



iJRASET

International Journal For Research in
Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 14 Issue: VIII Month of publication: August 2026

DOI: <https://doi.org/10.22214/ijraset.2026.84687>

www.ijraset.com

Call:  08813907089

E-mail ID: ijraset@gmail.com

ConQuote Connect: A Unified Construction Platform Integrating BIM, and Blockchain Escrow

Mr. Harshal Kadam¹, Mr. Mayur Prajapati², Mr. Amit Yadav³, Prof. Sonali Karthik⁴

^{1, 2, 3}Student, Information Technology Engineering, Theem College of Engineering, Maharashtra, India

⁴Assistant Professor, Information Technology Engineering, Theem College of Engineering, Maharashtra, India

Abstract: ConQuote Connect is a smart digital platform designed to solve common problems in the construction industry, such as unclear project details, payment delays, miscommunication and the difficulty of finding trustworthy contractors. It creates a single, streamlined space where builders can post their construction projects and contractors can submit structured and easy to compare quotations. A key part of the system is the use of Building Information Modeling (BIM), which allows builders to upload 3D models of their projects. These models help both parties clearly understand the scope of work and visually track progress through milestones, such as marking when the foundation, floors, or roofing are completed. To make payments more secure, transparent, and fair, ConQuote Connect uses blockchain-powered smart contracts. These contracts safely hold project funds and only release payments when a builder confirms that a milestone has been completed through the BIM model. The platform also includes AI tools that assist in comparing contractor quotes and helping builders make faster, more informed and data backed decisions. When a contractor successfully completes a project, they receive a digital certificate in the form of an NFT, which becomes part of their verifiable reputation and track record on the platform. Both builders and contractors have their own personalized dashboards to manage tasks, communicate updates, track progress and approve or verify completed work. By combining BIM, blockchain and AI in one easy to use system, ConQuote Connect offers a modern, transparent and trustworthy way to manage construction projects reducing disputes, saving time and improving industry collaboration.

Keywords: Building Information Modeling (BIM), Blockchain, Smart Contracts, Construction Project Management.

I. INTRODUCTION

ConQuote Connect is a smart construction quotation, escrow, and verification system that aims to transform the way builders and contractors collaborate. The platform addresses common challenges in construction procurement such as unclear project scopes, delayed or disputed payments, and the lack of trust between stakeholders. By integrating Building Information Modeling (BIM), the system provides a visual and data-driven representation of the project, serving as a single source of truth for defining scope and tracking progress. Blockchain-based escrow contracts further ensure transparency and security by automating milestone-based payments, while NFTs establish a permanent, verifiable record of contractor performance and project completion. Together, these technologies create a unified digital platform that enhances trust, accountability, and efficiency in the construction industry.

II. LITERATURE REVIEW

The construction industry continues to experience inefficiencies in procurement processes, delayed milestone payments, and frequent disputes due to limited transparency and manual verification systems. Recent research highlights the integration of Building Information Modeling (BIM) and blockchain-based smart contracts as a promising solution for automating construction payments and improving trust among stakeholders. Studies such as the framework proposed by Mohamed A. Kamel et al. demonstrate the use of 5D BIM integrated with blockchain escrow mechanisms to automate milestone-based payments, ensuring funds are released only after verified project updates [1]. Similarly, H. Elsharkawi et al. explored scan-to-BIM techniques combined with blockchain-enabled smart contracts, where real-time site data captured through photogrammetry and laser scanning is directly linked to automated payment triggers [2]. Further research by Yasin Celik et al. emphasized the lifecycle integration of BIM and blockchain, positioning BIM as a single source of truth while blockchain ensures immutable and tamper-proof transaction records across all construction phases [3]. In addition, Xuling Ye and Markus König proposed smart contract frameworks for automating claim management within BIM environments, reducing manual intervention and accelerating dispute resolution [4]. Research by Hesam Hamledari and Martin Fischer further demonstrates how blockchain enhances supply chain transparency by creating immutable logs for materials and logistics tracking, significantly improving data completeness and accountability [5].

Building upon these advancements, the proposed ConQuote Connect platform integrates BIM-based visualization, blockchain-powered milestone payments, and AI-driven quotation comparison into a unified digital ecosystem. By combining secure financial automation, transparent progress verification, and intelligent decision-support systems, the platform aims to reduce disputes, streamline procurement, and foster trust-based collaboration between builders and contractors.

III. MATERIALS AND METHODS

A. System Architecture

The System Architecture for ConQuote Connect defines the structure and organization of its diverse components, illustrating how the core technologies BIM, Blockchain, and AI are integrated to meet the project's objectives of trust and transparency in construction procurement. It provides a high-level view of the system's design, which is fundamentally a Multi-Layered, Decentralized Application (dApp). The architecture separates concerns into specialized layers, ensuring that the Next.js frontend provides the user experience, the Firebase backend manages data and authorization, the Gemini API provides intelligent decision support via Genkit, and the Polygon blockchain establishes the immutable trust for escrow and reputation NFTs. This layered approach ensures that the system can handle the complexity of large BIM files, real-time AI analysis, and secure, transparent financial transactions simultaneously.

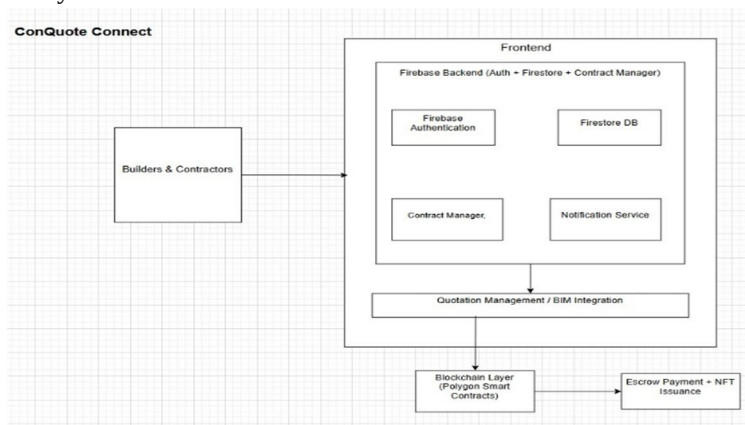


Figure1: System Architecture

B. Proposed System

The proposed system, ConQuote Connect, uses a layered architecture integrating BIM, cloud services, and blockchain to improve transparency and trust in construction management. Builders and contractors interact through a Next.js-based frontend with IFC.js support for real-time 3D BIM visualization, where project scope and milestones are clearly defined. Firebase Authentication and Firestore manage user roles, project data, quotations, and milestone records. Smart contracts deployed on the Polygon blockchain implement an escrow mechanism that automatically releases milestone-based payments upon builder approval. After successful project completion, an NFT certificate is issued to the contractor as a verifiable on-chain reputation record. This integration ensures secure payments, reduces disputes, and streamlines procurement processes.

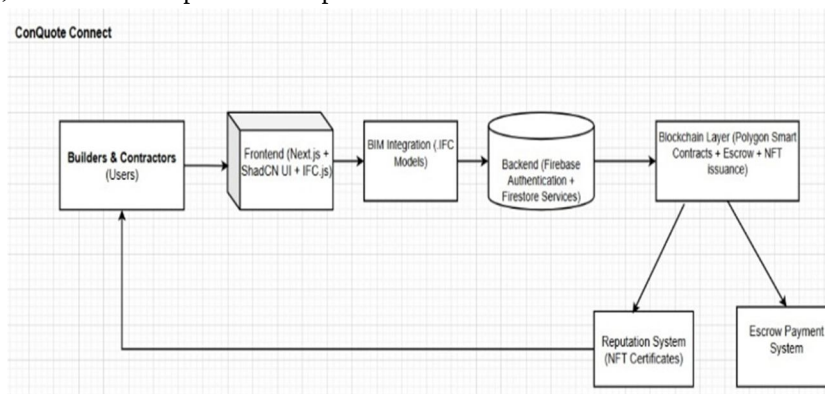


Figure 2: Proposed System

IV. RESULTS AND DISCUSSION

The successful implementation of the ConQuote Connect platform demonstrates the value of integrating BIM, Blockchain, and AI to address inefficiencies in construction procurement. The system secures project funds through a transparent Polygon smart contract escrow linked to verified BIM milestone approvals, effectively connecting project progress with financial control. Upon project completion, NFT certificates are issued to create an immutable on-chain reputation record, enhancing trust, efficiency, and transparency across the project lifecycle.

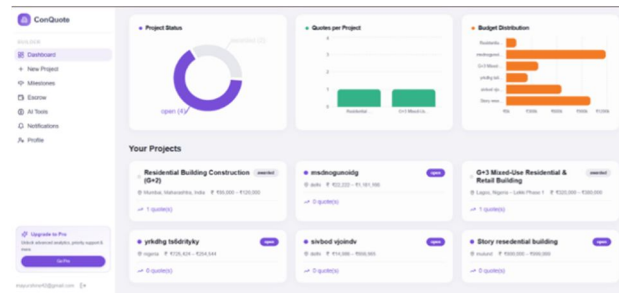


Figure 3.1: Landing Page

The landing page establishes ConQuote as an integrated digital construction ecosystem by highlighting BIM-based visualization, and blockchain-enabled payment security. Its clean UI design and focused messaging enhance user engagement while reinforcing the platform's technological innovation.

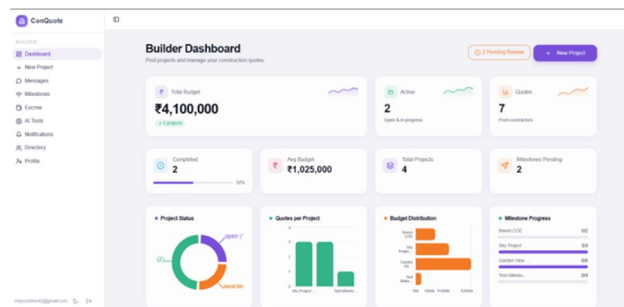


Figure3.2 Builder Dashboard

The Builder Dashboard provides a centralized interface for managing construction projects, tracking received quotations, and monitoring project progress. It offers real-time visibility into active projects, escrow status, and milestone tracking, enabling informed decision-making. The structured layout enhances workflow efficiency and simplifies project oversight.

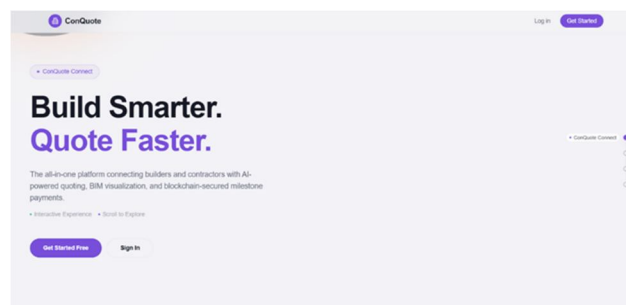


Figure3.3 Posted Project

The Posted Project page integrates a detailed project overview with an embedded IFC-based BIM viewer. It enables stakeholders to visualize and interact with the 3D model, improving transparency and supporting milestone verification.

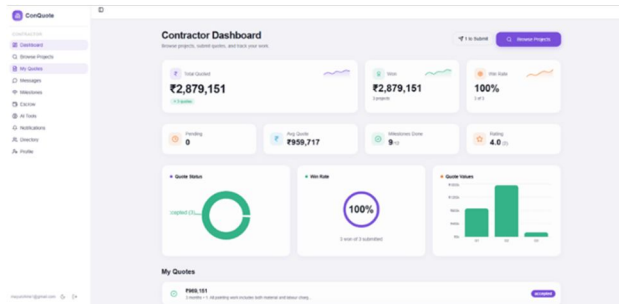


Figure3.4 Contractor Dashboard

The Contractor Dashboard enables users to browse available projects, submit quotations, and track bidding status in real time. It provides a structured overview of pending quotes, awarded projects, and total quoted value, ensuring transparency and workflow efficiency.

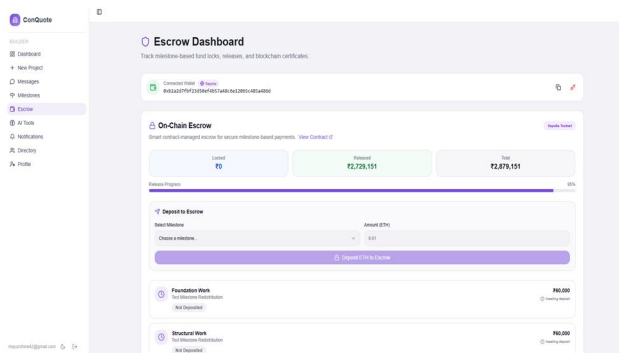


Figure3.4 Escrow Dashboard

The escrow connection with MetaMask represents the critical blockchain infrastructure of ConQuote Connect, enabling secure, transparent, and automated milestone-based payments between builders and contractors. This integration transforms traditional construction payment mechanisms by leveraging MetaMask as the user's gateway to the Polygon blockchain, where smart contracts govern the release of funds according to predefined conditions. The implementation encompasses wallet connection management, transaction signing, contract interaction, and comprehensive user feedback mechanisms that together create a seamless bridge between the familiar web application environment and the decentralized blockchain world.

V. CONCLUSIONS

The ConQuote Connect project successfully demonstrates the capability to revolutionize construction procurement by tightly integrating BIM, Blockchain, and AI. The system effectively addresses the industry's critical issues of trust and transparency by establishing a workflow where BIM models act as the verifiable scope, Polygon smart contracts provide automated, secure escrow payments, and the Gemini AI delivers objective quotation comparison and risk assessment. By enforcing structured data submission and issuing NFT certificates for completed projects, ConQuote Connect bridges the gap between digital design, financial security, and contractor reputation, proving that smart technologies can significantly foster efficient collaboration, reduce disputes, and streamline the entire construction contract lifecycle.

REFERENCES

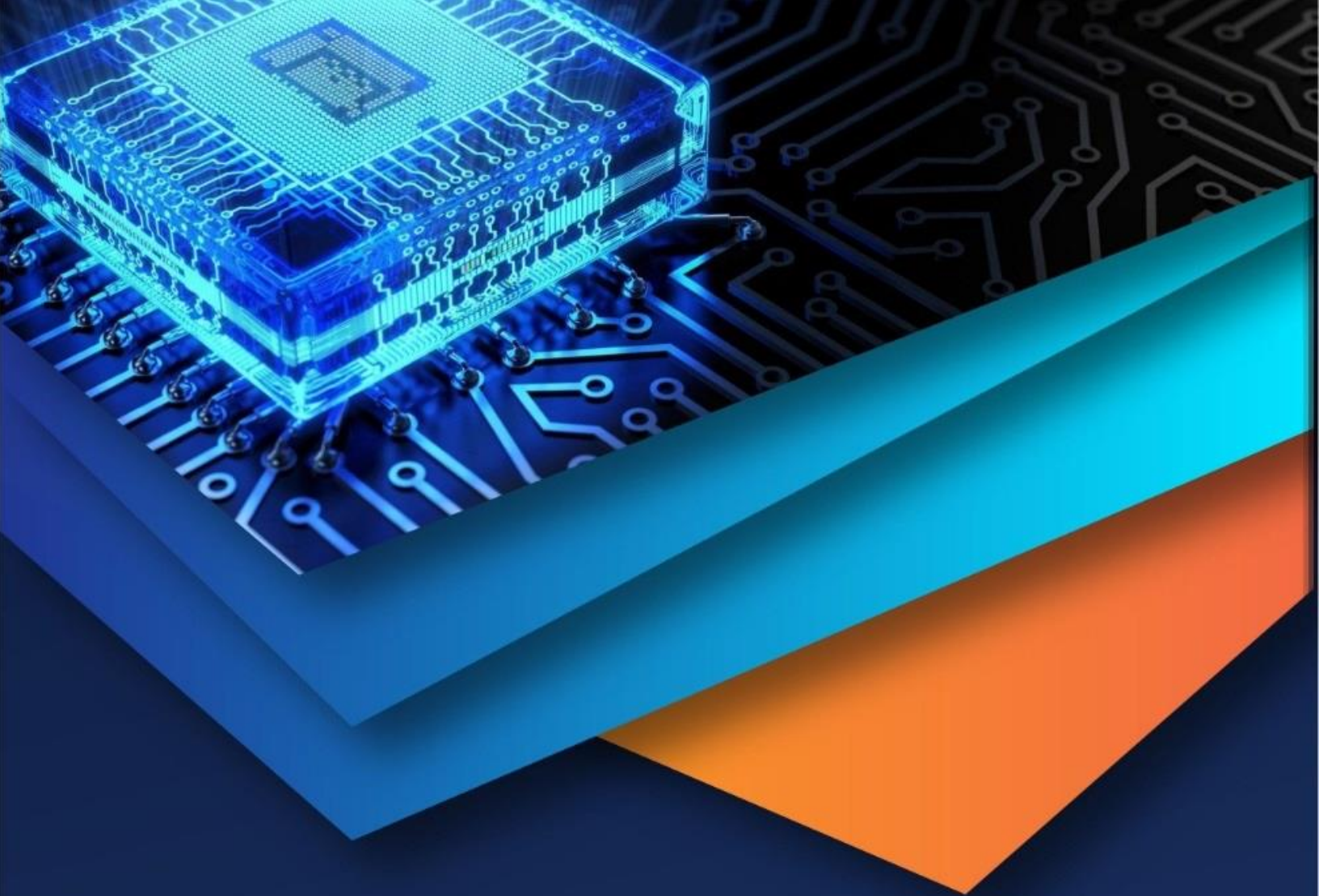
Journal Paper

- [1] ZHANG Yan and FEI. Guangzheng, "Overview of 3D Scene Viewpoints evaluation method", Virtual Reality & Intelligent Hardware, vol. 1, no. 4, pp. 341-385, 2019.
- [2] Xiangyu Wang, "Augmented Reality in Architecture and Design: Potentials and Challenges for Application", International Journal of Architectural Computing, vol. 7, no. 02.
- [3] Y. Yorozu, M. Hirano, K. Oka and Y. Tagawa, "Electron spectroscopy studies on magneto optical media and plastic substrate interface", IEEE Transl. J. Magn. Japan, vol. 2, pp. 740-741, August 1987.



Proceeding paper:

- [4] Shravani Aher, Roshani Avhad, Ekta Bhavsar, Om Pagare, Ms. Madhuri V. Malode, "Augmented Reality in Real Estate: Enhancing Property Visualization and Customer Experience".
- [5] Stefan Seipel, Martin Andrée, Karolina Larsson, Jesper M. Paasch & Jenny Paulsson, "Visualization of 3D Property Data and Assessment of the Impact of Rendering Attributes".
- [6] Nida Naeem, Irfan Ahmad Rana & Abdur Rehman Nasir, "Digital real estate: a review of the technologies and tools transforming the industry and society



10.22214/IJRASET



45.98



IMPACT FACTOR:
7.129



IMPACT FACTOR:
7.429



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089  (24*7 Support on Whatsapp)