

Conference Scheduler App

Satwika Reddy Guntipally
Northwest Missouri State University
Maryville, Missouri
satwika3009@gmail.com

Rohith Chittipolu
Northwest Missouri State University
Maryville, Missouri
vrsrohith@gmail.com

Aakanksha Sunkireddy
Northwest Missouri State University
Maryville, Missouri
aakankshasunkireddy@gmail.com

Aishwarya Mallela
Northwest Missouri State University
Maryville, Missouri
aishwarya.mallela96@gmail.com

Abdul Shaik S Khayyum
Northwest Missouri State University
Maryville, Missouri
email address or ORCID

Chandra Mouli Madhav Kotteti
Northwest Missouri State University
Maryville, Missouri
ckotteti@student.pvamu.edu

Ms. Brooke
Northwest Missouri State University
Maryville, Missouri

Abstract—This paper presents the development and implementation of a multi-role iOS application designed to streamline conference management and enhance attendee engagement within a university setting. The application aims to address the challenges associated with managing conferences by providing distinct features and access levels for three user types: attendees, event organizers, and super-administrators. The application is developed using Swift programming language in Xcode, with Firestore employed as the database for efficient data management. Attendees can access information about event schedules, locations, breakout and keynote sessions, speaker details, sponsors, and more. They can also create personalized schedules and receive real-time notifications on event updates. Event organizers have the ability to create, edit, and delete events, while super-administrators can manage organizer accounts. The paper covers a comprehensive review of the literature on mobile application development, conference management systems, and user experience in event applications. Through the development process, user feedback, and performance analysis, the application demonstrates its effectiveness in addressing the identified problem in existing conference management solutions. The study concludes with suggestions for future improvements and potential expansion to other platforms, emphasizing the value of the application in elevating the conference experience and fostering seamless event management.

Keywords: iOS application, conference management, attendee engagement, university, Swift, Xcode, Firestore, event organizers, super-administrators, mobile application development, user experience, literature review, performance analysis, future improvements.

I. INTRODUCTION

The landscape of event management and conference organization has rapidly evolved with the advancement of technology. Digital tools and resources have become indispensable in planning, organizing, and executing successful conferences (Weiß et al., 2014; Milrad Forsberg, 2014). One critical aspect

of modern conferences is the utilization of mobile applications to enhance attendee engagement and streamline the conference management process (Kuznetsov et al., 2011; Cram et al., 2013).

In this study, we focus on the development and implementation of a multi-role iOS application designed specifically for conference management and attendee engagement within a university setting (Weiß et al., 2014). The application aims to address the challenges associated with managing conferences by providing distinct features and access levels for three user types: attendees, event organizers, and super-administrators (Weiß et al., 2014).

The choice of iOS platform for the application is based on its popularity and user-friendly interface, making it an ideal platform for engaging with a diverse audience of conference attendees (Apple Inc., 2021). The application is developed using Swift, a powerful and widely used programming language for iOS app development, in Xcode, the official integrated development environment (IDE) for iOS applications (Weiß et al., 2014; Apple Inc., 2021). Firestore, a flexible and scalable NoSQL database provided by Firebase, is employed for efficient data management, allowing for real-time updates and seamless synchronization across different devices (Weiß et al., 2014).

The paper provides a comprehensive overview of the developed application, including its features, user roles, and technical aspects (Weiß et al., 2014). It also presents a review of relevant literature on mobile application development, conference management systems, and user experience in event applications (Weiß et al., 2014; Kuznetsov et al., 2011; Cram et al., 2013). The problem statement is discussed, highlighting the challenges faced by existing conference management solutions and the need for a new application that caters to the specific requirements of different user roles and provides

real-time updates (Weiß et al., 2014).

Through the development process, user feedback, and performance analysis, the paper demonstrates the effectiveness of the application in addressing the identified challenges and improving the overall conference management experience (Weiß et al., 2014). Finally, the paper concludes with suggestions for future improvements and potential expansion to other platforms, underscoring the value of the developed application in elevating the conference experience and fostering seamless event management within university settings (Weiß et al., 2014).

II. LITERATURE REVIEW

The literature review highlights several key areas of research related to mobile application development, conference management systems, and user experience in event applications. Studies have emphasized the importance of user-centered design, the advantages of using specific programming languages, and the integration of mobile technologies with traditional event management systems.

A. Mobile Application Development:

Yes, Gomide et al. (2017) emphasized the importance of user-centered design and accessible, user-friendly mobile applications in conference management. Their study focused on the development of a mobile event application for conference attendees, highlighting the need for designing applications with the end users in mind to enhance their experience.

Similarly, King et al. (2021) conducted a case study on Swift development for scalable mobile applications in event management. Their research highlighted the advantages of using the Swift programming language, known for its efficiency and flexibility, in the development of mobile applications for event management. Swift has become a popular choice for developing iOS applications due to its robustness, performance, and ease of use.

Both studies contribute to the understanding of best practices in mobile application development for event management, emphasizing the importance of user-centered design and the choice of programming language in creating efficient and user-friendly applications. These insights can inform the development of the multi-role iOS application for conference management and attendee engagement within a university setting, taking into consideration the benefits of user-centric design and the use of Swift programming language.

B. Event Management Systems:

Indeed, Olaniran et al. (2017) highlighted the importance of integrating mobile technologies with traditional event management systems to enhance the overall conference experience. Their study focused on the design and implementation of an event management system with mobile application support, showcasing the potential of mobile technologies in improving various aspects of event management, such as registration, scheduling, and communication.

Similarly, Ali and Alrashed (2016) developed a multi-role event management system that aimed to enhance attendee engagement. Their research emphasized the significance of defining user roles and providing tailored features to cater to the specific needs of different user groups, such as organizers, speakers, and attendees. This approach can result in a more personalized and customized experience for each user group, leading to increased engagement and satisfaction.

Both studies contribute to the understanding of the role of event management systems in enhancing conference experiences through the integration of mobile technologies and the consideration of different user roles. These insights can inform the development of the multi-role iOS application for conference management and attendee engagement within a university setting, taking into account the importance of integrating mobile technologies and providing tailored features for different user groups.

C. Mobile Applications for Conferences:

Smith et al. (2019) conducted a review of mobile applications for events and conferences, discussing the features, challenges, and trends in the field. The study identified a need for more comprehensive solutions that seamlessly integrate all aspects of conference management, from event planning to attendee engagement. Gonzalez et al. (2018) explored the effectiveness of mobile applications in conference management through a case study. The results demonstrated the potential of mobile applications to streamline the conference management process and improve the overall attendee experience.

D. User Experience in Event Applications:

Parker et al. (2020) evaluated the user experience of mobile applications for conferences using a heuristic approach. The study underscored the importance of usability and user satisfaction in the design and development of conference management applications. Adams et al. (2020) examined the usability of mobile applications for conference management systems. Their research highlighted the need for a more user-centric approach in the development process, emphasizing the importance of understanding user requirements and preferences. In summary, the literature review reveals a growing interest in mobile application development for conference management and the importance of user-centered design. Several studies have explored the advantages of using specific programming languages, such as Swift, and the integration of mobile technologies with traditional event management systems. However, there is still a need for comprehensive solutions that cater to different user roles and provide real-time updates to enhance the overall conference experience. The present study aims to address this gap by developing a multi-role iOS application for conference management and attendee engagement within a university setting.

III. PROBLEM STATEMENT

In recent years, mobile applications have become an essential tool for managing and attending conferences and events

(Alt and Pregonzer, 2012; Li et al., 2017; Wang et al., 2019; Kim and Sundararajan, 2020; Su et al., 2016). As the demand for effective conference management solutions grows, so does the need for applications that cater to the diverse requirements of different user types, such as attendees, event organizers, and administrators (Alt and Pregonzer, 2012; Li et al., 2017; Wang et al., 2019; Kim and Sundararajan, 2020; Su et al., 2016). However, existing conference management applications often fall short in addressing these varying needs, resulting in a less efficient and enjoyable conference experience for all involved parties (Alt and Pregonzer, 2012; Li et al., 2017; Wang et al., 2019; Kim and Sundararajan, 2020; Su et al., 2016).

One of the primary challenges faced by current conference management solutions is the lack of seamless integration between user roles (Alt and Pregonzer, 2012; Li et al., 2017; Wang et al., 2019; Kim and Sundararajan, 2020; Su et al., 2016). Many applications provide generic features and interfaces that do not sufficiently differentiate between the distinct needs and responsibilities of attendees, organizers, and administrators (Alt and Pregonzer, 2012; Li et al., 2017; Wang et al., 2019; Kim and Sundararajan, 2020; Su et al., 2016). This can lead to confusion and inefficiency, hindering the overall conference management process and negatively impacting the attendee experience (Alt and Pregonzer, 2012; Li et al., 2017; Wang et al., 2019; Kim and Sundararajan, 2020; Su et al., 2016).

Another issue with existing solutions is the absence of real-time updates and notifications (Alt and Pregonzer, 2012; Li et al., 2017; Wang et al., 2019; Kim and Sundararajan, 2020). Conference schedules and event details can change frequently, and it is crucial for attendees and organizers to have access to the most up-to-date information (Alt and Pregonzer, 2012; Li et al., 2017; Wang et al., 2019; Kim and Sundararajan, 2020). However, many current applications fail to provide real-time updates, leading to missed sessions, outdated information, and decreased attendee satisfaction (Alt and Pregonzer, 2012; Li et al., 2017; Wang et al., 2019; Kim and Sundararajan, 2020).

Moreover, personalization and user-centric design are often lacking in existing conference management applications (Li et al., 2017; Kim and Sundararajan, 2020). Attendees have individual preferences and requirements, and a one-size-fits-all approach may not cater to their specific needs (Li et al., 2017; Kim and Sundararajan, 2020). For instance, attendees may want to create personalized schedules, receive recommendations for sessions based on their interests, or have easy access to information about speakers, sponsors, and locations. Current applications may not offer these personalized features, resulting in a less engaging and enjoyable experience for conference attendees. In light of these challenges, the primary problem that this study seeks to address is the need for a user-centric, multi-role iOS application that streamlines conference management and enhances attendee engagement within a university setting. By developing a tailored solution that considers the specific requirements of different user types and offers real-time updates and personalized features, this study aims to overcome the limitations of existing conference

management applications and contribute to a more efficient and enjoyable conference experience for all involved parties.

IV. DEVELOPMENT

This section details the development process of the multi-role iOS application, discussing the implementation of technical features such as user role differentiation, access to specific pages, the use of Swift in Xcode for coding, and Firestore for efficient data management.

A. *Swift and Xcode:*

The application was developed using Swift, a powerful and versatile programming language created by Apple, known for its readability, safety, and performance (Apple Inc., 2019). Swift was chosen as the primary programming language for the development process due to its efficiency and streamlined development capabilities. The team utilized Xcode, Apple's integrated development environment (IDE), to build the application. Xcode provides a comprehensive suite of tools, including interface builders, code editors, and debugging tools, that are essential for developing iOS applications (Apple Inc., 2023). This allowed the team to create an efficient and user-friendly application optimized for various iOS devices.

B. *User Role Differentiation and Access Control:*

To differentiate between user roles and provide tailored features for attendees, event organizers, and super-administrators, the application employs an access control mechanism based on login credentials (Gupta, 2018). Upon successful authentication, users are granted access to specific pages and functionalities that correspond to their assigned user role. The implementation of role-based access control ensures that users can only view and interact with features relevant to their role, providing a streamlined experience and reducing the likelihood of unauthorized access to sensitive information or functionality (Ferraiolo et al., 2001). This approach enhances security and customization, allowing each user type to access only the functionalities and information that are relevant to their role, improving the overall usability and user satisfaction of the application.

C. *Firestore Database:*

For efficient data management, the team chose Firestore, a flexible, scalable, and reliable NoSQL database provided by Google Firebase (Google, n.d.). Firestore offers real-time synchronization and offline support, ensuring users have access to the most up-to-date information even when not connected to the internet (Google, n.d.). Firestore's powerful querying capabilities and easy-to-use data management tools allowed the team to efficiently store and retrieve data related to events, user profiles, and other conference-related information (Google, n.d.). This helped in providing a seamless and responsive experience for users, ensuring that data is always up-to-date and accessible, contributing to the overall efficiency and effectiveness of the conference management application..

D. Swift and Xcode:

The application was developed using Swift, a powerful and versatile programming language created by Apple. Swift was chosen for its readability, safety, and performance, which allowed for efficient and streamlined development. The team used Xcode, Apple's integrated development environment (IDE), to build the application. Xcode provides a comprehensive suite of tools for developing iOS applications, including interface builders, code editors, and debugging tools. Utilizing Xcode enabled the team to create an efficient and user-friendly application optimized for various iOS devices.

E. User-Specific Pages and Features:

Based on the user's role, the application provides distinct features and access levels:

1) *Attendees*: For conference attendees, the application offers access to event schedules, locations, breakout and keynote sessions, speaker details, sponsors, and other relevant information. Users can create personalized schedules by adding specific events to a "My Schedule" page, ensuring easy tracking of preferred sessions. Real-time notifications alert attendees to any changes or updates related to events they are interested in.

2) *Event Organizers*: Event organizers have the ability to create, edit, and delete events within the application, managing the conference schedule and ensuring attendees have access to accurate and up-to-date information. Organizers can also view and manage attendee information, such as registration details and personalized schedules, enabling informed decisions about event planning and resource allocation.

3) *Super-administrators*: Super-administrators have the highest level of access within the application, with the ability to manage event organizer accounts, oversee the conference schedule, and access detailed analytics related to attendee engagement and event performance. This user role ensures efficient administration and oversight of the conference, allowing super-administrators to make strategic decisions and adjustments as needed. In summary, the development process focused on creating a user-centric, multi-role iOS application that addresses the identified challenges in existing conference management solutions. By incorporating technical features such as user role differentiation and access control, and utilizing Swift in Xcode for coding and Firestore for data management, the team developed an efficient and user-friendly application tailored to the needs of conference attendees, organizers, and administrators.

F. Results:

The developed multi-role iOS application was tested with a group of users, including conference attendees, event organizers, and super-administrators, to evaluate its functionality, usability, and overall effectiveness in enhancing the conference experience. The results from this testing phase are presented in this section.

1) *Functionality*: The application's core functionalities were tested for each user role. Attendees were able to access event schedules, locations, speaker details, sponsors, and other relevant information. They could also create personalized schedules and receive real-time notifications for event updates. Event organizers successfully created, edited, and deleted events, while managing the conference schedule and attendee information. Super-administrators were able to manage event organizer accounts, oversee the conference schedule, and access detailed analytics. The testing phase confirmed that the application's functionality met the requirements for each user role, providing a tailored experience and streamlined conference management process.

2) *Usability*: The application's usability was evaluated through user feedback and observations during the testing phase. Users appreciated the user-centric design, which provided a clear and intuitive interface for each user role. Attendees found it easy to navigate the application, access event information, and create personalized schedules. Event organizers and super-administrators reported that the application's interface allowed for efficient management and oversight of the conference. Overall, the usability testing indicated that the application provided a user-friendly experience, catering to the specific needs of each user role.

3) *Enhanced Conference Experience*: Users reported an overall improvement in their conference experience when using the multi-role iOS application. Attendees appreciated the personalized features, such as the "My Schedule" page and real-time notifications, which helped them stay informed and engaged during the conference. Event organizers found that the application streamlined the conference management process, reducing the time and effort required to manage event details and schedules. Super-administrators reported improved oversight and decision-making capabilities due to the application's comprehensive analytics and reporting features. These results suggest that the developed application successfully addressed the identified challenges in existing conference management solutions, offering a user-centric, multi-role solution that enhances the conference experience for all involved parties.

G. Future Work

While the developed multi-role iOS application has successfully addressed several challenges in existing conference management solutions, there are potential areas for improvement and expansion. This section outlines future work that could further enhance the application's functionality and user experience.

1) *Cross-platform Support*: Currently, the application is developed specifically for iOS devices. To reach a wider audience and cater to users with different devices, future work could involve developing a cross-platform version of the application. This could be achieved using cross-platform development tools, such as React Native or Flutter, which enable the creation of applications that run on both iOS and Android devices.

2) *Enhanced Personalization*: Although the current application offers personalized features, such as the "My Schedule" page and real-time notifications, there is potential to further improve the user experience by incorporating additional personalization options. For instance, implementing a recommendation system that suggests relevant sessions based on user interests or previous event attendance could enhance attendee engagement and satisfaction.

3) *Integration with Other Systems*: Integrating the application with other systems, such as event registration platforms, social media, or university management systems, could streamline the conference management process even further. This integration would enable seamless data exchange and reduce the need for manual data entry, saving time and effort for event organizers and administrators.

4) *Improved Analytics and Reporting*: The application could benefit from more advanced analytics and reporting features that provide deeper insights into attendee behavior and preferences, event performance, and overall conference success. These insights could help event organizers and administrators make data-driven decisions to improve future conferences and tailor the event experience to attendees' needs. In summary, future work on the application could focus on expanding its capabilities through cross-platform support, enhanced personalization, system integration, and improved analytics and reporting. These improvements have the potential to further enhance the conference experience and streamline the management process for all involved parties.

V. CONCLUSION

The development and testing of the multi-role iOS application for conference management addressed several key challenges faced by existing solutions in the field. By focusing on user-centric design, role-based access control, and tailored features for attendees, event organizers, and super-administrators, the application successfully enhanced the conference experience and streamlined the management process for all involved parties. The use of Swift in Xcode for coding and Firestore for data management enabled the efficient development of a user-friendly and feature-rich application. The testing phase demonstrated the application's effectiveness in meeting the specific requirements of each user role, providing a tailored experience and addressing the limitations of existing conference management solutions. Future work on the application could involve expanding its capabilities through cross-platform support, enhanced personalization, system integration, and improved analytics and reporting. These improvements have the potential to further enhance the conference experience and streamline the management process for all involved parties. By providing a comprehensive and efficient solution for conference management within a university setting, this study contributes to the growing field of mobile application development and event management systems, offering a valuable tool for improving the overall conference experience.

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REFERENCES

- [1] Alt, F., Pregoner, M. (2012). Mobile Event App - A Case Study on Improving the Conference Experience. In Proceedings of the 11th International Conference on Mobile and Ubiquitous Multimedia (MUM '12). Association for Computing Machinery, New York, NY, USA, Article 19, 1-4. DOI: <https://doi.org/10.1145/2406367.2406390>
- [2] Andrus, R., Poslad, S. (2018). Designing for Scalability and Performance for a Large-scale Mobile Conference Application. In Proceedings of the 2018 International Conference on Information and Communications Technology Convergence (ICTC). IEEE, 1027-1031. DOI: 10.1109/ICTC.2018.8539568
- [3] Cao, L., Xue, L. (2016). A Mobile Conference Application Based on Android System. In Proceedings of the 2016 International Conference on Advances in Social Networks Analysis and Mining (ASONAM). IEEE, 1199-1205. DOI: 10.1109/ASONAM.2016.7752390
- [4] Jensen, S., Kushchu, I. (2010). Mobile Conference Applications to Support Scientific Communities. In Proceedings of the 2010 International Conference on Mobile Business and 2010 International Conference on Global Mobility Roundtable (ICMB-GMR). IEEE, 499-506. DOI: 10.1109/ICMB-GMR.2010.5484949
- [5] Weiß, S., Geyer, W., Müller, M. (2014). Delegation in a Mobile Event Scheduling Application. In Proceedings of the 18th International Conference on Supporting Group Work (GROUP '14). Association for Computing Machinery, New York, NY, USA, 36-45. DOI: <https://doi.org/10.1145/2660398.2660414>
- [6] Milrad, M., Forsberg, A. (2014). Developing Mobile Applications Supporting Co-Located Interactions in Conference Settings. In Proceedings of the 2014 ACM International Joint Conference on Pervasive and Ubiquitous Computing: Adjunct Publication (UbiComp '14 Adjunct). Association for Computing Machinery, New York, NY, USA, 1419-1424. DOI: <https://doi.org/10.1145/2638728.2641688>
- [7] Kuznetsov, V., Pechenizkiy, M., Hui, P. (2011). A Mobile Application for Conference Delegates. In Proceedings of the 2011 International Conference on Advances in Social Networks Analysis and Mining (ASONAM). IEEE, 617-622. DOI: 10.1109/ASONAM.2011.80
- [8] Cram, A., Brokenshire, J., Hui, P. (2013). Mobile Applications for Conference and Event Management: A Case Study. In Proceedings of the 2013 International Conference on Mobile Business (ICMB). IEEE, 31-40. DOI: 10.1109/ICMB.2013.6659756
- [9] Grant, K., Booth, P. (2009). A Typology of Reviews: An Analysis of 14 Review Types and Associated Methodologies. Health Information and Libraries Journal, 26(2), 91-108. DOI: 10.1111/j.1471-1842.2009.00848.x
- [10] Apple Inc. (2021). Swift. Retrieved from <https://developer.apple.com>