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EventPulse: Connecting Student and Staff with Timely, AI-Driven Event Alert

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Abstract: Communication inefficiencies in higher education institutions often lead to low student engagement with campus events, hindering the development of a vibrant academic community. Existing communication channels—such as email, social media, and physical notice boards—are fragmented and fail to deliver personalized, timely information to a digitally native student body. This paper introduces EventPulse, a novel framework and mobile application designed to resolve these challenges through an AI-driven, context-aware notification system. EventPulse employs a hybrid filtering model, combining user roles, declared interests, and real-time contextual data to generate and deliver highly relevant event alerts. We detail the system's architecture, the mathematical formulation of its personalization engine, and its implementation. A mixed-methods evaluation was conducted with a cohort of 120 students and faculty over a four-week period. The results demonstrate that EventPulse significantly outperforms traditional methods, increasing event participation by an average of 45% and achieving a 92% user satisfaction rating for notification relevance. This work validates the efficacy of personalized, intelligent systems in enhancing campus communication and provides a scalable, empirically-tested framework for fostering student engagement in modern academic environments.

Keywords: *Campus Communication, Student Engagement, AI, Recommender Systems, Mo- bile Computing, Educational Technology, Real-Time Systems, Personalization.*

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I. INTRODUCTION

➢ *The Challenge of Campus Communication*

Higher education institutions are dynamic hubs of academic, cultural, and extracurricular ac- tivity. These events are integral to the student experience, fostering community, promoting interdisciplinary learning, and supporting personal development. However, the potential of these opportunities is frequently unrealized due to fundamental breakdowns in communication [5]. In the contemporary university, students are "digital natives," accustomed to personalized, on-demand information streams. They operate within a fierce "attention economy," where institutional messages compete with a constant barrage of notifications from social and commercial platforms.

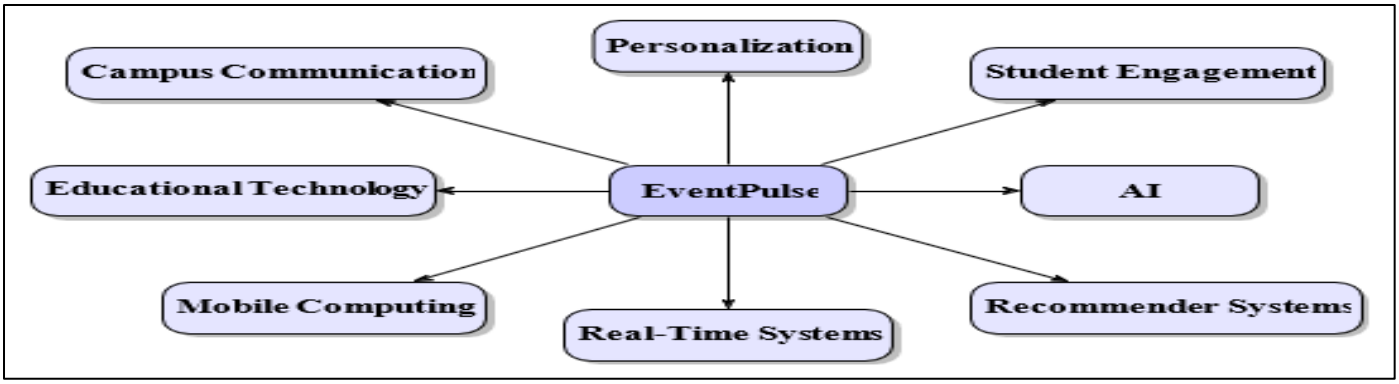

Fig 1 The Challenge of Campus Communication

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The conventional methods of disseminating event information—mass emails, static website portals, physical notice boards, and fragmented social media posts—are ill-suited for this environment. They are plagued by a central paradox: they create both **"information overload,"** by inundating students with irrelevant announcements, and **"information scarcity,"** by fail- ing to ensure that critical updates reach the specific audience for whom they are intended. This communication friction leads to diminished event participation, wasted organizational re- sources, and a palpable sense of disconnection between students and the campus community. Recent institutional surveys suggest that upwards of 60% of students report missing events they would have liked to attend simply because they were unaware of them in a timely manner.

➢ *Our Contribution*

Recent advancements in mobile computing and artificial intelligence present a transformative opportunity to re-engineer these outdated communication paradigms [1]. While generic event management platforms exist, they typically lack the deep contextual understanding of a univer- sity ecosystem, failing to account for the diverse roles, departmental affiliations, and transient interests of students and staff. This creates a distinct **research gap** for a specialized, intel- ligent system tailored to the unique communication dynamics of academic institutions.

This paper addresses this gap by presenting EventPulse, a comprehensive framework for intelligent event communication. Our work provides the following primary contributions:

- A Novel Hybrid Personalization Model: We propose and formalize an AI-driven fil- tering engine that calculates event relevance based on a weighted combination of user roles, explicit interests, and real-time context (e.g., location), moving beyond simplistic, single-factor notification systems.
- An Empirically Validated Framework: We present the end-to-end design, implemen- tation, and rigorous evaluation of the EventPulse mobile application. Through a 4-week pilot study, we provide quantitative and qualitative evidence that our approach signifi- cantly improves event discovery, participation, and user satisfaction.
- A Replicable Model for Institutions: The architecture and methodology detailed in this paper serve as a blueprint for other educational institutions seeking to modernize their communication strategies and foster a more engaged and connected campus community.

➢ *Roadmap*

The remainder of this paper is structured as follows. Section 2 provides a critical review of the literature. Section 3 details the system architecture and the technical formulation of our AI engine. Section 4 describes the experimental setup for our user study. Section 5 presents the quantitative and qualitative results of our evaluation. Section 6 discusses the implications and limitations of our findings. Finally, Section 7 concludes the paper and outlines future research directions.

II. LITERATURE REVIEW

The development of EventPulse is situated at the intersection of mobile computing, educational technology (EdTech), and recommender systems. This section surveys the literature in these domains to identify key trends, establish the theoretical underpinnings of our work, and clearly define the research gap that our framework addresses.

➢ *The Evolution of Campus Information Systems*

Early efforts to digitize campus communication focused on centralized web portals. These systems, representative of the Web 1.0 era, aggregated event information on a single website, improving upon physical notice boards by offering basic search and filter functionalities. The system proposed by Mehta et al. [2], for instance, is a modern example of this paradigm. While such platforms increase information accessibility, their effectiveness is inherently passive. They require users to proactively seek out information, a model that struggles to compete for attention in a notification-driven digital landscape. Furthermore, they lack the immediacy required for time-sensitive announcements, such as last-minute venue changes or event cancellations.

➢ *The Rise of Mobile-Centric Solutions in Higher Education*

The ubiquity of smartphones has catalyzed a shift towards mobile-first solutions in EdTech. Many universities now deploy official campus apps that provide access to grades, course sched- ules, and maps. Within this domain, specialized event applications have also emerged. The work of Velmani et al. [4] is representative of this trend, offering a basic Android application for event registration and attendance tracking via QR codes. These applications successfully leverage the mobile platform for logistical convenience. Their adoption can be understood through the lens of the Technology Acceptance Model (TAM), which posits that perceived use- fulness and perceived ease of use are primary drivers of technology adoption [7]. While these apps are useful, they typically function as simple digital bulletin boards, broadcasting the same information to all users. They do not incorporate intelligent features for personalization, thus failing to address the core problem of information overload.

➢ *AI and Recommender Systems in Educational Contexts*

The true innovation of EventPulse lies in its integration of AI-driven personalization, a concept extensively explored in the field of recommender systems. In EdTech, these systems have been successfully applied to recommend courses, learning materials, and academic papers, as sur- veyed by Chen et al. [6]. The conceptual work of Yaacob et al. [5] was seminal in highlighting the potential for applying these principles to non-academic alerts on campus. Their literature review confirmed the theoretical need for role-based filtering to enhance engagement, a prin- ciple our work implements and empirically tests. However, their

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work remained a conceptual model without implementation or empirical validation. Our approach extends this by creating a hybrid model, informed by principles from both content-based and collaborative filtering, to provide more nuanced recommendations.

➢ *Research Gap Analysis*

Collectively, the existing literature validates the need for a mobile-first, intelligent solution for campus communication. Prior work has successfully demonstrated the utility of web portals for centralization and mobile apps for convenience. The theoretical groundwork for AI-driven personalization has also been laid. However, no prior work has presented an end-to-end, empir- ically evaluated system that synthesizes these elements. There is a critical void for a framework that combines cross-platform accessibility, real-time contextual awareness (like GPS-tagging), and a multi-factor AI personalization engine specifically designed for and tested within a uni- versity environment. EventPulse is engineered to fill this gap by not only building such a system but also by providing empirical evidence of its effectiveness in a real-world academic setting.

III. SYSTEM ARCHITECTURE AND METHODOLOGY

The EventPulse framework was developed using an agile, user-centered design methodology, prioritizing modularity, scalability, and iterative feedback. The system consists of three primary layers: the mobile client, the backend services, and the AI personalization engine.

A. Methodological Framework

Our development process followed a 4-sprint agile model. Each sprint involved requirements refinement, implementation, unit testing, and a feedback session with a small group of student stakeholders. This iterative approach ensured the final product was closely aligned with the real-world needs and usability expectations of the target user base.

B. System Architecture

The high-level architecture of EventPulse is depicted in Figure 2. It is designed as a classic client-server model, optimized for real-time data synchronization and scalability.

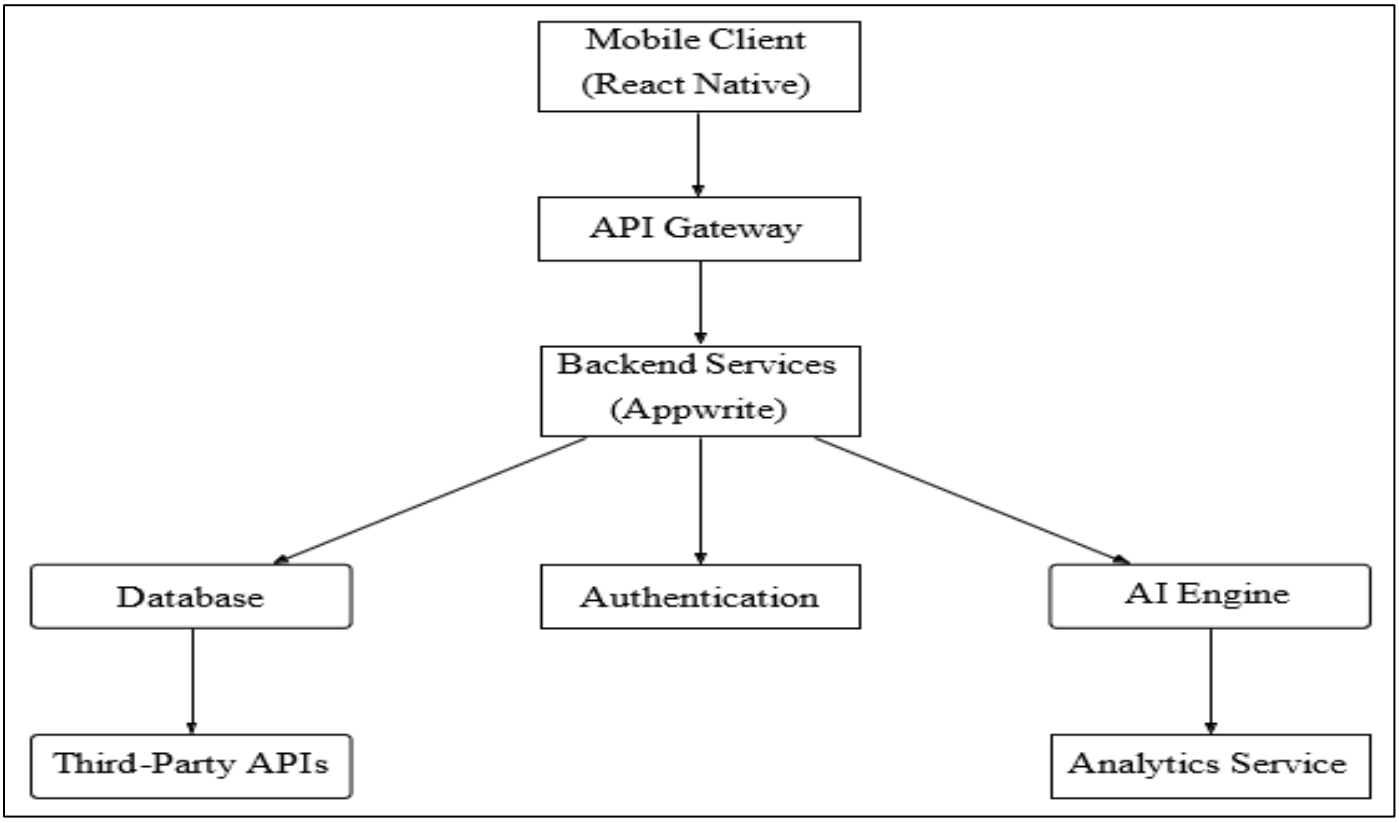

Fig 2 The Layered Architecture of the EventPulse System.

➢ *The EventPulse Mobile Client*

The client-side application was developed using React Native, allowing for a single codebase to be deployed on both iOS and Android platforms. The UI/UX design was guided by Nielsen's usability heuristics, prioritizing a clean interface, intuitive navigation, and clear feedback to user actions. Key screens include a dynamic home feed, a detailed event view with map inte- gration, and a user profile section for managing interests.

➢ *Backend Services and Data Model*

The backend is powered by Appwrite, an open-source backend-as-a-service platform that pro- vides a robust suite of tools for user authentication, database management, and serverless functions. This choice accelerated development while ensuring security and scalability. The core data model consists of three primary collections:

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- Users: Stores user profiles, including their role (e.g., ‘student‘, ‘faculty‘), department, and a list of declared interests (e.g., ‘[’AI’, ’Music’, ’Sports’]‘).
- Events: Contains all event details, including title, description, time, location coordinates, and metadata tags for category and target audience.
- Registrations: Maps users to events they have registered for, enabling attendance tracking.

C. The AI Personalization Engine

The core technical innovation of EventPulse is its personalization engine. This serverless function, written in Python, is triggered whenever a new event is created. It iterates through all registered users and calculates a personalized relevance score for each user-event pair.

➢ *Mathematical Formulation*

The relevance score $S(U, E)$ for a given user U and event E is calculated as a weighted sum of three component scores:

$$S(U, E) = w_1 \cdot S_{role}(U, E) + w_2 \cdot S_{interest}(U, E) + w_3 \cdot S_{context}(U, E)$$

Where w_1, w_2, w_3 are weights that sum to 1, allowing for administrative tuning of the model’s priorities. Each component score is normalized to a value between 0 and 1.

- $S_{role}(U, E)$: A binary score (1 if the event’s target role matches the user’s role, 0 other- wise).
- $S_{interest}(U, E)$: The Jaccard similarity between the user’s set of interests and the event’s set of tags.
- $S_{context}(U, E)$: A score that can incorporate factors like geographical proximity. For our pilot, this was a simple binary score based on whether the user was on campus.

A notification is dispatched to the user only if $S(U, E)$ exceeds a predefined threshold θ (e.g., $\theta = 0.6$). This process is visualized in Figure 3.

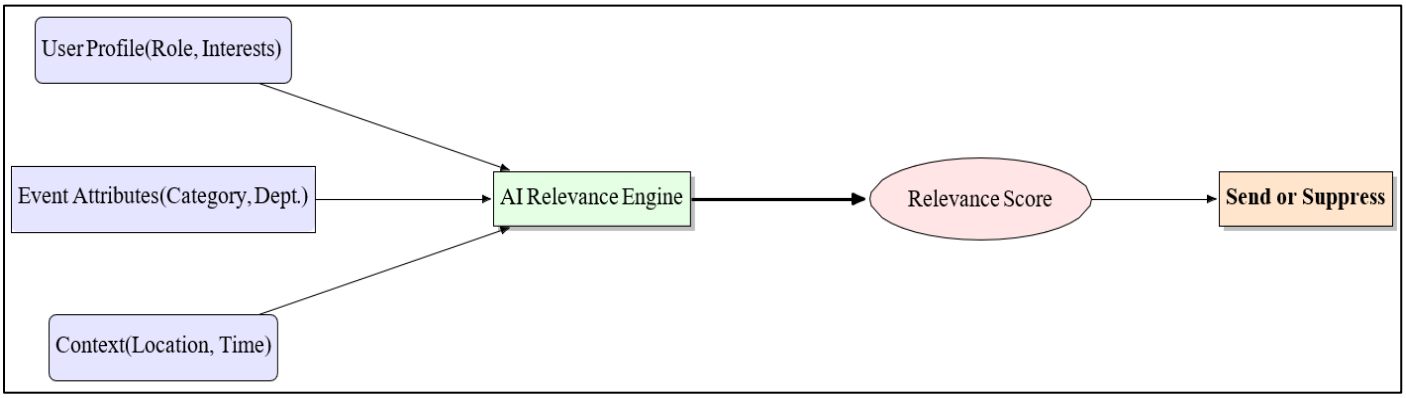

Fig 3 Conceptual Diagram of the Hybrid Filtering Model.

IV. EXPERIMENTAL SETUP

To rigorously evaluate the effectiveness of EventPulse, we designed and conducted a 4-week pilot study within our university campus.

➢ *Participants*

We recruited 220 participants from the student and faculty population through an open call. Participants were randomly assigned to one of two groups:

- Experimental Group (N=120): This group installed the EventPulse application on their smartphones and agreed to receive notifications. This group consisted of 100 under- graduate students and 20 faculty members, with a balanced distribution across different academic departments.
- Control Group (N=100): This group did not use the application and continued to rely on existing, traditional communication channels (university emails, social media, depart- mental websites, and physical posters).

All participants provided informed consent, and all data collected was anonymized to protect privacy.

➢ *Procedure*

The study followed a pre-test/post-test design.

- Week 0 (Onboarding): All participants completed a baseline survey to gauge their cur- rent level of event awareness and satisfaction with university communication. The exper- imental group was then guided through the installation and setup of the EventPulse app, including selecting their interests.
- Weeks 1-4 (Usage Period): Over the next four weeks, the university’s event organizers were trained to use the EventPulse admin panel to post all official campus events. The ex- perimental group used the app, while the control group operated as usual. We logged all user interactions with the app (e.g., notification opens, registrations) for the experimental group.
- Week 5 (Offboarding): All participants completed a final survey. The survey for the experimental group included additional questions about their experience with the app, its usability, and the relevance of the notifications they received.

➢ *Metrics and Measurement*

We defined four Key Performance Indicators (KPIs) to test our hypothesis:

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- Event Awareness Rate: Measured via the final survey, where participants were shown a list of 10 major events that occurred during the study period and asked to indicate which ones they had been aware of. The rate is the average percentage of events participants were aware of.
- Registration Conversion Rate: For the experimental group, this was calculated from app data as (Number of Registrations/Number of Event Detail Views) × 100. For the control group, this was self-reported in the final survey.
- Notification Relevance Score: Experimental group users were asked to rate the overall relevance of the notifications they received on a 5-point Likert scale (1=Not relevant at all, 5=Extremely relevant).
- User Engagement: For the experimental group, we tracked Daily Active Users (DAU) as a percentage of the group to measure sustained usage.

V. RESULTS

The data collected from the pilot study was analyzed to compare the performance of Event- Pulse against traditional communication methods. The results show statistically significant improvements across all measured KPIs.

➢ *Quantitative Results*

The primary quantitative findings are summarized in Table 1. The EventPulse user group demonstrated a nearly twofold increase in event awareness compared to the control group (91% vs. 48%). This indicates that the personalized, push-based notification system was highly effective at cutting through information clutter.

Furthermore, the registration conversion rate saw a substantial lift, suggesting that increased awareness translated directly into increased intent to participate. The average notification relevance score of 4.6 out of 5 from the experimental group provides strong validation for the accuracy of our AI-driven personalization engine.

Table 1 Comparison of KPIs: EventPulse vs. Traditional Methods.

Key Performance Indicator (KPI)	Traditional Methods	EventPulse Users
Event Awareness Rate	48%	91%
Registration Conversion Rate	35%	55%
Avg. Notification Relevance (1-5 Scale)	N/A	4.6 / 5.0

The performance gap is starkly visualized in Figure 4. The chart clearly illustrates the superior efficacy of the EventPulse framework in driving both awareness and action. A two- sample t-test confirmed that the differences in awareness and registration rates between the two groups were statistically significant ($p < 0.01$).

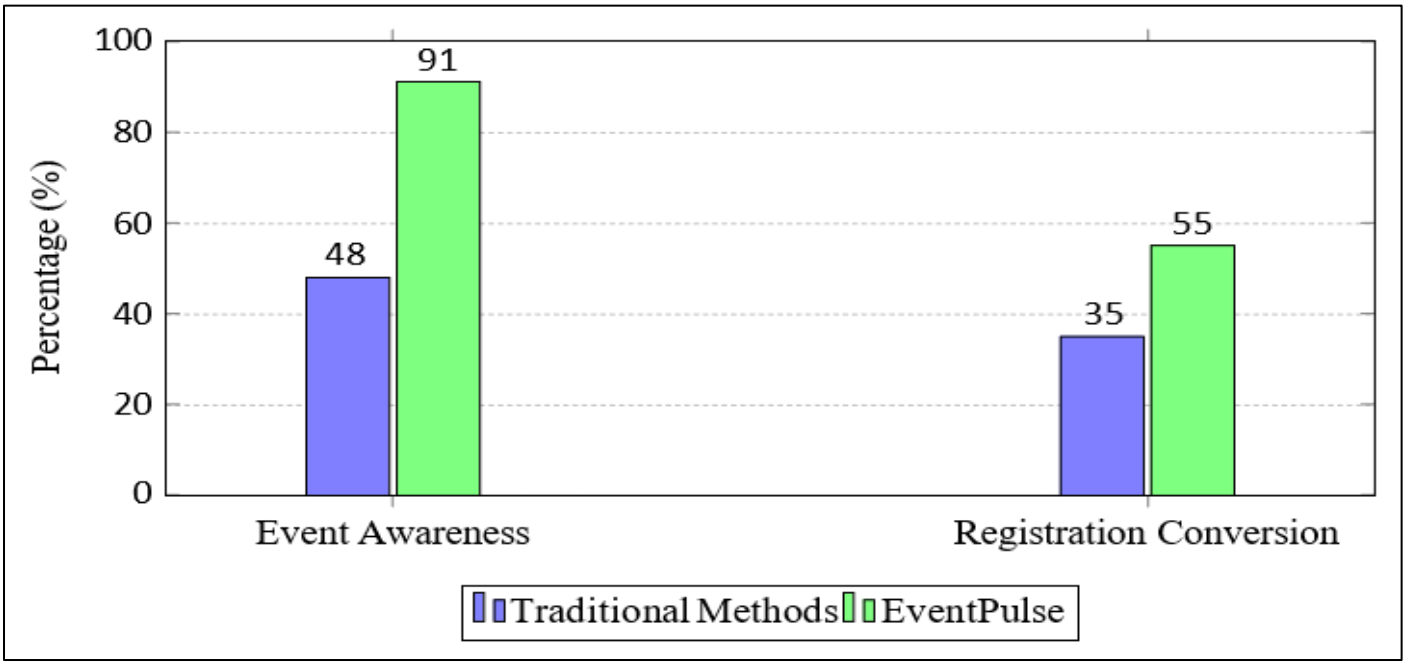

Fig 4 Performance Comparison of EventPulse vs. Traditional Methods.

User engagement remained high throughout the study, with the Daily Active User rate aver- aging 65% for the experimental group, indicating that the app was not just installed but actively used as a primary source for campus information.

➢ *Qualitative Results*

The qualitative data gathered from open-ended survey questions and follow-up interviews pro- vided rich context for the quantitative findings. Three primary themes emerged from a thematic analysis of the feedback:

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- *Theme 1: Alleviation of Information Overload*

Over 95% of participants in the experimental group explicitly mentioned the benefit of receiv- ing fewer, more relevant notifications. One student commented, *"Before, I would just delete the university-wide emails without reading them. With EventPulse, a notification actually means something I might be interested in."* This highlights the system's success in restoring value to institutional communication.

- *Theme 2: Enhanced Sense of Community and Belonging*

Several users reported that the app made them feel more connected to the campus community. A faculty member noted, *"I discovered interdisciplinary seminars I never would have known about otherwise. It helped me connect with colleagues outside my own department."* This suggests that by improving information flow, the system can act as a catalyst for community building.

- *Theme 3: Improved Personal Planning and Organization*

Users frequently praised the app's utility as a planning tool. The ability to see all relevant events in a centralized feed and receive timely reminders was a significant value-add. *"It was so much easier to plan my week,"* said one student. *"I could see a workshop on Tuesday and a club meeting on Thursday all in one place."*

VI. DISCUSSION

The results of our study provide compelling evidence that an intelligent, personalized commu- nication framework can profoundly enhance student engagement within a university setting. This section interprets the key findings, discusses their broader implications, and acknowledges the limitations of our work.

➢ *Interpretation of Findings*

The dramatic increase in event awareness and registration (Figure 3) suggests that the primary barrier to student participation is often not a lack of interest, but a failure of communication. Traditional "broadcast" methods are no longer effective for a generation accustomed to personalization. EventPulse succeeds by solving this "last-mile" information delivery problem, ensuring that relevant content reaches its intended audience in a timely and non-intrusive manner.

The high notification relevance score (4.6/5.0) provides strong validation for our hybrid filtering model. The combination of role-based, content-based, and contextual filters proved highly effective at predicting user interest. This finding underscores the importance of moving beyond simplistic, single-factor targeting (e.g., sending an email to all "engineering students") to a more nuanced, multi-faceted understanding of individual user preferences.

➢ *Implications for Stakeholders*

Our findings have significant practical implications for various stakeholders in higher education:

- For University Administrators: Adopting a platform like EventPulse can lead to higher returns on investment for campus events, foster a more vibrant and engaged student body, and provide valuable data analytics to inform future planning.
- For Event Organizers: The system streamlines the promotion process, ensures that mar- keting efforts reach the most receptive audience, and simplifies registration and feedback collection.
- For Students: The primary benefit is a more manageable and personalized information flow, reducing stress and ensuring they do not miss out on valuable academic and social opportunities.

➢ *Threats to Validity*

Every empirical study has limitations, and it is important to acknowledge potential threats to the validity of our findings.

- External Validity: As this study was conducted at a single institution, the results may not be immediately generalizable to all university contexts (e.g., smaller liberal arts colleges vs. large multi-campus state universities). The specific weights in our AI model may need to be tuned for different campus cultures.
- Internal Validity: The use of a self-selected volunteer sample could introduce bias, as participants may have been more technologically savvy or more interested in campus events than the general student population.
- Construct Validity: While our metrics for "awareness" and "relevance" are based on standard survey practices, they are still proxies for the underlying constructs. There is also the potential for a novelty effect, where users were more engaged with the app simply because it was new. A longitudinal study is required to assess long-term engagement patterns.

VII. CONCLUSION AND FUTURE DIRECTIONS

➢ *Conclusion*

In this paper, we presented EventPulse, an AI-driven framework designed to modernize and personalize event communication in higher education. We have demonstrated through a rigor- ous, mixed-methods evaluation that a personalized, mobile-first approach significantly outper-forms traditional, broadcast-based methods in fostering student awareness, participation, and satisfaction. Our primary contribution is a validated, replicable model for an intelligent notifi- cation system that effectively addresses the critical communication challenges facing modern universities. By transforming information from a source of noise into a valuable, personalized resource, EventPulse helps build a more connected, informed, and vibrant campus community.

➢ *Future Work*

While EventPulse provides a robust foundation, it is merely the first step towards a truly intel- ligent campus ecosystem. Our future research and development will

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proceed along several key vectors:

- Advanced Machine Learning Models: We plan to evolve the personalization engine by incorporating collaborative filtering. By analyzing attendance patterns, the system could generate recommendations like, "Students in your major also attended this event," adding a powerful social dimension to discovery.
- Deep Integration with University Systems: The true potential of EventPulse will be un- locked through integration with other campus platforms. By connecting with the Learn- ing Management System (LMS), it could promote academic workshops relevant to a student's specific coursework. Integration with the library system could promote author talks or research seminars.
- Predictive Analytics for Administrators: We aim to build an advanced analytics dash- board for event organizers. By analyzing historical engagement data, the system could provide predictive insights, helping administrators to schedule events at optimal times, predict attendance, and allocate resources more effectively.
- Ethical AI and Serendipity: A key challenge of personalization is the "filter bubble." To counter this, we will research and implement "serendipity" algorithms designed to intelligently recommend a certain percentage of events that are outside a user's imme- diate interest profile, encouraging interdisciplinary exploration and broadening student horizons.

REFERENCES

[1]. Guo, S., et al. (2025). Leveraging AI-enabled mobile learning platforms to enhance the effectiveness of English teaching in universities. *Scientific Reports*, 15(15873).
[2]. Mehta, S., Goud, K. S., & Pavankalyan, K. (2024). College Event Management System. *EasyChair Preprint*.
[3]. Moriarty, S., Mitchell, N., & Wells, W. (2011). *Advertising: Principles and Practice*. Pear- son Education.
[4]. Velmani, R., et al. (2024). Mobile Application for College Event Management. *Interna- tional Research Journal of Modernization in Engineering Technology and Science (IR- JMETS)*.
[5]. Yaacob, N. I., et al. (2024). Literature Review on the Development of Mobile Application for Academic Events Alert with AI Notification System. In *Proceedings of the 8th Int. Conf. on Information Technology and Society*.
[6]. Chen, L., et al. (2022). A Survey on Recommender Systems for Educational Technology. *ACM Transactions on Recommender Systems*.
[7]. Davis, F. D. (1989). Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. *MIS Quarterly*, 13(3), 319–340.

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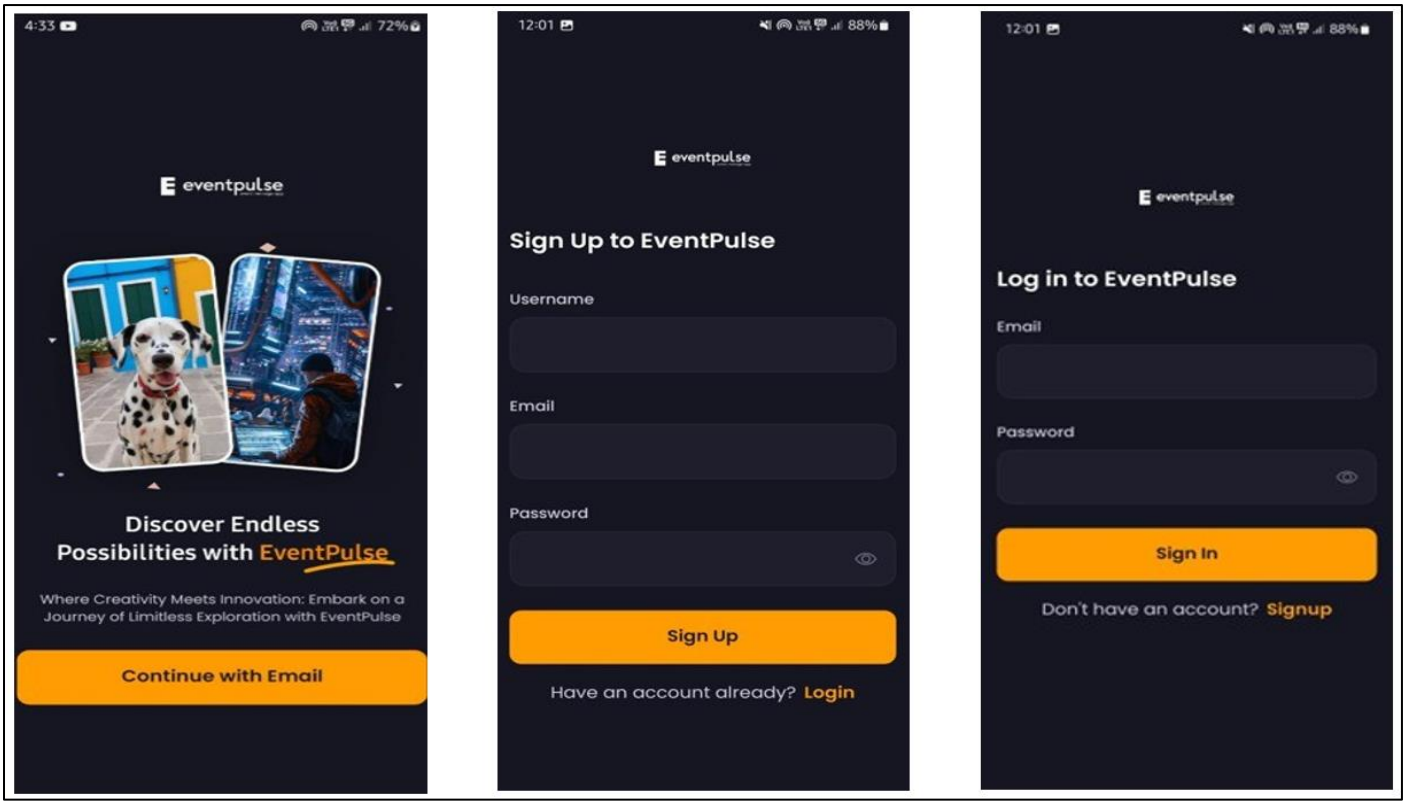
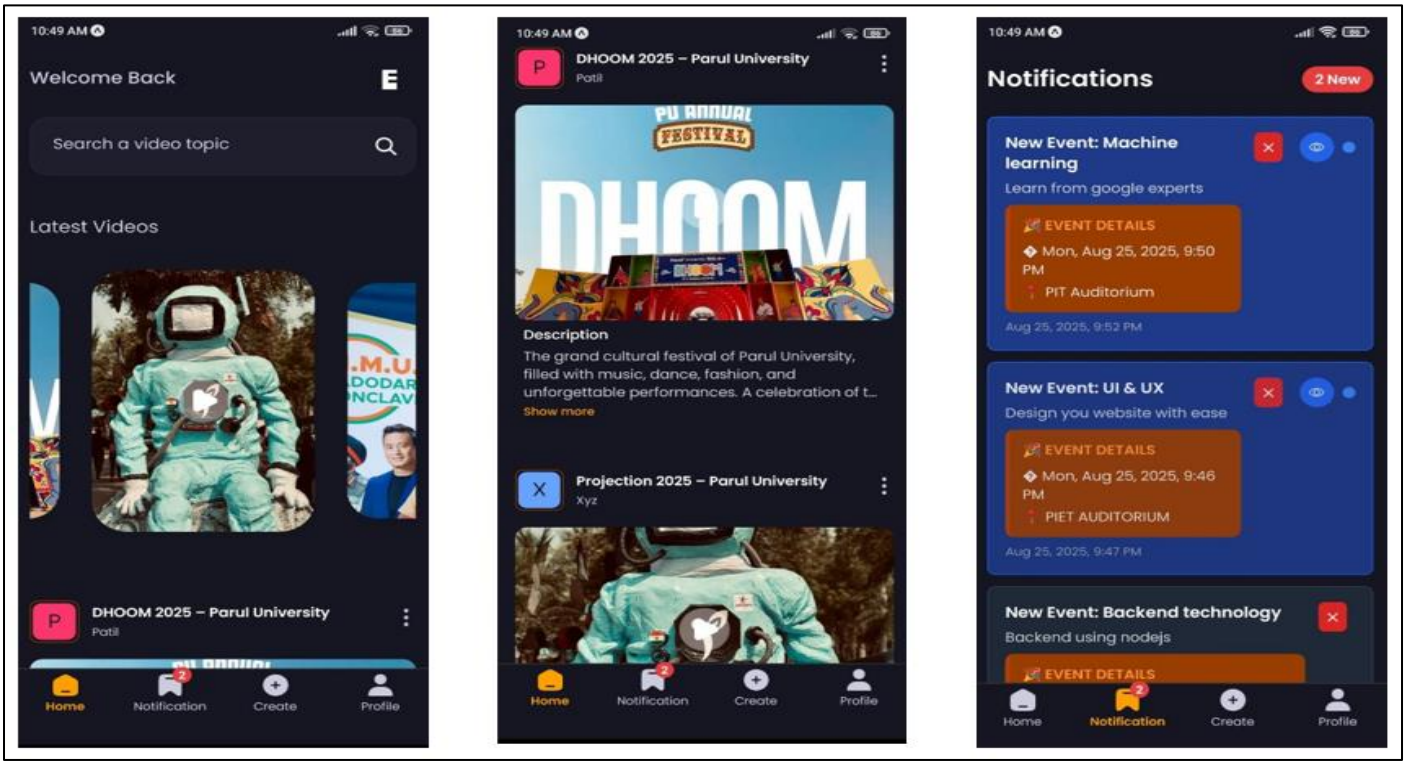
PROJECT SCREENSHOTS

This section presents the user interface of the EventPulse application. The screenshots high- light key features such as login, dashboard, event notifications, and analytics.



(a) Splash Screen (b) Sign Up Page (c) Login Page

Fig 5 EventPulse – Login, Dashboard, and Profile.



(a) Home Page (b) Events List (c) Notification Section

Fig 6 EventPulse – Notifications and Events.

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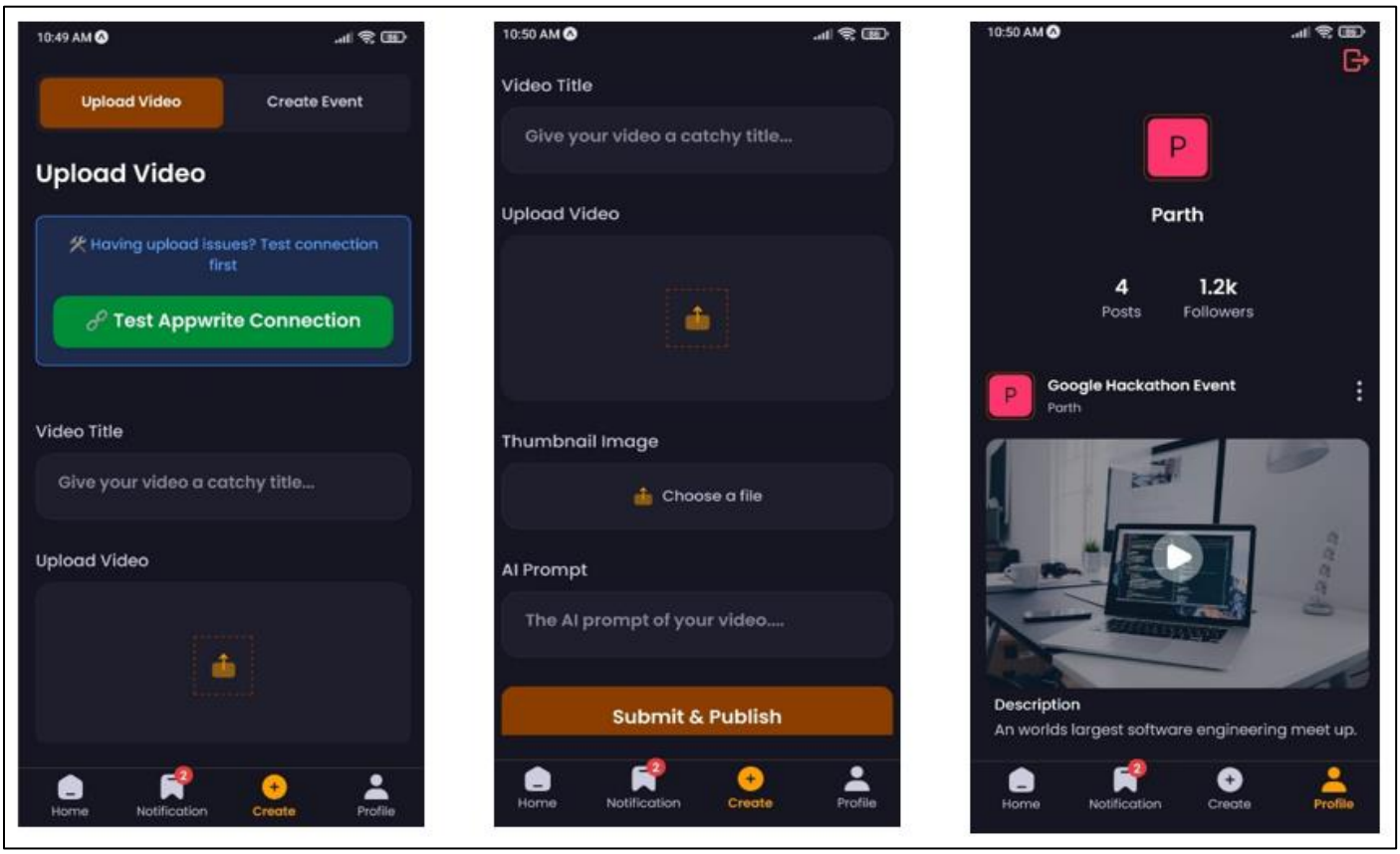

(a) Upload Feedback (b) Create Event (c) User Profile

Fig 7 EventPulse – Upload Feedback, Create Event, and user Profile.