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QR Pass Utility Revolutionizing Event Management

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Abstract - This project aims to solve the challenges associated with propagating information and to streamline traditional event management procedures, eliminating issues such as excessive paperwork and extended registration queues. The core objective of this endeavor is to develop an Android application that empowers users to efficiently manage their event participation. This includes tasks such as reserving event seats and simplifying on-site registration processes. A key innovation in this application is the utilization of QR code technology to provide secure and convenient participant identity verification during events, marking a significant advancement in the field of event management

Key Words: QR Codes/QR Authentication, Attendance Management/Real-time Analytics, Mobile App/User-friendly, Technology Integration/Event Optimization/Innovation

1. INTRODUCTION

In an era characterized by technological advancements and an ever-growing demand for efficient and streamlined processes, traditional attendance management systems have encountered the need for transformation. The QR-Based Event Access and Attendance System represents a significant leap forward in the field of attendance management and event access control. This innovative project harnesses the power of React.js and Native JavaScript to offer an integrated, reliable, and user-friendly solution for tracking attendance and managing event access.

QR (Quick Response) codes have emerged as a symbol of efficiency and convenience in the digital age, and their utilization in this project exemplifies the fusion of modern technology with the practical requirements of event management. By generating unique QR codes for event attendees, this system not only facilitates seamless access but also contributes to the larger realm of data-driven decision-making through real-time analytics.

The core aim of this project is to modernize the conventional approach to attendance management by introducing a technologically advanced yet user-friendly solution. This not only streamlines the event check-in process but also elevates the overall event experience, benefiting both event organizers and attendees. The potential for further development and broader adoption of the system underscores its significance and relevance in the ever-evolving landscape of event technology. This research paper explores the development, implementation, and potential impacts of the QR-Based Event Access and Attendance System, shedding light on the opportunities it presents for efficient event management.

2. RELATED TECHNOLOGY

2.1. React Js

React.js is an open-source JavaScript library developed by Facebook for building dynamic user interfaces. Its virtual DOM system ensures rapid updates to data without full page reloads, resulting in a seamless user experience. With a component-based architecture, React simplifies the development process by breaking interfaces into reusable, self-contained units. Its extensive ecosystem of libraries and extensions offers developers a wide range of tools. React.js is widely used for creating high-performance web applications, making it a crucial technology in modern web development.

2.2. Native JavaScript

Native JavaScript refers to the core programming language used for web development without the incorporation of additional frameworks or libraries. It is the fundamental scripting language supported by web browsers, allowing developers to create interactive and dynamic web applications. Native JavaScript empowers developers to manipulate HTML and CSS elements, handle user interactions, and manage data, resulting in a seamless and responsive user experience. Unlike frameworks, Native JavaScript offers complete control over the development process, making it a versatile tool for building a wide range of web applications. Its significance lies in its ability to execute code directly in the user's browser, reducing the need for server-side processing and enhancing the performance and interactivity of web applications.

2.3. QR Code Technology

QR Code (Quick Response Code) technology is a two-dimensional barcode system that has gained widespread recognition for its efficiency and versatility. Developed in Japan, QR Codes have evolved into a powerful tool for encoding information in a compact, visually appealing format. These square-shaped codes can store a variety of data, from URLs and contact information to product details and event access. QR Codes have become an integral part of modern technology, providing a quick and convenient means for users to access information with a simple scan using their smartphones. Their applications extend to marketing, logistics, ticketing, and more, making QR Code

technology an essential element in enhancing accessibility and data sharing in today's digital age.

2.4. MySQL Database

MySQL is the most widely-used open source SQL database management system, is developed, distributed, and supported by Oracle Corporation. Database Management System such as MySQL server is needed in order to add, access, and maintain data stored in a database which is a structured collection of data.

3. SYSTEM ANALYSIS AND DESIGN

3.1. System Architecture

This application system consists of two main components which are front-end system and back-end system as shown in figure 1.

A. The Front-end System is the information-displaying section which queries the data from the remote database and also able to send data to be stored in the database. Moreover, the staff side front-end system will send the participant information to the server to verify their identity.

B. The Back-end System is the database management section which always interacts with the front-end system. Additionally, it will send the required data to the front-end system whenever the request is sent.

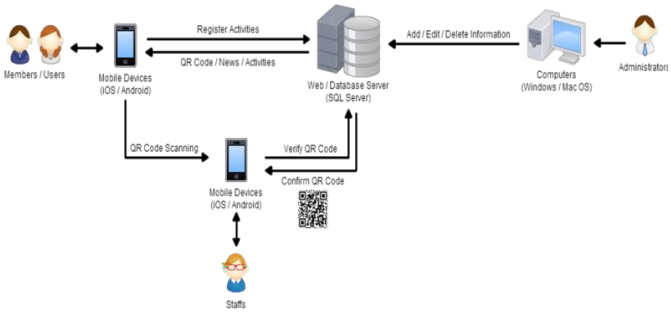

Figure 1: System Architecture

3.2. System Structure

This application consists of six main modules which are Authentication System, Member Management System, Registration Management System, Event Management System, Data analysis and Report system, and Administrator Management System.

A. Authentication System: provides security to the whole system by allowing only authorized members to have the right to utilize the preserved features.

- **Member Registration System:** a system which allows user to be able to register and become a member.
- **Log-in System:** a system which allows member to be able to log into the application and access the preserved area.

B. Member Management System: manages members in the back-end system and personal profile adjustment for front-end users.

C. Data Analysis and Report System: manages information of event news in the back-end system and show it in the front-end.

D. Event Management System: a system which manages information of an event.

- **Show Event:** a system which shows event in the interface.
- **Add Event:** a system which allows administrator to be able to add a new event into the database.
- **Edit Event:** a system which allows administrator to edit event information in the database.
- **Delete Event**: a system which allows administrator to be able to delete event information in the database.
- **Event Registration System**: a system which allows member to be able to reserve their seats in the upcoming events.
  - **QR Code Generation:** a system which generates a unique QR code for each participant in each event.
  - **QR Code Verification:** a system which verifies participant from their QR code.

E. Project Ideas Management System: manages information of Project Ideas which are the research topics that provided for university students in the back-end system and show it in the front-end.

F. Administrator Management System: manages the right of administrators according to the priority.

3.3. DataFlow

The data flow of this system is explained in the figure Unauthorized user can provide their information to register as a new member. Members can reserve event participation and receive a unique QR code. Administrators provide information to the system. Lastly, Coordinator can scan QR code at the event site and get verification of participants.

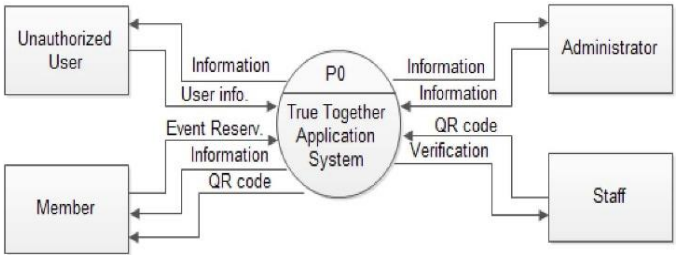

Figure 2: Data Flow Diagram

3.4. User Interface and Layout Design

The examples of the application's user interface are displayed in the figure 3.

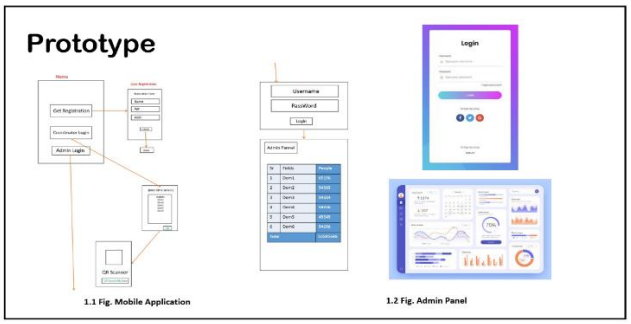

Figure 3: Design and Prototype

4. IMPLEMENTATION

This application is an android application working simultaneously with database implemented by MySQL Server. This application has two main components which are front-end and back-end system.

- **The Front-end system** is the information-displaying section which queries the data from the remote database in JSON format then displays it in human language.
- **The Back-end system**, a web application implemented by Node js and API write in PH0P using CodeIgniter, is the database management section which allows administrators to be able to manage information in the database and application

More importantly, this application uses QR code to verify the participant's identity and confirm participation with just one scan which will provide more convenience to everyone involved.

5. RESULTS AND DISCUSSION

This application is aimed to solve the problems of the slow traditional event-registration procedure, so we performed a test by simulating a scene of 10 participants register into an event using this application and another one which did not then compared the result between these two cases. The result is shown in the table below.

Table 1. Comparison of two cases

	Time (minutes)
This application	0.20
Traditional procedure	1.31
Note: This test was performed by only one event coordinator, in the real situation it can be more than one.	

We opted for a benchmarking approach to assess the application's performance and validate its efficiency, effectiveness, user-friendliness, responsiveness, and overall ease of use. Our test group consisted of individuals who are proficient in smartphone usage, representing the typical user demographic. During the assessment, we assigned specific tasks to each participant and recorded the time it took to accomplish these tasks. Additionally, any comments or feedback provided by the participants will be integrated into our ongoing development plan to enhance the application further. The comprehensive test results are presented in the following tables.

Table 2: Member Registration Task

Task 1: Member registration		
Detail: A task for users to fill in their information into the required fields and receive a new member account.		
Expected time: Less than 60 seconds		
Users	**Time (seconds)**	**Comments**
1	**45**	**-**
2	**40**	**-**
3	**55**	**-**
4	**30**	**-**
5	**35**	**-**
Conclusion result: All testers were able to accomplish the task within the expected time.		

Table 3: Event Registration Task

Task 2: Event registration (QR code scanning)		
Detail: A task for event coordinator to scan QR code of each participant and confirm their participation.		
Expected time: Less than 5 seconds		
Users	**Time (seconds)**	**Comments**
1	**0.50**	**-**
2	**1**	**-**
3	**0.30**	**-**
4	**2**	**-**
5	**0.60**	**-**
Conclusion result: All testers were able to accomplish the task within the expected time.		
Note: Event Coordinator is able to use any QR code scanner but have to log into the system as a coordinator before scan any QR code.		

6. CONCLUSION

This application is designed to tackle the issues related to the dissemination of information and to meet the user's demands. Additionally, it provides comprehensive event information for easy user access and event participation management. What's more, this application offers universal accessibility, allowing users to utilize it anytime and from anywhere. The incorporation of QR codes further enhances the convenience of event management by simplifying authentication with a single scan.

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REFERENCES

[1] Nazim Ibragimov, (ICECCO 2019) "Perspectives of Integration QR Codes and RFID readers in large-scale events controlled by HRM." International Conference on Electronics Computer and Computation
[2] Phanuphong Hathaiwichian, (ICT-ISPC2014) "Android Application for Event Management and Information Propagation." Third ICT International Student Project Conference
[3] React.js Library: https://react.dev/
[4] Native JavaScript: https://developer.mozilla.org/en-US/docs/Web/JavaScript
[5] QR Code Technology: https://www.qrcode.com/en/
[6] Android Development: https://developer.android.com/