DEVELOPMENT OF A FACILITATED CROWD-DRIVEN ONLINE PROFIT-MAKING SYSTEM

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ABSTRACT

This paper presents a facilitated crowd-driven online profit-making system. The system uses crowd-funding method and is capable of performing agent, expert and investor registration and login, facilitator login, registration of online profit-making platforms by agents, facilitator verification of platforms and the interaction of experts and investors through a chat mechanism. The incremental software development process is employed in the development of the system. The development of the system passed through five increments and in each increment, communication, planning, modeling, construction and deployment activities are carried out. The system iterated between development and testing stages until the set objectives of the system is met. The web application of the system is developed using Hypertext Markup Language (HTML) for the interface, Structured Query Language (MySQL) for the database, PHP: Hypertext Preprocessor (PHP) for scripting and Apache for Webserver. The system is to provide help for investors interested in online profit-making in order to know safe online platforms to invest in and have a more guided investment and expert knowledge in online investment.

Keywords: Facilitated, Crowd-driven, Online profit-making, Crowd-funding, Facilitator.

INTRODUCTION

New ventures require resources to succeed, and one of the most critical of these is financing. In recent years, crowd-funding has emerged as novel way for entrepreneurial ventures to secure funds without having to seek out venture capital or other traditional sources of venture investment (Mollick, 2013). Crowd-funding is an umbrella term describing the use of small amounts of money, obtained from a large number of individuals or organisations, to fund a project, a business or personal loan, and other needs through an online web-based platform. Crowd-funding has four subcategories: donation crowd-funding, reward crowd-funding, peer-to-peer lending and equity crowd-funding (Kirby and Worner, 2014). According to Hasteer *et al* (2015), crowdsourcing is an emerging form of outsourcing. It is the process of dissemination of tasks to a diverse group of people. It can be defined as a process that aims at acquiring various services and ideas with the help of contributions from wider class of people which mostly involve the online community members. One should keep in mind two issues when developing crowdsourcing methods. One is the system operator's reluctance because of the possible revenue reduction. The second is insufficient users' activity as crowdsourcing workers (Nevolin, 2016).

Crowdsourcing enables companies and individuals as well to tap into the versatile knowledge, creativity, and talent of a large population of crowd contributors. Yet, crowdsourcing can expose companies to a myriad of risks that can have drastic impact on the profitability and competitive position. Some of these risks are: performance risk, strategic resource risk, market

risk, financial risk and legal risk (Kamoun, Alhadidi and Maamar, 2015). Quinn and Bederson (2011) refer to crowdsourcing as a sub-area of collective intelligence, and existing crowdsourcing systems fall into two general types which are: Intentional Human Computing (IHC) Systems and Unintentional Human Computing (UHC) Systems. Investment-based crowd-funding involves at least three parties: the project owner seeking finance, the platform which acts as intermediary between the project and the investor, and the investor who forms part of the 'crowd' funding the project (ESMA, 2014). In today's constantly changing marketplace, your organization's success depends on moving, managing and investing funds — when and where you need them. One must carefully analyze and balance safety, liquidity and yield, rely more than ever, on technology to drive treasury activities and provide information that fuels decision making. There is a need for greater expertise than ever before and a partner one can trust (Citigroup Inc., 2017).

According to Zhai (2013), while crowdsourcing system designs have progressed substantially through engineering breakthroughs, some challenges in the crowdsourcing model however remain unanswered. First, System Design: in various crowdsourcing systems, what roles can crowds play and what contributions can they make? Second, Data Analysis: how can the human inputs with varied qualities be properly cleansed, and how can trustworthy results be effectively generated from their myriad inputs? Third, Human Computation Theory: at a higher level, what is the symbiosis between human intelligence and artificial intelligence? There has been an intriguing synergy between AI and human intelligence, where human intelligence can guide artificial intelligence in some areas, while artificial intelligence can complement human intelligence in others. Some people go into online investment by trial and error and most times fall victim to online fraudsters. Some lose money in the process of investing online due to lack of appropriate guidance on e-investment. Hence, in this paper, the focus is to make visible the possible online investment platforms or avenues, provide a platform for crowdsourcing of expertise and investors, to minimize the risk of getting into wrong or fraudulent investment platform and to increase the chances or assurance of return on investment.

LITERATURE REVIEW

In Mollick (2013), an exploratory empirical study, the goal was to develop initial evidence about the nature of crowd-funding and its role in entrepreneurship research. This method is appropriate for an evolving topic in the evolving field of entrepreneurship, as this initial data can serve as a useful base for future theory-building. Thus, rather than formal hypothesis testing, the remainder of the author's paper examines the key issues around crowd-funding from the perspective of entrepreneurship: its links to existing theory, the effects of a new form of fundraising, and the success or failure of the process. As the goal of this paper was to provide the widest possible perspective on crowd-funding, the author used data extracted from Kickstarter, the largest and dominant crowd-funding site. However, this research can be further improved by looking at the role of crowd-funding in other areas apart from entrepreneurship research like information technology.

Zhai, (2013) explains that the main principle of citizen engineering is to leverage a large number of publicly accessible citizens to collaboratively solve real-world problems. The author described a photo submission project that utilizes crowds as information collectors and by introducing an image classifying platform, the author demonstrated that crowds can also be leveraged as data processors. Although crowdsourcing is a promising approach to tackle problems that are challenging to computer algorithms, it inevitably has issues that need to be further addressed. One challenge is to retrieve quality results from various inputs of multiple

participants. The author presented an online platform that organized citizen engineers to perform a complex image labelling task – classifying damaged photos after an earthquake. Although this study is open to citizen engineers, it can be further improved by making room for others who are experienced in carrying out the same task.

As a first step to test for home bias under regular market conditions, Lin and Viswanathan (2013) gathered all transaction data on Prosper.com between January 2007 and May 2008 (all listings and all bids placed on those listings). During this period, major features of Prosper.com were relatively stable and the Securities and Exchange Commission (SEC) had not yet intervened in the market. More important, borrowers and lenders freely participated from all states across the US. Using this dataset, the authors first presented some macro-level evidence of home bias, focusing only on loans that were actually funded. Then the work turned to the potential-dyads approach to examine whether investors are indeed more likely to invest in someone from their home state. The same approach is then applied to transaction data from "mini Prosper" to further verify the robustness of the authors' finding. This research can be extended by not just focusing on home bias.

In a survey, information was collected regarding the use of data by Daggers and Nicholls (2016). Almost half of the total use only 'secondary data' – a mixture of what has been called 'overview data', i.e. facts and figures from the literature to lend detail to the analysis (19 papers) and 'desk research' – a more structured approach to gathering and organising publicly available information, such as literature reviews (11 papers). The most common primary data collection technique was interviews (29% of papers), and most of these were with impact investors. The picture that emerged indicated that it was generally difficult for academic researchers to access quantitative data sets, largely because aggregated public data sets for Social Impact Investment (SII) simply do not exist yet. Though the result of this research is informative, it is limited to social impact investors and data gathering can be gotten from other types of experienced investors as well.

METHODOLOGY

Incremental Software Development Life Cycle (ISDLC) was adopted in the development of the online profit-making system. The method starts with software requirement engineering through which the major modules of the system were identified and then decomposed into their lower level sub-modules. Afterwards, an iterative approach was used to iteratively design, code, test, integrate the modules and their sub-modules until the system was completed.

Functional decomposition of the online profit-making system

The functionalities of the online profit-making system are divided into four major modules, namely;

i. Agent module
ii. Facilitator module
iii. Expert module
iv. Investor module

The online profit-making system is a web application that aids the user to register, sign up or sign in depending on the purpose of application usage. This application aids in the registration of agents, signing in of already registered agents and gives the agents the platform to register different profit-making ventures or websites which will not be active on the application until verified by the facilitator. The application has a platform that aids the facilitator to log in and verify the different profit-making ventures registered by the agents after

carrying out a background check on each of them. The facilitator can also drop a comment that will help investors to know which of the profit-making ventures are safe to invest in. The application has a platform where experts can register, log in and provide training and expert knowledge to the investors through a chatting mechanism. The application aids the investors to register and make payment on registration for the payment of experts, sign in, search for and verify different online profit-making ventures that one can invest in and also communicate with experts online for expert knowledge. The facilitator has the sole responsibility to verify the different online profit-making ventures uploaded by agents and give comments whether they are safe to be invested in or not. Registration details and application data is stored in the database. The interaction with the system modules are given in Figure 1.

This application is designed for four different types of users: agents, facilitator, experts and investors. The user of the application has interaction with the online profit-making system for optimal use and functionality of the application. The user of the application who is not a facilitator has access to all the application modules except the facilitator module which is designed only for the facilitator. The use case diagram depicting such user interaction is given in Figure 2.

The facilitator is in charge of the database, the management of the connections and the interactions of the agents, experts, investors and subscribers in the network. The facilitator has the responsibility of carrying out a background check and investigation of every registered profit-making platform done by the agent to confirm its reality and safety before verifying on the application each platform authenticity. The facilitator is the stakeholder. The facilitator's interaction with the different core modules in the application is shown in Figure 3.

Agent module
The agent module comprises of the agent login page, agent registration page, agent homepage, agent platform registration page, add platform page and edit platform page. This module aids the agent to register, login, and view already registered profit-making platforms, add platforms and also edit platforms. The process flowchart for the agent module is shown in Figure 4.

Facilitator module
The facilitator module handles the verification of registered platforms and the facilitator has to login to the system to view all registered online profit-making websites. The facilitator has the privilege when logged in to visit each registered online profit-making websites to make enquiry about them. The facilitator has to do an offline background check and research on each registered online profit-making platforms before verifying them or giving comments on the system about each of them. Figure 5 shows the process flowchart for the facilitator module.

Expert module
The expert module handles expert registration and expert login. The experts on login can view how many chats they have from investors and also have access to the chat module where they can chat with different investors online and reply to chats that were sent to them when they were offline. The experts can logout from the expert platform when done with chatting or replying of investor messages. The process flowchart for the expert module is shown in Figure 6.

Investor module
The investor module performs the registration and login of investors. The registration of investors include investor make-payment platform, pay invoice platform which demands the

investor to pay a token for the services rendered by the system including expert knowledge and expertise. On registration and login, the investor can then search for different online profit-making platforms and receives verification result to confirm if they are safe for investment or not. Investors can also chat with different experts online or drop a message for an expert that is offline. The investors although registered on the system will have to register on the chat module and login to the chat module in order to be able to chat with the experts. The process flow chart for the investor module is given in Figure 7.

The database is where the entire user data will be stored and retrieved when needed. The process flow chart for database is given in Figure 8.

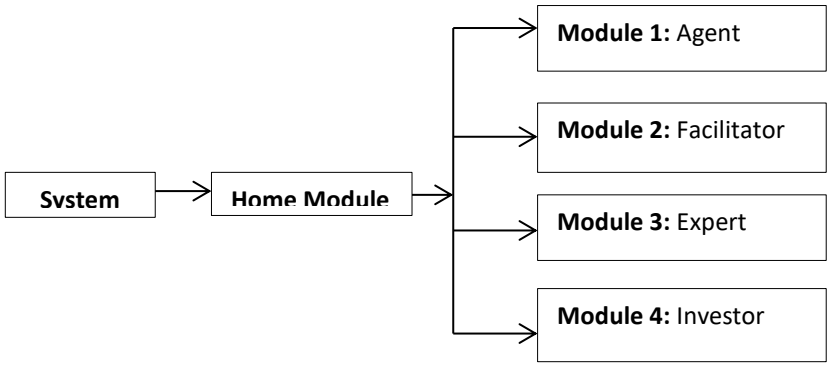

Figure 1: Flowchart and components of the web application

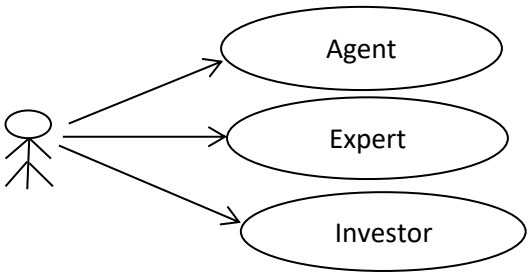

Figure 2: Use case diagram of user interaction with modules

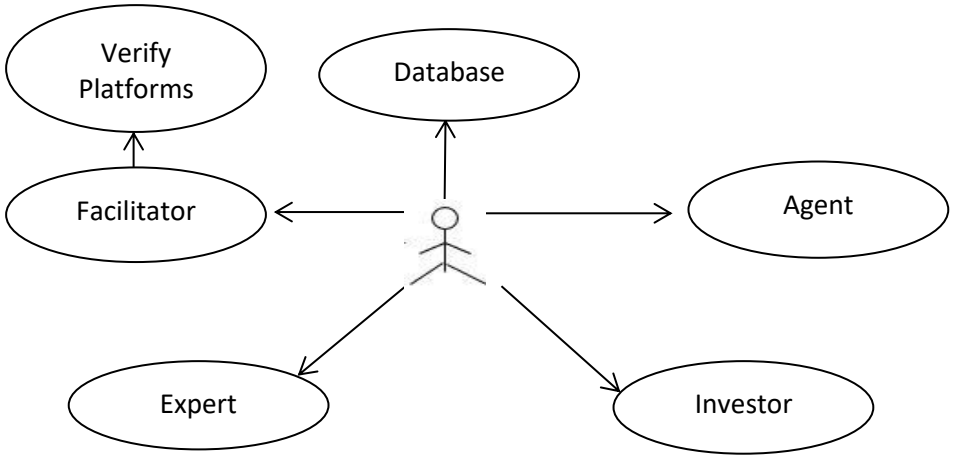

Figure 3: Use case diagram of facilitator interaction with modules

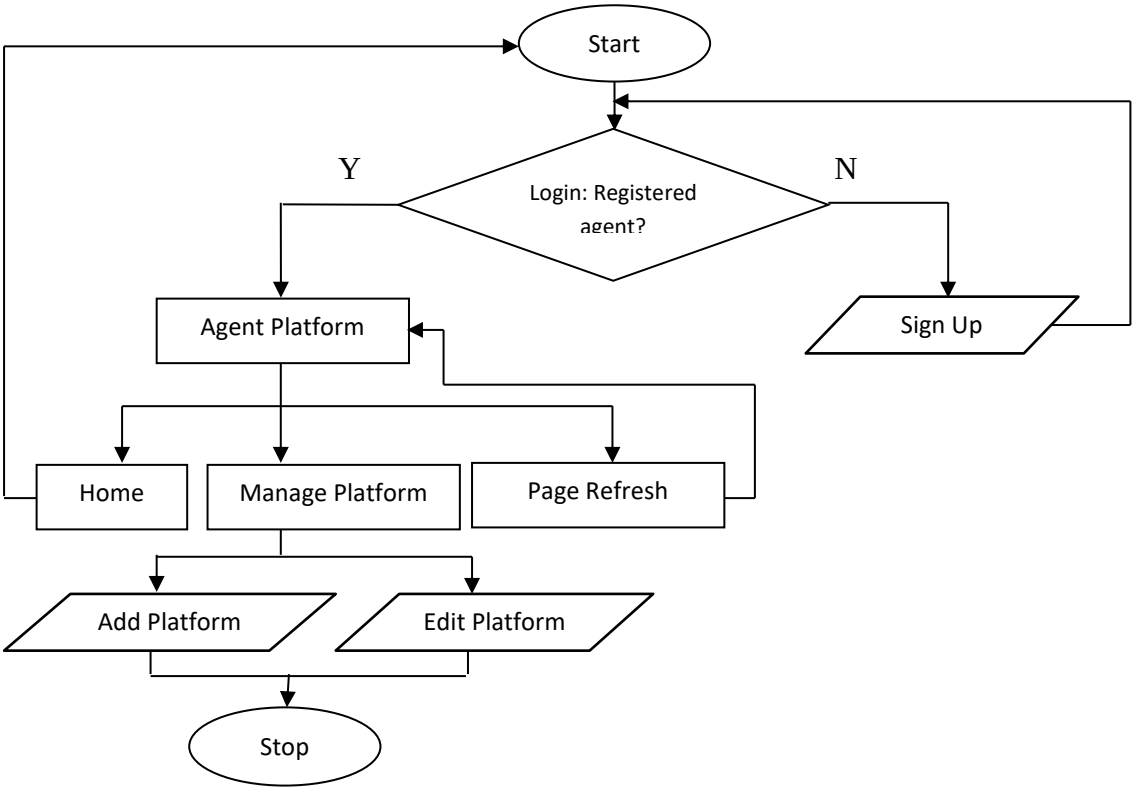

Figure 4: Flowchart of agent module process

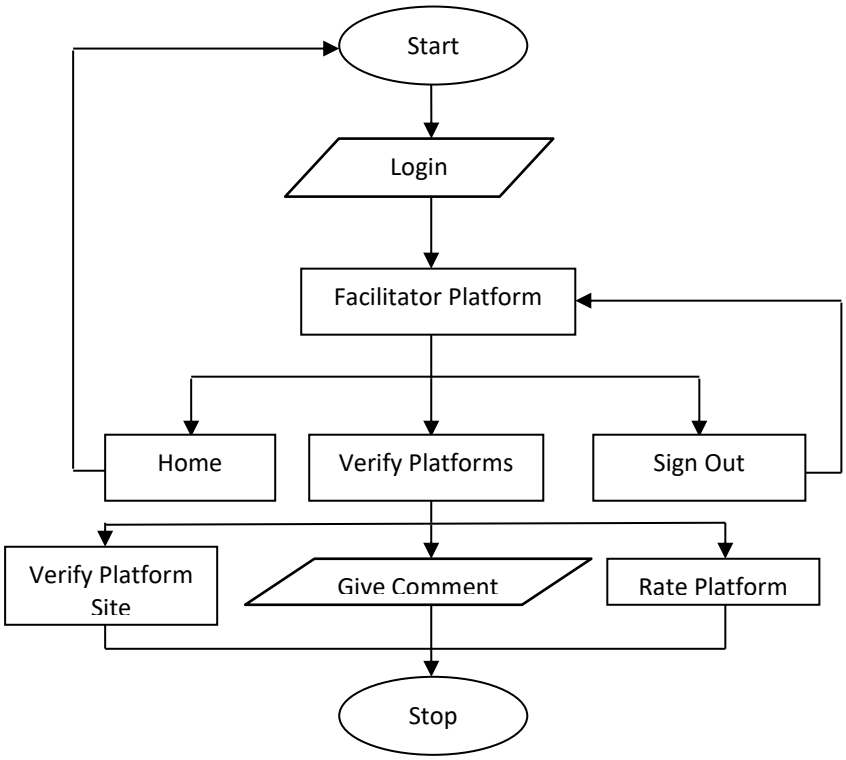

Figure 5: Navigation of facilitator module

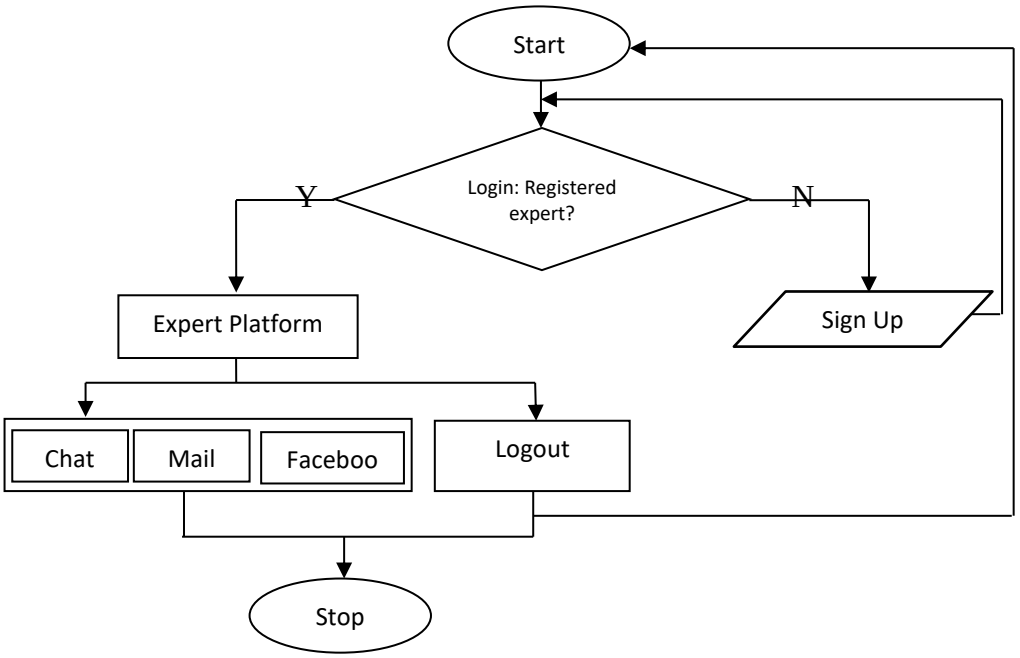

Figure 6: Navigation of the expert module

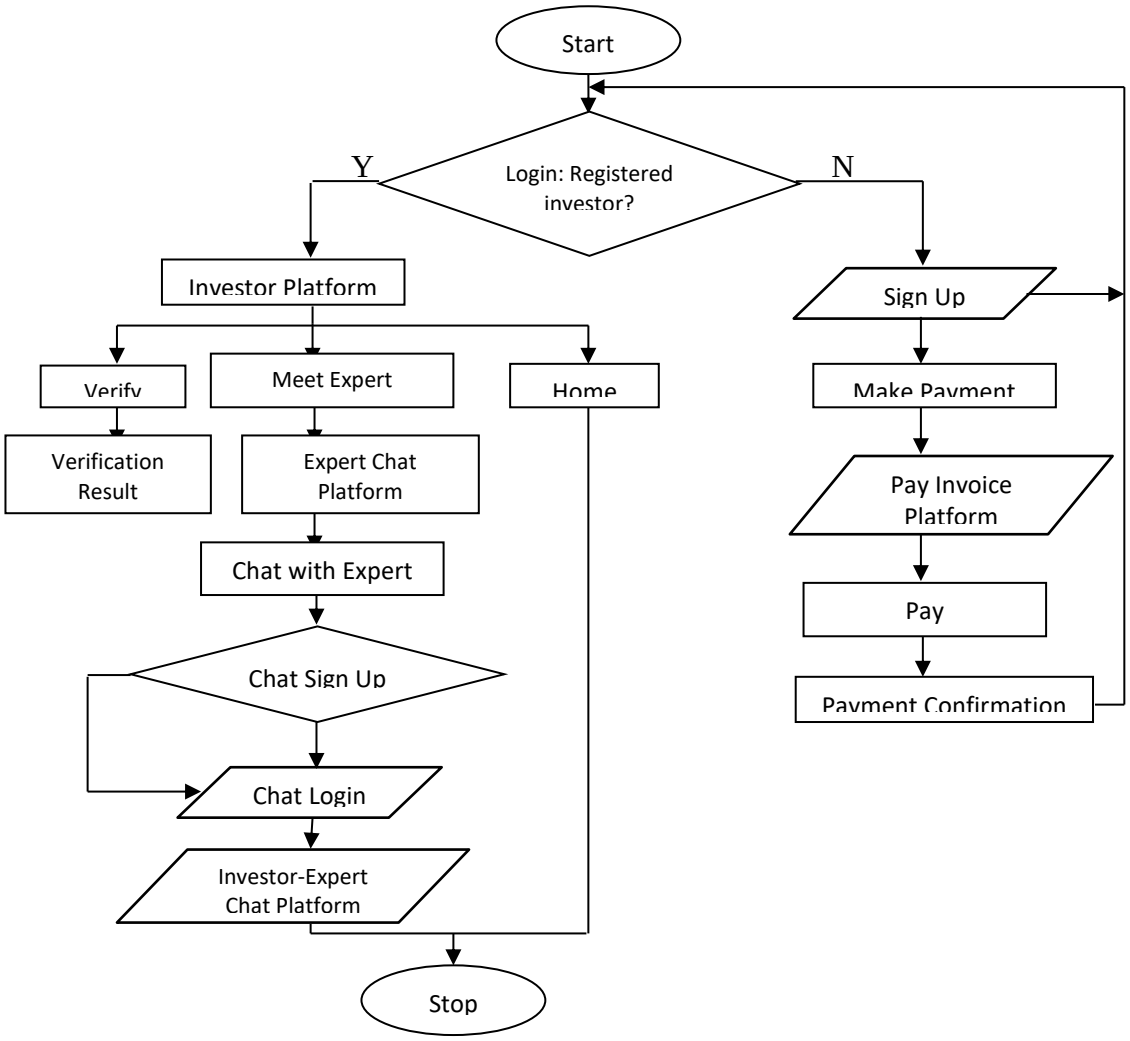

Figure 7: Navigation of investor module

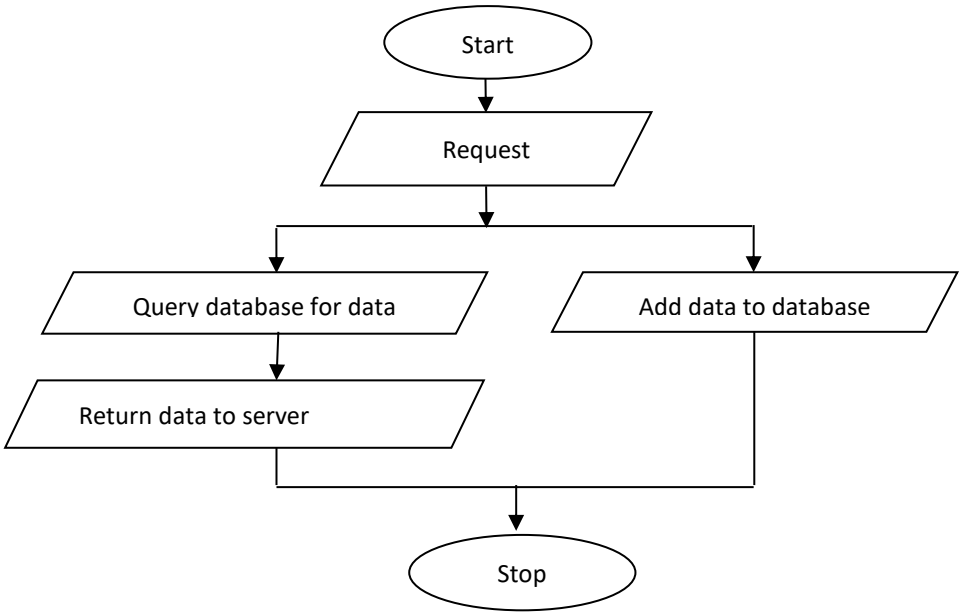

Figure 8: Flowchart of a database module process

RESULTS

This section presents the screenshots of some features available in the online profit-making web application. Figure 9 is the screenshot of a section of the online profit-making application homepage where users can access the links to the different major modules of the system. Figure 10 is the screenshot of the agent platform page after sign up and login as an agent. This page aids the agent to select different options including the manage platform option where the agent can view registered platforms, add platform or edit platform as shown in Figure 11. Figure 12 shows the screenshot of the facilitator platform when logged into the system where the facilitator can select the verify platform option to view and verify by giving comments on each of the registered online profit-making platforms on the system.

After registration and login, the experts have access to the expert platform page as shown in Figure 13, where they can access the chat module to chat with online investors or reply offline chats sent to them. The investors have access to the investor platform page when logged in as shown in Figure 14 after registering in the system. The investor on this page can either use the search mechanism to search for and get verification results for different platforms (example shown in Figure 15) or use the Meet Expert button to access the Investor-Expert chat platform (Figure 16) where the investor can chat with online experts or drop an offline message for offline experts. In order to chat with experts, the investor will have to register on the chat module and login and this is shown in Figure 17.

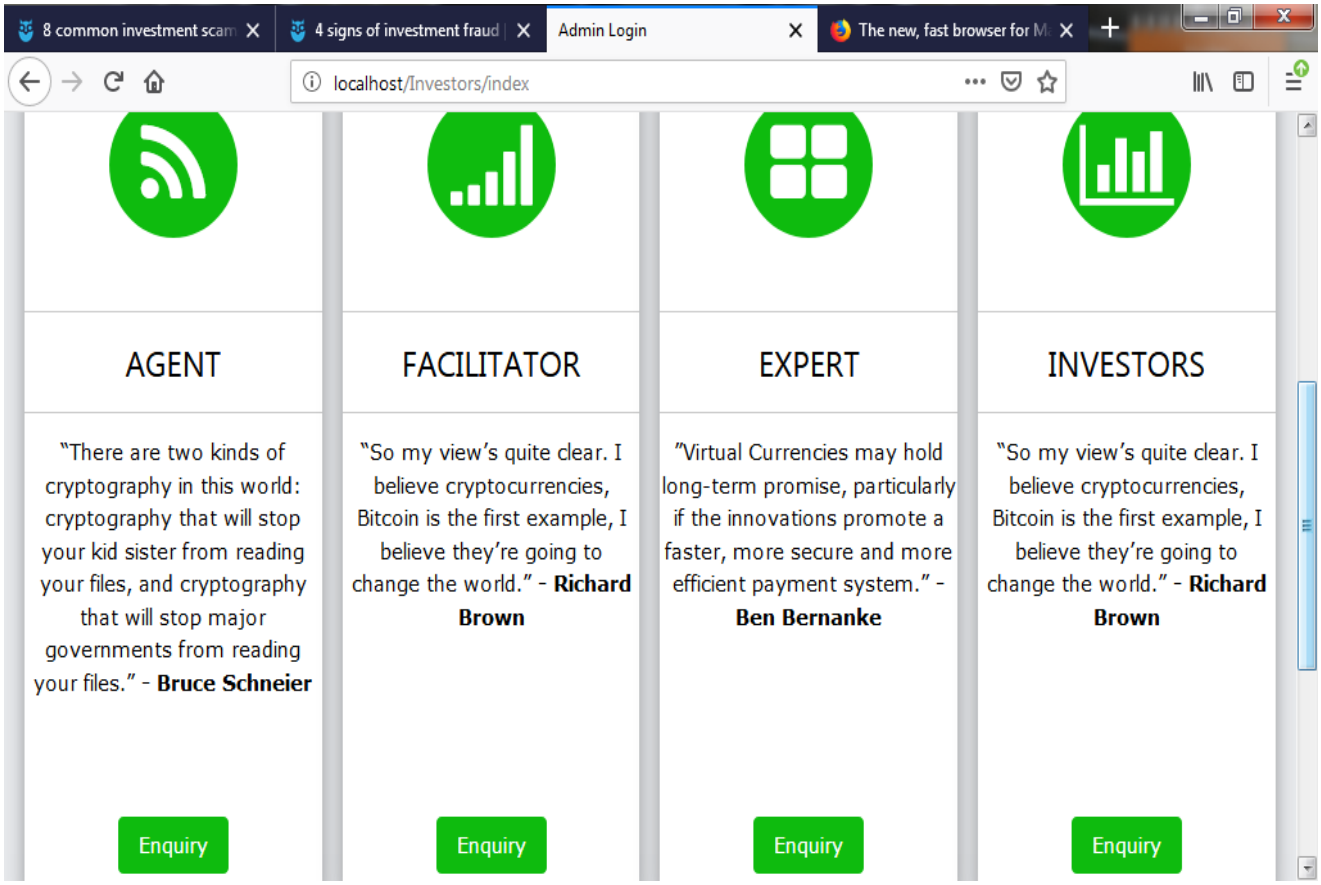

Figure 9: Screenshot of the Home page module of the system

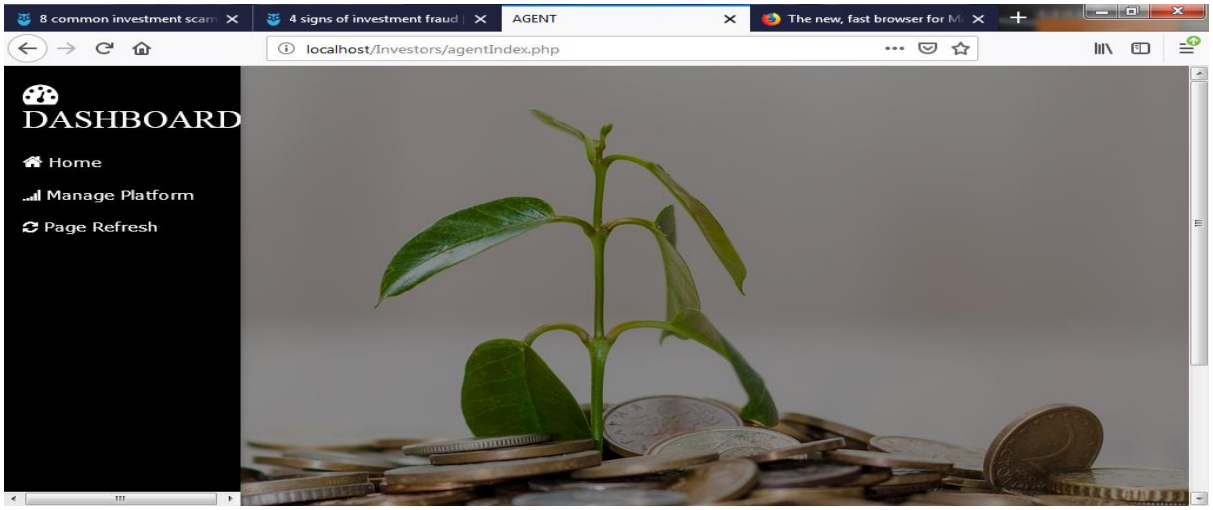

Figure 10: Screenshot of Agent platform page

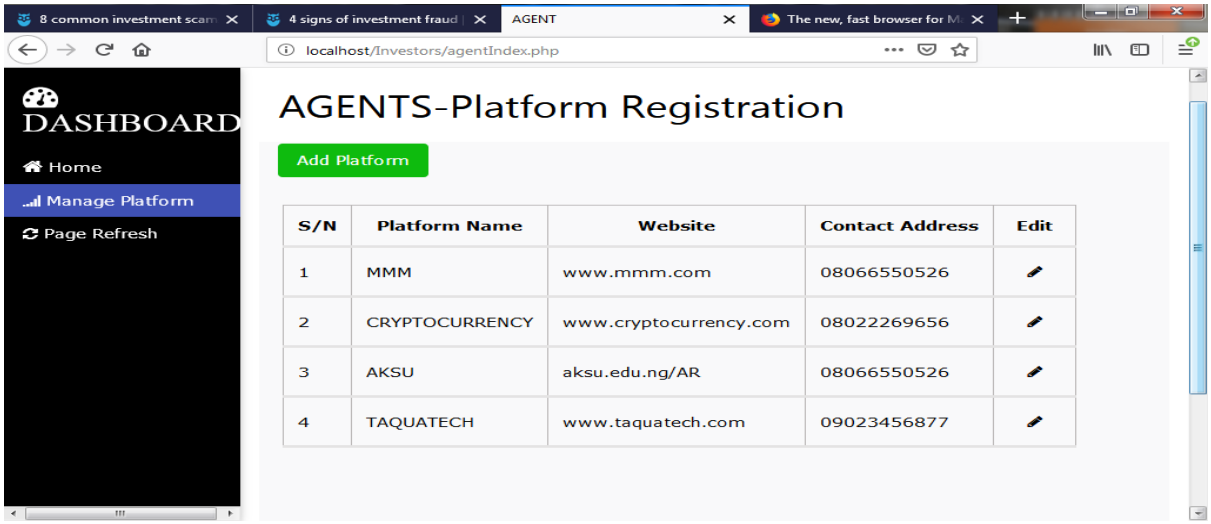

Figure 11: Screenshot of Agents-platform registration page showing registered platforms

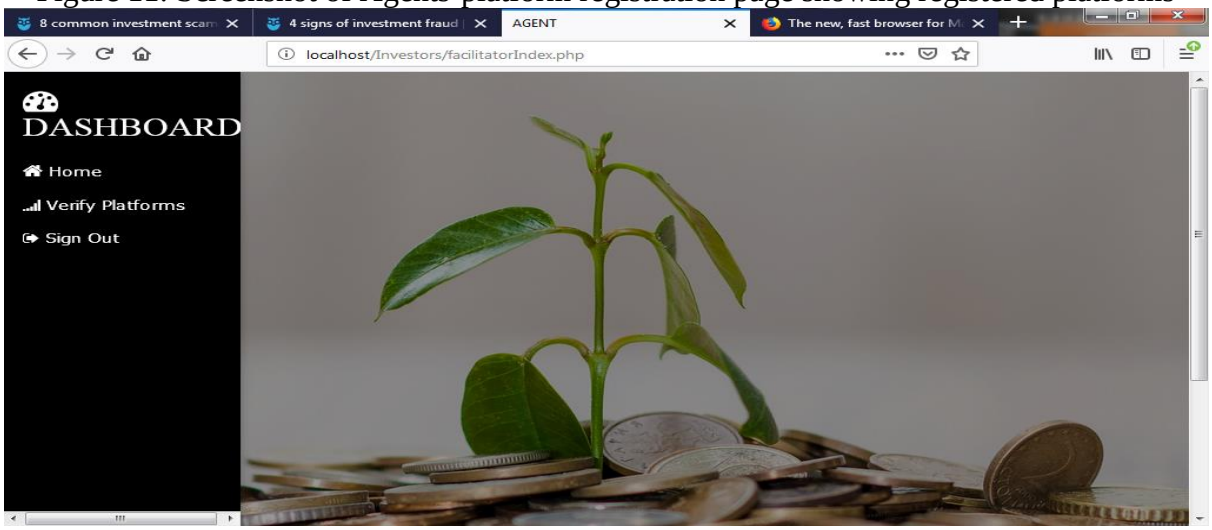

Figure 12: Screenshot of Facilitator platform page

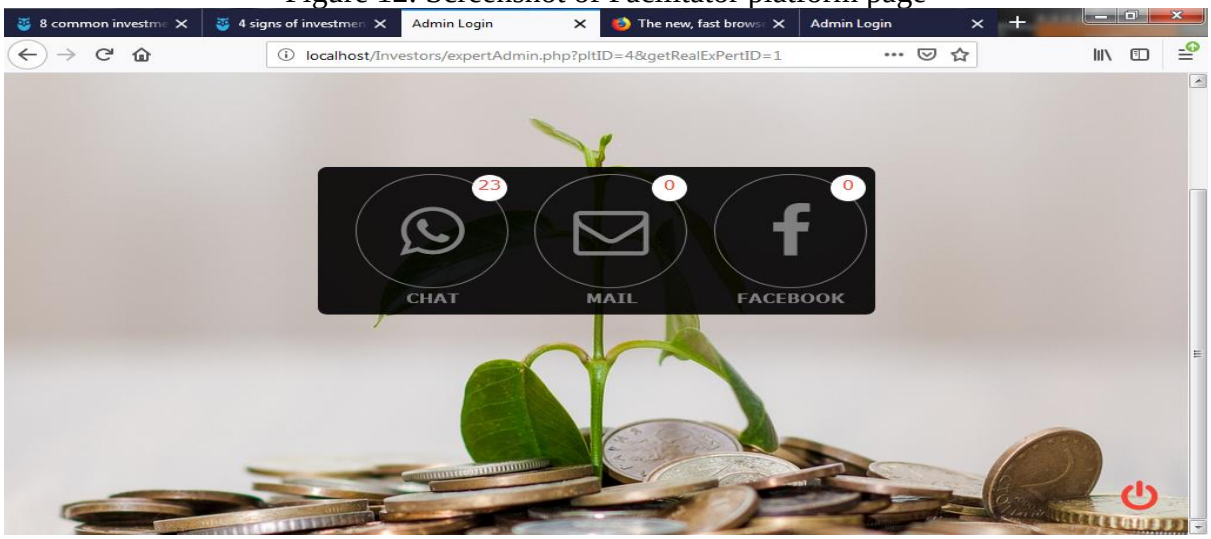

Figure 13: Screenshot of Expert platform page

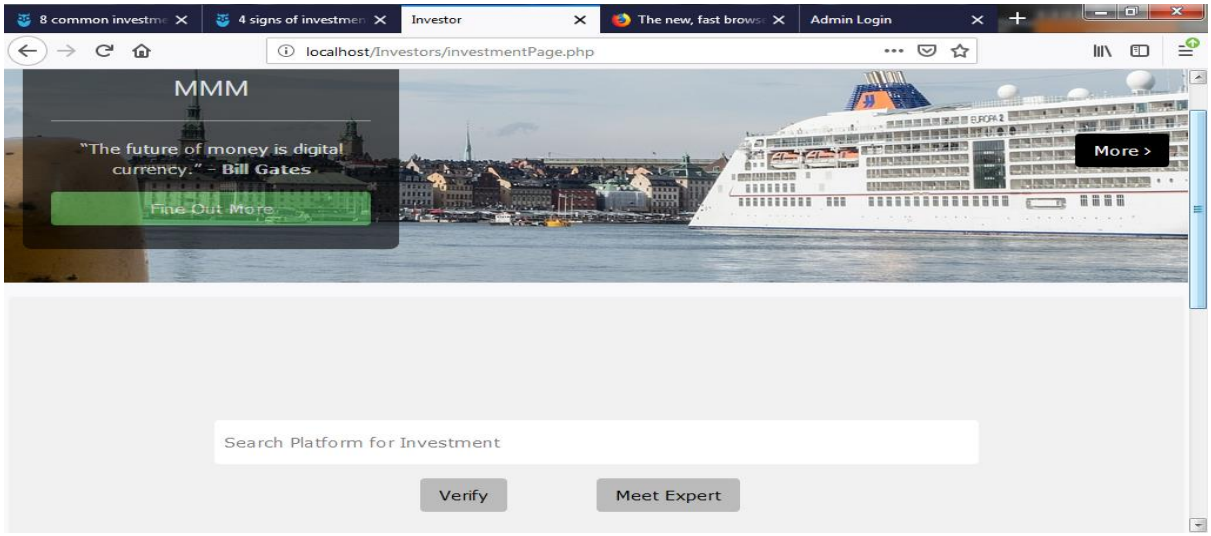

Figure 14: Screenshot of Investor platform page

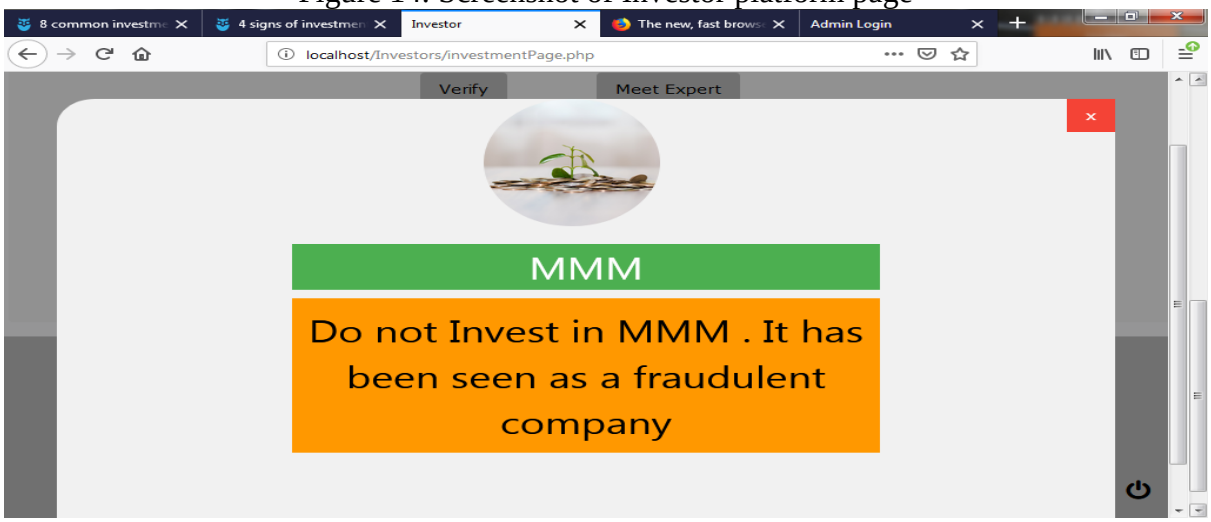

Figure 15: Screenshot of Investor search verification result page

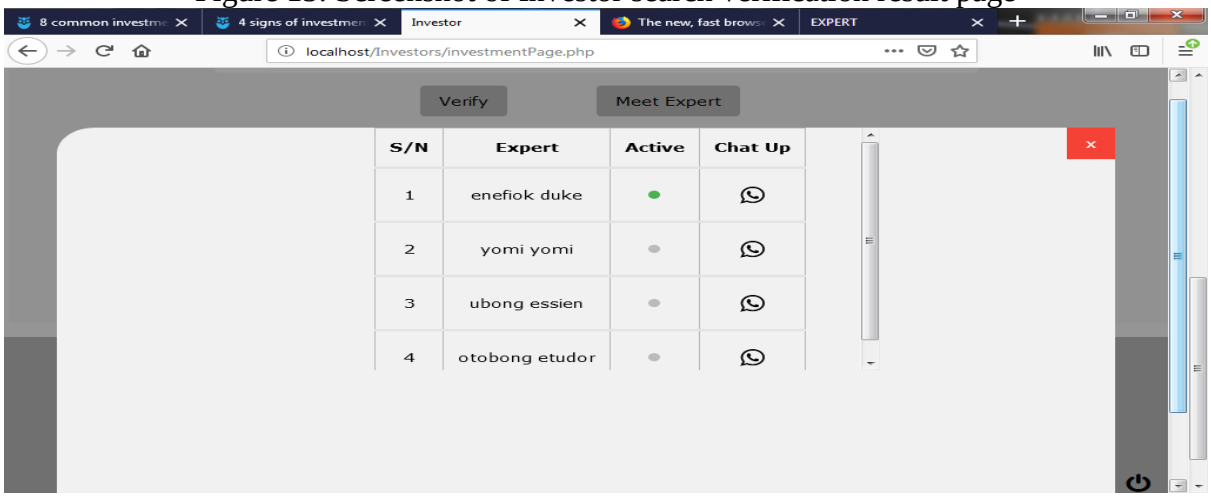

Figure 16: Screenshot of Investor-expert chat platform page

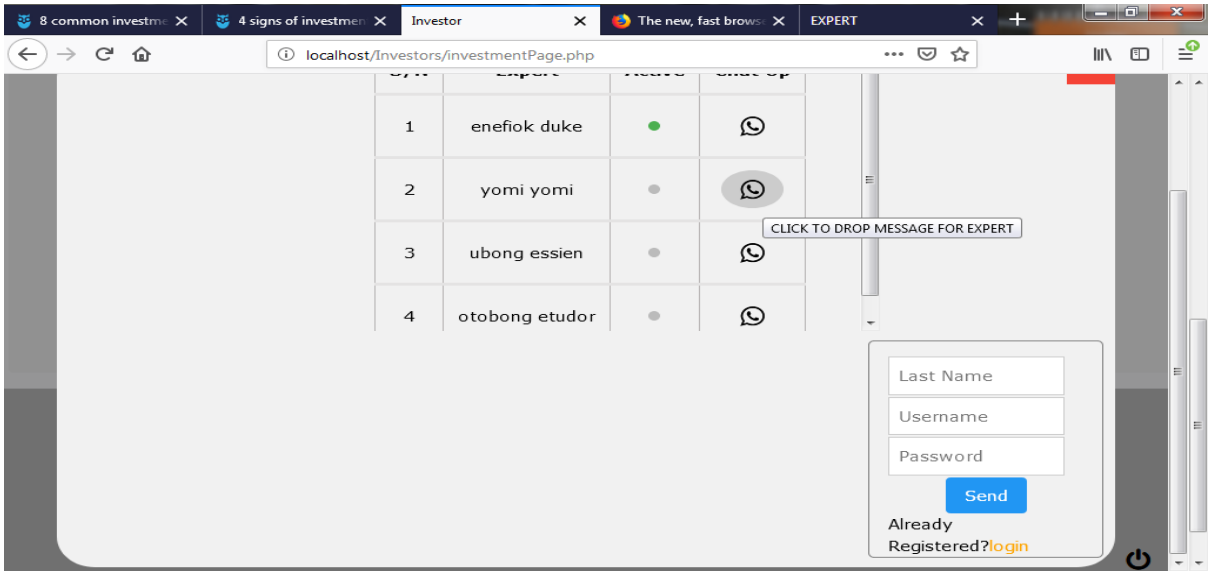

Figure 17: Screenshot of Investor chat sign up page

DISCUSSION

Crowdsourcing is an emerging topic, research suggests that crowdsourcing can be a viable option in a variety of situations, but very few studies so far have focused on crowdsourcing in a software development context. The TopCoder crowdsourcing platform represents a significant 'market' of supply and demand for software development tasks. TopCoder claims many benefits can be achieved in terms of quality, cost, speed and flexibility. However, the results of the study suggest that these benefits are not easy or automatic to realize (Stol and Fitzgerald, 2014). Though the objectives of investor subscription and management, expert recruitment and management and the connection and interaction of investors and experts have been achievable with the developed online profit-making system, it is not easy to get the crowd to engage the system.

CONCLUSIONS

In this paper, a facilitated crowd-driven online profit-making system was developed and through the agent module, agents can register different online profit-making platforms and the facilitator after doing a background check and investigation on the registered platforms both online and offline will verify the platforms through the facilitator module and comment on which is real and which is fake. The developed online profit-making system has an expert module for expert registration and login and also an investor module for investor registration, payment for services rendered by the system and investor login. These modules help in the communication of experts and investors through a chat mechanism provided by the system and through this chat, investors can enjoy expert knowledge on online investment. Additional studies is required for the development of visible policies guiding user interaction and hence development of terms and conditions.

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