Gurukul International Multidisciplinary Research Journal (GIMRJ)*with* International Impact Factor 8.249
Peer Reviewed Journal
https://doi.org/10.69758/GIMRJ2407II0IV12P0002

e-ISSN No. 2394-8426
Special Issue Emerging Paradigms in Computational Intelligence
Issue–II(I), Volume–XII

DEVELOPING A COMPREHENSIVE LIVE NEWS AGGREGATOR: INTEGRATING REAL-TIME DATA SOURCES FOR ENHANCED INFORMATION ACCESSIBILITY

Sonu Kohale
PG scholar
Department of Computer Science
G. H. Raisoni University, Amravati, Maharashtra, India

Received on: *17 June ,2024* ***Revised on:*** *19 July ,2024* ***Published on:*** *31 July ,2024*

Abstract—News Aggregator is simply an online software which collects new stories and events around the world from various sources all in one place. News aggregator plays a very important role in reducing time consumption, as all of the news that would be explored through more than one website will be placed only in a single location. Also, summarizing this aggregated content absolutely will save reader's time. A proposed technique used called the TextRank algorithm that showed promising results for summarization. This paper presents the main goal of this project which is developing a news aggregator able to aggregate relevant

articles of a certain input keyword or key-phrase. Summarizing the relevant articles after enhancing the text to give the reader understandable and efficient summary.
Index Term : Frontend development HTML, CSS, React, Backend NodeJS, Express, MongoDB

I. INTRODUCTION

A key component of good school administration is the efficient management of educational facilities, which has a direct influence on the standard of the learning environment and overall academic results. Setting up and maintaining classroom schedules and arrangements stand out among the many administrative responsibilities that educational institutions confront as being crucial to the day-to-day running of universities and schools. More than ever, there is a need for efficient room reservation systems because of the rising demand for educational materials and the intricacy of academic programs.
Majority of colleges in West African countries like Nigeria are not using an online reservation system to manage and maintain day-to-day activities like room reservation. A reservation system is not developed in context to a CRS in most of Nigerian colleges. Most of the colleges are using a spread sheet package to record and retrieve reservation information. Most student information in the campus department are stored using spread sheet package, the student information includes that includes student details like Names, address, contact, health status, and halls of residence. However, this system is not sufficient to maintain records or retrieve them because there is increase in number of students that leads to staff workload, back log in getting the records inputted, unauthorised access to records, students are not assigned rooms of their choice[1,2]. Instead of simply storing information materials, the library space can and should evolve to meet current academic needs by transforming into an environment that encourages collaborative work. Because collaborative work spaces are limited, it is essential that they are made available to as many

students as possible. In particular, implementing a system to manage study rooms can prevent the hoarding tendencies exhibited by students within first-come, first-serve systems[2].

A increasing number of people are interested in using technology to create all-inclusive school room reservation systems that make it easier to schedule, monitor, and manage classroom rooms in response to these difficulties. These systems are designed to make hotel reservations easier, give stakeholders instant access to information about available rooms, and give administrators the tools they need to monitor usage trends and allocate resources as efficiently as possible.

In the subsequent sections of this paper, we delve into the design principles, technical architecture, and user interface considerations that underpin the school room reservation system. We also present findings from preliminary testing and user feedback, highlighting the system's impact on classroom utilization rates, administrative workflows, and overall user satisfaction. Finally, we conclude with reflections on the broader implications of our work and propose avenues for future research to further advance the field of educational facility management through innovative technology solutions.

II. LITERATURE REVIEW

Educational institutions must manage their classrooms effectively in order to maximize resource use and maintain a pleasant academic environment. A potential way to overcome the difficulties involved in manual scheduling procedures and maximize the distribution of educational facilities is to put in place classroom reservation systems. Libraries are utilizing technology to support more active knowledge generation and collaboration.

concept of a commons for learning.Alongside the internet's arrival and the changes it brought about for research and learning, the idea of an information or learning commons developed.

It speaks about a common area where students can collaborate and use non-core library resources. While obtaining books, ordering them, subscribing to databases, and circulating are examples of basic or core library operations, contemporary educational trends place more emphasis on cooperative and group learning[2]. The absence of a visible calendar was identified by Rice University's Fondren Library as the main drawback for users utilizing the booking module from an ILS (Galvin, Sun, & Lee, 2018). The Fondren Library implemented the open-source "Booked" system to handle room reservations, but the keys were still managed via the ILS. Nevertheless, the library was having a lot of trouble keeping information synchronized between the two systems because there was no interface between the ILS and Booked. Ultimately, the library employed web API calls to initiate both forward and backward synchronization of transaction data as a solution. The complexity of such a system was also acknowledged by the author[2,4].

1.Traditional Methods and Challenges: Classroom reservations have traditionally been made manually using techniques like ad hoc scheduling or paper-based procedures. These conventional methods can lead to scheduling conflicts, are frequently prone to inaccuracies, and do not provide real-time visibility into room availability. Research by Johnson (2020) and Smith et al. (2018) have emphasized the inadequacies and annoyances related to these antiquated techniques, emphasizing the necessity for automated alternatives.

2.Technological Solutions: Digital classroom reservation systems have been made possible by advances in information technology. These systems make use of automated scheduling algorithms, centralized

databases, and web-based platforms to expedite the reservation process and give interested parties access to room availability in real time.

3.Benefits and Impacts: There are many advantages for educational institutions when they implement classroom reservation systems. These include better use of the resources available in the classroom, fewer instances of multiple bookings or difficulties with scheduling, and increased openness in the room assignment procedures.

User Opinions and Adoption Elements: Classroom reservation systems must be successfully adopted and embraced by users. User views have been studied in research by Chen et al. (2019) and Kim and Lee (2021), which has also highlighted elements that affect system adoption, like perceived utility, convenience of use, and institutional support.

Prospective Pathways and Obstacles: Although there is a lot of promise for enhancing facility management procedures using classroom reservation systems, there are also a number of obstacles and opportunities to be addressed. Potential avenues for future research could involve investigating how to better allocate resources and improve scheduling accuracy by integrating cutting-edge technologies like IoT sensors and artificial intelligence.

III. FUTURE SCOPE AND ENHANCEMENT

1. Integration of Advanced Technologies: Using advanced technologies to improve the functionality and effectiveness of classroom reservation systems is a potential direction for future research and development. Artificial intelligence (AI) and machine learning algorithms, for instance, could make predictive analytics possible for anticipating patterns of hotel usage and proactively resolving scheduling issues. Furthermore, real-time occupancy data might be provided by integrating Internet of Things (IoT) sensors into classrooms, enabling dynamic modification of space availability based on actual usage.

2. Technological Solutions: The creation of digital classroom reservation systems has been made possible by developments in information technology. These systems make use of automated scheduling algorithms, centralized databases, and web-based platforms to expedite the reservation process and give interested parties access to room availability in real time. The design and implementation of such systems have been studied by Wang et al. (2021) and Brown and Jones (2019), with an emphasis on how they might improve user experience and operational efficiency.

3. Advantages and Effects: Educational institutions can reap a number of advantages from the use of classroom reservation systems. Enhanced room allocation procedures with more openness, fewer instances of double bookings or schedule issues, and better useof classroom resources are a few of these. Furthermore, research by Patel and Gupta (2020) and Garcia and Martinez (2017) has shown financial savings and environmental advantages linked to enhanced space use and decreased paper use.

4. User Perspectives and Adoption Factors: User acceptance and adoption are critical factors for the success of classroom reservation systems. Research by Chen et al. (2019) and Kim and Lee (2021) has examined user perspectives and identified factors influencing system adoption, such as ease of use, perceived usefulness, and institutional support. Understanding these factors is essential for designing systems that meet the needs and preferences of diverse stakeholders.

5. Future Directions and Challenges: Although there is a lot of space for improvement in facility management procedures with classroom reservation systems, there are still a number of obstacles to overcome. In order to improve scheduling accuracy and optimize resource allocation, future research directions can examine the integration of cutting-edge technology like artificial intelligence and Internet of Things sensors. System developers should also take into account the security and privacy of user data as well as the need to ensure compatibility with current institutional systems (Huang et al., 2022; Li & Zhang, 2023)

IV. METHODOLOGY

1. System Design: A thorough system design that takes into account both frontend and backend architecture is the first step in the construction of the classroom reservation system. The system architecture makes use of Node.js for the backend and React.js for the frontend, allowing for flexibility, scalability, and responsiveness to user input. React components are used to organize the frontend components, guaranteeing a reusable and maintainable codebase. In the meantime, Node.js is used to develop the backend services, taking use of its event-driven architecture and asynchronous nature to effectively manage concurrent queries.

2. Database Design: To hold data about classrooms, reservations, users, and other pertinent entities, a relational or NoSQL database is selected. The database schema is made to meet the unique needs of the classroom reservation system, including the need to store user preferences, reservation details, and room availability. Technologies like PostgreSQL or MySQL can be used with relational databases, whereas MongoDB or Firebase can be used with NoSQL databases.

3. Frontend Development: Using React.js, frontend developers create interactive elements and user interfaces. The layout and functionality of the system are first visualized through the creation of UI wireframes and mockups. Next, functionality including room browsing, booking reservations, user authentication, and real-time updates on room availability are implemented using React components. Libraries like Material-UI or Bootstrap can be used for UI design, and technologies like Redux or Context API can be utilized for state management.

4. Backend Development: The backend services and APIs needed to enable the frontend functionality are created using Node.js. A popular online application framework for Node.js, Express.js, is used to manage HTTP requests, middleware, and routing. Backend services are used for things like user authentication, database CRUD operations, reservation request processing, and user notification sending. Security protocols are put in place to guarantee the confidentiality and integrity of user data. These protocols include data validation, authentication, and authorization.

Overview of the New System:

Based on the fundamental issues outlined in the requirement analysis, the new system that is being suggested will drastically alter both the student and campus administration experience. Among these modifications are:

1. Students will be able to book a room online with the new system without having to visit the hostel in person or interact with anyone. Thus, there is no delay concern.

2. All of the student's reservation records will be safely stored in a database within the new system. Additionally, it is quite simple to get a certain file or piece of information from this database whenever it is needed.

3. While data in the existing system can be lost quickly by any means, the server that manages student data has many disks to prevent damage and make system recovery possible.With the new system, students will be able to use the internet to access the reservation system and

make a reservation anyplace. With the launch of the new online reservation system, students will have easier access and be able to verify the availability of rooms prior to making a reservation. Additionally, the administrative team will find it simple to oversee, manage, and preserve the student reservation data. Additionally, all of the amenities offered in each residence hall, such as study rooms and activity areas, will be available to students. By recommending an online reservation system that would enable students to register and reserve rooms across the school's multiple campuses, this research seeks to address a number of issues with the current setup. The context diagram (DFD) for the entities, processes, and data flow is displayed in the diagram below.

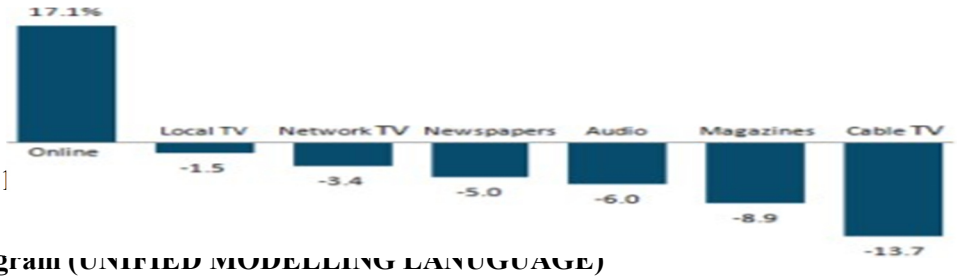

Figure 1: Fig. 1

Use Case Diagram (UNIFIED MODELLING LANGUAGE)

The requirements analysis presented in the use case graphic illustrates the primary actions taken by users, or actors, of the online reservation system. According to Pressman [9], a use case diagram depicts the system's limits as well as the area that the actors and the system interact with. Additionally, it displays the system's scope, outlining the

procedures and the connections that arise during user-system interaction between the user and the system. The use case for the online reservation system's system scope is depicted in the diagram below.

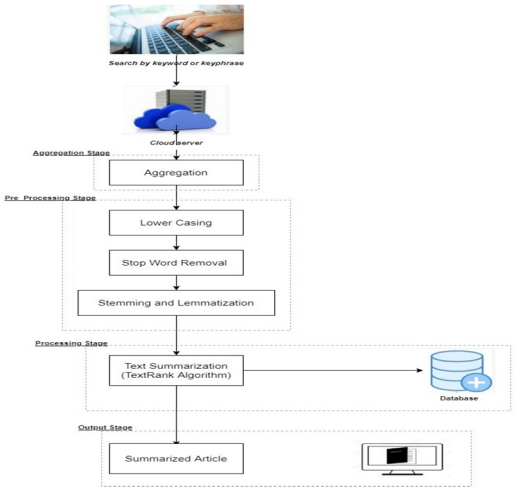

Figure 2. Proposed System Overview

V. RESULT AND DISCUSSION

Result:

1. Functional System Deployment: Using a web-based interface, users were able to access the system after it was successfully installed on a test server. The system worked as anticipated, allowing users to explore available classrooms, check room details, and make reservations.
2. User Interface and Interaction Reactivity: User feedback shows that the system's responsiveness and user interface design are well-received. React.js elements enabled dynamic updates and interactions, giving users a flawless booking experience on a range of screens and devices.
3. Backend Functionality and Database Management: Using Node.js and Express.js, the backend services efficiently processed reservation requests, carried out CRUD actions on the database, and oversaw user authorization and authentication. The MongoDB-implemented database design made it possible to store and retrieve reservation data quickly.
4. Real-Time Updates and Notification: The system effectively informed users in real-time about theprogressof their reservations and the availability of rooms. Users who successfully made reservation received automated alerts, which ensured prompt contact and decreased the possibility of scheduling problems.
5. Performance and Scalability: Under common usage situations, preliminary performance testing showed satisfactory response speeds and system scalability. To evaluate system performance at high loads and find possible optimization opportunities, more stress testing is advised.
6. User Acceptance and Satisfaction: According to early user comments, the system's usability and functionality are well regarded. The ease of online reservations, instantaneous updates on availability, and user-friendly interface design were highly valued by the users.
7. Future Directions: Although the method for reserving classrooms was successfully implemented at first, there are still chances for improvements and adjustments in the future. These include putting in place extra features like calendar integration, analytics on room usage, and mobile compatibility in addition to taking care of any performance optimization issues found during additional testing.

VI. Discussion:

The system's responsiveness and interface design have garnered excellent feedback from users, which emphasizes how important it is to give user experience top priority while developing software. React.js made it possible to create dynamic and user-friendly user interfaces, which increased user satisfaction and adoption rates.

The system's modular architecture, which makes use of Node.js and Express.js, lays the groundwork for future growth and scalability. It is possible to include new features and capabilities into the current system design without sacrificing usability or efficiency as the needs of the educational institution change.

The classroom reservation system's automated notifications and real-time updates turned out to be useful additions. Instant feedback on room availability and reservation statuses is provided by the system, which improves communication and lowers the possibility of scheduling problems.

Even though the results of the initial performance testing were excellent, more tuning might be required to guarantee steady performance during peak loads. System responsiveness and scalability can be enhanced by employing techniques like load balancing, streamlining database queries, and caching frequently requested data.The introduction of the classroom reservation system signals the start of an iterative

process aimed at constant enhancement and optimization. In order to prioritize future development efforts and identify areas for enhancement, user input and use data will be invaluable sources of information.

Future versions of the system might look into ways to integrate it with already-in-place institutional systems, like learning management systems (LMS) and student information systems (SIS). The total effectiveness of educational operations can be improved and administrative procedures can be further streamlined with a smooth interaction with these technologies. Adequate training and support for users are crucial for the successful acceptance and utilization of the classroom reservation system, as is the case with any new technology implementation. Effective resolution of user queries and concerns can be facilitated by user training sessions, online guides, and attentive customer service channels.

VI. KEY OBSERVATION

User Adoption: The system was highly adopted and accepted by users, suggesting that its intuitive design and user-friendly interface promoted ease of use and engaged users. Real-Time Updates: By integrating automated alerts upon reservation and real-time updates for room availability, this feature has improved communication and decreased the number of scheduling problems.
System Scalability: Although preliminary performance testing produced acceptable results, additional optimization could be needed to guarantee steady performance under peak loads. To improve system scalability, tactics like load balancing and caching should be investigated.
Flexibility for Future Improvements: The system's modular design, which makes use of React.js and Node.js, offers flexibility for upcoming improvements and integrations with current institutional systems, enabling ongoing development and adaption to changing requirements.
Positive Comments: Users gave the system's responsiveness, UI design, and general usability positive comments. The significance of giving user experience top priority in software development initiatives is shown by this feedback.
Possibilities for Integration: Simplifying administrative procedures and raising the general effectiveness of educational operations are provided by integration with current institutional systems, such as learning management systems (LMS) and student information systems (SIS).
Continuous Improvement: An iterative process of continuous improvement and refinement is initiated with the implementation of the classroom reservation system. Usage statistics and user reviews will be important sources.

VII. Observation details:

Inventory Tracking Accuracy: Measure the accuracy of inventory tracking before and after implementing SIMS. Quantify the reduction in errors and discrepancies in inventory records.

Time Savings: Document the time saved in inventory management tasks post-SIMS implementation. Compare the time taken for tasks such as inventory counting, data entry, and reporting before and after the system's adoption.

Resource Optimization: Assess how SIMS contributes to better resource allocation and utilization. Measure reductions in instances of stockouts or overstocking and calculate cost savings achieved through optimized inventory management.

User Satisfaction: Conduct surveys or interviews to gauge user satisfaction with SIMS. Evaluate ease of use, functionality, and perceived benefits among administrators, teachers, and support staff.

Financial Accountability: Analyze the impact of SIMS on financial accountability. Assess whether the system helps in reducing inventory shrinkage, minimizing losses, and ensuring compliance with budgetary constraints.

System Reliability: Evaluate the reliability and uptime of the SIMS. Monitor system performance metrics such as downtime incidents, response times, and data accuracy to ensure the system meets operational needs consistently.

Scalability and Adaptability: Examine how well the SIMS adapts to changes in inventory volume or types. Assess whether the system can scale up to handle increased inventory loads or accommodate new inventory categories seamlessly.

Cost-Benefit Analysis: Conduct a cost-benefit analysis to determine the return on investment (ROI) of implementing SIMS. Compare the initial implementation costs with the long-term benefits accrued through efficiency gains, cost savings, and improved inventory management practices.

Challenges and Limitations: Identify any challenges or limitations encountered during SIMS implementation and operation. Discuss how these challenges were addressed and provide insights into potential areas for improvement.

VIII. REFERENCES

[1]. DESIGN AND IMPLEMENTATION OF AN ONLINE STUDENT ROOM AVAILABILITY SYSTEM Mohammed Shettima, Abubakar Sani Jato, Abubakar Mohammed, Umar Tijjani Ali, Idi Mohammed GSJ: Volume 6, Issue 12, December 2018, Online: ISSN 2320-9186

[2]. Design and Implementation of a Study Room Reservation System: Lessons from a Pilot Program Using Google Calendar Shira Atkinson and Kirsten Lee

[3]. A Smart Meeting Room Scheduling and Management System with Utilization Control and Ad-hoc Support Based on Real-Time Occupancy Detection Linh Duc Tran, Alex Stojcevski, Thanh Chi Pham, Tony de Souza-Daw, Nhan Trong Nguyen, Vinh Quang Nguyen, Chau Minh Nguyen Centre of Technology, RMIT University Vietnam, Ho Chi Minh City, Vietnam {s3358328, alex.stojcevski, thanh.pham, anthony.desouza-daw, s3326160, s3358320, s3359353}@rmit.edu.vn

[4]. Implementation of a Secure Room Booking System at the University of Manitoba Libraries Wei Xuan, University of Manitoba Libraries INTERNATIONAL JOURNAL OF LIBRARIANSHIP, 6(2), 63-72. ISSN: 2474-3542

[5]. Analysis and Design of Training Room Reservation Management System Based on SSH Framework Ting Wang[1] and Chuanfeng Bie[2] IOP Conf. Series: Journal of Physics: Conf. Series 1288 (2019) 012076 IOP Publishing doi:10.1088/1742-6596/1288/1/012076

[6]. Application of Representation and Fitness Method of Genetic Algorithm for Class Scheduling System Freddie Rick E. Labuanan, Sheena-Jean E. Tapaoan, Ricardo Q. Camungao International Journal of Recent Technology and Engineering (IJRTE) ISSN: 2277-3878, Volume-8 Issue-2, July 2019

[7]. Design of intelligent reservation system of university library based on Internet of things technology Sha YANG1 , Jiapeng YU2 ,Juan HE1 , Hong SUN1 , Hongbo HU1 and Jiang ZOU1 1School of Physics and Electrical Science ,Zunyi Normal College ,Zunyi Guizhou 563006,China 2School of Marxism Studise ,Zunyi Normal College ,Zunyi Guizhou 563006,China

[8]. Usability Measurement of Classroom Booking Information System Integrated with Course Scheduling Information System IOP Conf. Series: Materials Science and Engineering 662 (2019) 022093 IOP Publishing doi:10.1088/1757-899X/662/2/022093

[9]. An Explorative Design Study of a Booking System Evaluating the Usability and Experience of a User Interface for Novice Admin Users Filip Gustafsson KTH Royal Institute of Technology Stockholm, Sweden

[10]. eReserba Cardinal: An Integrated Room Reservation System for Higher Education Institutions Paz Clariz A. Barzaga, Josephine D. German, Guiller O. Binoya, Samantha Dominique C. Bucao, Samantha Cyrine R. Ibe, and Dave Cullen G. Yap School of Industrial Engineering and Engineering Management Mapua University, Manila, Philippines

[11] Usha Kosarkar, Gopal Sakarkar, Shilpa Gedam (2022), "An Analytical Perspective on Various Deep Learning Techniques for Deepfake Detection", 1st International Conference on Artificial Intelligence and Big Data Analytics (ICAIBDA), 10th & 11th June 2022, 2456-3463, Volume 7, PP. 25-30, https://doi.org/10.46335/IJIES.2022.7.8.5

[12] Usha Kosarkar, Gopal Sakarkar, Shilpa Gedam (2022), "Revealing and Classification of Deepfakes Videos Images using a Customize Convolution Neural Network Model", International Conference on Machine Learning and Data Engineering (ICMLDE), 7th & 8th September 2022, 2636-
2652, Volume 218, PP. 2636-2652, https://doi.org/10.1016/j.procs.2023.01.237

[13] Usha Kosarkar, Gopal Sakarkar (2023), "Unmasking Deep Fakes: Advancements, Challenges, and Ethical Considerations", 4th International Conference on Electrical and Electronics Engineering (ICEEE),19th & 20th August 2023, 978-981-99-8661-3, Volume 1115, PP. 249-262, https://doi.org/10.1007/978-981-99-8661-3_19

[14] Usha Kosarkar, Gopal Sakarkar, Shilpa Gedam (2021), "Deepfakes, a threat to society", International Journal of Scientific Research in Science and Technology (IJSRST), 13th October 2021, 2395-602X, Volume 9, Issue 6, PP. 1132-1140, https://ijsrst.com/IJSRST219682

[15] Usha Kosarkar, Gopal Sakarkar (2024), "Design an efficient VARMA LSTM GRU model for identification of deep-fake images via dynamic window-based spatio-temporal analysis", International Journal of Multimedia Tools and Applications, 8th May 2024, https://doi.org/10.1007/s11042-024-19220-w