

Cashlyt: Smart Location-Based Cash in and Cash Out Platform for UPI and Bank Balance Conversion

Vrashank Domatwar

Student

Department of IT

G H Raisoni College Of Engineering and Management
Pune, India

vrashank.domatwar.it@ghrcemp.raisoni.net

Mrs. Rajeshree Rathod

Assistant Professor

Department of IT

G H Raisoni College Of Engineering and Management
Pune, India

rajeshree.rathod@raisoni.net

Abhishek Kolhe

Student

Department of IT

G H Raisoni College Of Engineering and Management
Pune, India

abhishek.kolhe.it@ghrcem.raisoni.net

Muktar Sayyad

Student

Department of IT

G H Raisoni College Of Engineering and Management
Pune, India

muktar.sayyed.it@ghrcem.raisoni.net

Abstract—The increasing adoption of digital payment systems such as Unified Payments Interface (UPI) and mobile banking has significantly transformed the financial ecosystem in India. Despite this growth, a substantial portion of the population continues to rely on physical cash, especially in semi-urban and rural regions where access to formal banking infrastructure remains limited. Users frequently encounter challenges in converting digital money into physical cash and depositing cash into digital accounts due to issues such as ATM unavailability, long queues, restricted banking hours, and lack of trustworthy service providers.

To address these limitations, this paper proposes CASHLYT, a smart and secure location-based Cash-In and Cash-Out (CICO) platform that facilitates seamless interaction between users and verified agents. The system utilizes real-time location services to identify nearby agents and enables users to generate cash-in or cash-out requests through a mobile application. Upon request acceptance, a one-time password (OTP) is generated to authenticate the transaction, ensuring secure and reliable cash exchange between users and agents.

Unlike conventional digital payment platforms, the proposed system does not handle financial transactions within the application, thereby reducing complexity and security risks. Instead, it focuses on enabling safe coordination and verification for offline cash exchange while maintaining transaction logs for transparency and accountability. The architecture integrates user, agent, and administrative modules along with location-based services and secure authentication mechanisms.

The proposed solution aims to bridge the gap between digital and physical financial systems, improve last-mile cash accessibility, and enhance user trust through verified agents. By reducing dependency on traditional banking channels and providing a scalable and user-centric platform, the system contributes to advancing financial inclusion and strengthening the overall fintech ecosystem.

Index Terms—Cash-in, Cash-out, Fintech, Financial Inclusion, Agency Banking

I. INTRODUCTION

Due to significant advancements in technology, the field of finances has drastically changed due to the development of digital payments, including UPI, mobile banking, and digital wallets. Despite their benefits, digital payments are not enough to substitute physical cash since the latter is used for financial transactions across semi-urban and rural areas, where digital literacy and banking are yet to develop. Therefore, one of the main problems faced by users is the conversion of digital money to cash, which can be done using ATMs, but these are often unavailable or do not contain necessary funds. In addition, banks operate at certain times only and can be hard to reach; thus, users have to rely on unverified sources and face various difficulties related to safety and fraudulent activities [6].

Fintech developments have helped improve the process of digital payments, but none of them provide solutions to the aforementioned problem. Current solutions primarily concentrate on transaction facilitation within their applications, neglecting the aspect of coordination of safe exchanges of cash [6]. Therefore, there is a need to fill this gap by creating an application that helps to find a local trusted agent who will perform a cash exchange.

In order to do that, this paper offers to develop CASHLYT a smart location-based Cash-In and Cash-Out (CICO) platform, which allows to find nearby verified agents who accept cash from customers in exchange for their digital payments. Such platform would use GPS and secure mechanisms like OTP for ensuring the safe and fast exchange of money.

II. PROBLEM STATEMENT

With increasing advancements in technologies like Unified Payment Interface (UPI) and mobile banking, one major concern faced by the industry is that of bridging the gap between digital transactions and physical money. Even after such innovations, a majority of people still continue to use cash as their means of carrying out day-to-day financial transactions. This issue stems from problems related to availability of ATMs, cash shortage, long queues, and unavailability of banking facilities during odd hours [7].

Without any systematic process in place, the only option available to the users is turning to informal agents who act as mediators between digital money and physical currency. Such practices expose users to fraudulent transactions and lack of transaction visibility [1]. In addition to this, the user does not get any information regarding trustworthy agents located near him/her at the time of need.

Current technologies facilitate digital transactions without addressing the issue of cash accessibility and secure coordination between users and agents in a systematic manner. In other words, there are no location-based platforms available today which would provide users with secure and verified cash exchange services.

A much needed technology in such cases would be one wherein users can easily identify trusted agents located nearby and conduct cash operations along with maintaining transaction records.

III. LITERATURE REVIEW

A number of studies have already been carried out on the significance of fintech such as digital payment systems and how they help in improving financial inclusion and facilitate the transaction process. Some of these studies have recognized the rapid adoption of technology systems such as UPI, mobile banking, and digital wallets, which help to make the process easier. There are several studies on security aspects of mobile payment systems by developing secure architectures and methods of ensuring authentication and fraud detection mechanisms. Apart from that, studies conducted on the issue of financial inclusion emphasize the need for digital means of offering banking facilities to underprivileged segments of society, especially those in remote rural areas.

Unfortunately, very few studies are available on this topic focusing only on transaction processes. Many researchers have also studied some aspects such as agent-based financing and location-based services. However, there is no comprehensive study on how to facilitate easy and secure cash-in and cash-out operations in a real-time manner. In today's world, there is a dearth of offline systems for facilitating cash transfer.

IV. PROPOSED SYSTEM

The proposed solution has been named Cashlyt which is a location based innovation in the form of a CICO network meant to make the transition from physical to digital currency seamless and secure. The application is meant to solve the problem of connecting the popularity of electronic payment

networks and continued usage of physical currencies for daily transactions. This would be done by creating a connection

between the user and the nearby agents making sure that the cash exchange process takes place in an organized manner [6].

The software is expected to perform the two functions of cash-in and cash-out. In case of the cash-in, a person pays the physical cash to the agent in exchange for which the agent will deposit equivalent value of digital currency to the account of the user. As far as the cash-out is concerned, the user will pay the digital cash to the agent who will provide the equivalent physical cash to him/her. It can also be used for facilitating indirect cash transactions through conversion process from physical to digital currency.

One of the salient features of the proposed system includes real-time location services, thereby making the system highly accessible. Using GPS technologies, this application would detect the available agents around the particular user and enable the same for completing any kind of requested transaction. The use of location services enables the users to perform transactions without necessarily visiting ATMs or banks, which might not be available always [5]. Further, the availability status of the agents would be maintained inside the application itself.

In order to achieve a secured system, OTP authentication is employed in the transaction process. Upon making a request from the user, an accepted request generates a One Time Password. Once the transaction takes place between the two parties, the user would provide the received password to the agent. The agent then uses the application to verify whether the transaction is legitimate or not. Thus, the OTP acts as an important step in preventing fraud [7].

Apart from authentication processes, detailed logs of each transaction with regard to status of request and verification details are captured by the system. This provides greater clarity and monitoring ability along with dispute resolution capabilities in case any arises. Also, there exists an administrative module to supervise agent verification process, system activities and resolve operational problems for greater reliability and effectiveness of the system.

Overall, the discussed model presents an effective solution for overcoming the barriers between cash and electronic financial transactions. Combining location-based services with verified agents and secure methods of authentication, it increases financial inclusiveness while reducing the necessity of relying on conventional bank structures for last mile cash services [1].

V. SYSTEM ARCHITECTURE

The architecture of CASHLYT has been established on a resilient, loosely coupled architecture that aims to create an effective link between digital finance and physical cash transactions through a modular and secure structure. First, the backend server has been implemented using Node.js and Express.js as the main orchestrators of all the processes in the system through the use of secure REST APIs. These orchestrators facilitate communication between the mobile applications of both the user and agent and the web dashboard,

which have been designed using Flutter and React respectively. The use of real-time technology has been facilitated by the Google maps API, which allows for the identification of nearby agents, and the Firebase Cloud Messaging System that sends instant notifications of transaction requests.

On the other hand, the architecture features multiple layers for data protection and security. The security layer takes care of important activities such as authenticating users and logging the transactions through OTP. In terms of storing information, the PostgreSQL database has been used.

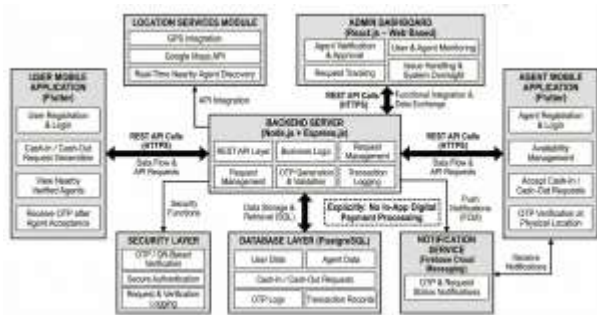


Fig. 1: System Architecture of CASHLYT Platform

The system consists of the following components:

- User Interface (Web/Mobile Application)
- Agent Module
- Backend Server
- Database
- Payment Gateway

VI. WORKING OF THE SYSTEM

A. Cash-In Process

Cash-In procedure allows for an easy transformation of cash money into electronic currency by providing a secured interaction with the certified agent. First, the user signs in to the app and clicks on the Cash-In button; here the amount that the user wishes to deposit should be typed in. Then, the system uses location services (GPS, mapping software) to locate nearby agents and show the user their availability [5].

Afterward, the user chooses an appropriate agent, and sends him or her the request to approve the transaction. When the request is accepted, the system generates a unique one-time password (OTP) that will be used as the security token for this particular transaction. The generated OTP can be used by the client alone within a certain time period in order to avoid any kind of misuse [7].

From the side of the agent, the OTP supplied by the user is used by the system for the verification process. The OTP is validated with the help of the system data so as to ascertain the authenticity of the OTP, and whether the request has expired[1]. After successful validation, the agent proceeds to complete the process by sending the amount to the user's bank account or mobile wallet using external payment methods like UPI or mobile banking.

Additionally, the system maintains records for all the transaction details, which include the user ID, agent ID, transaction amount, date and time of the transaction, and the verification status. In essence, the Cash-In process provides a secure and efficient way of converting cash to digital money without necessarily using banking services.

B. Cash-Out Process

Cash-Out allows the user to withdraw cash from the virtual balance in possession using the services of an approved agent. It starts with the user logging into the application and initiating a Cash-Out procedure, where they enter the amount that they want to withdraw [5]. Next, the system searches for available agents near the user's current location and presents the results for selection [5].

Once the user has selected the agent, they send a request for withdrawing the funds, which can be accepted or rejected by the agent depending on their availability. Upon acceptance of the request, the system generates a One-Time Password (OTP) and communicates it to the user [5][7]. At this point, the user needs to go to the agent's place.

In the case of the transaction, the user sends the designated digital amount to the agent via a secure payment mode like UPI. Once the digital payment is successfully received by the agent, they input the OTP into the system for validation [6]. OTP is validated to authenticate the transaction and ensure it is valid and not modified.

Once the OTP is successfully validated, the agent gives the physical cash of an equal amount to the user. Just like the Cash-In procedure, all details about the transactions such as the request information, payment confirmation, OTP validation information, among others, are logged in the system for security purposes.

Overall, the Cash-Out process provides a secure and efficient alternative to traditional cash withdrawal methods such as ATMs, particularly in areas where banking infrastructure is limited or unavailable.

VII. RESULT

The execution of Cashlyt takes advantage of a scalable backend system that guarantees a smooth and secure environment for CICO transactions. The combination of Node.js and PostgreSQL as back-end components enables a highly responsive "digital witness" system. Node.js supports non-blocking I/O processes that make it ideal for use in the discovery module because it allows for the real-time matching of users and agents based on geolocation.

A. User Onboarding and Profile Management

The process guarantees that both the users and agents have a single access point to begin the financial transaction process seamlessly.

- **Login Interface:** There is one screen where users and agents can log into their modules by using their login information.



Fig. 2: User Interface showing the Cashlyt User Login Page.

- **User Profile:** This dashboard provides users with a comprehensive view of their account details, transaction history, and personalized settings.



Fig. 3: User Interface showing the Cashlyt User Profile.

B. Core Operations: Cash-In and Cash-Out

The core feature is powered by real-time location tracking and authentication to fill the gap between online and offline cash.

- **Home Page and Agent Discovery:** Users can create a request by specifying the required amount that needs to be deposited or withdrawn. Once the agent accepts the request, an OTP is generated for a secure transaction.

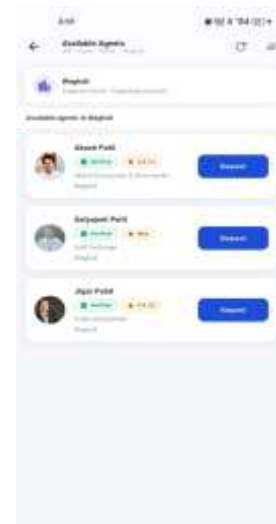


Fig. 4: Interface showing Cashlyt Agent Discovery.

- **Transaction Interface:** Users can create a request by specifying the required amount that needs to be deposited or withdrawn. Once the agent accepts the request, an OTP is generated for a secure transaction.

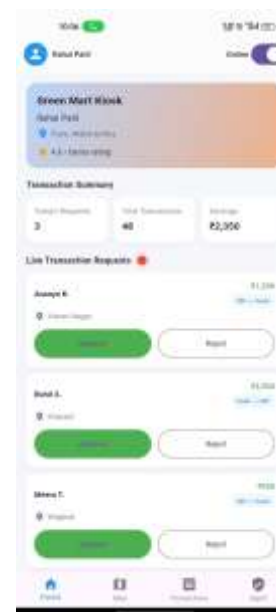


Fig. 5: Interface showing the Cashlyt Transaction Interface .

- **Verification and Completion:** An agent verifies the OTP provided by the customer through the application to complete the process.



Fig. 6: Interface showing the Cashlyt Transaction Completion.

C. Administrative Oversight

The online Admin Dashboard maintains system integrity and accountability through centralized administration and live data monitoring.

- **Agent Registration:** Agent Registration is done the Agent and admin review and approve agent applications, checking submitted documentation to maintain the security and reliability of the network.



Fig. 7: Interface showing the Cashlyt Agent Registration .

- **System Monitoring:** A centralized interface tracks all transaction logs, request statuses, and user feedback in real-time to resolve any potential disputes.



Fig. 8: Interface showing the System Monitoring .

VIII. ADVANTAGES OF THE PROPOSED SYSTEM

- **Improved Financial Accessibility:** Helps in converting money into digital money and digital money into cash easily, particularly in semi urban and rural areas.
- **Reduced Dependency on ATMs and Banks:** Eliminates dependency on banks or ATM, which may not be available or can be crowded.
- **Location-Based Convenience:** Identifies nearby agents through GPS.
- **Secure Transactions using OTP Authentication:** Transactions done are always verified and secure from any kind of security threats.
- **Verified Agent Network:** Only those agents who are authorized are able to conduct the transaction.
- **Time-Saving and Efficient:** Reduces waiting time through quick agent connectivity.
- **Offline Cash Exchange Capability:** Enables secure offline cash transactions between users and agents.
- **Transparency through Transaction Logging:** Maintains secure and reliable transaction logs for transparency and accountability.
- **User-Friendly Interface:** Easy-to-use mobile application designed for individuals who have some level of experience with smartphones.
- **Supports Financial Inclusion:** Facilitates access to financial services by unbanked and underbanked communities.
- **Real-Time Agent Availability:** Shows live agents which speeds up the process.
- **Reduced Risk of Informal Transactions:** Eliminates risk of dealing with people without proper verification.
- **Enhanced Trust and Reliability:** Uses OTP and agent verification to instill user trust.
- **Minimized Transaction Errors:** Ensures transaction is completed properly using OTP method.

- **Centralized Monitoring and Control:** Admin panel can help with monitoring of system activity.
- **Audit and Record Keeping:** Transaction history is available for auditing purposes.
- **Low Operational Cost:** Does not need costly facilities such as ATMs.
- **Faster Service Compared to Traditional Methods:** Rapid processing and verification save time.
- **Encourages Digital Payment Adoption:** Assists individuals with cash to digital transition.
- **Reduced Geographical Barriers:** Gives access to financial services in rural or distant places.
- **Customizable and Upgradable:** Allows integration of extra features like rating or fraud protection.

IX. LIMITATIONS OF THE PROPOSED SYSTEM

- **Need for Availability of Agents:** The system is dependent on local agents; without their availability, any transaction cannot take place.
- **Requirement for Internet Connection:** This application needs an internet connection for the creation of request, validation of OTP, and geolocation services.
- **Limited Initial Reach:** At the beginning, there may not be many agents who would register themselves with the system, limiting its use in some areas.
- **Dependence on External Transaction System:** Digital transactions will be done using the UPI or banking system, where issues of delays and failures can occur.
- **Security Risks for Physical Transactions:** Being offline, cash transactions can involve risks of stealing, counterfeit money, or other related disputes.
- **Concern about Trustworthiness:** Users might have concerns about trusting the verified agents during the initial stage of operation.
- **Failure of OTP Generation/Use:** Issues with the process of OTP generation or entering the wrong code can make the process of transaction fail.
- **Dependency on Smartphones and Technology:** The system uses smartphone devices and technology, which may not be available with some users.
- **Risk of Conducting Fraudulent Activities:** The possibility of making any fake request and misusing the system by the users or agents exists.
- **System Scalability Issues:** With increasing users and agents, more advanced infrastructure might be required.

- **Legal and Regulatory Restrictions:** The system should follow financial laws in terms of the handling and management of cash.
- **Maintenance Overhead:** Monitoring the system, verifying agents, and upgrading the system regularly are necessary for optimal functioning.

X. CONCLUSION

A proposed system suggests an innovative, practical and secure solution that allows users to convert cash into digital money by using a geographic-aware platform that allows to switch from one currency form to another [6]. Being connected to nearby agents, users will be able to perform financial operations easily and reduce dependence on banking infrastructures, such as ATMs and banking offices [1]. Using a real-time location services system will make it easy to find a suitable agent, while OTPs-based security will increase the security level and minimize risks of unauthorized actions[7].

In addition, the proposed system provides great possibilities of ensuring financial inclusion since a reliable tool of entering the digital finance sector has been developed. Using transaction logging and verifying the identity of agents will promote more accountability and trust [10]. Though some challenges exist in relation to the system and its usage, such as a need to rely on the presence of agents and use external payment platforms, overall, this system seems to have a great future perspective.

XI. FUTURE SCOPE

There is a great deal of scope available for further improvement and extension of the proposed system for increased functionality, security, and better user experience. Some of the possible improvements that can be made in the future include the introduction of QR-code based authentication mechanism as an alternative to OTP for providing a faster and more convenient option for transaction processing. Feedback and ratings for agents can also be included in the system as a means of evaluating their performance and ensuring greater reliability in this regard. Moreover, through the incorporation of machine learning and AI techniques, the system will be able to detect fraud cases and analyze transaction patterns to make better decisions.

In the future, some additional features could be incorporated in the system to enhance its effectiveness. For example, direct integration with the banking systems and digital wallets will allow the platform to facilitate transactions more easily. Moreover, the reach of the system can be increased in terms of covering as many rural and remote areas as possible. Some additional improvements could include multilingual interface support and biometric authentication for enhancing security and user experience.

XII. REFERENCES

- [1] A. Patel and S. K. Satapathy, "Empowering Digital Banking Services and Enhancing Financial Inclusion using Smart and Robust Fintech Software Solutions," in *Proc. 2023 World Conference on Communication & Computing (WCONF)*, 2023.
- [2] V. Sharma, N. Grover, S. Kathuria, R. Singh, A. Dhyani, and P. S. Pandey, "Integrating Digitalization Role to Play in Financial Management," in *Proc. 2023 International Conference on Computational Intelligence, Communication Technology and Networking (CICTN)*, 2023.
- [3] S. K. Matharu, "Swipe, Scan, Pay: How Gen Z in Central India is Using and Viewing Virtual Payments," in *Proc. 2025 IEEE International Conference on Advances in Computing Research on Science Engineering and Technology (ACROSET)*, 2025.
- [4] D. Singh and S. Bharti, "An Enhanced Security Method for Monitoring Transaction Risks in Electronic Money Transfer Machines in India," in *Proc. 2023 IEEE International Conference on Integrated Circuits and Communication Systems (ICICACS)*, 2023.
- [5] V. K. Gumasa, S. Shilpi, S. N., R. Tewari, and M. Soni, "Blockchain-Integrated Federated Trust Authentication Framework for Secure Mobile Payment System," in *Proc. 2025 2nd International Conference on Software, Systems and Information Technology (SSITCON)*, 2025.
- [6] M. J. B. Enojas, J. E. Morgado, H. L. C. Bongao, J. C. Rufo, R. G. Arribas, and C. P. Damiles, "Design and Development of a GCash Cash-in and Cash-out Machine," in *Proc. 2023 IEEE Symposium on Industrial Electronics & Applications (ISIEA)*, 2023.
- [7] M. Subha Sri, J. Krishna Chaithanya, and N. Dhruthiee, "Design and Implementation of Smart ATM under IDLE Application," in *Proc. 2022 7th International Conference on Communication and Electronics Systems (ICCES)*, 2022.
- [8] Bindu K. Nambiar Kartikeya Bolar "Factors influencing customer preference of cardless technology over the card for cash withdrawals: an extended technology acceptance model" *Published online: 27 January 2022*
- [9] Andra's Borsos, Adrian Carro, Aldo Glielmo, Marc Hinter-schweiger, Jagoda Kaszowska-Mojas and Arzu Uluc "AGENT-BASED MODELING AT CENTRAL BANKS: RECENT DEVELOPMENTS AND NEW CHALLENGES" *Documentos Ocasionales N.º 2503 BANCO DE ESPAÑA, Madrid, 2025*
- [10] Alexey Ponomarenko , Andrey Sinyakov "Impact of Banking Supervision Enhancement on Banking System Structure: Conclusions Delivered by Agent-Based Modelling " *The Central Bank of the Russian Federation, 2017*
- [11] PETR TUC'N'IK , LUKA' S' VA'LEK , PETR BLECHA ,VLADIM'IR BURES "USE OF TIMEBANKING AS A NON-MONETARY COMPONENT IN AGENT-BASED COMPUTATIONAL ECONOMICS MODELS" *WSEAS TRANSACTIONS on BUSINESS and ECONOMICS*
An Overview of India's Unified Payments Interface (UPI): Benefits, Challenges, and Opportunities, 2023
- [12] Dr.A.Shaji Goerge, A.S.Hoven George , Dr.T.Baskar , A.S.Gabrio Martin "An Overview of India's Unified Payments Interface (UPI): Benefits, Challenges, and Opportunities, 2023" *Partners UniversalInternational Research Journal*