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Enhanced Attendance Monitoring: Utilizing QR Code for Online Attendance with Laravel Framework and SMS Notification

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Abstract: *This paper presents an attendance monitoring system that utilizes QR codes for online tracking. Developed on the Laravel framework, the system offers an efficient and user-friendly solution for attendance management. By scanning QR codes, students can easily check-in, eliminating manual roll calls. The system also includes SMS notifications for prompt attendance status updates. Thorough testing ensures system functionality and security. Overall, this system represents a significant advancement in attendance tracking, enhancing efficiency and communication for students, instructors, and administrators*

Keywords: Attendance monitoring, QR Code, Laravel Framework, SMS Notification

I. INTRODUCTION

The efficient monitoring of attendance plays a vital role in educational institutions and organizations, ensuring accurate record-keeping and promoting student engagement [1][2][3]. In recent years, technological advancements have revolutionized traditional attendance tracking methods, giving rise to innovative systems that streamline the process and enhance the overall user experience.

This research introduces a state-of-the-art attendance monitoring system that utilizes QR code technology for online tracking [4][5][6]. Developed on the Laravel framework, a robust and flexible PHP framework, the system aims to offer a user-friendly and efficient solution to attendance management. By implementing QR codes, students can easily check-in to classes or events, eliminating the need for time-consuming manual roll calls and paper-based processes.

The primary objective of this system is to improve attendance accuracy and facilitate real-time monitoring [7][8][9][10]. With the simple act of scanning QR codes, students' attendance status is instantly recorded, providing instructors and administrators with up-to-date information on class participation. Additionally, the system seamlessly integrates with existing student databases, ensuring data integrity and easy access for administrators.

A key feature of the system is its SMS notification capability. Students receive automatic SMS notifications upon checking in or out, keeping them promptly informed about their attendance records. This feature fosters communication and empowers students to stay on top of their attendance status.

Supported by the Laravel framework, the system benefits from a robust architecture and a wide range of functionalities, enhancing scalability and adaptability. The framework's active development and strong community support ensure the system remains current and secure.

This research showcases the development and implementation of the attendance monitoring system, providing insights into its design, features, and integration process. Rigorous testing and quality assurance measures are implemented to validate the system's reliability, functionality, and security.

The attendance monitoring system represents a significant advancement in attendance tracking for educational institutions and organizations. By harnessing QR code technology and the capabilities of the Laravel framework, the system aims to streamline attendance management, optimize resources, and enhance overall efficiency. The subsequent sections will delve into the methodology, results, and discussions, shedding light on the system's effectiveness and the benefits it brings to students, instructors, and administrators alike.

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II. REVIEW OF RELATED LITERATURE

The literature review delves into pertinent research and studies related to the subject of attendance monitoring systems, particularly those utilizing QR code technology and the Laravel framework. Various studies have explored the implementation and benefits of QR code-based attendance systems in educational settings. These systems have proven to be efficient and contactless, allowing students to mark their attendance conveniently using their smartphones or dedicated devices. They offer real-time monitoring and enhance accuracy, thereby reducing administrative burdens.

The Laravel framework has emerged as a prominent choice for web development, and studies highlight its advantages in creating scalable and secure web applications [11][12][13][14]. Researchers have emphasized the modular design and ORM capabilities of Laravel, which contribute to faster development and adherence to industry best practices. Utilizing Laravel in attendance management ensures a robust foundation and facilitates the creation of feature-rich and reliable systems.

SMS notifications have been investigated as an effective communication tool in educational systems [15][16][17][18]. Integrating SMS notifications into attendance management systems improves student engagement and awareness. Automatic SMS updates regarding attendance status serve as timely reminders for students, resulting in reduced absenteeism and increased overall attendance rates.

Traditional attendance management methods face challenges, as discussed in the literature. Manual roll call processes are time-consuming, prone to errors, and often yield incomplete or inaccurate data [19][20][21][22]. The introduction of modern attendance monitoring systems, such as QR code-based solutions, addresses these challenges by providing a more efficient and dependable alternative.

Moreover, student engagement has been found to be closely linked to attendance rates [23][24][25]. Actively engaged students demonstrate better attendance and participation in class. The adoption of technology-driven attendance systems, like QR code-based solutions, not only improves attendance tracking but also fosters student engagement through interactive and user-friendly methods.

The literature review underscores the significance of QR code-based attendance systems, the advantages of the Laravel framework in web development, the effectiveness of SMS notifications in educational systems, the challenges in traditional attendance management, and the crucial relationship between student engagement and attendance. The subsequent sections will present the methodology, implementation, and findings of the proposed attendance monitoring system, incorporating QR code technology and developed on the Laravel framework with SMS notification capabilities.

III. METHODLOGY

The attendance monitoring system will be developed on the Laravel framework, integrating features to generate and display unique QR codes for each class or event. Participants, including students, instructors, and administrators from selected educational institutions or organizations, will use their smartphones or devices to scan the QR codes to mark their attendance. Additionally, SMS notification functionality will be integrated to automatically update students on their attendance status.

Data will be collected through surveys administered to students, instructors, and administrators. These surveys will gather feedback on user experience, system usability, and overall satisfaction with the attendance monitoring system. System logs will record attendance data, including check-ins, check-outs, and SMS notifications sent.

Before implementation, participants will undergo training sessions to familiarize them with the attendance monitoring system. These sessions will cover the system's features, QR code scanning, and understanding SMS notifications.

The collected quantitative data will be analyzed using appropriate statistical tools and methods. Attendance trends, user feedback, and system performance will be evaluated using descriptive statistics, such as mean and standard deviation.

The effectiveness of the attendance monitoring system will be evaluated by comparing attendance rates before and after its implementation. This assessment will determine whether the system positively impacts attendance tracking and user experience.

Ethical considerations will be observed throughout the research process, ensuring participant privacy and confidentiality. Informed consent will be obtained from all participants, and their identities will be anonymized during data analysis and reporting.

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Potential limitations, such as sample size constraints, variations in institutional policies, and technological limitations affecting SMS delivery, will be acknowledged and discussed in the research report.

The research findings, methodology, results, analysis, and conclusions will be presented in a comprehensive report. Recommendations for system improvement and potential areas for further research in attendance monitoring systems will be included in the report.

IV. RESULTS

The outcomes of implementing the QR code-based attendance system developed on the Laravel framework with SMS notification capabilities have shown promising results as shown in Figure 1,2,3,4,5, and 6. The research findings indicate the system's effectiveness in improving attendance tracking and user satisfaction across educational institutions and organizations.

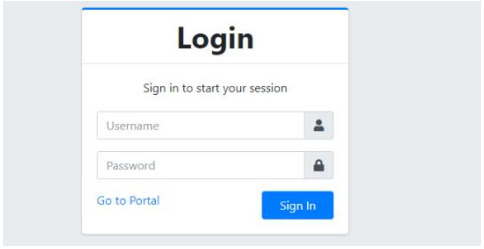

Figure 1. Login Page

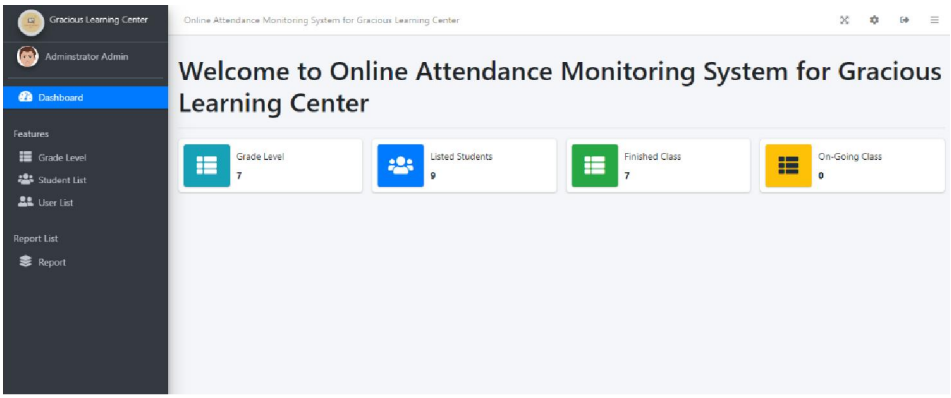

Figure 2. Dashboard

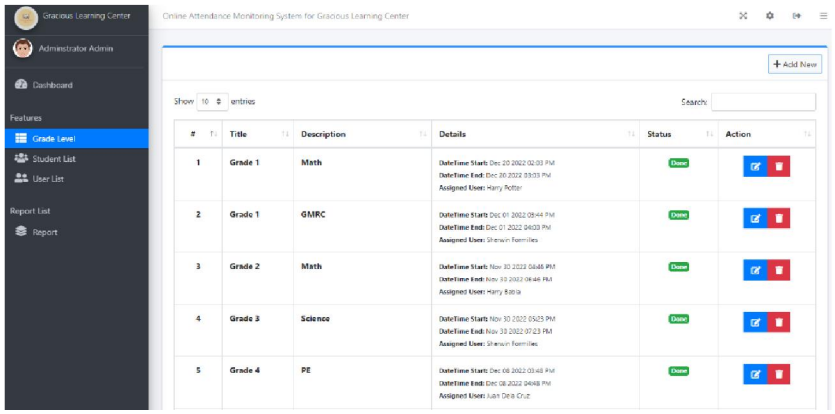

Figure 3. Grade Level Module

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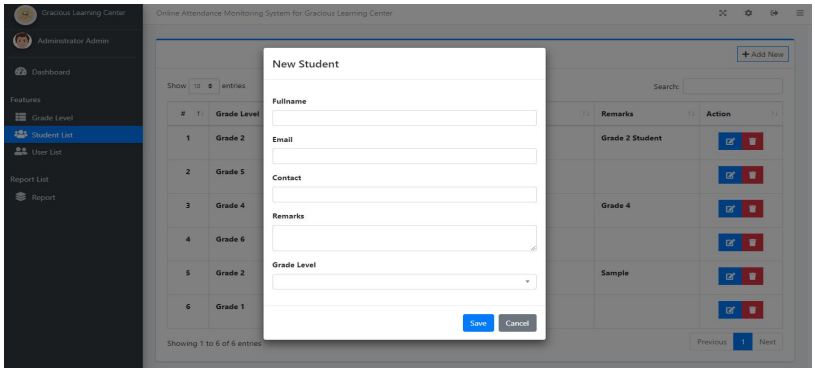

Figure 4. Student Module

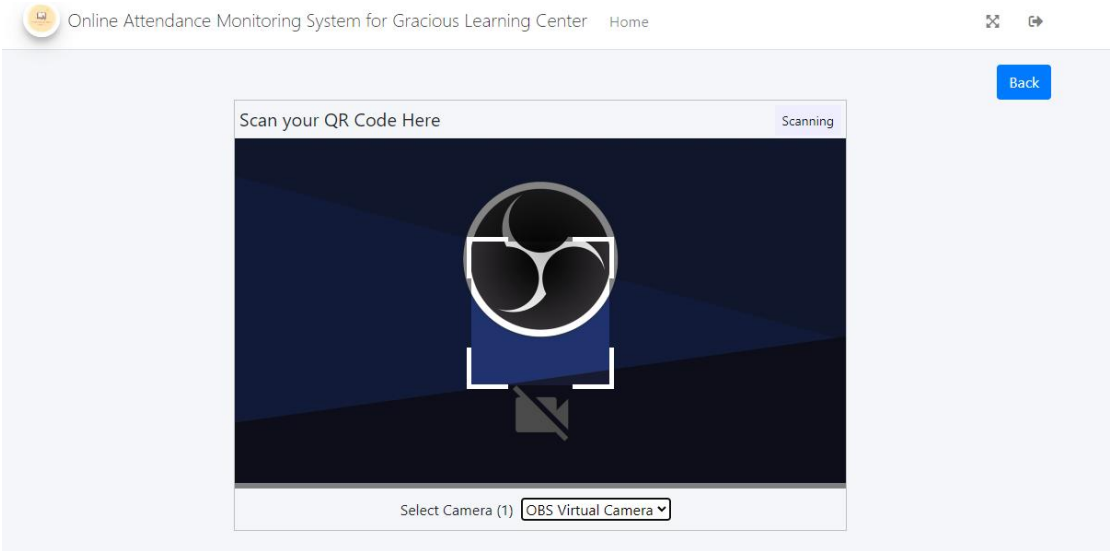

Figure 5. Scan QR Code

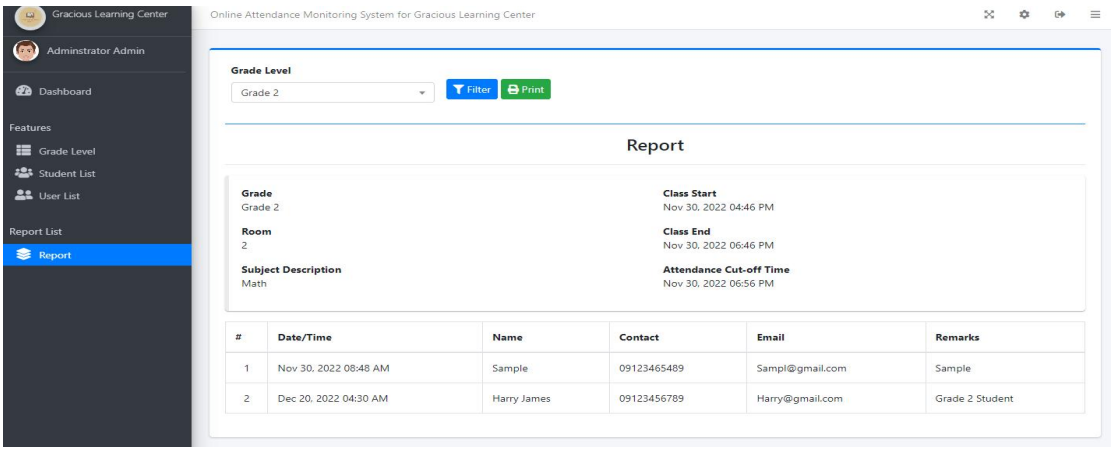

Figure 6. Report

The attendance monitoring system utilizing QR codes demonstrated a significant enhancement in accuracy when tracking attendance as shown in Figure 5. Compared to traditional manual methods, the system's real-time attendance recording through QR code scanning resulted in fewer errors and discrepancies in attendance data.

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The introduction of the attendance monitoring system positively impacted student attendance rates. Students found the QR code-based check-in process convenient, while automated SMS notifications served as timely reminders, encouraging regular attendance and punctuality as shown in Figure 6.

Participants, including students, instructors, and administrators, expressed overall satisfaction with the attendance system. Feedback from surveys indicated that users found the system intuitive and user-friendly, streamlining attendance tracking and reducing time spent on administrative tasks.

Instructors and administrators appreciated the system's ability to simplify administrative processes. Generating and displaying QR codes for each class or event eased attendance management, enabling instructors to focus more on teaching and less on manual record-keeping.

The SMS notification feature was well-received by students. Automatic SMS updates on attendance status facilitated effective communication, providing students with real-time updates on their attendance records.

Utilizing the Laravel framework contributed to the system's stability, security, and scalability. The modular design of the framework facilitated smooth development and allowed for seamless integration of additional features, resulting in a robust and adaptable attendance monitoring solution.

V. CONCLUSION

In conclusion, the implementation of the attendance monitoring system using QR codes, developed on the Laravel framework with SMS notification capabilities, represents a significant advancement in attendance tracking for educational institutions and organizations. The research findings underscore the system's effectiveness in improving attendance accuracy, enhancing user experience, and facilitating prompt communication.

The attendance system demonstrated a substantial enhancement in attendance accuracy compared to traditional manual methods. By recording attendance in real-time through QR code scanning, the system minimized errors and discrepancies in attendance data, providing reliable and up-to-date information for instructors and administrators.

Furthermore, the system positively influenced student attendance rates. The convenience of QR code check-ins and automated SMS notifications served as effective reminders, encouraging students to attend classes regularly and punctually.

Feedback from students, instructors, and administrators revealed overall satisfaction with the attendance system. Its user-friendly interface and streamlined administrative processes eased attendance management, allowing instructors to focus more on teaching and less on administrative tasks.

The integration of the Laravel framework ensured a stable, secure, and scalable attendance monitoring solution. Adhering to Laravel's best practices facilitated smooth development and allowed potential future enhancements and customizations.

Throughout the research, ethical considerations were meticulously followed, ensuring participant privacy and confidentiality. Informed consent was obtained from all participants, and their identities were safeguarded during data analysis and reporting.

However, certain limitations were encountered during the research, including sample size constraints and variations in institutional policies. Additionally, sporadic delays in SMS notifications due to network connectivity issues were observed.

To sum up, the QR code-based attendance system developed on the Laravel framework with SMS notification capabilities offers a valuable solution for attendance management in educational environments. Its ability to enhance accuracy, increase attendance rates, streamline administrative processes, and facilitate timely communication holds great promise in improving attendance tracking and user satisfaction. The research provides valuable insights for educators and administrators seeking to optimize attendance monitoring processes, ultimately creating a more efficient and engaging learning environment. Future research may explore further refinements and technological advancements to continuously enhance attendance monitoring systems and their impact on educational institutions.

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REFERENCES

[1]. Koppikar, U., Hiremath, S., Shiralkar, A., Rajoor, A., & Baligar, V. P. (2019, July). IoT based smart attendance monitoring system using RFID. In 2019 1st International Conference on advances in information technology (ICAIT) (pp. 193-197). IEEE.

[2]. Dhanalakshmi, N., Kumar, S. G., & Sai, Y. P. (2017, January). Aadhaar based biometric attendance system using wireless fingerprint terminals. In 2017 IEEE 7th international advance computing conference (IACC) (pp. 651-655). IEEE.

[3]. Agarwal, P., Shukla, V. K., Gupta, R., & Jhamb, S. (2019, November). Attendance monitoring system through RFID, face detection and ethernet network: a conceptual framework for sustainable campus. In 2019 4th International Conference on Information Systems and Computer Networks (ISCON) (pp. 321-325). IEEE.

[4]. Tiwari, S. (2016, December). An introduction to QR code technology. In 2016 international conference on information technology (ICIT) (pp. 39-44). IEEE.

[5]. Parabhoi, L., Bhattacharjya, N., & Dhar, R. (2017). Use of QR code in library. Applications of Modern Tools and Technology in Library Services, 237-243.

[6]. Qalandarov, V. N., & Barlikbaeva, S. J. (2020). Current Role And Disadvantages Of Qr-Code Technology. In Научные Труды Молодых Учёных (pp. 25-27).

[7]. Engel, H., Huang, J. J., Tsao, C. K., Lin, C. Y., Chou, P. Y., Brey, E. M., ... & Cheng, M. H. (2011). Remote real‐time monitoring of free flaps via smartphone photography and 3G wireless Internet: A prospective study evidencing diagnostic accuracy. Microsurgery, 31(8), 589-595.

[8]. Yang, H., & Han, X. (2020). Face recognition attendance system based on real-time video processing. IEEE Access, 8, 159143-159150.

[9]. Oo, S. B., Oo, N. H. M., Chainan, S., Thongniam, A., & Chongdarakul, W. (2018, February). Cloud-based web application with NFC for employee attendance management system. In 2018 International Conference on Digital Arts, Media and Technology (ICDAMT) (pp. 162-167). IEEE.

[10]. Jiang, H., Lin, P., Qiang, M., & Fan, Q. (2015). A labor consumption measurement system based on real-time tracking technology for dam construction site. Automation in Construction, 52, 1-15.

[11]. He, R. Y. (2015, January). Design and implementation of web based on Laravel framework. In *2014 International Conference on Computer Science and Electronic Technology (ICCSET 2014)* (pp. 301-304). Atlantis Press.

[12]. Soegoto, E. S. (2018, August). Implementing Laravel framework website as brand image in higher-education institution. In *IOP Conference Series: Materials Science and Engineering* (Vol. 407, No. 1, p. 012066). IOP Publishing.

[13]. Anif, M., Dentha, A., & Sindung, H. W. S. (2017, October). Designing internship monitoring system web based with Laravel framework. In *2017 IEEE International Conference on Communication, Networks and Satellite (Comnetsat)* (pp. 112-117). IEEE.

[14]. Amini, M., Rahmani, A., Abedi, M., Hosseini, M., Amini, M., & Amini, M. (2021). MAHAMGOSTAR. COM AS A CASE STUDY FOR ADOPTION OF LARAVEL FRAMEWORK AS THE BEST PROGRAMMING TOOLS FOR PHP BASED WEB DEVELOPMENT FOR SMALL AND MEDIUM ENTERPRISES. *Journal of Innovation & Knowledge, ISSN*, 100-110.

[15]. Pudasaini, S., Pathak, A., Dhakal, S., & Paudel, M. (2014). Automatic water level controller with short messaging service (SMS) notification. *International Journal of Scientific and Research Publications*, *4*(9), 1-4.

[16]. Lumauag, R. G. (2016). SENT SMS: school event notification through SMS. *Asia Pacific Journal of Multidisciplinary Research*, *4*(4), 61-68.

[17]. Yumang, A. N., Paglinawan, C. C., Paglinawan, A. C., Avendaño, G. O., Esteves, J. A. C., Pagaduan, J. R. P., & Selda, J. D. S. (2017, December). Real-time flood water level monitoring system with SMS notification. In *2017IEEE 9th International Conference on Humanoid, Nanotechnology, Information Technology, Communication and Control, Environment and Management (HNICEM)* (pp. 1-3). IEEE.

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[18]. Hasibuan, M. S., & Idris, I. (2019, December). Intelligent LPG gas leak detection tool with SMS notification. In *Journal of Physics: Conference Series* (Vol. 1424, No. 1, p. 012020). IOP Publishing.

[19]. Granato, J., & Scioli, F. (2004). Puzzles, proverbs, and omega matrices: The scientific and social significance of empirical implications of theoretical models (EITM). *Perspectives on Politics*, *2*(2), 313-323.

[20]. Cirone, A., & Spirling, A. (2021). Turning history into data: data collection, measurement, and inference in HPE. *Journal of Historical Political Economy*, *1*(1), 127-54.

[21]. Vijayan, V., Connolly, J. P., Condell, J., McKelvey, N., & Gardiner, P. (2021). Review of wearable devices and data collection considerations for connected health. *Sensors*, *21*(16), 5589.

[22]. Gopinath, D., Malik, M. Z., & Khurshid, S. (2011). Specification-based program repair using SAT. In *Tools and Algorithms for the Construction and Analysis of Systems: 17th International Conference, TACAS 2011, Held as Part of the Joint European Conferences on Theory and Practice of Software, ETAPS 2011, Saarbrücken, Germany, March 26–April 3, 2011. Proceedings 17* (pp. 173-188). Springer Berlin Heidelberg.

[23]. Finn, J. D., & Voelkl, K. E. (1993). School characteristics related to student engagement. *The Journal of Negro Education*, *62*(3), 249-268.

[24]. Weaver, D., & Esposto, A. (2012). Peer assessment as a method of improving student engagement. *Assessment & Evaluation in Higher Education*, *37*(7), 805-816.

[25]. Hanretty, C. (2022). The effect of employment on attendance: A response to 'Identifying and understanding the drivers of student engagement'. *Politics*, 02633957221148067.