

also generate revenue through high commission fees on escrow, advertising low-ranked services, and using personalized data of users.[16]

Related work in the field of decentralized freelancing and blockchain technology has begun to emerge as researchers and developers recognize the **potential of utilizing blockchain for freelancing platforms**. Several studies have explored the application of blockchain in freelancing, focusing on aspects such as trust, security, transparency, and automated payment systems.

A decentralised system is a network in which nodes are not dependent on a single master node and control is dispersed among several nodes. Cryptocurrency service providers such as Bitcoin, Ethereum, Litecoin, and many other providers use this model of delivering services.[17] In the dynamic landscape of blockchain technology, Ethereum stands out as a beacon of decentralization and innovation. Decentralised system with low expenses, efficient, transparent, and safe enough to take over the job of, say, banks. The method provided in this research benefits from blockchain characteristics such as dependability, security, and speed. Because of consensus and a decentralised methodology, the Ethereum network has not experienced any downtime since its introduction. As a result, this is still additional advantage, specifically the fact that the platform is constantly available and functional. This suggests that all blockchain-based applications, including this one, do not experience downtime. The solution has an intuitive user interface that is capable of expansion. Even though the application was developed as a proof-of-concept, it shows high potential for commissioning in a real environment.[18]

After an in-depth exploration of the research paper and its visionary solution, it's crucial to examine the existing decentralized freelancing platforms In the ever-evolving landscape of freelancing, several pioneering platforms have emerged to redefine the way professionals collaborate and transact. Among these, notable platforms like Deelance and Coinlancer have garnered attention for their innovative approaches to decentralized freelancing.Platforms like Deelance and Coinlancer have emerged as pioneers, revolutionizing the way freelancers and clients collaborate.As the potential of blockchain technology in revolutionizing freelancing platforms gains recognition among researchers and developers, a new wave of decentralized platforms has emerged. These platforms represent a paradigm shift in the way professionals collaborate and conduct transactions.

This collective advancement signifies a trajectory towards a future where blockchain plays a pivotal role in redefining trust, transparency, and security dynamics in the freelancing ecosystem.

III. METHODOLOGY USED

In the realm of system analysis and design, the careful evaluation and selection of hardware and software components play an important part in deciding the success of a project. This section focuses on scrutinizing these components, ensuring their compatibility with the system's objectives, and establishing a robust foundation for seamless operation.

A detailed description of the operational framework of the platform is presented. This encompasses a comprehensive depiction of the procedural steps involved in the platform's functionality, encapsulating both technical and user-centric aspects.

The flowchart illustrates the step-by-step interactions between freelancers and clients on the UrGig platform, providing a visual roadmap of the entire process from registration to project completion. For a comprehensive grasp of UrGig's workflow, it's vital to consider the roles of both **freelancers and clients.** Freelancers on UrGig register, create profiles, bid on jobs, collaborate with clients, and submit completed work. Clients post jobs, review proposals, select freelancers, oversee projects, and release payments upon satisfaction. This dual-perspective approach ensures a clear understanding of UrGig's workflow.

In the decentralized workflow, freelancers experience a profound paradigm shift, placing

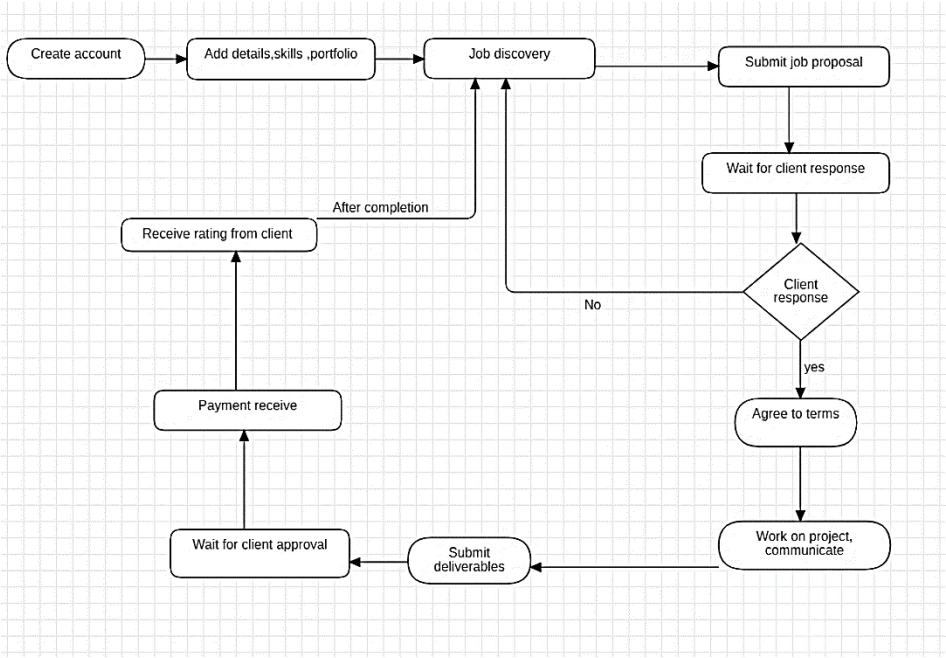
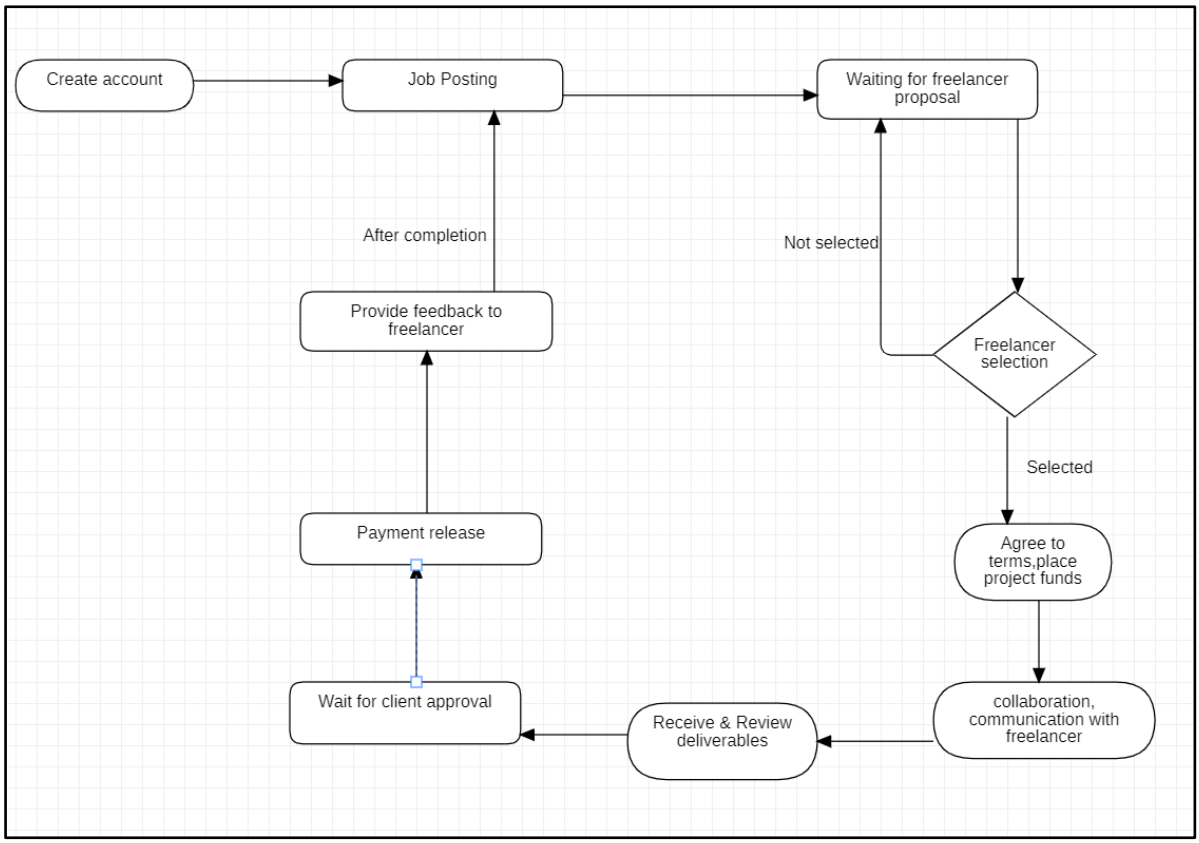


FIG 3.1 Workflow for Freelancer

security and transparency at its forefront. Throughout the entire process, from initial registration to the culmination of projects, a strong emphasis is placed on cultivating trust and collaboration. This innovative approach creates a fabric of reliability and openness, ensuring freelancers navigate a secure environment. The decentralized model fosters confidence by integrating trust-building measures into every stage, leading to a seamless collaboration experience. This unique methodology not only transforms the freelancing landscape but also sets a standard for secure and transparent work environments. Freelancers, operating within this framework, benefit from heightened assurance, enabling them to engage in their endeavors with confidence and efficiency, ultimately contributing to the evolution of a more trustworthy and collaborative freelancing ecosystem.

The client workflow provides a holistic guide, commencing with easy job posting, allowing clients to articulate project requirements effortlessly. Seamless collaboration ensues, empowering clients to select freelancers based on their skills and experience. Real-time project

FIG 3.2 Workflow for Client



tracking ensures transparency throughout the process, while the decentralized escrow system serves as a reliable mechanism, ensuring a successful and fair culmination of projects on our platform. This comprehensive approach streamlines the client experience, emphasizing efficiency, transparency, and fairness in every stage of the collaboration process.

The selection of hardware is paramount to ensuring optimal performance and efficiency in any project. The chosen hardware components collectively form the backbone, providing a robust infrastructure to support the project's needs. This includes a contemporary computer or laptop with at least a dual-core CPU, sufficient RAM (8GB or more), a reliable internet connection, and standard input devices such as a keyboard and mouse.

On the software front, the outlined components are central to the project's successful implementation. For web development, Next.js, a React framework with server-side rendering, is chosen, along with a UI library such as Bootstrap or Tailwind CSS for styling flexibility. The backend infrastructure relies on Supa base, an open-source alternative to Firebase, offering real-time database and authentication services. Third-party services include IPFS for decentralized file storage, enhancing web speed, security, and openness, and Stripe as a widely used and secure payment gateway for online transactions.

In terms of hosting, Vercel is selected as the platform, providing a seamless deployment and hosting solution specifically designed for Next.js applications. Each hardware and software component is chosen with precision to strengthen the project's foundation, ensuring compatibility and alignment with its objectives. This meticulous selection process establishes a solid groundwork for the project's journey towards success.

IV. IMPLEMENTATIONS

Embarking on the implementation of the UrGig project is a meticulous journey that unfolds through well-defined phases. The initial stage of Requirements Gathering and Analysis involves comprehensive market research and documentation, establishing a robust foundation by understanding user needs and market dynamics. The subsequent Design and Development phase transforms conceptual ideas into a tangible platform, focusing on user-centric design and system architecture to create a seamless and intuitive user experience.

Following the design phase, the project transitions into the Testing and Quality Assurance phase, ensuring rigorous assessments for reliability, security, and

optimal performance. This phase plays a crucial role in identifying and rectifying potential issues, guaranteeing a high-quality end product that meets or exceeds user expectations.

The culminating phase is the Deployment and Launch, where the project transitions from concept to reality. Leveraging Vercel as the hosting platform, the project undergoes seamless server deployment, ensuring accessibility and optimal performance in a live environment. Simultaneously, user training is conducted to familiarize users with the platform's features, ensuring a smooth and successful launch.

The detailed breakdown of the project's technological framework outlines carefully chosen hardware components, such as a contemporary computer or laptop, and essential software components, including Next.js, Bootstrap or Tailwind CSS, Supabase, IPFS, Stripe, and Vercel. Each component is selected with precision to strengthen the project's foundation, ensuring compatibility and alignment with its objectives.

After implementing frontend and backend tasks, below are the snapshots of the platform showcasing the website pages:

In Figure ,UrGig's main page is showcased, featuring an advanced interface and innovative elements within the decentralized freelance ecosystem.

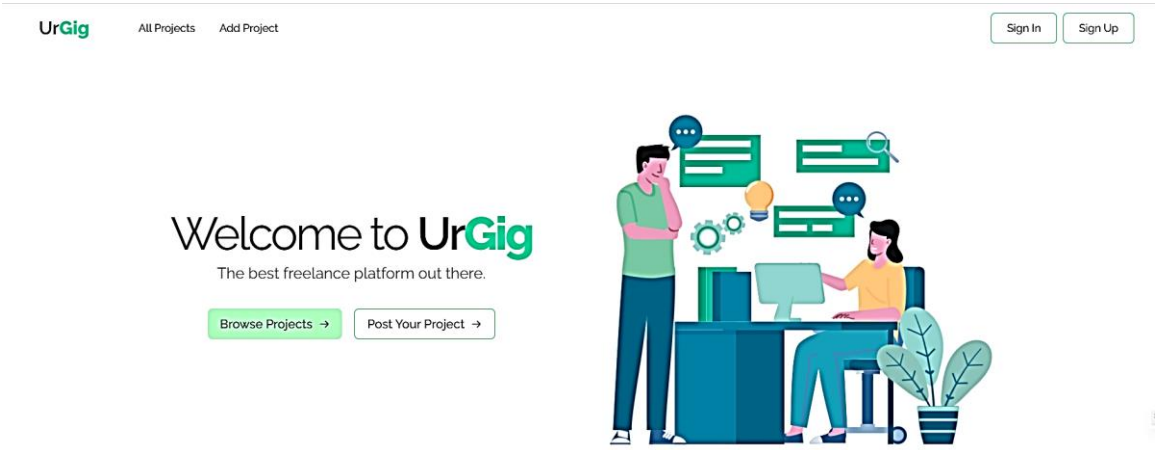


FIG 5.1 Main Page

Clicking on the 'Browse Projects' button, as depicted in Figure 5.1, reveals a comprehensive project list, showcasing all client-posted projects.

Refer to Figure 5.2 for a detailed view of the projects available on the urgig platform

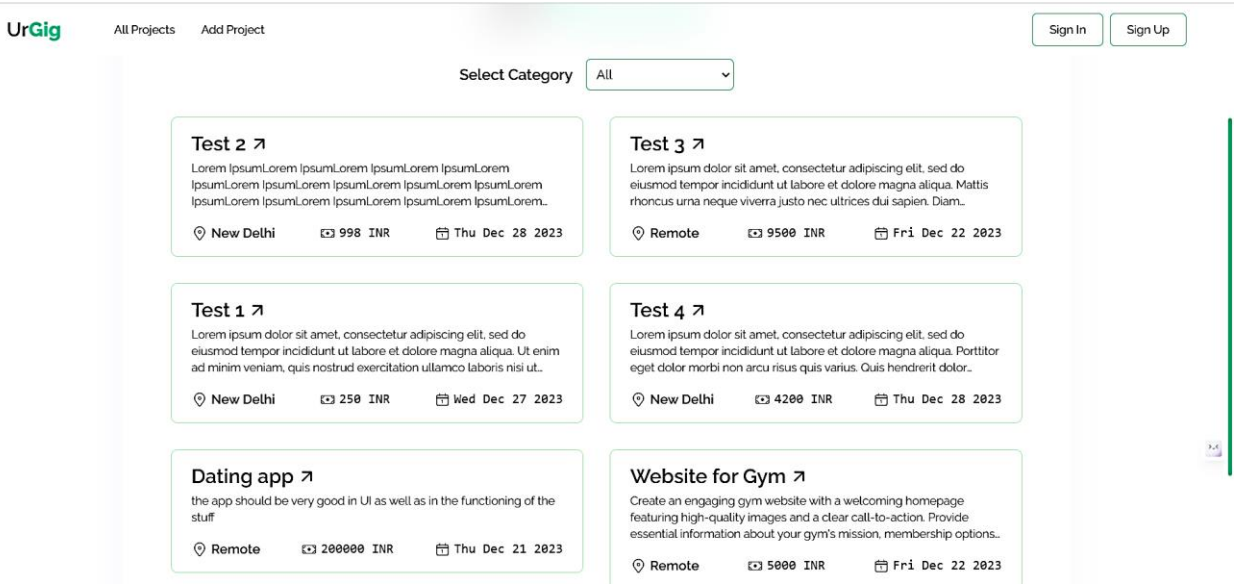
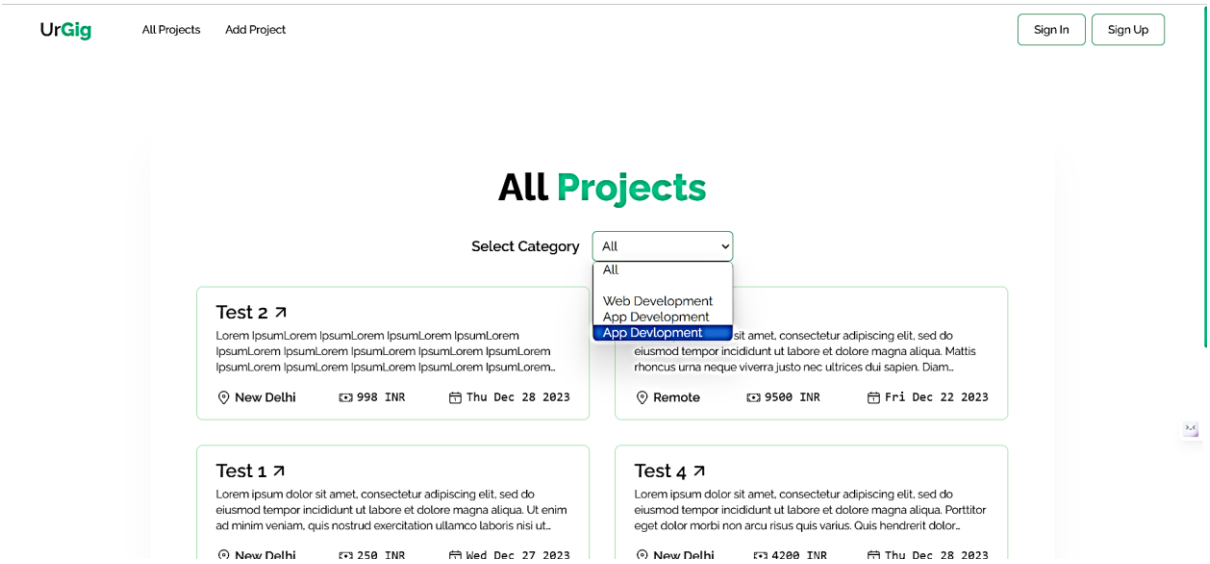


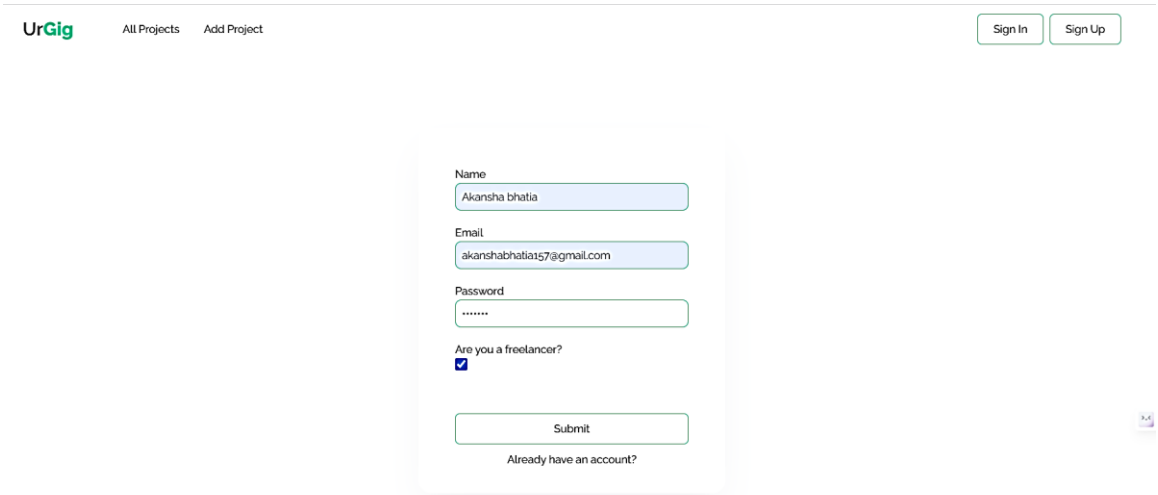
FIG 5.2 Project listing



User will find options for selecting the project category, ranging from web development to app development and more. Choose the category that aligns with freelancer project requirements for a tailored and efficient experience on the UrGig platform.

As a freelancer

To register as a freelancer, kindly check the designated checkbox in the interface displayed below, as indicated in the corresponding figure. This checkbox prompts the query *'Are you a freelancer?*' and serves as a pivotal step in the signup process on the UrGig platform.



As a client

To register as a client, please uncheck the designated checkbox as depicted in Figure 5.10. This checkbox initiates the query *'Are you a freelancer?*' and unchecking it is a crucial step in completing the signup process on the UrGig platform.

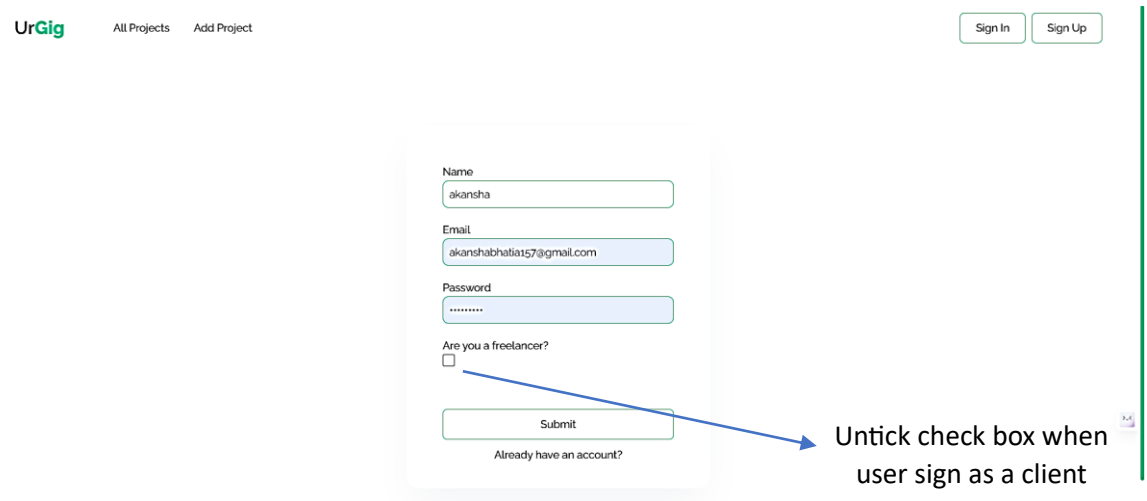
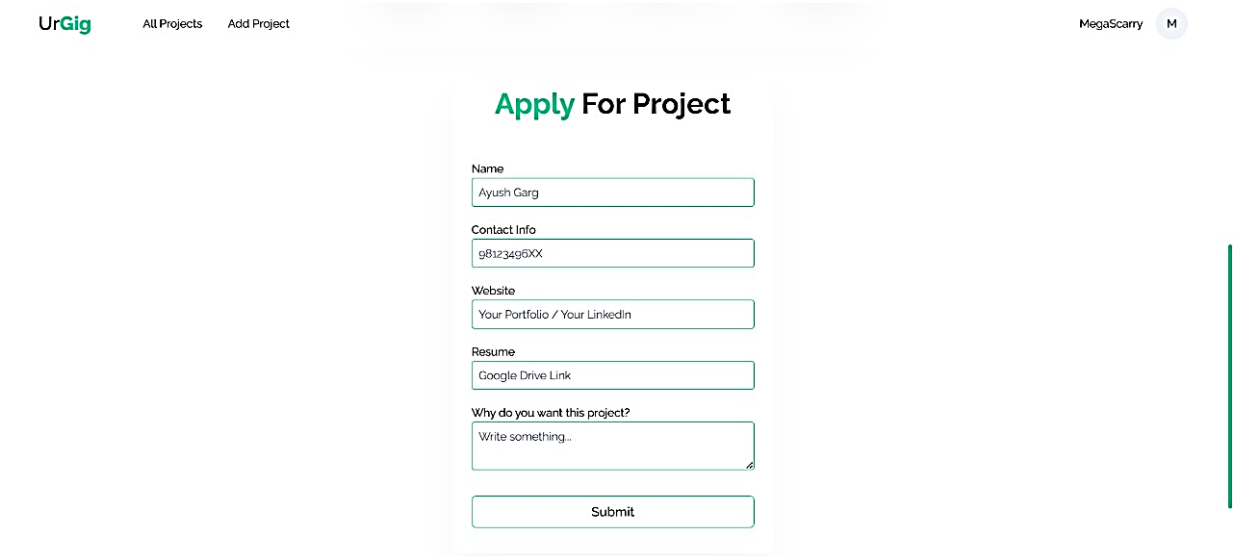


FIG 5.3 Sign up

In Figure 5.4, the interface demonstrates the process by which a freelancer applies for a project after selecting one from the project list (as shown in Figure 5.2). Upon clicking a project, freelancers are prompted to fill essential details, including name, contact information, portfolio link, LinkedIn link, resume, and a statement outlining their motivation for the project. Subsequently, freelancers can submit their application, ensuring a comprehensive and informed submission process on the UrGig platform.

FIG 5.4 Apply for a project



When clicking on profile name or the logo located in the right-side corner, Figure 5.4 showcases the profile interface. The initial view illustrates a freelancer who has not applied for any projects, while the subsequent display presents a list of projects for which the freelancer has submitted applications. This feature provides a comprehensive overview of a freelancer's engagement and application status on the UrGig platform.

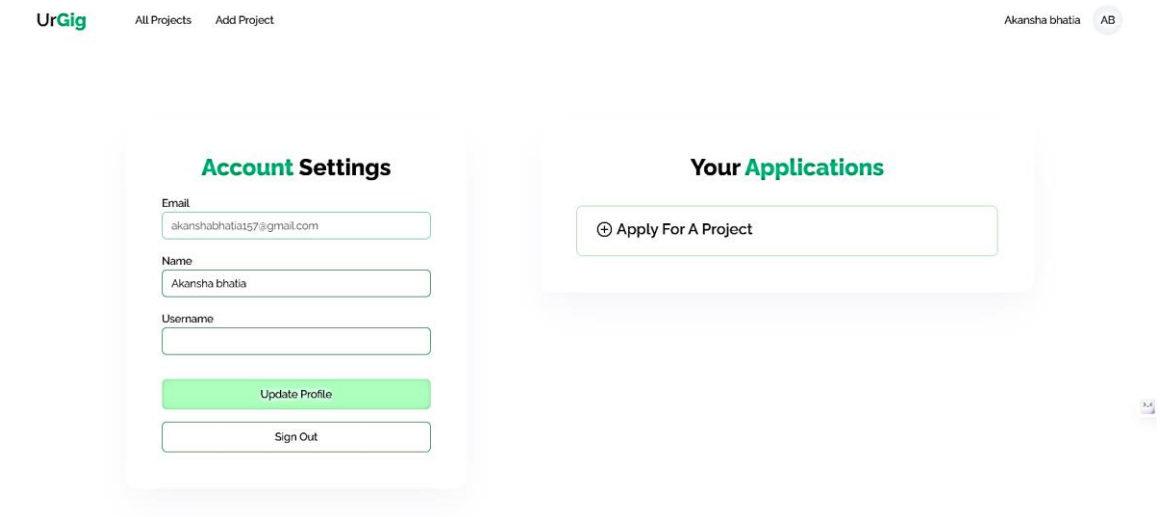
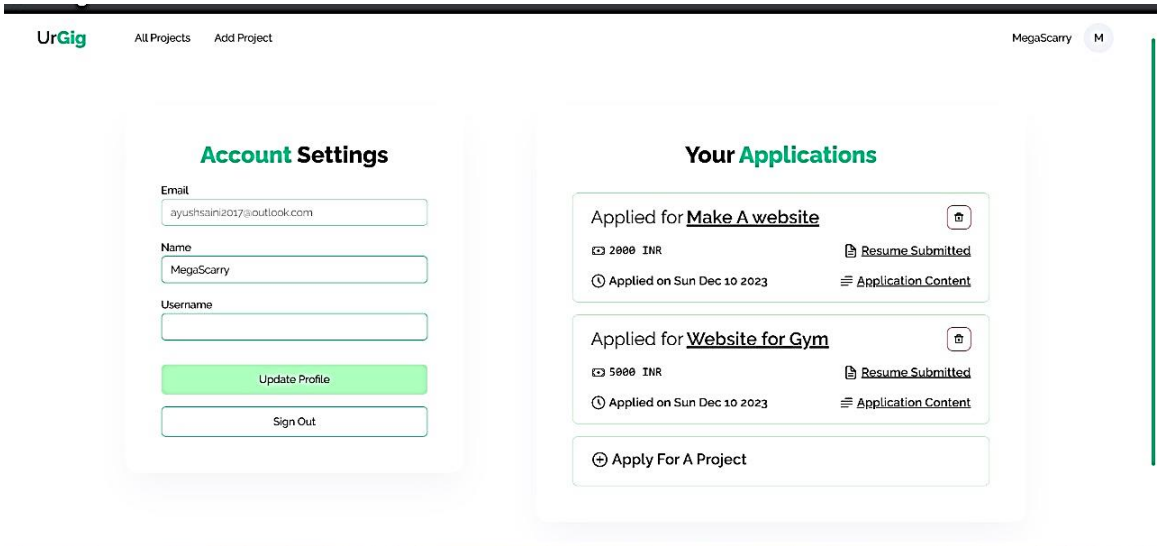


FIG 5.5 Freelancer profile before and after applying for a project



In the subsequent figures, the user interface captures client activities on our platform, delineating their engagement and interactions within the UrGig ecosystem. These illustrations provide a detailed portrayal of the features and functionalities tailored to clients, ensuring a comprehensive understanding of their experience and navigation on the platform.

In Figure 5.6, the depicted interface serves as the 'List a Project' page for clients. Within this page, clients can input essential project details, including the project title, project description, project image URL, project completion price, expected date of project completion, and the preferred project location (on site/remote). This comprehensive form facilitates the seamless submission of project requirements by clients on the UrGig platform.

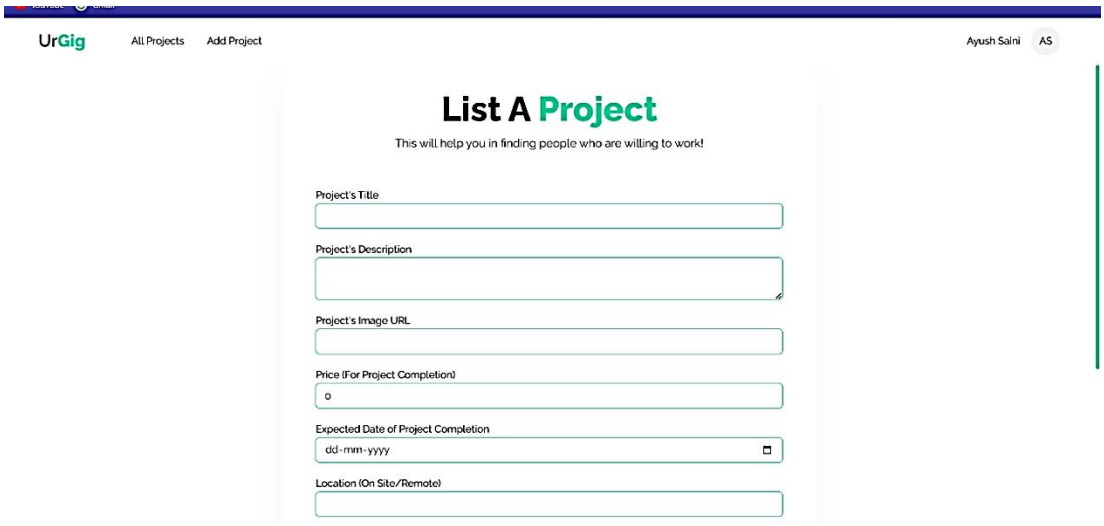


FIG 5.6 List projects

When clicking on profile name or the logo positioned in the right-side corner, Figure 5.12 reveals the client profile interface. This interface offers access to account settings and presents a comprehensive view of projects listed by the client, showcasing a detailed overview of the client's engagement and project activities on the UrGig platform.

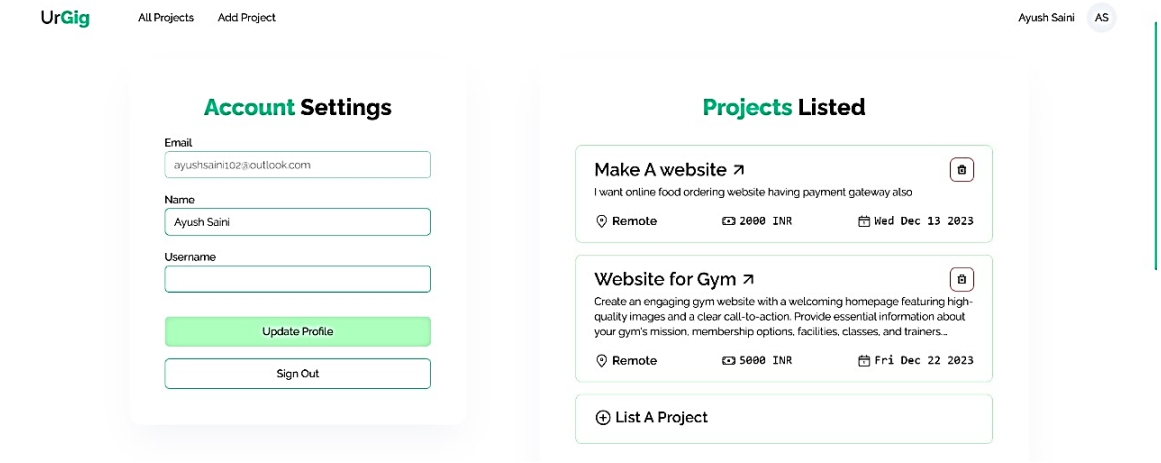


FIG 5.7 Client profile

In Figure 5.8, the interface illustrates the 'Applications Received' section. The initial view presents a list of applicants, indicating freelancers who have applied for a specific project.

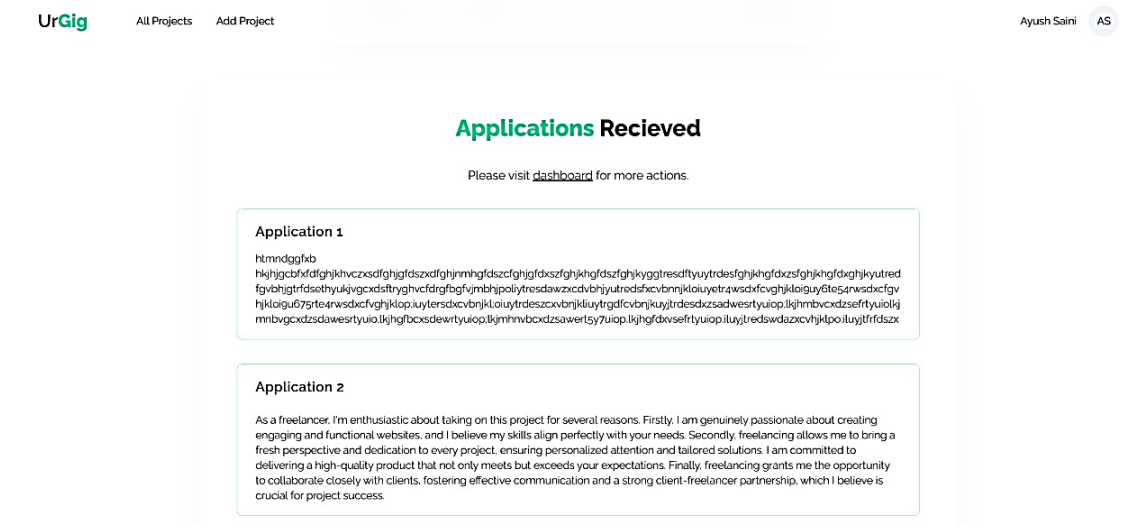
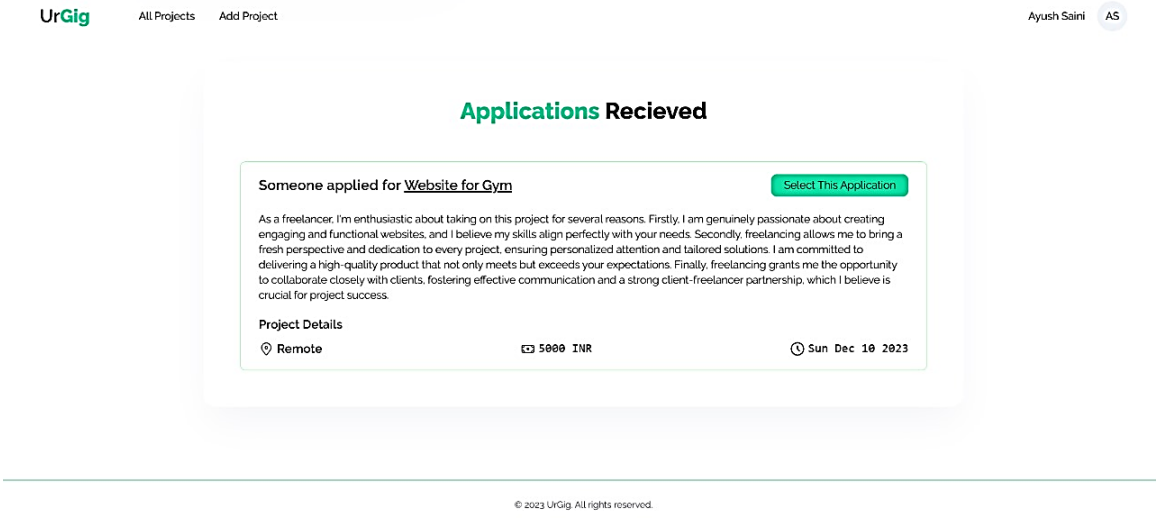


FIG 5.8 Application received for a projects

In the second figure, accessible by clicking on an individual application, a detailed view is provided, offering comprehensive insights into the specific freelancer's application for a more informed evaluation on the UrGig platform.



After clicking the 'Select this Application' button on an individual application, as presented in the above Figure , Figure 5.9 initial figure, a prompt message appears, seeking confirmation with the query, *'Are you sure? Doing this will assign your project 'project name' to this applicant, and all other applications for 'project name' will be deleted*.' Users are provided with the options to either cancel or continue, ensuring a deliberate and informed decision-making process on the UrGig platform."

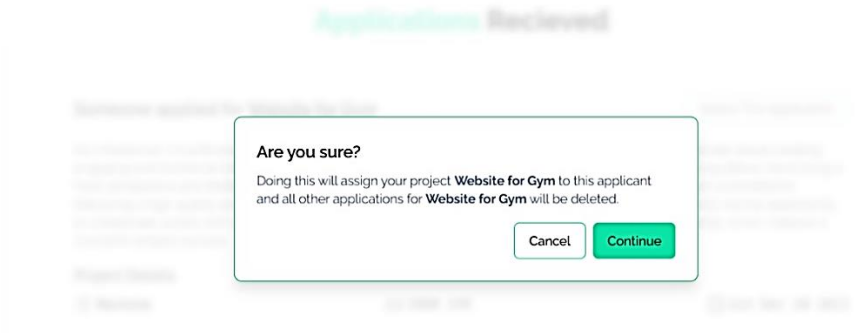
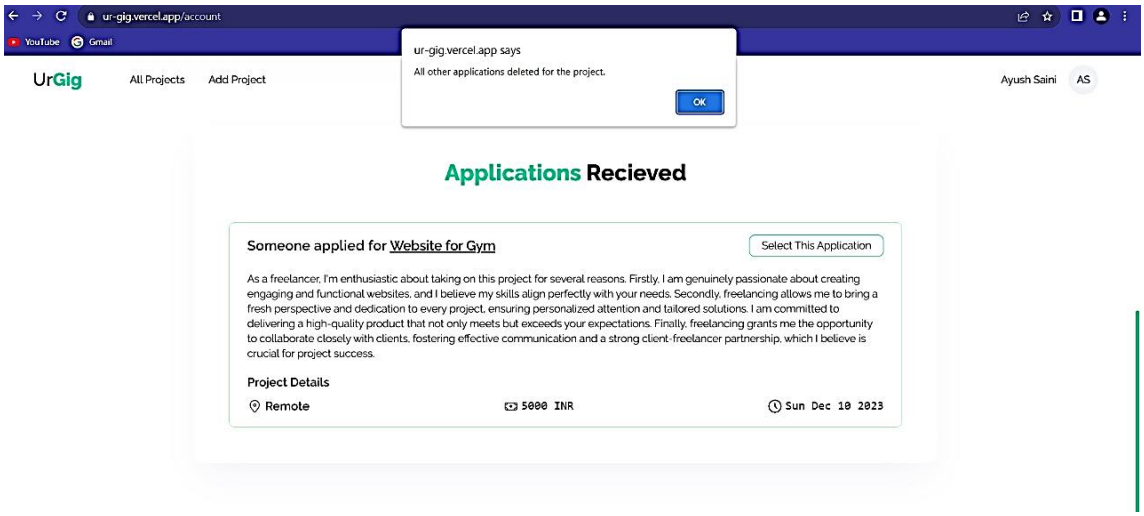


FIG 5.9 Selecting a freelancer for a project

In the subsequent figure, following the selection of the 'Continue' button, as indicated in the aforementioned prompt, all other applications for the project are systematically deleted. Simultaneously, the project is assigned to the chosen freelancer, marking a decisive action in the project allocation process on the UrGig platform.



After accepting a freelancer for a project, a notification is displayed on both the freelancer and client profiles, indicating that 'Freelancer Name' has applied for 'Project Name,' and their application has been selected. Subsequently, upon acceptance, the client gains access to the freelancer's phone number. Please refer to Figure 5.10 for a detailed view of this interaction on the UrGig platform.

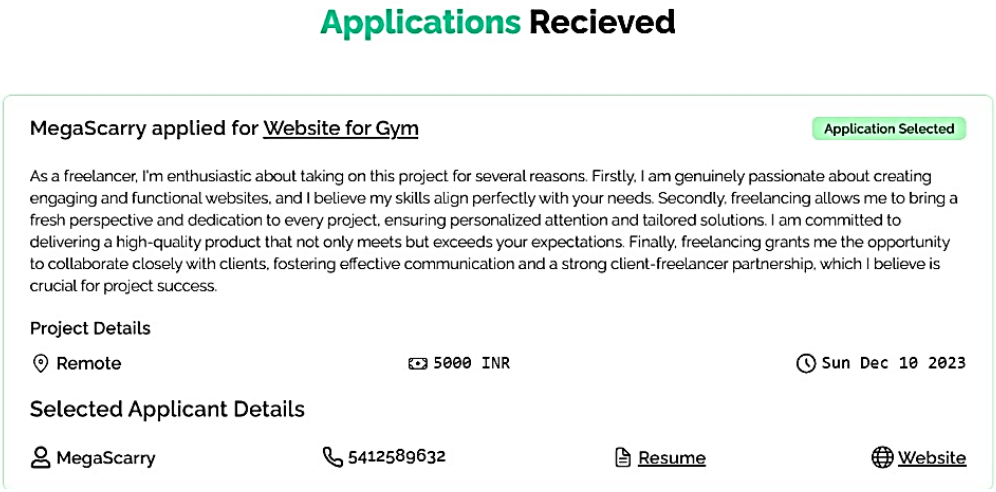


FIG 5.10 After accepting it display on freelancer profile

The platform adheres to **strict privacy measures** by revealing only the *phone number of the freelancer chosen by the client* for their project. This ensures that sensitive contact information is exclusively disclosed to the selected freelancer, upholding a professional standard of privacy on the UrGig platform.

There is an additional feature on our platform: an AI chatbot that not only assists users with their inquiries but also enhances the interaction process. This intelligent chatbot begins by gracefully requesting users' names and email addresses, thereby personalizing the experience from the outset. Furthermore, users can seamlessly navigate through the conversation by starting new chats, concluding ongoing discussions, and refreshing the interface as needed. This multifaceted functionality not only streamlines communication but also fosters a more intuitive and user-friendly environment for engaging with our AI system.

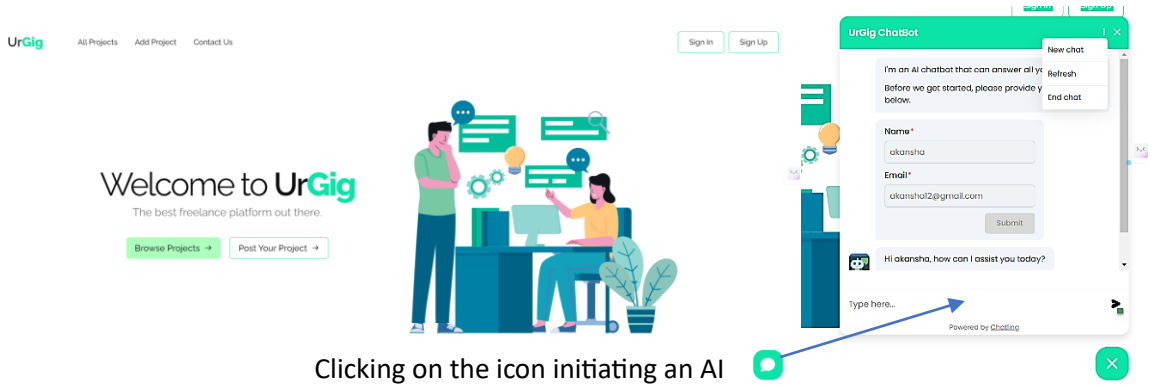


FIG 5.11 Interactive AI Chatbot Interface

This figure depicts an interactive user interface featuring an AI chatbot capable of answering various inquiries. Users can engage with the chatbot by clicking on the designated icon, initiating a conversation with the AI system. The chatbot is programmed to provide comprehensive responses to a wide range of questions posed by users. Prior to commencing the interaction, users are prompted to input their personal details.

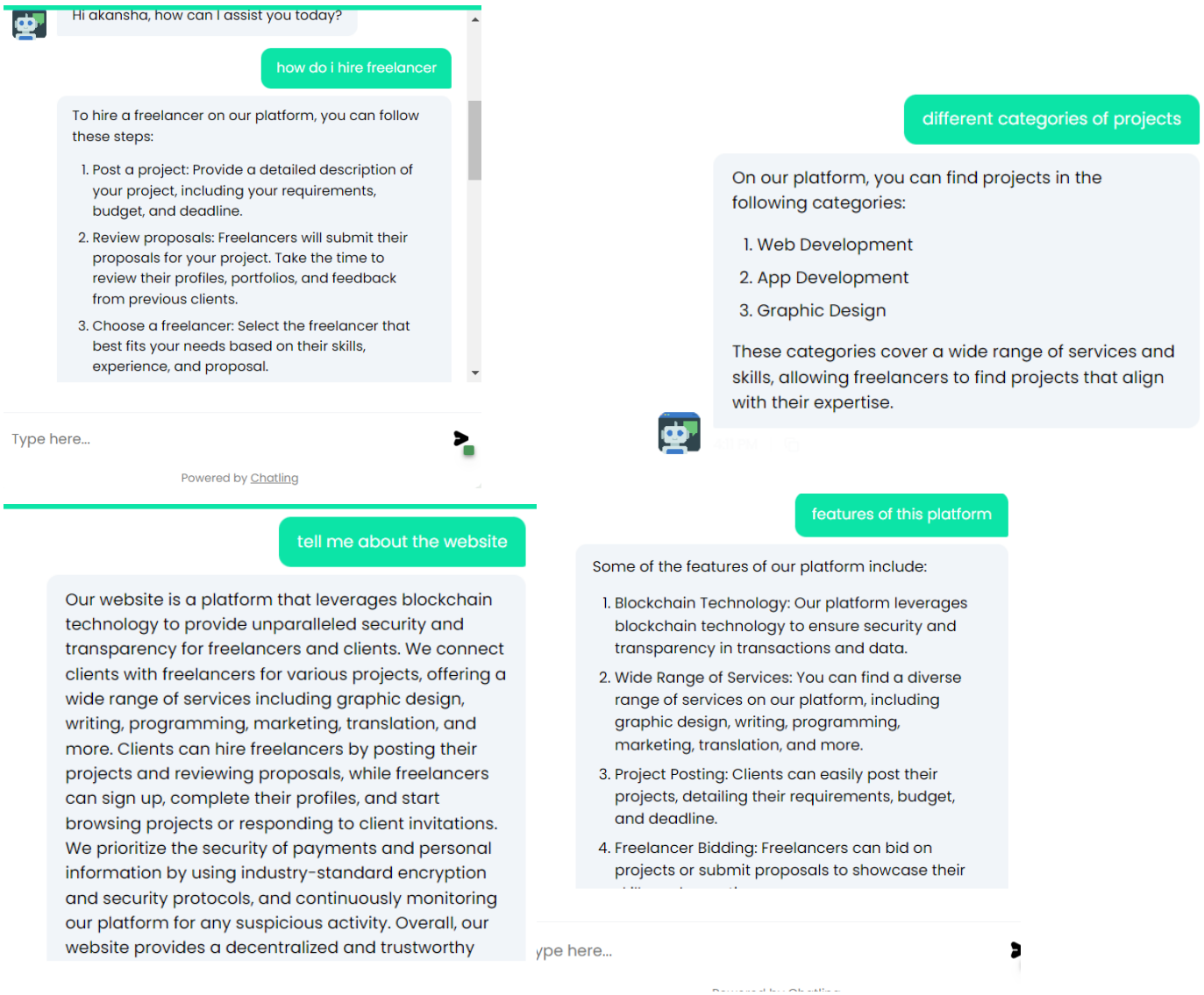


FIG 5.12 Conversational Diversity: User Queries and Chatbot Responses

In this depiction, users engage with the AI chatbot by posing various queries, each met with a prompt and informative response from the system. The chatbot seamlessly navigates through the diverse inquiries, showcasing its versatility and adaptability in addressing a wide array of topics.

As users input their questions, the chatbot swiftly processes the information and generates relevant and accurate replies, demonstrating its capability to handle diverse conversational scenarios effectively. Through this interactive exchange, users experience firsthand the chatbot's ability to provide timely and valuable assistance across a spectrum of queries, thereby enhancing the overall user experience.

In the competitive landscape of decentralized freelancing, this systematic and carefully planned progression exemplifies a dedication to excellence, setting the stage for a successful project implementation that aligns seamlessly with the project's overarching vision and user expectations. The comprehensive requirements documentation, meticulous design and development, rigorous testing, and strategic deployment underscore the commitment to delivering a high-quality, user-driven platform in the evolving landscape of freelancing.

V. CONCLUSION

This innovative solution, deeply rooted in blockchain and biometrics, addresses the limitations of centralized platforms head-on. By leveraging blockchain's immutable and transparent ledger, the platform tackles trust deficits and security concerns. Smart contracts eliminate intermediaries, reducing costs and enhancing operational efficiency. The emphasis on a tamper-proof trust and reputation system builds confidence among freelancers and clients, fostering a secure and transparent collaborative environment. The blockchain-powered freelancing web application emerges as a transformative force in the industry. It not only addresses existing challenges but propels the freelancing ecosystem into a future characterized by security, transparency, and collaboration.

This table provides a concise comparison of key aspects between Upwork, Fiverr, and decentralized platforms. It covers trust systems, fee structures, data security, smart contracts, transparency, specialization, flexibility, and blockchain integration. Decentralized platforms stand out with blockchain-based trust, decentralized storage, and automated contracts, offering higher transparency and security. This serves as a helpful reference for freelancers choosing the most suitable platform for their needs.

Aspect	**Upwork**	**Fiverr**	**Decentralized platforms**
Trust & Reputation System	Yes (Ratings & Reviews)	Yes (Ratings & Reviews)	Yes (Blockchain-based Trust System)
Fee Structure	Service Fee + Payment Fees	Service Fee + Payment Fees	lower due to blockchain
Data Security	Centralized Storage	Centralized Storage	Decentralized Blockchain
Smart Contracts	No	No	Yes (Automated Contracts)
Transparency & Opacity	Operational Opacity	Some Transparency	High Transparency
Specialization & Service Diversity	Diverse Services	Focused on Creative Tasks	Dependent on Implementation
Flexibility & Work-life Balance	Yes (Project Selection)	Yes (Micro-tasks & Projects)	Yes (Flexible Contracts)
Integration with Blockchain	No	No	Yes (Fundamental to Operation)

Table 5.1 Centralized v/s decentralized

The platform's meticulous design, from secure communication channels to seamless payment processing, redefines the freelancing experience. UrGig's deployment and launch, marked by strategic planning and technological integration, have positioned it as a dynamic and user-friendly space where freelancers, clients, and developers converge. This journey, marked by thoughtful planning, strategic implementation, and the seamless integration of diverse technologies, showcases UrGig's evolution from conceptualization to a fully functional platform. The commitment to transparency, supported by blockchain technology, ensures secure and transparent transactions. UrGig's impact extends beyond individual transactions, reshaping the freelancing industry into a safer, more trustworthy, and rewarding space. The platform stands as a testament to innovation, addressing the freelancing landscape's challenges and ushering in a future where security, transparency, and mutual benefit thrive.

VI. FUTURE SCOPE

This refinement aims to simplify navigation, streamline processes, and enhance overall accessibility, thereby making our decentralized freelancing platform more user-friendly. Exploration of integration with emerging blockchain technologies is a key facet of our future work. We aim to stay at the forefront of technological advancements, leveraging innovative blockchain solutions to enhance the security, efficiency, and overall performance of our platform. This proactive approach ensures that our decentralized freelancing ecosystem remains cutting-edge and competitive in a rapidly evolving landscape.

Rigorous testing protocols are integral to our strategy, ensuring scalability as we grow. Scalability challenges will be systematically addressed, fortifying the platform's ability to handle increased user load and transaction volumes without compromising performance.

Our dedication to ongoing innovation is underscored by the provision of customization options. These empower users to tailor their experience, fostering satisfaction and user loyalty. By creating an ecosystem where freelancers and clients seamlessly connect, collaborate, and thrive, our vision is to establish a harmonious environment that accommodates the evolving demands of the global gig economy. As we embark on this journey, the decentralized freelancing platform we envision is poised to evolve dynamically, setting new standards for quality, scalability, and user-centricity.

REFERENCE

[1] "The Freelancer: A Conceptual Review" Abdul Ghafoor Kazi, Rosman Md Yusoff, Anwar Khan", Shazia Kazi Faculty of Management (FM),

[2] ""Boundaryless" in the creative economy: assessing freelancing on Upwork"Pawel Popiel ,Annenberg School for Communication, University of Pennsylvania, Philadelphia, PA 19104, USA

[3] "Does freelancing have a future? Mathematical analysis and modelling"Fareeha Sami Khan, M. Khalid, Ali Hasan Ali, Omar Bazighifan, Taher A. Nofal and Kamsing Nonlaopon

[4] "Significant aspects, emerging opportunities of future of work in Digital era with specific reference to potential and challenges for online freelancing and Microwork in India" Jayadatta S,Praveen B Patil, Gangadhar Sheeri, Nitin Bhasker

[5] "Freelancers as Part-time Employees: Dimensions of FVP and FJS in E-Lancing Platforms" Zubair Nawaz , Jing Zhang, Rafiq Mansoor, Saba Hafeez and Aboo bucker Ilmudeen

[6] "Challenges of IT freelancers on digital labor platforms: A topic model Approach" Lisa Gussek, Alex Grabbe, Manuel Wiesche

[7] "Reduction of Online Fraudulent Activities in Freelancing Sites Using Blockchain and Biometric" Amreen Batool and Yungcheol Byun

[8] "Blockchain smart contracts: Applications, challenges, and future

Trends" Shafaq Naheed Khan, Faiza Loukil, Chirine Ghedira-Guegan, Elhadj Benkhelifa, Anoud Bani-Hani

[9] "Blockchain Technology and Manufacturing Industry: Real-Time Transparency and Cost Savings" Taehyun Ko , Jaeram Lee and Doojin Ryu

[10] Decentralized Freelancing System - Trust and Transparency

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[11] I. Afrianto, C. R. Moa, S. Atin, I. Rosyidin and Suryani, "Prototype Blockchain Based Smart Contract For Freelance Marketplace System," 2021 Sixth International Conference on Informatics and Computing (ICIC), Jakarta, Indonesia, 2021, pp. 1-8, doi: 10.1109/ICIC54025.2021.9633001.

[12] A. Van den Born and A. Van Witteloostuijn, "Drivers of freelance career success", J. Organ. Behav., vol. 34, no. 1, pp. 24-46, 2013.

[13] A. S. Gillis, "What is the gig economy? Definition from WhatIs.com", 2020, [online] Available: WhatIs.com.

[14] H. Yoganarasimhan, "The value of reputation in an online freelance marketplace", Mark. Sci., vol. 32, no. 6, pp. 860-891, 2013.

[15] Kenneth C. Wilbur, Linli Xu, David Kempe (2013) Correcting Audience Externalities in Television Advertising. Marketing Science 32(6):892-912. https://doi.org/10.1287/mksc.2013.0807

[16] https://whitepaper.deelance.com/market-problem

[17] Decentralized Freelancing System - Trust and Transparency

Mihir Gandhi, Priyam Shah, Devansh Solanki, Mihir Shah Student, Dept. of Computer Engineering, K.J. Somaiya College of Engineering, Mumbai, India

[18] Radosavljevic, Milan & Pesic, Aleksandar & Petrovic, Nenad & Tosic, Milorad. (2021). Freelancing blockchain: A practical case-study of trust-driven applications development.