Examining a Crowdsourcing Loan Platform Built on the Blockchain to Support Undergraduate Education in Low-Income Nations

MR.G.SURESH [1], MISS.Y.KEERTHI [2]

#1 Assistant Professor in the department of IT at DVR & DR HS MIC COLLEGE OF TECHNOLOGY (Autonomous), Kanchikacherla (NTR Dist, AP)

#2 MCA Student In The Department Of Computer Applications at DVR & Dr HS MIC College of Technology (Autonomous), Kanchikacherla, NTR District, A.P

ABSTRACT— A major barrier to higher education in underdeveloped nations is the availability of financial aid. Due to their parents' unemployment and their nations' failing economy, brilliant but financially struggling youngsters are unable to finish their education. This prevents the pupils' abilities from reaching their maximum potential. Governments grant student loans to cover the costs of higher education so that more people may have access to this opportunity and realize their full potential. The Ministry of Education is in charge of disbursing student loans from the government. Once they begin earning, the students repay the loan together with interest. All of the money for student loans has come from the government. A worldwide economic catastrophe has ensued as a consequence of the COVID-19 pandemic and the conflict between Russia and Ukraine. Government expenditure has grown in response to the worldwide economic downturn. Through the use of blockchain technology and crowdsourcing, we want to transform the student loan program, which will in turn assist the government ease its expenditure load. In order to help pay for college, this paper lays out a decentralized lending network that uses blockchain technology to solicit donations from investors. Through the website, investors from recognized financial institutions will be able to lend money to students. When the students join the employment, they will repay the debts, along with interest. Investors may earn interest on their money via the proposed platform, students can pay for their education, and governments can reinvest the funds they originally allocated to student loan programs.

We support the efficacy of our work with numerical findings and do a comprehensive security study.

INTRODUCTION

To succeed academically at university, there are several challenges that students must face. Studying alone won't get you very far as an educational coder. Time management issues, financial difficulties, lack of sleep, social engagements, and, for example, all have the potential to impede a student's academic performance. Thanh Ngoc Dinh was the associate editor who oversaw the manuscript's evaluation and gave final approval for publishing. A major barrier to higher education in underdeveloped nations is the availability of funding. Due to their parents' lack of employment and their nations' poor economies, brilliant but financially disadvantaged kids are unable to continue their education beyond the secondary level. That is why these talented yet financially struggling kids are underutilized. Developing nations often have student loan schemes in place to assist with the costs of higher education and the repayment of these loans after the borrowers have found gainful employment. The developing nation governments' Ministry of Education has been the only entity to contribute to the initiative. Students may acquire loans to assist pay for higher education under the Students Loan Scheme if they are admitted into and attending approved programs at institutions. As an example, in 1989, PNDC Law 276 established the Students' Loan Scheme in Ghana. This loan is available to students via the Ministry of Education (GES), and they are required to repay it with interest once they begin working after graduation. A worldwide economic catastrophe, affecting underdeveloped nations in particular, has been set off by the appearance of COVID-19 and the conflict between Russia and Ukraine. Developing nations' economies are vulnerable to wild swings in factors including inflation, state debt, and FDI, all of which have a negative impact on economic development. Governments throughout the world are stepping up their social intervention programs in response to the economic crisis. Some of these programs include free public high school, national health insurance, student loans, and more. Publicizing targeted social initiatives like the Students' Loan Scheme and soliciting investments via blockchain-based crowdsourcing may help alleviate the financial strain on the government. Crowdsourcing is a way to solve

problems in a decentralized way by asking a large number of people for their ideas. A typical crowdsourcing platform has three parts: people making requests, people actually doing the job, and a central hub for all of it. Requesters use the crowdsourcing site to post jobs that are challenging for computers but easy for people to do. People that are up for the challenge begin competing by posting their solutions to the crowdsourcing site. The requesters then incentivize the employees who came up with a decent solution, which is often the most effective one. Blockchain technology records all transactions that take place on a decentralized network. A blockchain enables participating parties to validate transactions without the intervention of a centralized body. Many additional difficulties, including as voting, trade settlements, and money transfers, might be solved with its help. By using crowdsourcing powered by blockchain technology, this effort completely transforms the Students Loan Scheme in underdeveloped nations. The goal of this project is to provide a decentralized crowdsourcing framework for student loan programs in higher education that uses blockchain technology. The program will benefit students, schools, and potential investors. Students may use this platform to apply for financing from recognized financial institutions. Once the student has worked for a certain period of time while attending school, the investors' (workers') initial investment will be fully refunded, plus a portion of the student's profits. Using blockchain's distributed design, which offers a trustworthy financing platform for low-income students to complete their education, this solution creates a long-term investment mechanism that is dependable, genuine, and accountable. Due to the distributed nature of the system, blockchain technology allows for the monitoring of both investors and students to guarantee the accuracy of the data. Here are the main points of this paper: This article discusses the problems that intelligent but impoverished students encounter in attaining higher education in underdeveloped nations. A decentralized crowdsourcing network built on the blockchain is proposed here so that students may earn money for their education and pay it back when they start working. One way to do this is to work with the country's finance ministry to pass a legislation that will allow for the tracking of these kids after they enroll in college. A portion of the students' pay can be taken by the fundraiser, who can then distribute it to the appropriate investor,

once they begin working after school. The withdrawal will continue every month until the student pays off the debt in full. Smart contracts automate the investing procedure described in this article. Students on the platform are legally bound to their investment by the smart contracts. Investors in the system have access to liquid assets that can be converted into tokens whenever they choose. Our suggested system's efficacy is shown by a performance study. What follows is an outline of the rest of the paper: The instruments used to conduct this study are detailed in Section II. While Section IV explains the system model, Section III discusses relevant literature to this research. Section VI brings the work to a close, while Section V presents the security and performance assessments.

RELATED WORK

"Determinants of university working-students' financial literacy at the university of cape coast Ghana"

This paper explores the determinants of university working-students' financial literacy. It further seeks to establish the relationship between financial literacy and certain demographic characteristics. This study adopted a correlational research design

as the framework to examine the relationship between variables without determining cause and effect. Data were randomly collected from 250 undergraduate and postgraduate students of a public university in Ghana. The paper found that age and work experience were positively related to financial literacy. Also, mother's education was positively correlated with respondents' financial literacy. However, level of study, work location, father's education, access to media and the source of education on money were all not significantly correlated with financial literacy. A key recommendation is that given the positive correlation between mother's education and financial literacy, parents should be actively involved in designing educational programs on financial issues at the basic and high school levels for their kids. It is believed that such a step forward will help parents to guard and guide their children's financial behaviours.

"Student loans in developing countries: Feasibility experience and prospects for reform"

Student loan schemes now exist in more than fifty countries, but many are not working well and critics question whether student loans are feasible in developing countries. This special issue of Higher Education compares

experience of student loans and other forms of student support in selected Asian and African countries and examines the prospects for reform of student loan programmes in order to improve their effectiveness and reduce default. This introduction to the volume describes current research on student loans by the International Institute for Educational Planning (IIEP) and the World Bank, and draws on the conclusions of a series of Educational Forums on student loans organised by IIEP, to conclude that student loans are feasible, and can promote wider cost-sharing and help to generate additional resources for higher education, but only if loan programmes are well designed and efficiently managed. The purpose of this introduction and the subsequent articles in the special issue is to suggest some ways of improving performance of student loans in developing countries, drawing on lessons from experience in Asia and English-speaking Africa. **"University education in ghana: A privilege or a right?"**

The study seeks to explore the cost of university education in Ghana. The rationale is premised on the fact that education is a human right which must be accorded to all humans regardless of their socio-economic status. Therefore, the present study at hand details the challenges of accessing higher education in Ghana and students' coping strategies. Qualitative research methodology with interviews, focus group discussion and autoethnography was employed as major instruments for data collection. Document review was used to understand the cost of pursuing university education in Ghana. The results indicated that majority of students who enrol, persist and graduate in Ghanaian universities are economically advantaged students. These students are beneficiaries of high-quality education coupled with good resources in the urban areas from primary education. The plight of majority of Ghanaian population who depends on agriculture in rural areas with less quality of education is rare in Ghanaian universities. Moreover, there are government financial support systems for the needy students such as Student Loan Trust Fund (SLTF) but this financial assistance has its own challenges which impedes greater accessibility. From the findings gathered, it can be concluded that university education in Ghana is more of a privilege than right. In the light of this, the study suggests that stakeholders and educational legislators in Ghana should develop feasible policies that considers the economicallydisadvantaged students who

qualify for university education but unable to access it due to inadequate resources. "The challenge of financing higher education and the role of student loans scheme: An analysis of the student loan trust fund (SLTF) in Ghana", Student loans program is one of the most controversial phenomena in financing higher education in Ghana, but its importance as a cost sharing mechanism is incontestable. This paper describes the challenge of financing higher education in Ghana. It provides a critique of the Social Security and National Insurance Trust (SSNIT) Student Loans Scheme, and analyses the present Student Loan Trust Fund (SLTF) policy. The paper outlines the new policy framework, critically looks at some implementation problems and provides some practical policy recommendations. The paper questions the mechanisms put in place to ensure the sustainability of the new policy? It concludes that a more efficient student loans scheme should strike the balance between lenders risk and borrowers' aversion. "Impacts of the COVID-19 pandemic and the Russia–Ukraine conflict on land use across the world" The impacts of the COVID-19 pandemic and the Russia–Ukraine crisis on the world economy are real. However, these implications do not appear to be symmetric across countries and different economic sectors. Indeed, the consequences of these two shocks are more severe for some countries, regions and economic activities than for others. Considering the importance of the agricultural sector for global food security, it is important to understand the impacts of the pandemic and the conflict on the different dimensions of agriculture, namely land use. Given the scarcity of data for the last few years available from the various statistical databases, this research mainly considers the insights highlighted in the literature on the implications, in agricultural dimensions, of the most recent shocks. The study here presented shows that the Russia–Ukraine crisis has had more impact on land use changes than the pandemic, namely promoting adjustments in the decisions of farmers and policymakers to deal with constraints in agri-food chains. Nonetheless, the impacts of the conflict on land use were not totally explored.

"An incentive and reputation mechanism based on blockchain for crowd sensing network" Nowadays, sensors inserted in mobile applications are used for gathering data for an explicit assignment that can effectively save cost and time in crowd sensing networks (CSNs). The true value and

essence of gathered statistics depend on the participation level from all the members of a CSN, i.e., service providers, data collectors, and service consumers. In comparison with the centralized conventional mechanisms that are susceptible to privacy invasion, attacks, and manipulation, this article proposes a decentralized incentive and reputation mechanism for CSN. The monetary rewards are used to motivate the data collectors and to encourage the participants to take part in the network activities. Whereas the issue of privacy leakage is dealt with using Advanced Encryption Standard (AES128) technique. Additionally, a reputation system is implemented to tackle issues like data integrity, fake reviews, and conflicts among entities. Through registering reviews, the system encourages data utilization by providing correct, consistent, and reliable data. Furthermore, simulations are performed for analysing the gas consumed by smart contracts. Similarly, the encryption technique is ratified by comparing its execution time with other techniques that are previously used in literature. Lastly, the reputation system is inspected through analysing the gas consumption and mining time of input string length.

"PrivCrowd: A secure blockchain-based crowdsourcing framework with fine-grained worker selection"

Blockchain-based crowdsourcing systems can mitigate some known limitations of the centralized crowdsourcing platform, such as single point of failure and Sybil attacks. However, blockchain-based crowdsourcing systems still endure the issues of privacy and security. Participants' sensitive information (e.g., identity, address, and expertise) have the risk of privacy disclosure. Sensitive crowdsourcing tasks such as location-based data collection and labelling images including faces also need privacy-preserving. Moreover, current work fails to balance the anonymity and public auditing of workers. In this paper, we present a secure blockchain-based crowdsourcing framework with fine-grained worker selection, named PrivCrowd which exploits a functional encryption scheme to protect the data privacy of tasks and to select workers by matching the attributes. In PrivCrowd, requesters and workers can achieve both exchange and evaluation fairness by calling smart contracts. Solutions collection also can be done in a secure, sound, and noninteractive way. Experiment results show the feasibility, usability, and efficiency of PrivCrowd.

"Achieving private and fair truth discovery in crowdsourcing systems"

Nowadays, crowdsourcing has witnessed increasing popularity as it can be adopted to solve many challenging question-answering tasks. One of the most significant problems in crowdsourcing is truth discovery, which aims to find reliable information from conflict answers provided by different workers. Despite the effectiveness for providing reliable aggregated results, existing works on truth discovery either fall short of preserving the workers' privacy or fail to consider the unfairness issue in their design. In light of this deficiency, we propose a novel private and fair truth discovery approach called PFTD, which is implemented by two non-colluding cloud servers and leverages the Paillier cryptosystem. This approach not only preserves the privacy of the answers of each worker, but also addresses the unfairness issue in crowdsourcing. Extensive experiments conducted on both real and synthetic datasets demonstrate the effectiveness of our proposed PFTD approach.

"Establishment and operation of college students entrepreneurship crowdfunding website based on the crowdfunding mode"

In recent years, as one of the internet finance innovations, crowdfunding business model can concentrate the funds, ability and channels of everybody to provide the necessary fund assistance for a certain activity. The college students entrepreneurship crowdfunding website is the service platform to provide the entrepreneurial fund support for college students' entrepreneurs, which can help the college students overcome the difficulty in funds and management faced by the traditional entrepreneurship in the past. By investigating and surveying, this paper conducts a comprehensive research on the developments of college students entrepreneurship crowdfunding website from design, development and promotion, aiming at needs of developments of the hip crowdfunding in China with the practical situation, whose services can increase the quantity of visiting the website and provide high quality service for the existing consumers.

"EduRSS: A blockchain-based educational records secure storage and sharing scheme"

Accurate and complete educational records are a valuable asset for people. In recent years, educational records have been

digitized. However, there are still two key challenges that have not been resolved. One is to achieve secure and privacy-preserving storage of educational records, while another concern how to realize the sharing of educational records and ensure the security of the sharing process. In this paper, we propose EduRSS, a blockchain-based storage and sharing scheme for educational records is proposed, which combines blockchain, storage servers, and cryptography techniques to create a reliable and safe environment. In our proposal, the blockchain technology is used to ensure the security and reliability of data storage, while the smart contracts on the blockchain are used to regulate the process of storage and sharing. More precisely, the off-chain storage servers store the original educational records in encrypted form, while the hash information of the records is stored on the blockchain. The off-chain records are anchored periodically with the hash information on the blockchain to ensure the security of data storage. Cryptography techniques are utilized to handle records encryption and messages digital signature. To assess the effectiveness of EduRSS, we designed and tested a proof of concept of this scheme. The relative security analysis shows that EduRSS is safe and has a lower computational cost than that of the CPABE and the MA-CPABE schemes.

METHODOLOGY

New User Signup: Using this module, signup 3 different users as investor, broker and students

User Login: Using this module, login as Investor

Investing Amount Details: Using this module, adding investment amount details to Blockchain

Raise Loan Request: Using this module, applying for loan and this loan will be approved by broker

View Status: Using this module, student can see all loan details

Investor selection and contract signing: Using this module, viewing all request from students and assign investor

**View Status:** Using this module, viewing loan status

Extension Compressed Storage: Using this module, applying compression technique we can reduce storage page and cost.
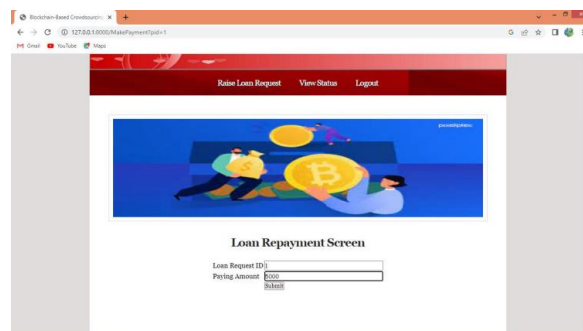
RESULT AND DISCUSSION
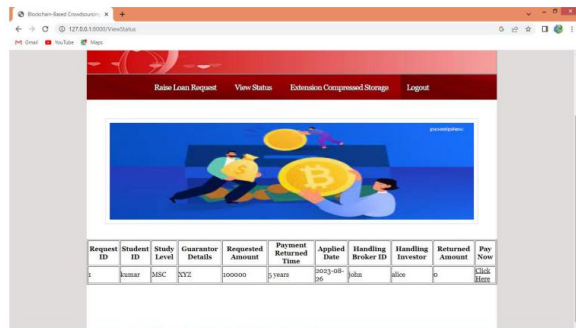
In above screen student can view his investor and can click on 'Click Here' link to make some payment as in last column we can see paid amount is 0 and after payment Blockchain will update payment details

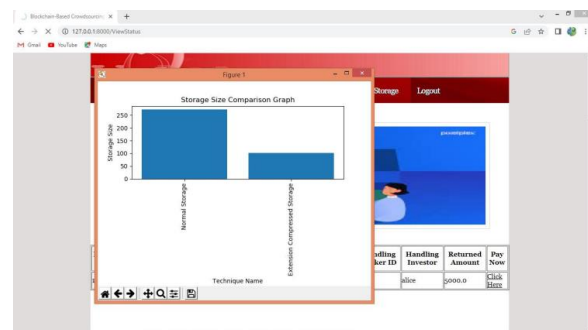In above screen student making some payment and then will get below output

In above screen we can see payment is done and now click on 'View Status' link again to view payment details
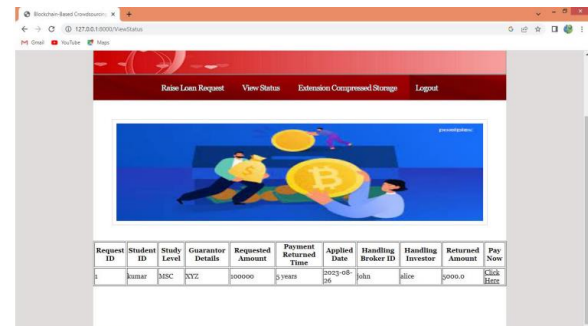

Now in above screen under 'Returned Amount' column we can see paid amount as 5000 and now click on 'Extension Compressed Storage' link to get below page

In above graph x-axis represents normal and extension compressed technique and y-axis represents storage size and if we use normal technique then storage will be more and charge will also be more and by applying compression technique we can reduce storage page and cost.
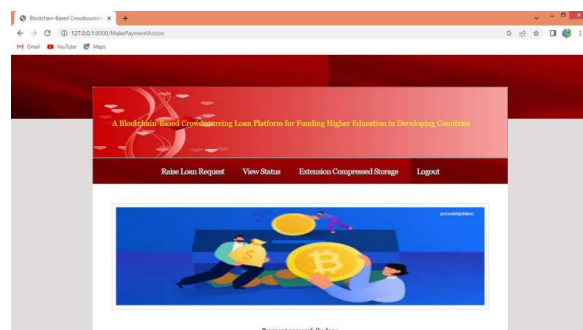
CONCLUSION

After graduating from high school, exceptional students should not be denied the opportunity to pursue postsecondary education due to a lack of financial assistance from their relatives. This work presents a blockchain-based crowdsourcing loan platform to provide financial assistance to students in tertiary institutions to fund their tertiary education. The blockchain employed in our work enables us to monitor the students and the investors, knowing that the information is correct as it is part of the chain, which has been verified due to the distributed system. This platform would provide chances for poor students by outsourcing funding for tertiary education that they would not otherwise be able to afford. We next intend to extend our idea by expanding the platform's functionality to include teaching and non-teaching staff.

REFERENCES

1. A. Ansong and M. A. Gyensare, "Determinants of university working-students' financial literacy at the university of cape coast Ghana", Int. J. Bus. Manage., vol. 7, no. 9, pp. 126, Apr. 2012. Show in Context CrossRef Google Scholar

2. M. Woodhall, "Student loans in developing countries: Feasibility experience and prospects for reform", Higher Educ., vol. 23, no. 4, pp. 347-356, Jun. 1992. Show in Context CrossRef Google Scholar

3. P. Acheampong and J. J. Kayange, "University education in ghana: A privilege or a right?", Int. J. Res. Stud. Educ., vol. 6, no. 3, pp. 17-25, Aug. 2016. Show in Context CrossRef Google Scholar 4. F. Atuahene, "The challenge of financing higher education and the role of student loans scheme: An analysis of the student loan trust fund (SLTF) in Ghana", Higher Educ., vol. 56, no. 4, pp. 407-421, Oct. 2008. Show in Context CrossRef Google Scholar

5. V. J. P. D. Martinho, "Impacts of the COVID-19 pandemic and the Russia–Ukraine conflict on land use across the world", Land, vol. 11, no. 10, pp. 1614, Sep. 2022. Show in Context CrossRef Google Scholar

6. M. K. Alam, M. I. Tabash, M. Billah, S. Kumar and S. Anagreh, "The impacts of the Russia–Ukraine invasion on global markets and commodities: A dynamic connectedness among G7 and BRIC markets", J. Risk Financial Manage., vol. 15, no. 8, pp. 352, Aug. 2022. Show in Context CrossRef Google Scholar

7. Y. Zhao and Q. Zhu, "Evaluation on crowdsourcing research: Current status and future direction", Inf. Syst. Frontiers, vol. 16, no. 3, pp. 417-434, Jul. 2014. Show in Context CrossRef Google Scholar

8. S. L. Kodjiku, Y. Fang, T. Han, K. O. Asamoah, E. S. E. Aggrey, C. Sey, et al., "ExCrowd: A blockchain framework for exploration-based crowdsourcing", Appl. Sci., vol. 12, no. 13, pp. 6732, 2020. Show in Context CrossRef Google Scholar

9. K. O. Asamoah, H. Xia, S. Amofa, O. I. Amankona, K. Luo, Q. Xia, et al., "Zero-chain: A blockchain-based identity for digital city operating system", IEEE Internet Things J., vol. 7, no. 10, pp. 10336-10346, Oct. 2020. Show in Context View Article Google Scholar

10. S. Shen, M. Ji, Z. Wu and X. Yang, "An optimization approach for worker selection in crowdsourcing systems", Comput. Ind. Eng., vol. 173, Nov. 2022. Show in Context CrossRef Google Scholar

11. M. Turkanovic, M. Holbl, K. Kosic, M. Hericko and A. Kamisalic, "EduCTX: A blockchain-based higher education credit platform", IEEE Access, vol. 6, pp. 5112-5127, 2018. Show in Context View Article Google Scholar

12. F. A. Sunny, P. Hajek, M. Munk, M. Z. Abedin, M. S. Satu, M. I. A. Efat, et al., "A systematic review of blockchain applications", IEEE Access, vol. 10, pp. 59155-59177, 2022. Show in Context View Article Google Scholar

13. Z. Zheng, S. Xie, H.-N. Dai, W. Chen, X. Chen, J. Weng, et al., "An overview on smart contracts: Challenges advances and platforms", Future Gener. Comput. Syst., vol. 105, pp. 475-491, Dec. 2020. Show in Context CrossRef Google Scholar 14. F. Tchakounté, K. A. Calvin, A. A. A. Ari and D. J. F. Mbogne, "A smart contract logic to reduce hoax propagation across social media", J. King Saud Univ. Comput. Inf. Sci., vol. 34, no. 6, pp. 3070-3078, Jun. 2022. Show in Context CrossRef Google Scholar

15. T. Meyer, M. Kuhn and E. Hartmann, "Blockchain technology enabling the physical internet: A synergetic application framework", Comput. Ind. Eng., vol. 136, pp. 5-17, Oct. 2019. Show in Context CrossRef Google Scholar

16. Z. Chen, C. Fiandrino and B. Kantarci, "On blockchain integration into mobile

crowdsensing via smart embedded devices: A comprehensive survey", J. Syst. Archit., vol. 115, May 2021. Show in Context CrossRef Google Scholar

17. M. Kamali, M. R. Malek, S. Saeedi and S. Liang, "A blockchain-based spatial crowdsourcing system for spatial information collection using a reward distribution", Sensors, vol. 21, no. 15, pp. 5146, Jul. 2021. Show in Context CrossRef Google Scholar

18. H. Horta, M. Meoli and S. Vismara, "Crowdfunding in higher education: Evidence from U.K. universities", Higher Educ., vol. 83, no. 3, pp. 547-575, Mar. 2022. Show in Context CrossRef Google Scholar

AUTHOR'S PROFILE:

MR. GORANTLA.SURESH Completed his MTECH(CSE) from JNTU Hyderabad. Currently working as an Assistant professor in the department of IT at DVR&DR. HS MIC College of Technology(Autonomous), Kanchikacherla, NTR District. His areas of interest are DataStructures, Machine learning, Java, andWeb technologies

Miss. YAKKATI KEERTHI, as MCA student in the department of DCA at DVR & DR. HS MIC COLLEGE OF TECHNOLOGY,Kanchikacherla, NTR District. She has completed BSC(MECS) in Sri Durga Malleswara Siddhartha Mahila Kalasala. Her areas of interests are Networks, Python,Web Technologies,Machine Learning ,java and Cloud Computing.