

Automatic Leaving Certificate issuing System for colleges Using AWS

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Abstract:

Degrees awarded using paper-based methods are often open to manipulation. It is a tedious and difficult procedure to verify these degrees using the present systems because they are neither transparent, immutable, or secure. Consequently, many schools are moving toward digital document delivery, using barcodes and QR codes to guarantee the authenticity of digital degrees, certificates, and grade reports. Organizations can quickly and readily validate these digital student records with bar codes and QR codes if necessary. Nevertheless, the majority of schools still use a paper-based application process to acquire these documents. It is not an easy process to obtain a leaving certificate or any other type of educational certificate. In order to receive their leaving certificates, students are required to collect No Due Certificates from several departments, such as the Head of Department (HOD), the mess, the library, athletics, fees, and many more. Therefore, this project develops a web-based, standalone application that students can use to apply for their graduation certificates. The student's request is reviewed and accepted by all relevant departments upon application; the program then generates the Leaving Certificate automatically and emails it to the student in question in a fraction of the usual time.

Keywords: Leaving Certificate, No objection Certification, Certification Generation.

I. INTRODUCTION

The development of a competent labor force is an important function of colleges and universities. By conferring credentials like degrees and certificates, they assist in opening doors to greater employment options. Degrees and certifications are official proof that an applicant has the education and experience needed to accomplish a job well. This helps hiring managers evaluate candidates. Paper certificates and degrees are typically produced and processed in a semi-or non-computerized fashion. There is a lack of security, auditability, immutability, and operational transparency in the current systems. In addition to being complicated, it is also arduous and vulnerable to fraud. The widespread prevalence of dishonesty, fraud, and bribery in the education

industry is a major problem with far-reaching negative consequences. The existing system allows schools to not only produce phony diplomas and certificates, but also have them attested by the appropriate authorities, provided they have the necessary funds. In response to these To address problems with centralized systems, increase security, transparency, and traceability, blockchain technology has recently arisen as a promising option. We offer a blockchain-based solution for academic certificate issuing, attestation, and verification that takes into account the advantages of blockchain technology and the shortcomings with the existing system. All degrees are issued, certified, and confirmed according to stated norms in the proposed system, which leverages various smart contracts to record stakeholder actions on an

immutable distributed ledger. To achieve scalability and prevent single point of failure, digital signatures are applied to the degrees that are issued, and files are kept on a distributed storage system. The validation of any certificate is not a problem because all records are kept on the blockchain. Notably, our suggested solution aligns with the current operations workflow, thus no stakeholder will need to make any significant changes.

[1] Pragati An interface for handling student records is described by Pralhad Patil et al. as Student Information Management, which is automatic. This system is designed to make the management of student records easy for schools and colleges. It is crucial for schools and colleges to manage students' information in a timely and accurate manner. Keeping track of students' graduation certificates and bonafies is made easier by our student information system. It keeps track of all the necessary details for students' graduation and bona fide certificates, such as their name. For each student whose registration number has been searched, it will automatically remove their bonafide and departure certificates by accessing information from Microsoft Access. This might be a huge time saver compared to having to retrieve all of the data individually. Limitation\ In the Long Run — Applicants will be able to skip the middleman and go straight to the certificate provider in the future. In addition, he might learn that the student has submitted the request for the legitimate. Even this may be changed because the request can be forwarded straight to the dean, who can then approve it and give the students who worked on this megaproject a certificate that shows them they learned all about our app's features, how it works, and the benefits it offers.

[2] in According to Omayma Husain et al., in a university setting, expert finding systems aid researchers by automatically suggesting qualified study partners. These algorithms disregard the human interaction viewpoint in favor of identifying experts based on the substance of their papers. Existing expert finding methods in academic

settings might benefit from human interaction factors to better discover potential research partners. When doing research in the real world, researchers take human interaction variables into account when deciding which research collaborators to work with. Few research have looked at what factors play a role in choosing a collaborator. The elements that impact collaborator selection, such as human capital, social capital, and cultural capital, and how these characteristics are prioritized by collaborator seekers were the focus of this study. By combining the STHC model with the social capital theory, it created and verified a theoretical model for expert finding systems in research universities to pick collaborators. Additionally, it looked at how cognitive accessibility and collaborator reliability impacted relevance. Also included were instructions for how to incorporate the suggested collaborator selection model into preexisting university expert finding systems. Cognitive accessibility, reliability, relevance, commitment, physical accessibility, complementing talents, cultural experiences, and research experience were shown to be the most important characteristics influencing collaborator selection in the setting of research universities, according to empirical studies. The results showed that reputation, relational accessibility, and network links had little impact on collaborator selection, which was surprising. In addition, the results of the mediation study demonstrated that the selection of collaborators is significantly influenced by relevance and network links. The IPMA study found that when choosing a partner, the three most essential criteria were cognitaccessibility, reliability, and relevance. This paper offers a research model for selecting collaborators in the setting of research institutions; theoretically, it is one of the first to combine the STHC model with social capital theory. The study was one of the first to look at how university settings affect the selection of collaborators based on cultural, social, and human capital. It also has real-world consequences for academic institutions, researchers, collaborators, and designers of expert-finding systems. Limitation\ In the Long Run — Suggestions for further investigation are given by

this study. Using the STHC and SCT models, this study initially evaluated eleven variables and classified them into three categories: human capital, social capital, and cultural capital. Aspects connected to the institution (such as its size and location) and the job (such as its relevance and criticality) can also play a role in the selection of collaborators; these other aspects can be the subject of future research. Interviewing university-based collaborator seekers can also help future researchers discover new influential elements. In addition, future scholars can build upon the suggested model by including other theoretical frameworks. Secondly, as academic researchers from research universities in Malaysia were the intended participants in this study, it would be beneficial to conduct more research to evaluate the suggested model at various academic institutions worldwide. The ability to generalize models and apply empirical findings in many contexts would be greatly enhanced by this. The third important takeaway is that the study's validation model informed the recommendations made to expert finding system designers. In order to enhance the process of selecting collaborators, they should integrate this model with the existing expert finding systems in institutions. Researchers at academic institutions also need to create a human-interaction model for use in selecting reviewers and supervisors, which brings us to our fourth point. Present expert finding methods can be enhanced by including these models. Fifth, when it comes to Malaysian universities, you'll find expert finding systems at places like UTM and U. Future researchers in the field can build on existing IS research by studying expert retrieval systems theoretically in Malaysia. This could involve creating models to measure user satisfaction and system success with these systems. The restrictions include In the Long Run — The following are some of the study's shortcomings, which were present despite its useful theoretical and practical contributions. First, academic researchers with expertise in research collaboration served as participants, and empirical data came from research universities in the Malaysian environment. Consequently, it is unclear whether the suggested

paradigm can be applied to different nations. Secondly, the suggested model was created by combining two theoretical frameworks. On the other hand, the model can be missing certain important details about partner selection, such as the importance of the work or the size of the institution. Third, this study only used a quantitative methodology and relied on survey data collecting. New factors may be identified from the researchers' perspective if a mixed-method or qualitative approach is considered.

[3]. In order to reduce the number of students who do not complete the Technical School Leaving Certificate program, Amrit Dhakal et al. identify the reasons why students do not complete the program, and they then provide recommendations for school administrators, students, parents, stakeholders, and future researchers. To investigate the reasons for and steps leading up to dropout, this study relied on in-depth interviews. Attitude issues, a disconnect between the curriculum and learning goals, unrealistically high expectations, physical disabilities, a lack of respect and acknowledgment from school administration, apathy, and an overall lack of motivation were among the many underlying causes of student dropouts identified by the study. Conversely, factors that contribute to student attrition include lack of respect and honor, curriculum and learning goals, physical impairments, and administrative negligence. School administrators and businesses can do more to prevent students from dropping out by enhancing the following areas: staff conduct, working conditions, working mode, and curriculum design.

The study is structured into five parts. We present a comprehensive overview of ITS in the second section. A concise introduction to deep learning and its uses is given in Section 3. Section 4 details how smart cities and ITS make use of deep learning to detect pedestrians, summarizes the work of several academics in the area, and lays out the obstacles to further study in each subfield. Next, in Section 5, we shall present the final verdict.

II. LITERATURE SURVEY

[4]. According to Saikumar Tara et al., the method by which businesses generate, store, and disseminate certificates automatically has been a game-changer. By doing away with the requirement for manual data entry and certificate distribution, it provides a simple and economical method of managing certificates. There is no longer any need for human proofreading thanks to automated certificate generation, which further helps to lower error rates. Automated certificate generation is an easy and uncomplicated process. It entails making precise and rapid use of a piece of software to create certificates. It is possible to use this program to create certificates for numerous people at once.

[5] Sorting, iterating, query management, and output production form the basis of the methodology used here, which was established by Ankit Kumar et al. Pretend that some robust clustering techniques have already clustered the data. Here, running MapReduce jobs faster on Hadoop's heterogeneous clusters might save a ton of time and energy. System incompatibility, disparities in nodes, and security features offered by Linux and Hadoop were the main obstacles that this project faced. Avoiding compatibility problems at crucial moments is possible with dedicated servers and clusters, which could lead to smoother experiences. Working on newer versions of Hadoop to include the best features and sidestep small problems like compatibility could enhance the underlying architecture and usage. Storage and indexing methods, query distribution, scalability, and performance in diverse contexts are all encompassed by the features that may be accessed using this technology, which in turn informs a large database. The results demonstrate a 30% reduction in data processing time as a result of the suggested effort.

[6]. A program that allows students to apply for diploma theses online was developed and

implemented by Besart Prebreza et al. While researching this system and the dissertation as a whole, the author came across other document management systems that were comparable and learned a lot about project management. Also included is a project schedule that details how much time was spent on each activity throughout development. A short, suggested description follows the presentation of the gathered needs and methodologies. In an effort to assist students in making a stronger case for their diploma theses, this project aims to provide a web-based Document Management application tool to streamline the application process.

[7] Our College Management System app, according to Rushikesh Basatwar et al. [7], eliminates the need for manual labor altogether. The administrator is in charge of and keeps tabs on this. Using this application reduces the need for human labor. Whenever a teacher or student needs it, it gives them the exact data they need. The information kept in the university database server can help the college administration make good decisions. Therefore, a college management system based on Android, such as the Pillai HOC app, is preferable. This data will be sent directly to the appropriate administrators, authorities, teachers, students, and guardians. In comparison to both the current Android app and the web app, the proposed app has many advantages, including superior features, better usability, higher search engine rankings, and a focus on student, parent, and public needs.

[8]. Undergraduates at the university level can learn how to create and use a DMS system from Mrs. Prithvi B. S. et al. By streamlining processes, saving money, and improving the speed of information retrieval, DMS will improve student knowledge exchange. In this paper, we have taken a look at some of the current problems that students are having with sharing information and managing their documents. Capacity, innovation, and productivity are all enhanced when students share what they know in the classroom. The author is well-equipped to construct an effective method for

managing

documents.

[9]. An innovative approach to the problems associated with maintaining student records has been detailed by Yerramsetti Sri Uday Kiran Sai Mahesh et al. in their description of the Student Document Management System built on the Ethereum Blockchain. This solution guarantees that student documents are valid and intact by using blockchain technology's security, transparency, and decentralized capabilities. By automating verification processes, smart contracts lessen administrative load and error risk. Students may securely share information with the right people and have more control over their records with decentralized access. The system's strong resistance to tampering and unauthorised changes is due to its immutability.

[10] In order to answer the important study issues, César Ortiz Cumpa et al. used a Systematic Literature Review (SLR) to collect and analyze data thoroughly. In order to find strong insights, 51 academic articles were carefully chosen and examined. Our review's findings shed light on an interesting worldwide trend: A number of countries have begun to prioritize the adoption of document management best practices. Because of their major roles in the research scene, Russia and Malaysia have emerged as the frontrunners. Not only that, but this is a widespread practice in many industries, including healthcare. Technology, innovation, and the ubiquitous trend of digitalization are intrinsically linked to modern good practices; these enable more effective document handling and management. The results highlight the many advantages linked with these behaviors, which is especially important. They make document-related activities much easier for staff to manage, speed up operations, and help with environmental sustainability, which is often neglected. Limitation\ The study's authors recognize that this issue will continue to grow in importance and influence the way governments interact with their population. They predict that it will continue to shape this connection in the years to come.

[11] the eleventh An electronic document management system was created and implemented using web technologies and object-oriented hypermedia design methodology (OOHDM) in the present work by Samuel M. Alade et al. The proposed system was built using UML and put into action with the help of the NetBeans software programming tool. The IDE provides a coding environment for creating the necessary programs such as HTML, PHP, CSS, JavaScript, and more. A graphical user interface was developed using HTML, CSS, and JavaScript, while the middleware was built using Xampp (Apache HTTP server, PHP, MySQL, and PHPMyAdmin), which provides scalability, load balancing, and transactional processing. The database technology SQLite was utilized for the back-end design process. The newly constructed system was evaluated and tested using a variant of the information system theory model proposed by DeLeon and McLeans. The results showed that the systems development produced a 95% accuracy rate and a 99.20% usefulness rate. Limitation\ Long-Term Goals - Integrating features like intelligence, platform-centric content strategies, and cloud awareness into the electronic document management system is the aim of future work.

[12] Shubham Gade et al. [12], it is very important to preprocess the data for any missing values. The author With the two-dimensional list data, author may estimate the initial parameters and learn about the dataset's characteristics, like its standard deviation and mean. After this, author get information about the properties of the dataset and assert the entropy of the data types stored in it, including strings and floats. A heat map is estimated for each attribute using the oversampled data. To achieve this, Author compare the transition data at various points in the sorting process and determine the overall amount of missing data as well as the percentage of missing data. This preprocessing may help to get rid of the redundant data to form the further database operations.

METHODOLOGY

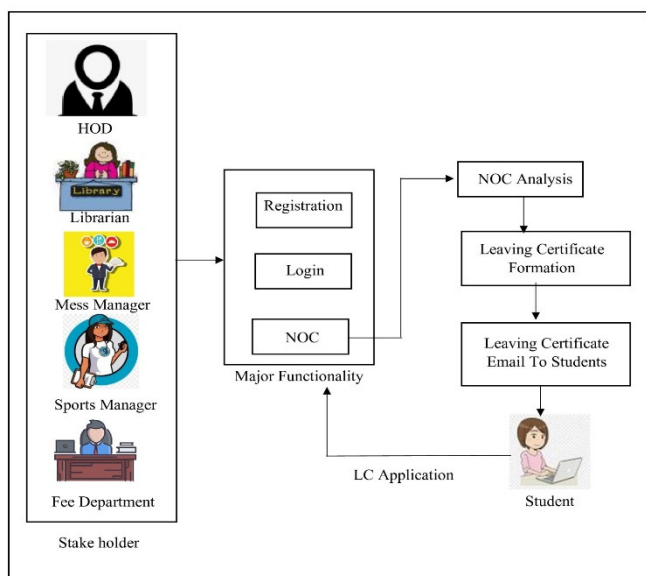


Figure 1: Proposed Methodology

The method that has been suggested to establish a Automatic LC generator system depicted in the system overview in Figure 1 up top. The suggested method was based in part on the execution of the procedures detailed below.

Step 1: Main Frame: The main frame is opened when the user executes the project. New users must register in this frame; to do so, click the "Sign In" button. Users will be presented with a sign-up frame where they can select either "Staff" or "Student" as their role.

Step 2: Staff registration frame : 1) Select "staff" if the user is a member of staff. The staff registration window will open. The user is required to fill out the entire form on that page, including their complete name, staff ID, phone number, email address, and choose a job from the drop-down menu. Hostel, fee, mess, and ADMIN are the five choices. The user is then prompted to input their login credentials after choosing the position. After that, the password will be set by the user. Clicking the Register button after finishing the process will show a notice saying that the staff registration was

successful. When the user is ready to input their login credentials, click OK to bring up the login screen. From the drop-down menu, choose "Login as Staff" and enter the credentials. The staff operation frame will be displayed after that individual is selected.

Step 3: Staff Operation frame: You can access the user's profile settings, generate a leaving certificate, and log out from this window. An option to edit the profile is available in the Manage Profile submenu. The staff edit profile frame is where the user can make changes to any of their previously entered information. You can alter your name, ID number, and password in this frame, but you can't modify your username or the position you're now in. A notice saying "Staff Profile Updated Successfully" will show up when you update the information. It will take you to the operation frame when you click OK. Under the main menu, choose "Status of Leaving Certificate" if you wish to see where your leaving certificate stands. The user will be able to view all student leave certificate requests, both pending and authorized, in the Status Frame. Selecting the student and then clicking the submit button will open View LC, where the user can approve the pending certificate. After opening the Data Frame, the user is asked to choose the position using the YOU combo box. They are then asked to review all the offered information, provide progress, and make any necessary notes. Click the approve button if everything is fine; click the disapprove button if something is wrong. The number of pending approvals and the phrase "Approved Successfully" will be displayed in the message box as the user hits the approve button. By returning to the submenu Status, you will be able to view the updated status of LC.

There is a consistent process for all staff selections, which can be found in the staff registration frame's "position" combo box.

Step 4: Student Registration frame: When a user clicks the "Student" registration button, a frame will pop up asking for various personal information. This includes the student's name, ID, phone

number, email address, password, and more. The user must then click the "register" button after finishing the form. "Successfully registered" is the notification that the student receives. The user is prompted to input their username and password in the login window after clicking OK. From the combo box, they can choose to log in as a student. The four options, "Manage Profile," "Personal Info," "Leaving Certificate," and "Logout," are accessible in Operation Frame.

You may access the Edit Profile submenu under the Manage Profile main menu. Through the student edit profile frame, the user is able to modify any registered information from the previously provided data. Usernames, ID numbers, and passwords can be changed in this frame, but usernames cannot. As soon as you save the changes, you'll see the "Student profile updated" notification. If everything is in order, the operation frame will load when you click OK.

You can add information or edit existing information by using the two submenus in the Personal Info menu. All of the necessary information for LC, including the student's name, mother's name, caste, and nationality, must be entered in the Add Info section. Next, they need to fill out the user's details, including their birthplace, last school attended, and date of birth (which can be entered in words). When you're done entering your details, use the submit button to see a confirmation message that your information was successfully added.

Accessing the option labeled "Modify Info" allows the user to make changes to any and all offered information. You will get the "Modify Successfully" notification once you make the changes. The Operation Frame will be opened once you click OK. Two submenus are present in the Leaving Certificate. Create an account and see your progress.

Clicking the Apply button will take the user to a screen where they can provide their educational standard, reason for leaving, and enrollment. When

the user selects the LC request, the staff operation frame's Leaving Certificate menu will take them to the Status submenu. The request to view them will be approved by the staff user from that frame onwards. The user can see where their LC approval stands right now by going to the View Status submenu. To exit all frames, use the exit function in logout. To close the program, the user can go back to the login screen and click the exit button.

III. RESULTS AND DISCUSSIONS

The proposed model for leaving certificate generation is developed in Java based machine with Netbeans as IDE and MySQL as database. The machine is equipped with 8 GB RAM and Core i5 processor.

The root mean square error (RMSE) is calculated by taking the difference between the actual and predicted evaluations and subtracting it from the total. This process is described in the equation below.

$$RMSE = \sqrt{(xp - xo)^2} \text{ ----- (1)}$$

Where

Xp – Expected number of LC Created

Xo – Obtained number of LCs

In the experimental evaluation, the proposed system was used to process an increasing number of Leaving certificate data for creation and the obtained values are recorded as shown in the below table and graph.

Experiment No	Expected Noof LC Generations	Obtained No of LC	MSE
1	3	3	0
2	6	6	0
3	10	9	1
4	13	12	1
5	18	16	2

Table 1: Recorded MSE

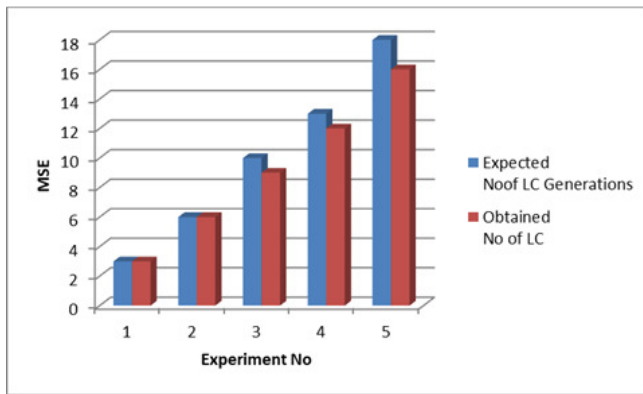


Figure 2: MSE for the Conducted experiment

The results of this early Leaving certificate system's first implementation prove the viability of the proposed methodology. To measure the magnitude of the methodology's mistakes, we computed the root-mean-squared error (RMSE), which yielded a result of 0.8944 for the suggested method.

IV. CONCLUSION AND FUTURE SCOPE

Degrees granted through traditional paper processes are frequently susceptible to fraud. Due to the lack of transparency, immutability, and security offered by current systems, the verification of these degrees is a rigorous and complex task. Thus, many educational institutions are transitioning to the digital transmission of diplomas, certificates, and grade reports, bolstered by the security features of QR codes and barcodes. Organizations can easily verify these digital student records whenever needed by scanning bar codes and QR codes. The application process for obtaining these documents, however, is still carried out manually in the majority of schools. A diploma or other form of academic credential is not something that is easily obtained. No Due Certificates must be collected by students from many departments before they may receive their departure certificates. These departments include the Head of Department (HOD), the mess, the library, athletics, fees, and many more. Therefore, in order to facilitate the application process for students' leave certificates,

this project creates a web-based standalone application. The timely preparation of the Leaving Certificate depends on the examination and permission of each department. After that, the student's completed Leaving Certificate is sent to them by email in a significantly shorter amount of time.

In the future this system can be enhanced to work as the web application for the schools and colleges and it may be designed to work as mobile application also.

REFERENCES

- [1] Pragati Pralhad Patil, Vishakha Mohan Lokare, T. Mohana Priya, Dr. M. Punithavalli, "AUTOMATIC STUDENTS BONAFIDE AND LEAVING CERTIFICATE APP", International Research Journal of Modernization in Engineering Technology and Science, Volume:03/Issue:12/December-2021, Impact Factor- 6.752, www.irjmets.com
- [2] omayma husain, naomie salim, rose alinda alia, samah abdel salam, ramayah thurasamy, hafiz muhammed faisal, and muzaffar hamzah, "Modeling Academic Research Collaborator Selection Using an Integrated Model", O. Husain et al., "Modeling Academic Research Collaborator Selection Using an Integrated Model," in IEEE Access, vol. 9, pp.102397-102421, 2021, doi: 10.1109/ACCESS.2021.3096250.
- [3] Amrit Dhakal, Aryal, P. K, Ayres, P., Sawyer, W., & Dinham, "Dropout of Technical School Leaving Certificate: A case study of Nepal", International Journal of Advanced Research in Science and Technology, Int. J. Adv. Res. Sci. Technol. Volume 12, Issue 7, 2023, pp.1005-1017, journal homepage: www.ijarst.com
- [4] Saikumar Tara, B. Sai Deepthi, K. Stella Rani, K. Srilekha, and M. Mary Grace, "Platform

- Depended Certificate Generating Automatic System”, Department of ECE, BVRIT Hyderabad College of Engineering for Women, Hyderabad, T.S, India, B. Raj et al. (Eds.): ICETE 2023, AER 223, pp. 790–796, 2023. https://doi.org/10.2991/978-94-6463-252-1_79
- [5] Ankit Kumar, Neeraj Varshney, Surbhi Bhatiya, Kamred Udham Singh, M. S. Mahmud, J. Z. Huang, S. Salloum, T. Z. Emara, and K. Sadatdiynov, “Replication-Based Query Management for Resource Allocation Using Hadoop and MapReduce over Big Data”, *BIG DATA MINING AND ANALYTICS* ISSN 2096-0654 06/10 pp 465– 477 Volume 6, Number 4, December 2023 DOI: 10.26599/BDMA.2022.9020026
- [6] Besart Prebreza, Daniela Gotseva, Plamen Nakov, M. S. Gingie, M. Lam, “A STUDY OF DOCUMENTSMANAGEMENTSYSTEMBASED ONWEB,Casestudy:UNIVERSITY”, October 2021 DOI: 0.11 09/TELECOM53156.2021.9659663 Conference: 2021 29th National Conference with Internationalparticipation(TELECOM),https://www.researchgate.net/publication/357446838_A_Study_of_DocumentsManagement_System_Based_on_Web_Case_Study_University
- [7] Rushikesh Basatwar1, Aakash Patil, Rushikesh Taiwade, Prateek Sahu, Prof. Priyadarshani Patil, “College Management System”, *International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)*, Volume 2, Issue 2, May 2022, www.ijarsct.co.in
- [8] Mrs. Prithvi B S, Manoj V, Mallanagouda Ramatal, Mahantesh M S, Nithin J, “Document Management System for UndergraduateStudents”, *International Journal of Research Publication and Reviews*, Vol 4, no 5, pp 4546-4549, May 2023, ISSN 2582-7421, www.ijrpr.com
- [9] Yerramsetti Sri Uday Kiran Sai Mahesh, Velagapudi Rohith, Vennam Srinivas Reddy, Mrs.B. Ratnamala, Dr. Reddyvaari Venkateswara Reddy, “A review on Student Document Management System based on Ethereum Blockchain (PERSONAL-D)”, *International Journal of Engineering Research & Technology (IJERT)* ISSN: 2278-0181, Vol. 12 Issue 08, August-2023, <http://www.ijert.org>
- [10] César Ortiz Cumpa A, Anibal-Romero B, Héctor Javier Bendezú Jiménez, “THE IMPACT OF DOCUMENT MANAGEMENT USING GOOD PRACTICES: A LITERATUREREVIEW”, Intern. Journalof Profess. Bus. Review. |Miami, v. 8 |n. 11 |p0124 e04112023, Doi:<https://doi.org/10.26668/businessreview/2023.v8i11.4112>
- [11] Samuel M. Alade, D. Morley, C. S. Parker, M. Ismael, L. Okumus, V. S. Abbasova, “Design and Implementation of a Web-based Document Management System”, *I.J. Information Technology and Computer Science*, 2023, 2, 35-53 Published Online on April 8, 2023 by MECS Press (<http://www.mecs-press.org/>) DOI: 10.5815/ijitcs.2023.02.04
- [12] “Enriching Crop Yield and Price Prediction Using Transformers”, Shubham Gade, Amita Singh and Sanjay Patil, in *International Journal of Research in Engineering, Science and Management*, vol. 7, no. 12, pp. 87-93, December 2024.
