# CONESCAPANHONDURAS2025paper24.pdf



Institute of Electrical and Electronics Engineers (IEEE)

# **Document Details**

Submission ID

trn:oid:::14348:477773548

**Submission Date** 

Jul 31, 2025, 11:53 PM CST

**Download Date** 

Aug 12, 2025, 12:21 PM CST

CONESCAPANHONDURAS2025paper24.pdf

File Size

806.9 KB

6 Pages

4,278 Words

26,678 Characters



# 3% Overall Similarity

The combined total of all matches, including overlapping sources, for each database.

## **Match Groups**

10 Not Cited or Quoted 3%

Matches with neither in-text citation nor quotation marks

0 Missing Quotations 0%

Matches that are still very similar to source material

= 1 Missing Citation 1%

 $\label{eq:marks} \mbox{Matches that have quotation marks, but no in-text citation}$ 

• 0 Cited and Quoted 0%

Matches with in-text citation present, but no quotation marks

## **Top Sources**

3% Internet sources

2% Publications

0% \_\_ Submitted works (Student Papers)

# **Integrity Flags**

0 Integrity Flags for Review

No suspicious text manipulations found.

Our system's algorithms look deeply at a document for any inconsistencies that would set it apart from a normal submission. If we notice something strange, we flag it for you to review.

A Flag is not necessarily an indicator of a problem. However, we'd recommend you focus your attention there for further review.





# **Match Groups**

10 Not Cited or Quoted 3%

Matches with neither in-text citation nor quotation marks

**99 O** Missing Quotations 0%

Matches that are still very similar to source material

= 1 Missing Citation 1%

Matches that have quotation marks, but no in-text citation

• 0 Cited and Quoted 0%

Matches with in-text citation present, but no quotation marks

# **Top Sources**

3% Internet sources

2% Publications

0% Submitted works (Student Papers)

# **Top Sources**

The sources with the highest number of matches within the submission. Overlapping sources will not be displayed.

1 Internet	
www.ncbi.nlm.nih.gov	<
2 Internet	
www.researchbank.ac.nz	<
3 Publication	
Sitty, Jean-Pierre Gabriel. "Assessing the Role of Generative Artificial Intelligence	<
4 Publication	
Cynthia Elvia Caceres Sanchez, Luis Alfredo Diburga Evangelista, Miguel Angel Ca	<
5 Internet	
admin.letsauthor.com	<
6 Internet	
link.springer.com	<
7 Internet	
scaleupally.io	<
8 Internet	
viktori.co	<
9 Internet	
core.ac.uk	<
10 Internet	



<1%



11

Publication

International Commission On Large Dams. "Twenty-Sixth International Congress ...





# Design of an Attendance Management and Registration System for Cultural or Organizational Events.

Abstract—Effective attendance management and registration systems are essential for the successful organization of cultural and institutional events. This study presents the design of a system developed using PHP Laravel and MySQL, leveraging QR code technology for accurate, secure, and real-time attendance tracking. Following the agile Scrum methodology, the system undergoes iterative improvements based on user feedback, while its UX/UI-driven design ensures an intuitive and accessible interface for organizers and attendees. In addition to automating administrative tasks, the system incorporates real-time data analytics to monitor attendance, evaluate participation, and enhance event planning. Secure data storage is ensured through MySQL integration, adhering to protection standards via JWT, OAuth2, and Google authentication. Designed for efficiency, scalability, and usability, the system addresses the needs of the Department of Art and Culture at Don Bosco University, where future implementation is envisioned, ensuring its practical applicability in optimizing resource allocation and event organization across various sectors.

Index Terms—Attendance registration, Database, Event Management, User Experience, User Interfaces

#### I. INTRODUCTION

The management and registration of attendance at events presents multiple challenges, especially in terms of accuracy, efficiency and accessibility. In many cases, organizers rely on manual methods, such as paper lists or spreadsheet records, which are prone to errors, data loss and difficulties in consolidating information in real time. In addition, the lack of automation complicates the analysis of attendance metrics, making it difficult to make strategic decisions for future editions of the event [1].

Another common problem is the user experience for both attendees and organizers. Unintuitive registration processes can lead to long lines, delays and difficulties in identity verification. Also, the lack of integration with emerging technologies, such as Quick Response (QR) codes, limits the possibilities for optimization and personalization of the cultural experience [2].

From an administrative point of view, the absence of a centralized system prevents the generation of real-time reports, making it difficult to access key information to evaluate the impact of the event and improve the planning of future activities. An efficient attendance register not only allows to control the access of attendees, but also to manage the level of capacity of the venue, facilitating the organization and optimization of resources [3].

Among the main advantages of an automated attendance register are increased security, by allowing exhaustive control of the occupancy level of each area of the event; greater efficiency, as appropriate technology reduces queues and crowds at entrances and exits; and a better experience for attendees and staff, as the combination of security and efficiency increases the overall well-being during the event [4].

Being able to control the occupancy capacity of the venue is a crucial aspect of event management. In addition, the optimization of resources at each moment of the event makes it possible to increase staffing in areas of high attendance and reduce it when attendance is low, which improves efficiency and reduces costs. It is also important to define and control the attendees that come to each room, which allows us to know their preferences and, in the future, offer more personalized experiences. Likewise, the generation of reports on the time spent by each attendee helps to identify the most crowded areas of the event and the average stay, which facilitates the improvement of future editions and the optimization of the user experience [5].

To address these challenges, this paper presents the design of an attendance management and registration system for cultural and organizational events. The proposal includes the conceptualization of a platform that allows automated access control through modern technologies, improving security, efficiency and attendee experience. In addition, a structured data model is proposed to facilitate the generation of real-time reports and the analysis of key metrics for future editions of the event.

The system design is based on the experience and needs of the Art and Culture Department of the Don Bosco University, where it is intended to be implemented in the future. This collaboration allows adapting the solution to a real environment, ensuring that it responds to the specific requirements of the management of cultural events in the institution. In this context, the present work focuses exclusively on the design phase of the system, addressing architectural, technological and usability aspects, with the aim of laying the foundations for its future implementation and improvements.

#### II. METHODOLOGY

#### A. Description of the development methodology

The SCRUM agile methodology [6] was selected for the design of the event and attendance management system, due to its set of best practices that promote collaborative teamwork,





optimizing project results. This methodology allows a flexible development through partial and regular deliveries of the final product, prioritizing those functionalities that provide greater value to the user, see Fig. 1.

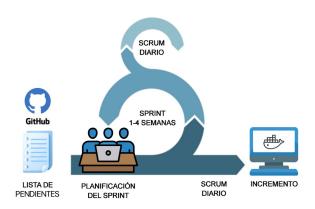


Fig. 1. Representation of the Scrum method taken from [7]

The project is executed in short, fixed-duration cycles of two weeks. Each iteration provides a complete and functional result of a requirement item, which facilitates adaptation to changes and continuous improvement of the system. In addition, for UI design and early validation of the user experience (UX), prototyping in Figma [8] is used, allowing to visualize and adjust the user interaction before implementation.

#### B. Technologies used

For the design of the event management and attendance registration system, several technologies were used. Laravel [9], as a PHP framework [10], was used to create the structure and logic of the system, facilitating the implementation of the MVC model[11] and the efficient management of routes and controllers. MySQL[12] was used as the database management system, allowing the storage and query of event and attendee information. Finally, PHP was the main programming language, providing the basis for the functionality of the system and its integration with the other technologies mentioned.

In addition to these technologies, Windows Authentication was implemented to enhance security and streamline user access. By integrating Windows Authentication, the system allows seamless login for users within the organization's network, eliminating the need for additional credentials and reducing the risk of unauthorized access. This authentication method ensures that only verified users can access the system, leveraging existing domain credentials and security policies. It also simplifies user management for administrators, as access rights can be controlled through Active Directory settings. The use of Windows Authentication enhances both security and usability, ensuring a more efficient and protected event management experience.

#### C. System Architecture and Operation

The Event Attendance Management and Registration System is a web platform designed to facilitate event management,

registration, and attendance control in cultural activities. It is oriented toward organizers, administrators, and attendees, providing an efficient solution for planning, monitoring, and analyzing participation in events. For its development, the Laravel framework was used, which follows the MVC (Model-View-Controller) architecture, allowing efficient management of routes, user authentication, and database manipulation. As a database management system, MySQL was used, optimized for efficient queries and handling large volumes of information. The main programming language is PHP, which facilitates integration with the database and management of system logic through controllers and models.

To ensure a homogeneous development and production environment, the system is based on Docker, which allows the application to be deployed in containers. Through Docker Compose, multiple containerized services are orchestrated, including the MySQL database and, optionally, an SMTP service that enables email notifications. Additionally, the system incorporates RESTful APIs to enhance interoperability with third-party services, allowing real-time data synchronization and external application integration. To improve security, the application employs authentication mechanisms such as JWT (JSON Web Token) and OAuth 2.0, ensuring secure access control. Furthermore, automated testing with PHPUnit and integration testing using Laravel Dusk are implemented to guarantee software reliability and maintainability, see Fig. 2.

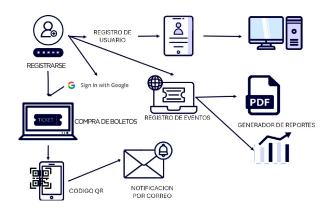


Fig. 2. Shows an example of the recommended software architecture for a project

#### III. SYSTEM DESIGN

#### A. System description

The event management system incorporates Google-based authentication[13], making registration and access easier for users. By using their Google accounts, attendees and organizers avoid the need to manage additional credentials, enhancing the user experience and providing increased security through Google's authentication protocols.

The system's main features include event management, where organizers can create, edit, and delete events with details such as date, location, and capacity. Users can manage their attendance and receive a unique QR code[14] to quickly and





securely validate their presence at the event. Additionally, the system allows integration with Google Calendar, which facilitates event organization and the sending of automatic reminders.

Among the benefits of Google authentication are ease of access without the need to remember additional passwords, enhanced security with multi-factor authentication, and reduced burden for administrators since they don't need to store credentials. Administrators can also manage users, view attendance statistics, and configure events from a control panel. The system sends email notifications to confirm registrations and send event reminders. Thanks to its modern architecture, the system provides a scalable and efficient solution for event management.

Technically, the integration with Google is done through OAuth 2.0, allowing users to grant permissions without sharing credentials. The system validates the access token, securely manages sessions, and ensures token renewal when necessary.

#### B. User interface

The design of the user interface (UI) and user experience (UX) [15] in an event management and attendance registration system is a key factor in ensuring its effectiveness and adoption. Since these types of systems are often used by organizers, administrators, and attendees with different levels of technological expertise, it is essential that the interface is intuitive, accessible, and efficient in managing registrations and queries. A well-designed UX reduces friction in the user journey, improves engagement, and increases overall satisfaction with the platform.

One key feature that enhances UX is the integration of Google login. This allows attendees to register in seconds and quickly access their events without the need to remember additional credentials. Furthermore, by synchronizing events with Google Calendar, users can receive automatic notifications about their upcoming activities, reducing the likelihood of forgetfulness or confusion. Additionally, push notifications and email reminders can further improve user engagement by ensuring they stay informed about changes in event schedules or last-minute announcements.

The UI design of the system should prioritize a clear organization of on-screen elements, with a structured navigation that allows users to quickly access essential functions, such as event creation, participant registration, report generation, and real-time attendance monitoring. See Fig. 3 for the use of a color palette that differentiates important sections, understandable iconography, and legible typography to enhance the visual experience and speed of decision-making. Moreover, responsive design principles should be applied to ensure that the platform is fully functional on both desktop and mobile devices, catering to users who prefer accessing events from different platforms.

From a user experience (UX) point of view, the system should minimize the learning curve by offering optimized workflows and reducing the number of unnecessary steps in the registration and administration processes. The integration



Fig. 3. Shows an example of the recommended color palette and typography for a project

of dynamic forms, auto-completion, real-time validations and interactive notifications can improve system efficiency and reduce data entry errors, see Fig. 4.

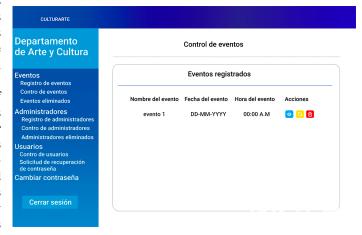


Fig. 4. Displays the main screen from where all administration options are managed

In terms of usability, the system must ensure that administrators can manage events quickly and effectively, while attendees can register their participation without difficulty. To this end, mechanisms such as the generation of QR codes for quick access, synchronization with external databases, advanced filters for searching records, and automatic reports to facilitate decision-making can be implemented. Accessibility must also be considered, ensuring that people with different abilities can interact with the platform through options such as screen reader compatibility, quick access keys, and customizable interface settings. Furthermore, although data security is addressed through advanced authentication mechanisms, it is also essential to evaluate the system's broader impact on accessibility and digital inclusion.



For instance, future iterations could integrate accessibility standards such as WCAG, support for screen readers, high-contrast modes, and keyboard navigation. To accommodate communities with limited access to technology, the system could adopt offline-capable progressive web application (PWA) versions, deploy modular solutions using low-cost hardware, or provide SMS/USSD interfaces for environments with unreliable connectivity. These adaptations would promote inclusive use and extend the system's benefits to a wider range of users.

#### C. Data collection and automation

The event management and registration system is designed to optimize participant management and data collection through the use of databases integrated with API services. This architecture allows seamless communication between the user interface and the backend, ensuring efficient processing of information in real time. Thanks to data centralization and process automation, attendance record accuracy is improved and decision making based on up-to-date data is facilitated.

The system's database stores all relevant information in a structured manner, recording events, attendees, organizers and attendance details. Through the use of a well-defined API, this data can be securely accessed, modified and queried from any authorized device. This approach not only avoids redundancies and errors in information, but also allows for the synchronization of multiple access points, ensuring data consistency.

Real-time attendance registration and validation is one of the key features of the system. Through API services, attendees can register and confirm their attendance using various methods, such as web forms, QR codes. The API interacts with the database to automatically check the validity of registrations, avoiding duplications or incorrect information. This automation reduces the operational burden on administrators and improves the attendee experience, as the registration process becomes more streamlined and secure.

Another fundamental aspect of the system is the automation of processes and the generation of reports. Through API queries, administrators can access detailed information on event attendance, apply filters according to specific criteria and export data in formats such as PDF. This functionality allows the effectiveness of organized events to be evaluated and facilitates decision making based on accurate information. The ability to generate real-time statistics provides analytical insight that can be used to improve the planning and management of future events.

#### D. Data security and protection

The integration of APIs into the event attendance management system provides multiple benefits, optimizing security, efficiency, and user experience. Thanks to this technology, the system can connect with email platforms to send automatic notifications, as well as with authentication systems such as OAuth, Google Sign-In, or SSO, enhancing access control and data protection.

A key aspect of security is user authentication and authorization. Technologies such as JWT tokens and OAuth ensure that only authorized individuals can access specific levels of information or modify certain records, safeguarding data integrity and preventing unauthorized access. The integration with Google Sign-In further strengthens security by leveraging advanced measures such as two-step verification and suspicious activity detection. These features comply with data protection regulations and foster user trust.

On the other hand, permission management is essential for the efficient administration of the system. With Google Sign-In, administrators can assign access levels according to each user's role. Event organizers can manage records and attendance with advanced permissions, while attendees can only access relevant information. This differentiation not only facilitates system control but also optimizes the collection of statistics on attendance and participation, enabling better event planning and management.

Additionally, Google integration simplifies account recovery. Since the platform offers advanced mechanisms for this purpose, users can restore access without the need for intervention from the support team, reducing the workload for administrative staff and ensuring a smooth experience for all participants.

#### IV. DISCUSSION

The proposed design has been evaluated in comparison with existing solutions in the market and academic literature, allowing for the identification of its main advantages and areas for improvement. Unlike other implementations, this proposal stands out for its lower cost and integration of new technologies to facilitate future cloud migration. The analysis highlighted key strengths such as ease of use, scalability, and interoperability, while also revealing areas for optimization, particularly in compatibility.

During the design phase, several limitations were identified that influenced the feasibility of the project. These included hardware restrictions, compatibility issues with existing platforms, and the need for high processing capacity. Such constraints posed significant challenges, requiring modifications to the initial project plan. Additionally, various obstacles, including regulatory barriers and infrastructure compatibility, prevented the full implementation of the solution at this stage. These challenges underscore the importance of thorough planning and the exploration of alternative approaches for future iterations.

Beyond the academic context of Universidad Don Bosco, where a controlled environment and specialized staff may ease implementation, the scalability and adaptability of the system in other sectors pose new challenges. For instance, deploying the system in public institutions may involve budget constraints, limited IT infrastructure, or resistance to change in technological practices. In contrast, private enterprises might require strict compliance with security and data privacy standards before adopting such solutions. In rural or low-resource



aquaculture environments, connectivity issues and lack of technical support could hinder real-time monitoring and system maintenance. Therefore, analyzing the socio-technical conditions, organizational readiness, and sector-specific regulations is crucial to assess the broader viability of this technology. Incorporating these considerations would enrich the relevance and practical contribution of the project, paving the way for tailored adaptations across diverse implementation settings.

An important aspect considered in the development process was the selection of a robust authentication mechanism. While Windows Authentication was implemented to enhance security within an organizational network, future versions could benefit from integrating Google Authentication. This method offers cross-platform accessibility, multi-factor authentication (MFA), and seamless cloud integration, providing greater flexibility for external participants. However, reliance on third-party authentication services also raises concerns regarding data privacy and compliance with organizational policies. A hybrid authentication model, combining Windows Authentication for internal users and Google Authentication for external attendees, could provide a balanced approach to security and usability.

#### V. DISCUSSION

The proposed design has been evaluated in comparison with existing solutions in the market and academic literature, allowing for the identification of its main advantages and areas for improvement. Unlike other implementations, this proposal stands out for its lower cost and integration of new technologies to facilitate future cloud migration. The analysis highlighted key strengths such as ease of use, scalability, and interoperability, while also revealing areas for optimization, particularly in compatibility.

During the design phase, several limitations were identified that influenced the feasibility of the project. These included hardware restrictions, compatibility issues with existing platforms, and the need for high processing capacity. Such constraints posed significant challenges, requiring modifications to the initial project plan. Additionally, various obstacles, including regulatory barriers and infrastructure compatibility, prevented the full implementation of the solution at this stage. These challenges underscore the importance of thorough planning and the exploration of alternative approaches for future iterations.

Beyond the academic context of Universidad Don Bosco, where a controlled environment and specialized staff may ease implementation, the scalability and adaptability of the system in other sectors pose new challenges. For instance, deploying the system in public institutions may involve budget constraints, limited IT infrastructure, or resistance to change in technological practices. In contrast, private enterprises might require strict compliance with security and data privacy standards before adopting such solutions. In rural or low-resource aquaculture environments, connectivity issues and lack of technical support could hinder real-time monitoring and system

maintenance. Therefore, analyzing the socio-technical conditions, organizational readiness, and sector-specific regulations is crucial to assess the broader viability of this technology. Incorporating these considerations would enrich the relevance and practical contribution of the project, paving the way for tailored adaptations across diverse implementation settings.

An important aspect considered in the development process was the selection of a robust authentication mechanism. While Windows Authentication was implemented to enhance security within an organizational network, future versions could benefit from integrating Google Authentication. This method offers cross-platform accessibility, multi-factor authentication (MFA), and seamless cloud integration, providing greater flexibility for external participants. However, reliance on third-party authentication services also raises concerns regarding data privacy and compliance with organizational policies. A hybrid authentication model, combining Windows Authentication for internal users and Google Authentication for external attendees, could provide a balanced approach to security and usability.

## VI. CONCLUSION AND FUTURE WORK

The presented design represents an innovative solution for the management and control of attendance at events, integrating automation, connectivity and data analysis in real time. Its implementation has the potential to generate a significant impact in areas that manage events, by offering improvements in process optimization, cost reduction, and greater precision in decision making. Although there are still aspects to be improved, the results obtained so far indicate that this proposal is viable and represents a promising alternative within its field of application.

The implementation of this solution could bring multiple benefits, such as improved accessibility to information and greater efficiency in production processes. In addition, its modular and scalable design allows its adaptation to different scenarios and needs, expanding its applicability and relevance in different contexts.

To complete the development and implementation of the solution, a series of steps have been identified to improve its functionality and applicability. First, it is necessary to optimize the prototype, fine-tuning both hardware and software to improve its efficiency and stability. Subsequently, experimental validation in real environments is required to evaluate its performance under practical conditions and make the necessary adjustments according to the results obtained.

Another key aspect is to address the limitations detected in the design phase, such as compatibility with other technologies. This will improve the overall performance of the system and ensure its effectiveness in the intended application. In addition, the exploration of technological alternatives that can further enhance the solution, including the use of emerging tools and innovative methodologies, is considered.

These steps will ensure that the design moves towards a successful implementation, ensuring its viability and maximizing its impact in the area of application. With these improvements



and strategies, the project can evolve into a consolidated and effective solution within the field for which it was designed.

A key area for future discussion is the integration of hybrid authentication mechanisms to enhance security and accessibility. While Windows Authentication has been implemented for internal users, exploring a combination of authentication methods—such as Google Authentication for external attendees—could improve flexibility and user experience. Future iterations should also analyze the impact of third-party authentication services on data privacy, regulatory compliance, and system scalability. Additionally, further research is needed to evaluate the feasibility of migrating the system to a cloud-based infrastructure, ensuring higher availability, real-time data synchronization, and improved performance across diverse platforms.

To further improve accessibility, compliance with WCAG (Web Content Accessibility Guidelines) should be considered, ensuring that individuals with disabilities can navigate and interact with the system effectively. Features such as keyboard navigation, alternative text for images, and adjustable font sizes contribute to a more inclusive experience. Additionally, incorporating real-time data visualization tools, such as dashboards displaying attendance trends and event analytics, can provide valuable insights for organizers, helping them optimize event planning and execution. By integrating these UI/UX principles, the system can deliver a seamless and efficient experience for all users, maximizing engagement, usability, and overall event success.

#### REFERENCES

- [1] D. S. Silva. "Transformación digital en la organización de eventos: Claves para innovar y optimizar el proceso." Accessed: 12-Feb-2025. (2025), [Online]. Available: https://www.danielasanchezsilva.com/post/transformaci%C3%B3n-digital-en-la-organizaci%C3%B3n-de-eventos-claves-para-innovar-y-optimizar-el-proceso.
- [2] M. R. González, "Innovación tecnológica: Eventos inmersivos," Trabajo de Fin de Grado, Universidad Rey Juan Carlos, Campus de Vicálvaro, España, 2024.
- [3] Á. R. Alguacil, "Sistema de control de aforos en eventos mediante tecnología móvil con servicios de seguridad," Proyecto de Fin de Máster, Universidad Politécnica de Madrid, Escuela Técnica Superior de Ingenieros Informáticos, España, 2023.
- [4] D. S. Silva. "La importancia de la seguridad en eventos masivos." Accessed: 12-Feb-2025. (2025), [Online]. Available: https://www.danielasanchezsilva.com/post/importancia-de-la-seguridad-en-eventos-masivos.
- [5] Faster Capital. "Análisis de eventos: Cómo utilizar datos y análisis para optimizar su estrategia de eventos." Accessed: 12-Feb-2025. (2024), [Online]. Available: https://fastercapital.com/es/contenido/Analisis-de-eventos-como-utilizar-datos-y-analisis-para-optimizar-su-estrategia-de-eventos.html.
- [6] M. T. Gallego, Metodología scrum, 2012.

- [7] A. Vázquez. "Scrum's product owner survival guide." Accessed: 17-Feb-2025. (2022), [Online]. Available: https://alejandro-vazquez.medium.com/scrums-product-owner-survival-guide-95d7af2334da.
- [8] Figma. "Figma: The collaborative interface design tool." Accessed: 12-Feb-2025. (2025), [Online]. Available: https://www.figma.com.
- [9] Laravel. "Laravel 11.x documentation." Accessed: 13-Feb-2025. (2024), [Online]. Available: https://laravel.com/docs/11.x/readme.
- [10] PHP. "Php manual." Accessed: 13-Feb-2025. (2025), [Online]. Available: https://www.php.net/.
- [11] E. B. Pantoja, "El patrón de diseño modelo-vistacontrolador (mvc) y su implementación en java swing,"

  Acta Nova, vol. 2, no. 4, pp. 493–507, 2004, Accessed:
  13-Feb-2025. [Online]. Available: http://www.scielo.
  org.bo/scielo.php?script=sci\_arttext & pid = \$168307892004000100005&lng=es&tlng=es.
- [12] Oracle. "¿qué es mysql?" Accessed: 13-Feb-2025. (2025), [Online]. Available: https://www.oracle.com/es/mysql/what-is-mysql/.
- [13] Google Developers. "Google identity platform." Accessed: 17-Feb-2025. (2024), [Online]. Available: https://developers.google.com/identity.
- [14] S. Pati, S. Bhanja, A. Majumder, S. Sahu, S. Banerjee, and G. Sen, "A novel qr code based smart attendance tracking system," in 2023 7th International Conference on Electronics, Materials Engineering & Nano-Technology (IEMENTech), Kolkata, India, 2023, pp. 1–4. DOI: 10.1109/IEMENTech60402.2023.10423485.
- [15] P. Rajesh, M. Selvadurai, V. S. Selvamani, and P. Chandrasekar, Fundamentals of UX/UI (An Approach to Design Principles). 2022, ISBN: 9789391303389. DOI: 10.47715/JPC.B.87.2022.9789391303389.

