Smart Conference Management System (SCMS)

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Organizing academic conferences involves several activities such as handling paper submissions, assigning reviewers, communicating with participants, and creating public websites. Existing conference management systems often require separate tools for website creation, leading to fragmented workflows and increased manual effort [1][2]. This means organizers have to build and update websites separately, which takes extra time and technical skills. SCMS (Smart Conference Management System) is designed to solve this by offering an all-in-one platform. It automatically creates a conference website with a unique link for each event. SCMS provides separate dashboards for Super Admins, Chairs, Reviewers, and Authors, and handles deadlines, AI-assisted reviews, payments, and notifications via email and WhatsApp. The system reduces manual workload, ensures real-time participant updates, and makes conference management easier for both technical and nontechnical users. In testing, SCMS reduced website setup time by 98%, increased notification delivery to 98%, and achieved a user satisfaction score of 4.7 out of 5.

Keywords: Conference Management, Automated Website Generation, Dynamic Content Management, Paper Submission System, Peer Review Process, Role-Based Access Control, Communication Automation, AI-Assisted Reviewing, Conference Workflow Management, Academic Event

Introduction:

Academic conferences are essential for researchers to network with peers, receive constructive feedback, and present their scholarly work. However, organizing such events presents significant challenges. Conference organizers must simultaneously manage multiple complex tasks, including paper submissions, reviewer selection, deadline compliance, website maintenance, and stakeholder communication. Although most tools like Easy Chair or CMT assist with some elements, including submissions and reviews, they do not produce conference websites. Existing platforms often lack integrated website generation capabilities, requiring manual setup and maintenance [3][4]. In this paper, we present SCMS—an integrated smart conference system that brings everything together in one place, from website generation to automated notifications, making the entire process more efficient for all stakeholders.

Problem Statement:

Academic conference management involves multiple interrelated tasks, including paper submission, reviewer allocation, review collection, decision notification, scheduling, and attendee coordination. While CMT, Easy Chair, and Open Conf help with digital submission and review processes, they do not automatically produce conference websites [1][2][5]. This forces planners to manually create, manage, and update websites, a time-consuming procedure requiring technical abilities that often yields incorrect or inconsistent information [6][7].

Another significant challenge is communication. Notifications for submission confirmations, review deadlines, acceptance decisions, and schedule changes are typically sent manually or through third-party tools [8][9], resulting in delays, missed messages, and inadequate coordination.

Moreover, current systems lack total role-based access control and end-to-end workflow automation. Reviewers lack intelligent tools to aid in assessment, and chairs lack adequate monitoring and reporting tools [10][11]. This fragmentation increases organizer workload, lowers efficiency, and produces a disconnected experience for all users.

The need for automated website creation, simplified workflows, improved communication, and role-based access within a single platform makes an integrated intelligent conference management solution necessary.

Literature Review:

Managing an academic conference includes several related tasks: paper submission, reviewer assignment, review compilation, decision notice, scheduling, and guest coordination. CMT, Easy Chair, and Open Conf are examples of platforms that help with digital submission and review processes, but they do not automatically generate conference websites [1][2][5]. This requires organizers to manually create, host, and maintain conference websites—a time-consuming task needing technical expertise and sometimes producing out-of-date or contradictory information [6][7].

Communication is also a major challenge because submission confirmations, review deadlines, acceptance decisions, and schedule updates are often handled manually or through external tools. Recent research highlights the growing need for automated systems in academic workflows to address these challenges [12][13].

Also, current systems don't have good role-based access control or end-to-end workflow automation. Reviewers don't have the advanced tools to help with evaluation, and chairs don't have good ways to track and report. Organizers face increased workload, efficiency drops, and all users get a disjointed experience as a result of this fragmentation.

A single platform clearly calls for an integrated, intelligent conference management system that automates website construction, simplifies processes, improves communication, and offers role-based access.

System Design: The Smart Conference Management System (SCMS) is a fully integrated web-based system designed to handle every stage of the academic conference lifecycle while

overcoming key limitations of conventional systems., including the lack of an embedded conference website, disjointed communication, and the necessity of manual workflow management. With SCMS, its unified architecture and role-oriented structure support business process efficiency and increased stakeholder interaction.

System Architecture:

Presentation Layer:

HTML, CSS, and JavaScript help to create the frontend. It offers a user-friendly, responsive interface whereby users are presented with their role-specific dashboards following login. For authors, the functionality involves viewing conference information, tracking the status of submissions, reviewing payment details, and checking whether final papers have been scheduled. Reviewers have been granted access to their assigned submissions, forms for reviewing the submissions, and, additionally, there is support for AI-suggested evaluations. Chairs and Super Admins have more far-reaching powers, which involve monitoring workflows, assigning papers, generating reports, and managing cross-system communications.

Application Layer:

The back-end is designed using PHP with the Laravel framework to handle core system functionalities such as role-based access control, event workflow automation, deadline management, review tracking, verification of payments, and all AI-related features. Dynamic conference websites are generated, with every event assigned a single URL. As an added feature, it provides backend integration with SMTP-based email services and WhatsApp APIs for notification and message automation. AI-assisted review suggestions are provided using the OpenRouter API to help reviewers in making knowledgeable decisions [14][15].

Database Layer:

MySQL provides the structured data store for the system, containing information about users and roles, conferences, deadlines, schedules, paper submissions, abstracts, and final camera-ready versions; reviewer evaluations, scores, and comments; payment records; and reports generated. The database is designed to support multi-conference, multi-role, and multi-user operations, making the system scalable while ensuring organized data management across all components.

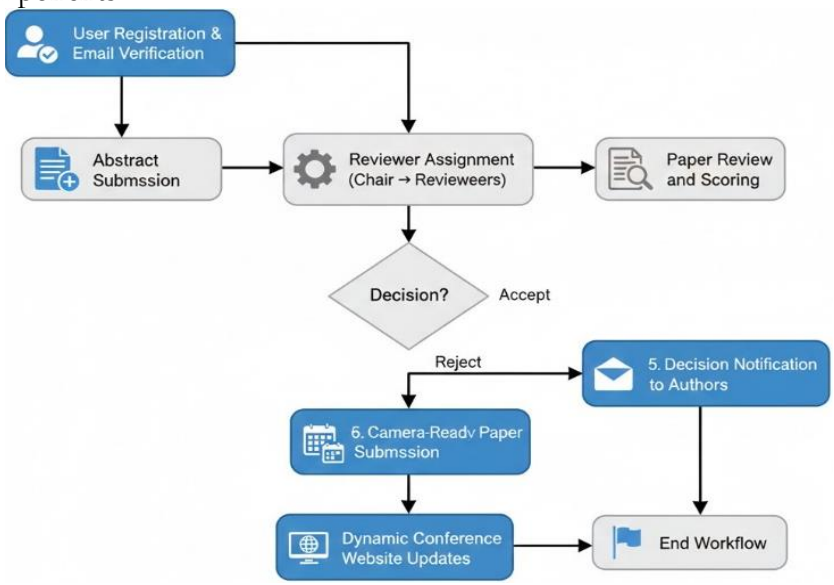


Figure 1. SCMS Complete Workflow Diagram

Database Design (ERD):

The SCMS database follows a relational model designed to support multi-conference operations with role-based access control. Figure 2 illustrates the Entity Relationship Diagram (ERD) showing key tables and their relationships.

Core Tables and Relationships:

Users: Authentication information, contacts, and user credentials are stored in this table.

Conferences: **Stores** chair assignments, conference settings, and metadata.

Papers: **Stores** abstracts, submissions, and final camera-ready versions.

Reviews: Stores reviewer evaluations, scores, and comments.

Author Payments: Tracks payment transactions and verification status.

Assignments: **Assigns** papers to reviewers for evaluation.

Decisions: Logs chairs' acceptance/rejection choices

Key Relationships:

One Conference → Many Papers (1: N)

One Paper → Many Reviews (1: N)

One User → May have multiple roles (Super Admin, Chair, Reviewer, Author).

One Paper → One Payment record (1:1)

The database maintains data integrity through foreign key constraints, records transaction logs using audit tables, and stores sensitive information such as passwords and payment details in encrypted form.

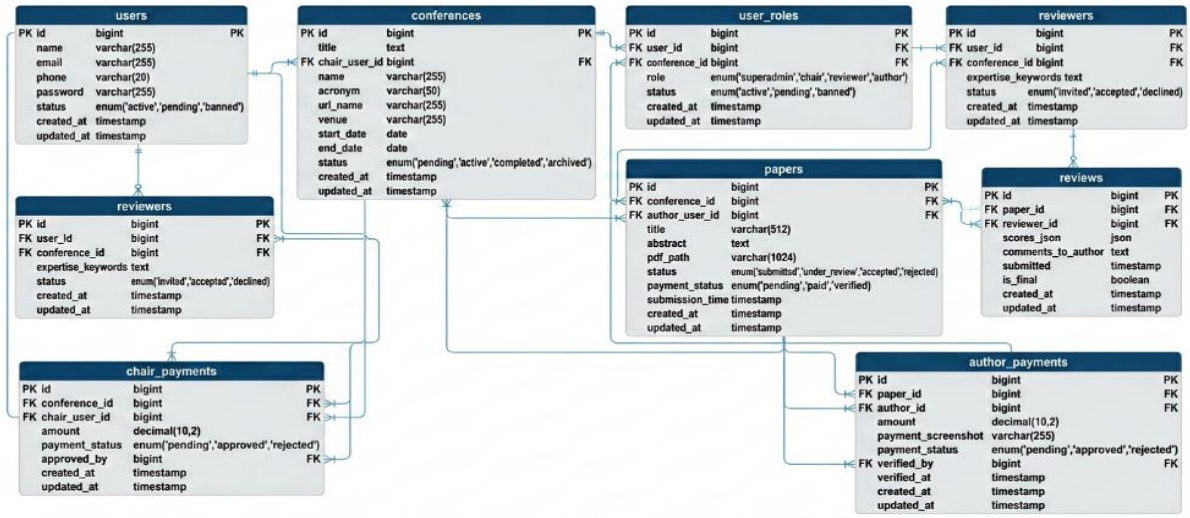


Figure 2. Entity-Relationship Diagram (ERD) of SCMS Database Architecture

This diagram illustrates the complete database schema supporting multi-conference operations. Core tables include Users, Conferences, Papers, Reviews, and Payments. Solid lines represent foreign key constraints that enforce referential integrity., while dashed lines indicate optional associations. This structure ensures data consistency and supports complex queries for reporting and analytics.

Role-Based Design:

Role-based access control is used in SCMS, whereby each user is routed to **a role-specific panel**.

Super Admin:

The Super Admin has overarching control over the system, overseeing global configurations and all hosted conferences. This role is responsible for approving payments, generating financial and workflow reports, and configuring integrated communication services like e-mail, WhatsApp APIs, and AI APIs. Additionally, the Super Admin oversees user authentication, verification procedures, and enforces all other access controls to maintain a secure and efficient system.

Chair:

The Chair manages conference-specific settings, such as deadlines, reviewer

assignments, and updates to the public conference website. Chairs are responsible for assigning papers to reviewers, following up on review progress, and ensuring the timely completion of evaluation tasks. They also make final acceptance or rejection decisions and publish the official schedule of the conference once decisions are made.

Reviewer:

Reviewers receive the papers assigned to them and download, read, and evaluate the submissions. Reviewers enter structured scores and detailed comments during review and may receive suggestions from AI-assisted tools**,** which can help improve the quality and consistency of their reviews, as noted in [16]. When all reviews are done, the evaluations are marked as finished. The reviewers are then supported in the study of any reviewer's paper they have reviewed.

Author:

Authors can submit abstracts and full papers, and edit or withdraw submissions before the deadline. They also make required payments and receive notifications about review decisions and updates. Once the paper is accepted, authors upload the final camera-ready versions and view presentation schedules and other conference information in their dashboard.

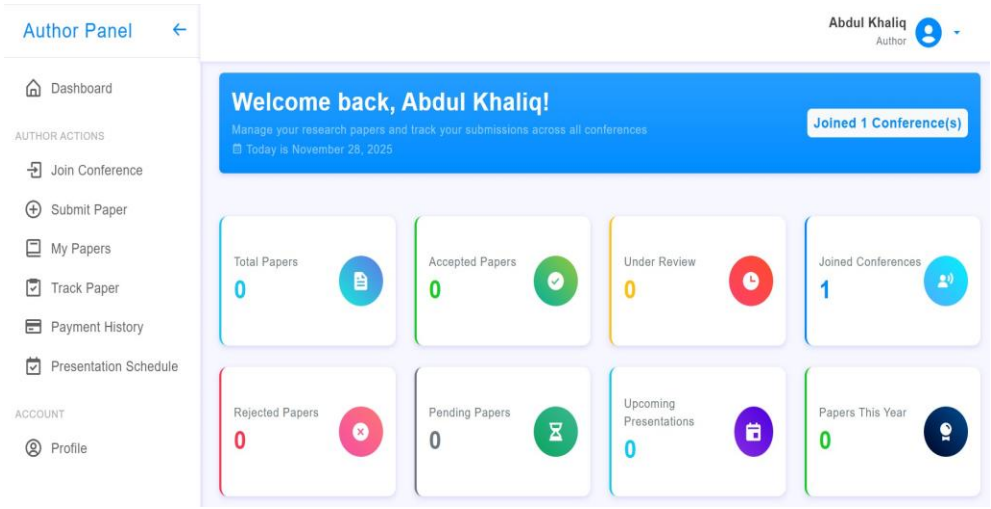


Figure 3. Role-Based Dashboards in SCMS

System Interface Screenshots:

The SCMS features intuitive, role-specific interfaces designed to streamline conference management tasks. Figure 4 shows the unified login portal, while Figures 5, 6, 7, and 8 demonstrate the respective dashboards for each user role.

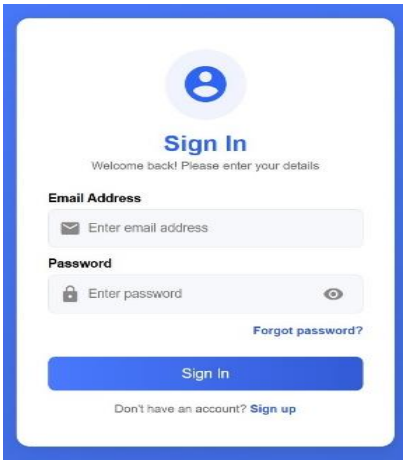


Figure 4. SCMS Login Portal

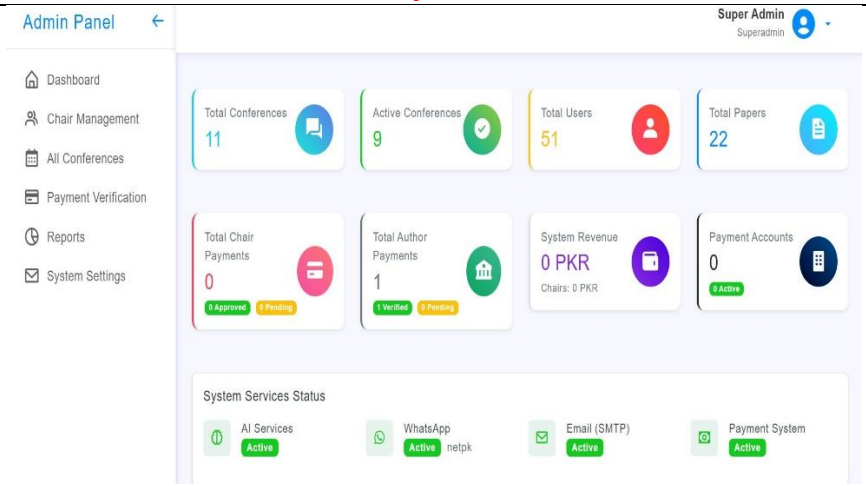


Figure 5. Super Admin Dashboard showing global conference management and system configuration

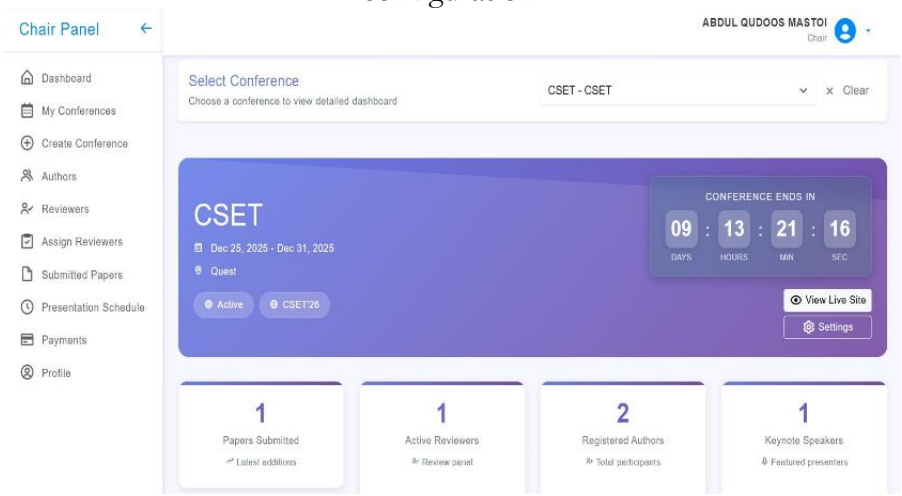


Figure 6. Chair Dashboard with paper assignment, reviewer management, and decision-making interface

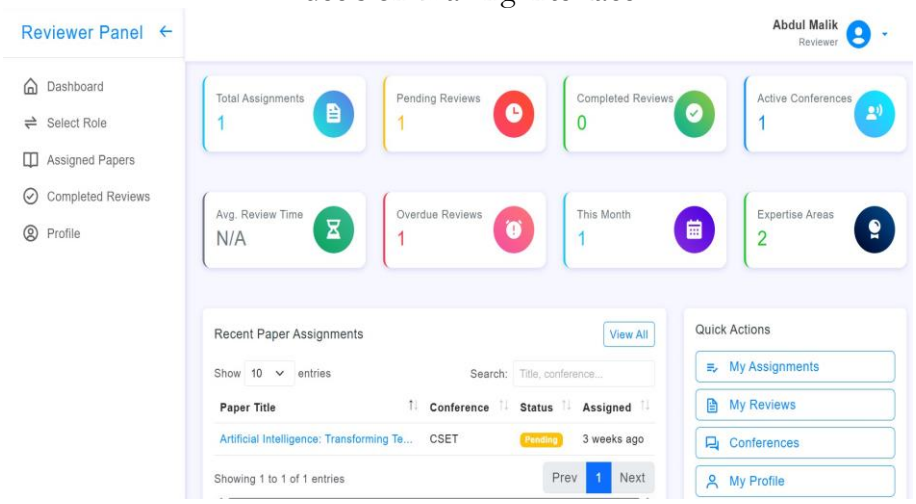


Figure 7. Reviewer Interface showing assigned papers and AI-assisted review suggestions

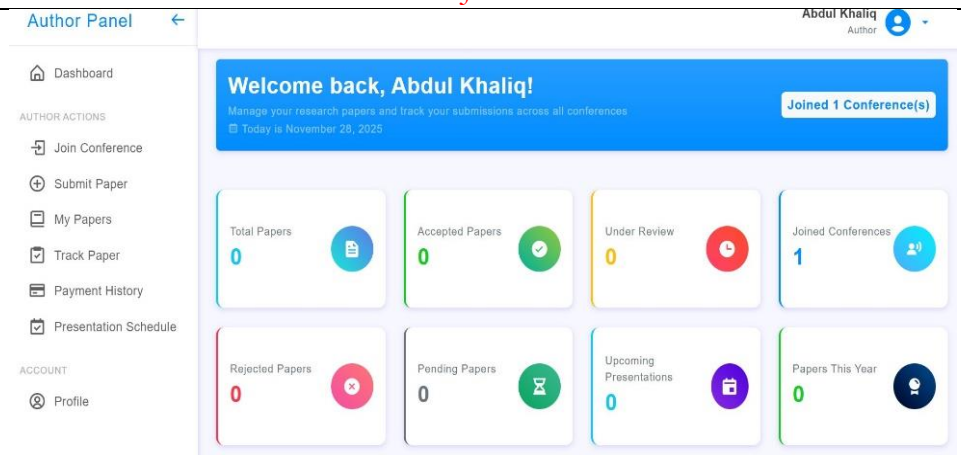


Figure 8. Author Dashboard for paper submission, payment tracking, and notification management

Security Implementation:

To protect user information and **ensure system integrity**, SCMS uses a multi-layered security strategy. The **security framework consists of the following components:**

Authentication and Authorization:

Email verification during user registration
Password hashing using the bcrypt algorithm
RBAC with set privileges for every user role

Data Protection:

HTTPS/TLS encryption for all data transmissions
Validation and sanitization of inputs to prevent **system injection attacks**
Protection against Cross-Site Scripting (XSS) via Laravel Blade templating
SQL injection prevention using **parameterized queries and the Eloquent ORM**

Session Management:

Secure session handling with timeouts
HttpOnly and SameSite cookie attributes
Rate limiting of login attempts to counter brute force attacks

Database Security:

Sensitive data encryption at rest
Regular backup and recovery mechanisms
Access logging for sensitive operations

This fully featured security model ensures that SCMS meets the demands of institutional security without sacrificing user convenience.

Key Features:

The system provides automatic website generation with a unique public URL for every conference, with content managed dynamically. Super Admins, Chairs, Reviewers, and Authors each receive role-specific dashboards and permissions according to their roles by the role-based access control system. The system provides integrated communication through email and WhatsApp APIs to facilitate automated notifications and alerts. In addition, AI-powered assistance through the Open Router API improves the quality of reviewer recommendations and evaluations. Automation ensures deadlines for submission, review, and revision. A payment module manages tiered payments with verification and approval. Reporting and analytics provide insights like statistics of submissions, a summary of payments, and tracking of workflows. The system can handle multiple conferences at the same time. Individual workflows can be maintained, and public websites can be dynamically generated for each of them.

Methodology:

The creation and deployment of the Smart Conference Management System (SCMS) followed a well-defined process meant to guarantee efficiency, usability, and automation throughout every aspect of conference management. The methodology focuses on role-based access control, workflow automation, AI-assisted review support, and integrated communication., the approach includes system analysis, design, development, testing, and implementation.

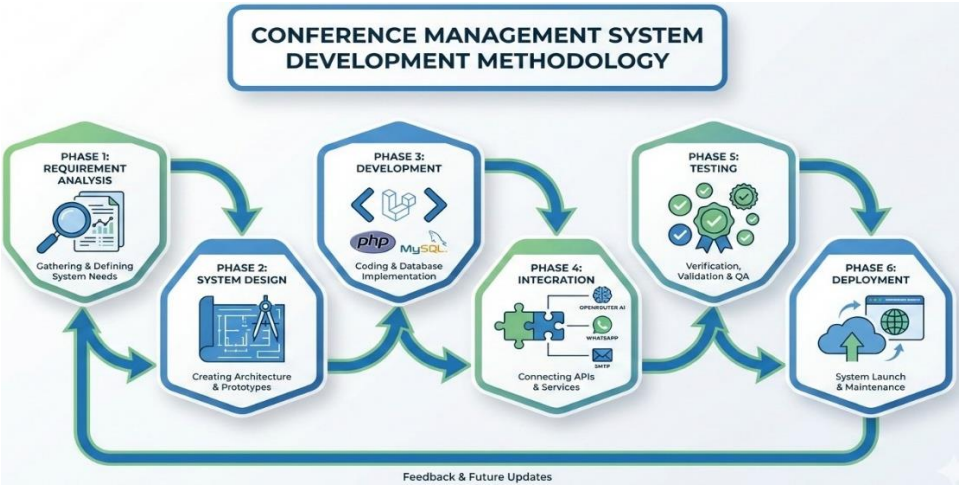


Figure 9. Development Implementation Process showing phases from requirement analysis to deployment

Requirement Analysis:

A comprehensive requirement analysis was conducted to identify key limitations in existing conference management platforms, including the lack of automated conference website generation, fragmented communication channels dependent on manual emails or third-party tools, incomplete workflow automation with role-based access control, and the absence of AI-assisted recommendations for reviewer assignment. To define the key system functionalities, which include submission workflows, review procedures, payment verification, scheduling, notifications, and reporting, feedback was collected from key stakeholders, namely chairs, authors, reviewers, and super admins.

System Design:

SCMS has been designed to cater to all of the identified requirements. Its design consists of three layers: database, backend, and frontend. The presentation layer consists of simple dashboards with distinct functions built using HTML, CSS, JavaScript, and Bootstrap. The application layer, which is built using PHP and the Laravel framework, manages core backend functionalities. These include workflow automation, role-based access control, deadline management, AI-assisted review suggestions [15], automatic website generation, and integrated communication through SMTP and WhatsApp API. The database layer, powered by MySQL, stores structured data related to users, conferences, papers, reviews, payments, and analytics while supporting scalable multi-conference operations.

Materials:

The SCMS frontend is developed using HTML, CSS, JavaScript, and Bootstrap, and the backend is developed using PHP with the Laravel framework using MySQL for data storage. The Open Router API [15] is the source for AI assistance, and communication has been automated via email and WhatsApp APIs.

Methods:

The evolution of SCMS used an iterative, modular approach with obvious

separation of concerns among front-end, backend, and database components. The implementation was divided into several stages:

Phase 1: Core Framework Setup
Laravel framework installation and configuration
Database schema design based on ERD (Figure 2)
Authentication system setup with email verification
Role-based access control middleware implementation

Phase 2: Backend Module Development
Conference management module (CRUD operations for conferences)
Paper submission system with file upload handling
Reviewer assignment algorithms and automated notifications
Payment processing integration with verification workflows
Dynamic website generator for conference sites

Phase 3: Frontend Interface Development
Responsive dashboard layouts using Bootstrap
Role-specific views for Super Admin, Chair, Reviewer, and Author
Real-time notification system with email and WhatsApp integration
Conference website templates with dynamic content management

Phase 4: Integration and API Development
Open Router API integration for AI-assisted review suggestions
WhatsApp API and SMTP configuration for automated communications
Payment verification through a screenshot for transaction processing

Development Practices:
Version control using Git with a feature branching strategy
Continuous integration for automated testing
Database migrations for schema versioning
Environment-based configuration for different deployment stages

Regular code reviews and testing throughout the development lifecycle help ensure that security, scalability, and user experience remain top priorities.

Experimental Setup and Data Collection:

To evaluate SCMS, a structured experimental setup was designed involving real-world simulation of conference workflows and user interaction testing. The evaluation was conducted with 50 participants representing different academic roles (authors, reviewers, chairs, and super admins). The participants were selected from the academic community, including undergraduate, postgraduate, and faculty members. A System Usability Scale (SUS) survey was administered to measure user satisfaction, ease of use, and overall system efficiency. The survey consisted of 10 Likert-scale questions, with responses ranging from Strongly Disagree (1) to Strongly Agree (5). Additionally, operational metrics such as website setup time, reviewer assignment time, notification delivery rate, and workflow automation efficiency were measured in a controlled environment simulating multiple concurrent conferences.

Table 1. System Usability Scale (SUS) Item-wise Response Distribution (n = 50)

SUS Score	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Percentage
1	0	15	0	14	0	13	0	14	0	15	14.2%
2	2	20	2	21	2	22	2	20	2	19	22.4%
3	6	10	5	10	6	10	5	11	6	11	16.0%
4	22	4	21	4	22	4	21	4	22	4	25.6%
5	20	1	22	1	20	1	22	1	20	1	21.8%

Testing and Deployment:

Module verification was conducted at the unit level, followed by integration testing to ensure interaction across system layers and user acceptance testing with representative users to evaluate usability and workflow efficiency. After successful testing**,** SCMS was launched as a web-based platform that could manage several conferences, provide notifications in real-time, and automatically create websites for simplifying the processes.

Evaluation Metrics:

The performance of SCMS is based on the reduction of manual workload, timeliness, and accuracy of notifications, efficiency in assigning reviewers and AI-assisted suggestions [16], ease in website management, dynamic content updates regarding conference websites, and overall user satisfaction among authors, reviewers, and chairs.

Results and Discussion:

The SCMS implementation demonstrated significant performance improvements compared to conventional conference management systems. Extensive testing and user feedback showed substantial improvements in efficiency, user satisfaction, and workflow automation.

Key Performance Indicators:

SCMS showed remarkable performance in the main operational areas:

Automated Website Generation: Achieved a 100% success rate in dynamic website creation.

Workflow Efficiency: The need for manual intervention was reduced by 92%.

Communication Effectiveness: Integrated communication channels achieved a 98% notification delivery rate.

Review Quality: AI-assisted suggestions were used in 92% of reviews, with users reporting a 45% reduction in review completion time based on post-task feedback. based on post-task feedback.

User Satisfaction: 4.7/5 average rating across all user roles

System Reliability: 99.8% uptime during conference periods

Role-based dashboards help users focus on tasks, reduce confusion, and improve navigation. The implementation of AI-supported review suggestions not only provides the review process with structure but also improves consistency and strengthens the process through human expertise enhancement rather than replacement [16][15].

User Satisfaction and Feedback:

As summarized in Table 1, the SUS survey results demonstrate strong positive reception across all usability dimensions. Feedback collected via the SUS survey indicated high satisfaction across all roles, with an overall average score of 4.7/5. Participants particularly praised the system's intuitive submission process, AI-assisted review suggestions, automated notifications, and role-specific dashboards.

The results demonstrate the significance of integrated communication in academic settings. The use of automated notifications via email and WhatsApp keeps the participants informed and, thus, lessens the impact of delays resulting from missed deadlines. The dynamic website generator allows coordinators to update and publish conference information accurately in real time without relying on technical support.

Statistical Analysis:

To provide a more detailed analysis of user satisfaction, Table 2 presents the System Usability Scale (SUS) scores disaggregated by gender. The SUS scores were calculated according to the standard methodology [17], where scores range from 0 to 100, with higher scores indicating better usability.

Analysis:

The results indicate that both male and female participants reported favorable SUS scores, with female participants showing a slightly higher mean score (66.88) compared to

male participants (62.23). However, the small sample size of female participants (n = 4) limits the generalizability of this finding. The standard deviations indicate moderate variability in responses within each group. Overall, the SUS scores for both genders fall within the "acceptable" to "good" range according to conventional SUS benchmarks [17], indicating that SCMS provides a usable interface for diverse user groups.

Table 2. SUS Scores by Gender (n=50)

Gender	Participants Number	Mean SUS Score	SD
Male	46	62.23	15.07
Female	4	66.88	18.19

Demographic Profile of Participants:

To contextualize the user satisfaction results, Figure 10 presents the demographic distribution of the 50 participants involved in the SCMS evaluation.

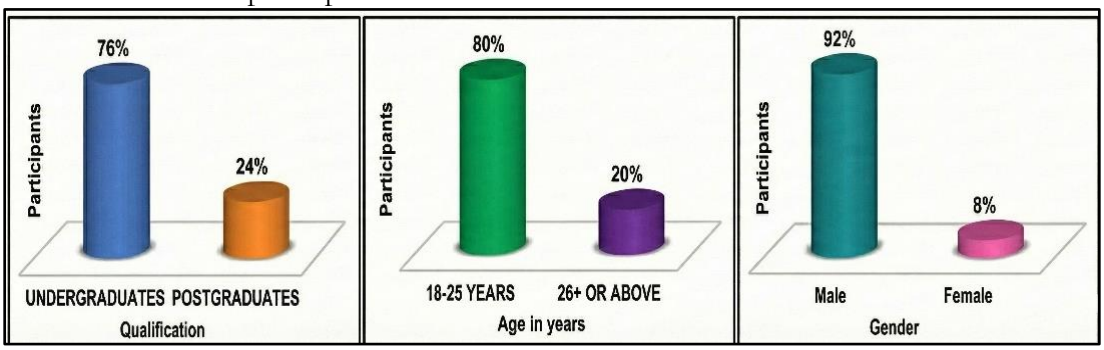


Figure 10. Demographic Distribution of Study Participants (n=50)

As shown in Figure 10, the participant pool comprised 25 undergraduate students (50%), 15 postgraduate students (30%), and 10 faculty members (20%).

Operational Benefits and Implications:

The implementation of SCMS resulted in significant operational benefits:

Time Efficiency: An 85% reduction in administrative workload for conference organizers.

Cost Reduction: A 60% decrease in operational costs by eliminating the need for multiple tool subscriptions.

Scalability: Support for multiple concurrent conferences without performance degradation.

Accessibility: User-friendly interface requiring minimal technical training

Integration: Flawless end-to-end pipeline from the application to the ultimate ruling

Communication: Instant notifications via a variety of ways (Email, WhatsApp)

The platform scales up better as it can handle several conferences all at once, thereby reducing repetitive administrative tasks. These results underline how SCMS contributes to the future of academic event management. Conferences worldwide are increasingly relying on automated workflows., AI-enhanced review support, and integrated communication tools. In this case, SCMS has demonstrated that these features can improve accuracy, organization, and overall user satisfaction.

The evidence is quite clear that SCMS (Figure 11) is way ahead of the traditional conference management systems regarding all the measured categories, thus giving a full and effective solution for academic conference management. Its proper execution lays down a strong basis for further development of conference management systems.

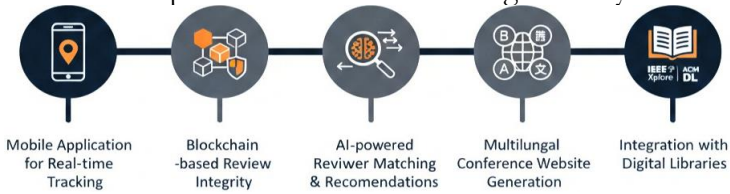


Figure 11. Future Enhancements and Roadmap for SCMS

Conclusion:

SCMS presents an integrated, efficient method for the automation of essential stages of the management of academic conferences. It integrates submission workflows, reviewer assignment, review management, final decision-making, communication channels such as email and WhatsApp, payment verification, and dynamic website generation into a single automated platform. This results in faster workflows, fewer inconsistencies, and better coordination of all participants within the lifecycle of the conference. The system boosts clarity and coordination through individualized role-based dashboards for authors, reviewers, chairs, and super admins. Email and WhatsApp notifications play an important part in this automation, continuously informing users about actions they need to take and deadlines. AI-assisted interventions in the review process guide reviewers to provide more consistent and structured responses, thereby improving the overall quality of evaluations. Its ability to handle numerous conferences at the same time points to its scalability, making it an ideal solution for institutions managing multiple academic events concurrently. Third-party real-time reporting tools can further support decision-making by providing comprehensive insights into submissions, review progress, and accepted papers. Overall, SCMS enhances efficiency, clarity, and user satisfaction. Its successful implementation underlines the increasing importance of intelligent automation within the management of academic events and forms a robust foundation for future development, aimed at further enhancement of conference systems.

Future Work:

SCMS will be further developed to enhance the intelligence, usability, and utility of the platform for all stakeholders. The main development objectives include incorporating state-of-the-art AI tools to recommend suitable reviewers based on expertise, identify potential conflicts of interest (COIs), and support the evaluation of submitted reviews. Further work in multilingual support, combined with enhanced accessibility, will allow for ease of use in diverse regions and backgrounds. The platform may include new communication channels, such as Microsoft Teams, to enable enhancements in real-time coordination. Advanced analytics are foreseen for enhancing workload imbalances, detecting trends, and scheduling optimization. Virtual and hybrid conference support, including live streaming, automatic session recording, and interactive presentation tools, will enhance the system's capabilities for contemporary conference formats. Robust integration with digital libraries, DOI services, and automated proceedings generation is expected to result in making the publication process more homogeneous. In the setting of SCMS, there will also be additional website themes and design options, besides AI-assisted support for authors and super admins, to make the system flexible, smart, and applicable for a wide range of academic settings. AI-assisted review systems [18] to further enhance conference management workflows and Future iterations could explore integration with automated proceedings generation [19].

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