Automatic Scholarship Fund Tracking System

Harshitha M, Vineet Ravindra Jamkhandi [2], Ghousia [3], Keerthi Kumar M [4], B M Sudesh [5]

[1] *Assistant professor, Information Science & Engineering, Vidya Vikas Institute of Engineering, Karnataka, India*
[2] *Student, Information Science & Engineering, Vidya Vikas Institute of Engineering, Karnataka, India*

[3] *Student, Information Science & Engineering, Vidya Vikas Institute of Engineering, Karnataka, India*

[4] *Student, Information Science & Engineering, Vidya Vikas Institute of Engineering, Karnataka, India*

[5] *Student, Information Science & Engineering, Vidya Vikas Institute of Engineering, Karnataka, India*

ABSTRACT

Abstract - The Scholarship Automatic Tracking System stands out as an optimal solution tailored to streamline scholarship tracking and management processes. Leveraging electronic tools and real-time searches, the system enhances transparency in payment procedures, minimizes errors, and boosts scholarship efficacy. By providing stakeholders with instantaneous access to financial data, it fosters a more accountable and efficient learning environment.

Keyword- Automated scholarship tracking, *SMS notification, AWS, transparency*

1. INTRODUCTION

The Scholarship Automatic Tracking System is a groundbreaking solution redefining the landscape of scholarship management. This comprehensive platform integrates cutting-edge technology with financial acumen to provide an end-to-end solution for the management of scholarship funds. "Smart Finance" represents a revolutionary approach to grant management by integrating technology and financial models into solutions. It is not merely a tool but a paradigm shift, empowering stakeholders with tools for strategic financial oversight, decision-making, and ultimately elevating scholarship management to unprecedented levels of efficiency and impact.

1.1 LITERATURE REVIEWS

This article is about "Smart Contract Based Scholarship Program for Central Sector University Students", which focuses on the integration of smart contract technology in scholarship management for secondary school students. Efficiency, transparency and security. This article is about "The impact of QR code tracking and SM S notification on donation management". The system provides easy and practical use for administrators and students. This article is on the topic “Encrypted Academic Chain: Using Blockchain Technology to Revolutionize the Scholarship Management Framework” and explores the evolution of block chain technology in scholarship management. Addressing the problem of capacity and inefficiency, this article presents a new framework that leverages decentralization and the security of the blockchain to revolutionize the way science is governed. This article is about "An advanced application for student scholarships using content-based technology". One of the best apps for student scholarships uses contextual filtering to provide professional and personal matches with qualified students. The system helps improve outcomes for students and scholars hip providers by improving the scholarship application and selection process through algorithms and data analysis.

1.2 .PROBLEM STATEMENT

The existing system exhibits numerous flaws and inadequacies, particularly in its suitability for managing student scholarships. The donation process often garners extensive media attention, especially when issues arise. Implementing a new system will elevate the level of security, instilling confidence among donors that funds are distributed accurately. Donors are increasingly demanding greater transparency and assurance regarding the allocation of funds to recipients, necessitating a more robust and trustworthy system.

2.METHODOLOGY

2.1 PROPOSED SYSTEM

The current system for student scholarships is riddled with flaws and shortcomings, rendering it unsuitable for its intended purpose. Instances of errors or mishaps in the donation process often attract significant media attention. Implementing a new system would bolster security measures, providing donors with assurance that funds are allocated accurately. There is a growing demand among donors for enhanced transparency and trust in the distribution of funds to recipients, highlighting the urgent need for improvement in the system.

- Secure student scholarship related documents under AWS S3 Service
- Student easily apply to scholarship & get SMS notification for entire scholarship process.
- System will increase the level of security and also the trust of donor.

2.2 FUNCTIONAL REQUIREMENTS

Application Manager: Responsible for approving NGO registrations, transferring funds to NGOs, and viewing scholarship details associated with NGOs. NGO: Registers for the application, submits basic details for approval, and upon approval gains access to scholarship related functions. Can view recipient details, apply for scholarships, download encrypted documents from AWS S3, decrypt and verify scholarship documents, approve or reject applications, pay scholarships, and view payment details. Donor: Registers for the application, adds funds to their wallet, pays amounts to NGOs, and can view NGO scholarship payments as well as feedback from scholarship recipients. Recipient: Registers for the application, uploads scholarship-related documents which are encrypted and stored in AWS S3, receives SMS notifications at each stage of the scholarship process, and posts feedback on NGOs upon receiving scholarships.

2.3 NON-FUNCTIONAL REQUIREMENTS

Availability: The system operates as a browser-based automation scholarship software, accessible 24/7 from various locations.

- Reliability: Our application prioritizes user satisfaction and is tailored to meet user needs, ensuring a user-friendly experience and enhanced reliability compared to alternative solutions.
- Scalability: Leveraging AWS S3 for storing scholarship related files, the system demonstrates high scalability. It adapts seamlessly to dynamic data without necessitating coding modifications, generating outputs based on real-time data changes.
- Security: The system, being browser-based and deployed on servers, ensures access is restricted to authorized users. Scholarship-related files are stored securely on AWS S3 with authentication measures in place for added security.
- Performance: Utilizing AWS S3 for scholarship file storage and implementing advanced C# programming concepts, the system is optimized for efficiency and high performance.
- Quality of Service: Regular software updates facilitate easy maintenance, while the system's design allows for seamless future modifications and enhancements.

2.4 SYSTEM DESIGN

The design phase serves the purpose of devising solutions to problems outlined by information requirements. It marks the initial transition from problem statement to solution, directing attention towards addressing the identified needs. Design is crucial in shaping software quality, as it prompts consideration of how best to fulfill those needs. In high-level design, the emphasis lies in identifying the modules required for system development and outlining their specifications. This phase determines the key data structures, file formats, output formats, etc. The primary focus is on determining the necessary modules to be built. Detailed design delves into specifying the internal logic of each module, concentrating on the logic's implementation within the software. Here, the focus shifts to designing the logic

for each module and determining how they can be effectively implemented. Design methodologies offer systematic approaches for creating designs, often emphasizing high-level design principles.

2.5 SYSTEM ARCHITECTURE:

Architecture involves examining a system as a composite of numerous components and understanding their interactions to achieve the desired outcome. The emphasis is on identifying components or subsystems and delineating their interconnections. In essence, the primary focus is on determining the essential major components required for the system.

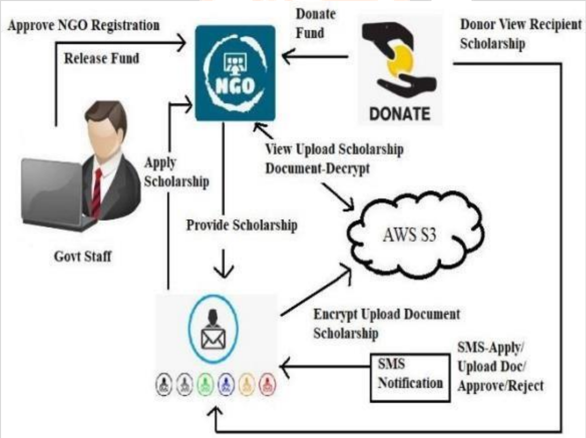
Approve NGO Registration
Release Fund
Donate Fund
Donor View Recipient Scholarship
NGO
DONATE
Apply Scholarship
View Upload Scholarship Document-Decrypt
Govt Staff
Provide Scholarship
AWS S3
Encrypt Upload Document Scholarship
SMS Notification
SMS-Apply/ Upload Doc/ Approve/Reject

Fig 1: System architecture

2.6 FRONT END USED: ASP.NET

ASP.NET is a widely used web application framework developed by Microsoft, enabling developers to build dynamic websites, web applications, and web services. It offers a comprehensive set of functionalities, generic libraries, and tools for constructing web applications using .NET languages like C# and Visual Basic. A notable feature of ASP.NET is its support for the Model View-ViewModel (MVVM) pattern, allowing for the separation of concerns in web applications. Additionally, ASP.NET facilitates the creation of Web APIs through technologies such as ASP.NET Web API and ASP.NET Core MVC, commonly utilized for developing RESTful services. ASP.NET boasts a rich development environment conducive to building robust, scalable, and secure web applications. It includes features such as authentication, authorization, session management, caching, and more, all readily available out of the box. These attributes make ASP.NET the preferred choice for many developers and enterprises seeking to develop web solutions efficiently.

2.7 BACK END USED: C# and MySQL

C# (pronounced "C Sharp") is a modern programming language developed by Microsoft Corporation in the United States. It shares similarities with Java and is an integral part of the .NET Framework, Microsoft's framework for developing object-oriented software solutions. Derived from popular languages like C and C++, C# is renowned for its simplicity, efficiency, and effectiveness. Despite its lineage in the C/C++ family, C# is a contemporary language well-suited for creating web applications. It is designed to facilitate the development of robust, reliable, and stable components capable of handling real-world applications. C# empowers developers to build powerful software solutions with ease.

2.8 C#*

- It belongs to the C/C++ family of languages.
- Simplifies and updates C++.
- Designed for the .NET Framework.
- Modern and concise language.
- Combines the strengths of various programming languages like Visual Basic, C++, and Java.
- Emphasizes simplicity, productivity, and robustness.
- NET is expected to be a preferred platform for programming.
- Major components of the .NET framework are written in C#.

2.9 MySQL

- Open-source RDBMS widely used for creating efficient databases.
- Developed, distributed, and supported by Oracle Corporation.
- Known for reliability, ease of use, and compatibility with multiple platforms and languages. Supports SQL for querying, manipulating, and managing relational data.
- Cross-platform compatibility across Linux, Windows, macOS, and UNIX.
- Offers features like indexing, caching, replication, and partitioning for performance optimization.
- Security features include user authentication, access control, encryption, and auditing.
- Different storage engines provide unique advantages for various applications.It embodies today’s concern for simplicity, productivity and robustness.
- It will become the language of choice for .NET programming.
- Major parts of .NET framework are actually coded in C#.

Certainly, here's a paraphrased version:
MySQL is a widely used open-source relational database management system (RDBMS) renowned for its scalability and high performance. It's developed, distributed, and supported by Oracle Corporation. Here are some of its key features: -
MySQL follows the relational model, organizing data into tables with rows and columns. It utilizes SQL (Structured Query Language) for managing relational databases.

Being open-source under the GNU General Public License (GPL), MySQL is freely available for download and use, making it accessible to developers and organizations of all sizes. It supports various operating systems like Linux, Windows, macOS, and UNIX, and can be deployed on-premises, in the cloud, or in hybrid environments.
Designed for handling large data volumes and high transaction rates, MySQL offers optimization features like indexing, caching, replication, and partitioning.
MySQL ensures high availability and fault tolerance through features such as master-slave replication, multi master replication, and clustering solutions like MySQL Group Replication and MySQL InnoDB Cluster. It includes security measures such as user authentication, access control, encryption, and auditing.

Supporting multiple storage engines like InnoDB, MyISAM, Memory, and Archive, MySQL caters to different use cases with each engine optimized for specific strengths.
With a vibrant community of developers, users, and contributors, MySQL benefits from extensive support, documentation, tutorials, and extensions that enhance its functionality.

2.10 Amazon Web Services (AWS)

Certainly, here's a paraphrased version:

Amazon Web Services (AWS) is a highly regarded cloud computing platform provided by Amazon, offering Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS) solutions. AWS introduced the pay-as-you-go model, enabling scalability and flexible access to computing, storage, and distribution resources.
One of its prominent services is Amazon Elastic Compute Cloud (EC2), which offers virtual servers, or instances, for computing tasks. EC2 provides various instance types tailored to specific applications, including memory-intensive and high speed processing tasks.
Amazon Simple Storage Service (S3) is a scalable solution for data backup, storage, and analysis. It allows IT professionals to store data as objects within S3 buckets, offering seamless integration. S3's cost-effective storage model enables businesses to optimize resource usage while accessing storage efficiently.
Interacting with Amazon S3 using C# involves tasks like file manipulation, object retrieval, and package management. The AWS SDK for .NET, especially the AWSSDK.S3 package, provides essential tools for this purpose. By utilizing the AmazonS3Client class from this package, developers can seamlessly integrate AWS S3 functionality into C# applications.

2.11 UPLOAD FILE TO AWS S3

You can utilize your own AWS access key and secret key by replacing "ACCESS_KEY" and "SECRET_KEY" placeholders with your credentials. The Basic AWS Credentials object authenticates your credentials, which are then passed to the AmazonS3Client constructor. Additionally, you can specify the desired region (for instance, US East1)

by providing a Region Endpoint object to the AmazonS3Client constructor. Once the credentials and S3 client are established, you can use the transfer utility class to upload files to amazon.

2.12 DONLOAD FILE FROM AWS S3

You can replace "ACCESS_KEY" and "SECRET_KEY" with your personal AWS access key and secret key. The method requires parameters including an S3 client, bucket name, object key, and local file path. It then constructs a Get Object Request to identify the bucket name and object key for downloading the file from S3. The file is then downloaded asynchronously and saved to the designated local file path.

3. CONTEXT DATA FLOW DIAGRAM:

Creating a context-level data flow diagram (DFD) is a fundamental step in system modeling, showcasing the interactions between the system and external agents, which act as data sources and destinations. At this level, the diagram portrays the system's engagements with the external environment solely through data flows across the system boundary. The context diagram simplifies the entire system as a single process, offering no insight into its internal workings. Subsequently, the context-level DFD is expanded to generate a Level 1 DFD, providing a more detailed depiction of the modeled system. The Level 1 DFD delineates the system's segmentation into subsystems (processes), with each handling specific data flows to or from external agents. These subsystems collectively deliver the full functionality of the system. Moreover, the Level 1 DFD identifies internal data stores essential for the system's operation and illustrates the data flow among different system components, offering a comprehensive view of the system's internal structure and data interactions.

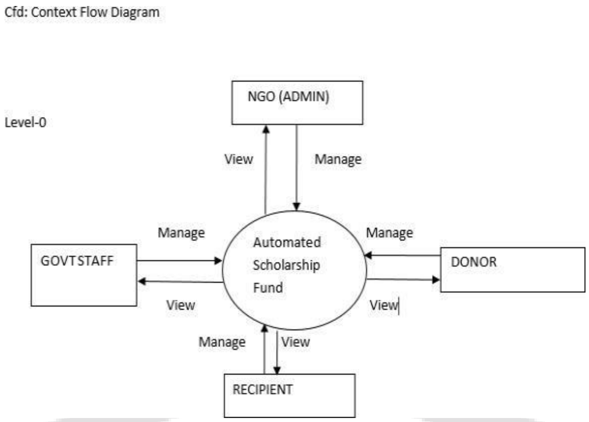

Fig 6: Context flow diagram

4. USE CASE DIAGRAMS:

Use case diagrams depict a system's functionality through actors and use cases. Use cases represent the services or functions offered by the system to its users. These diagrams, often termed behavior diagrams, outline a series of actions (use cases) that a system or systems (subject) can or should execute in conjunction with one or more external users (actors). Each use case should yield observable and beneficial outcomes for the actors or other stakeholders involved in the system.

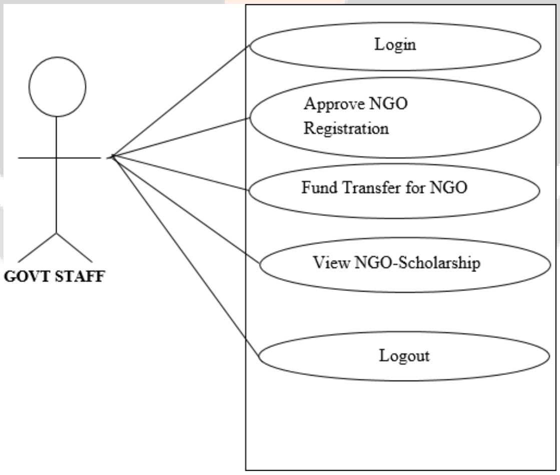

Fig 7: Admin Use-case diagram

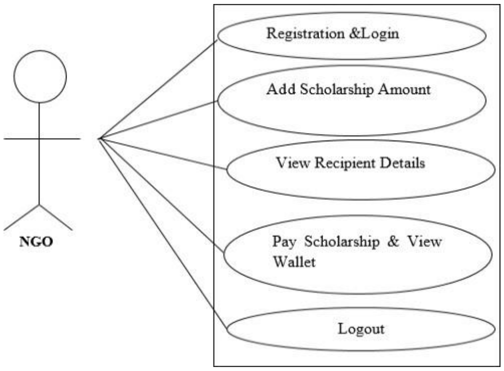

Fig. 8. NGO Use-Case Diagram

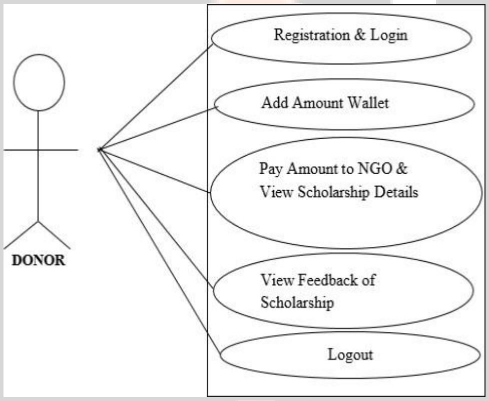
Registration & Login
Add Amount Wallet
Pay Amount to NGO & View Scholarship Details
View Feedback of Scholarship
Logout
DONOR

Fig. 9. DONOR Use-Case Diagram

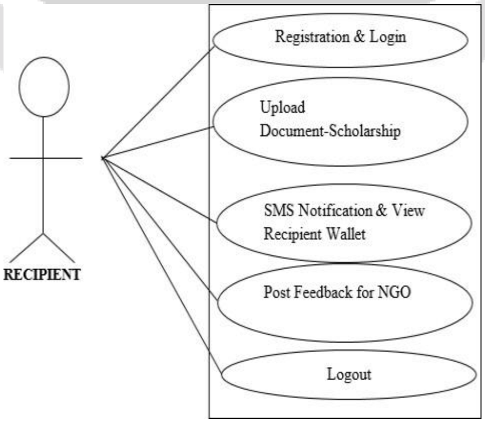
Registration & Login
Upload Document-Scholarship
SMS Notification & View Recipient Wallet
Post Feedback for NGO
Logout
RECIPIENT

Fig. 10. Recipient Use-Case Diagram

5. SEQUENCE DIAGRAMS:

A sequence diagram models the coordination of objects in time order. Indicates how objects interact with other objects in a particular data usage situation. With the best visual modeling, you can create parallel charts in a few clicks. Visual Paradigmcan also create line diagrams according to the flow of events you define in your usage descriptions. A sequence diagram models the coordination of objects in time order. It shows how objects interact with other objects in a particular data usage situation. Describes the objects and classes involved in the scene and the sequence of messages exchanged betweenobjects required for the scene to run.

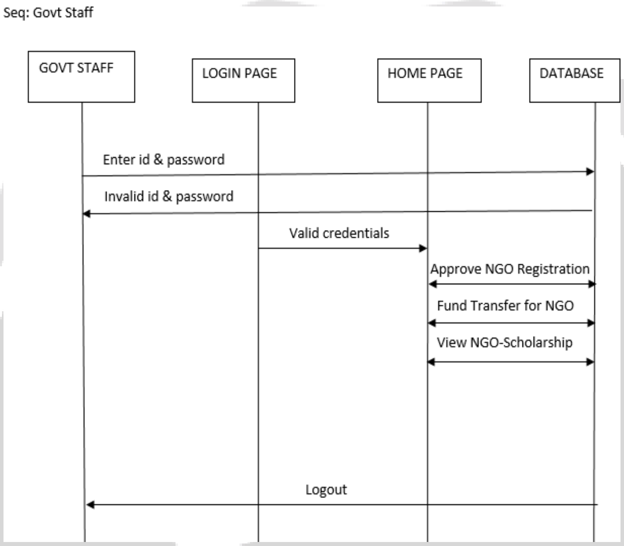

Fig. 11. Govt Staff Sequence Diagram

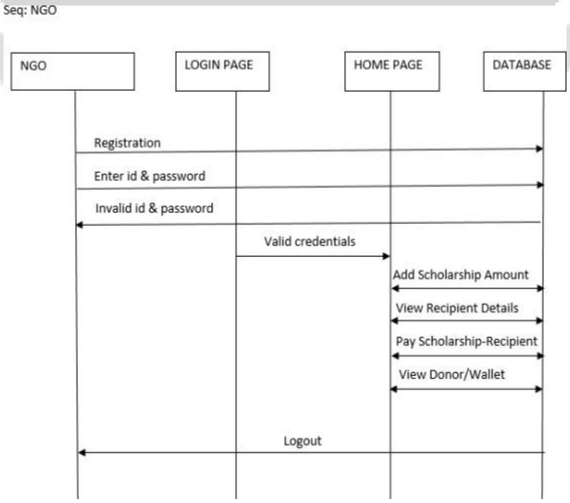

Fig. 12. NGO Sequence Diagram

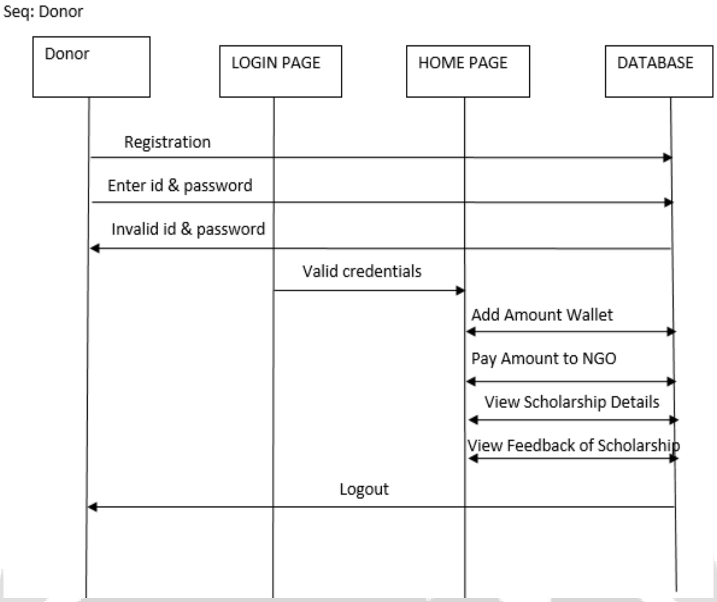

Fig. 13. Donor Sequence Diagram

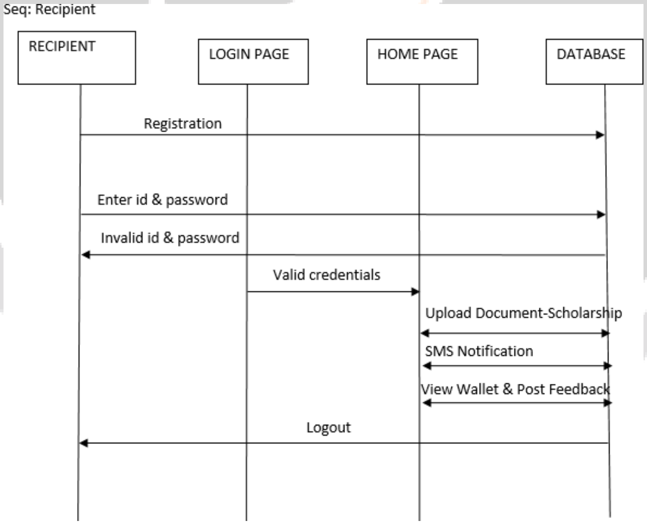

Fig. 14. Recipient Sequence Diagram\

6. Further enhancements to automate scholarship

Processes can significantly improve efficiency andaccessibility for applicants and organizations. Here are somepotential directions for future enhancements:

1. Blockchain for Transparency and Security: Utilize blockchain technology to ensure transparency, security, and immutability of scholarship records, reducing fraud and ensuring funds are used as intended.
2. Integration with Academic Institutions: Collaboratewith academic institutions to integrate scholarship application processes with student information systems, simplifying data exchange and verifying academic records for applicants.
3. Global Expansion and Standardization: Extend automated scholarship processes globally, considering regional educational system differences, qualifications, and cultural norms to standardize procedures.
4. Continuous Improvement through Feedback Loops**:Establish feedback mechanisms to collect input from applicants, reviewers, and stakeholders to continuously enhance the system, addressing any issues and identifying areas for improvement.

7. Conclusion

The proposed system facilitates transparent tracking and recording of transactions through web applications, ensuring accountability and trust. Utilizing blockchain technology and integrating with academic institutions can further enhance transparency and streamline processes, ultimately benefiting both scholarship providers and recipients.

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