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Development of a Persuasive Application System Technology for Occupational Safety of Medical Practitioners

[1]Ifenyinwa E. Nwankwo, [2]Viginia E. Ejiofor, [3]Chekwube Nwankwo and [4]Joshua John

[1,2]Department of Computer of Science, Nnamdi Azikiwe University, Awka.
[3] Department of Computer Science, Chukwuemeka Odumegwu University, Uli Campus, Anambra State.
[4]Institute of Computing and ICT, Ahmadu Bello University, Zaria, Nigeria.
Email: ifeanyinwa@gmail.com, ve.ejoifor@unizik.edu.ng, ch.nwankwo@gmail.com, jj8184709142@gmail.com

ABSTRACT

For many years now, healthcare workers have continued to be casualties of occupational hazards. While several studies have been presented to help manage occupational hazards, there is still gap (no occupational smart hazard management system for health care). To achieve this, this study aims at the development of a persuasive technology for occupational safety of medical practitioners. The research methodology used for the work is experimental, while the software design methodology combines behavioural driven and agile models. The Research method takes a Systematic Approach which began with designing a Persuasive Application System (PAS) using several models which include login and registration system, event scheduling, real-time monitoring and notification, reward and repercussion algorithms. The registration system allows users to create account for authorized access to the main system. The Event Scheduling Model (ESM) was designed using rule-based approach, MySQL database, date and time control function, to develop a system which allows admin upon registration and creation of staff account to schedule for task and assign staff that will implement it. When task is assigned to users, they automatically receive email which informs them of the task, for them to login and either accept or reject the task. Upon task acceptance, the real-time monitoring and management algorithm monitors the task status, considering time and date to make sure the staff are reminded of the task date earlier before time for preparation. The reward and repercussion algorithm then use these inputs such as number of tasks carried out by users, number of times the user adhered to Personal Protective Equipment (PPE), and number of time user did not adhere to PPE usage to determine the PPE adherence factor in percentage. The system was integrated as a software application system using HTML and react programming language. The Performance Testing Process considered the different approaches which include unit testing, module testing and integration testing. The results showed that the system was able to facilitate task scheduling, upon task acceptance, monitors adherence of staff to PPE, notify user to adhere to PPE.

Keywords: Persuasive Application System; Occupational Safety; Medical Practitioners; Event Scheduling Model; Personal Protective Equipment (PPE)

INTRODUCTION

Health care is not just about medicine but about commitment to healing with love and ensuring that patient's lives are saved at all costs. However, in achieving this goal, healthcare workers expose themselves to lots of risks, such as physical injury, stress, and exposure to diseases, which in many cases undermine their well-being [1], [2]. For instance, during the COVID-19 outbreak, the [3], reported that 1600 doctors died in India alone during, while on the 15th of April [5], revealed that 278 physicians died of COVID-19 due to occupational hazards. In recent times, modern technologies have resonated to change the behaviour of users through persuasions and social influence [5]. One such technology is Persuasive Application Systems (PAS), which have been applied in different areas including trade, religion, politics, management, the internet of things, human-computer interaction, and health psychology [6], [7], [8]. PAS are systems designed to influence user behaviour through persuasion to promote physical activities [5]. In [9], it is defined as "an attempt to reinforce or change one's behaviour, feeling, or thought about issues." According to [10], one area that has recorded increased application of PAS is healthcare; however, [11], revealed that while these application systems have improved quality of service in health care, there is no universal evaluation framework that measures the user experience factor. In addition, [10], revealed that these applications are only focused on usability, while critical factors such as user experience evaluation are ignored, necessitating a holistic system design that considers both user experience and evaluation. In addition, [12], identified six key attributes, which are goal setting, reward, cooperation, social comparison, and social learning, as main components for a reliable PAS; however, it is difficult to identify a PAS that considers these components in their entirety and hence affects their reliability. For instance, [13], investigated the factors that affect user behaviour on mobile health applications, while [14], proposed a technology acceptance model that focused on supporting user participants in the health care process rather than a persuasive approach.

In [2], a mobile application system as a regional agent for improved management of COVID-19 patients was presented, while [5], investigated the impact of PAS on the wellbeing of humans through the development of a health monitoring application system. While these studies have all contributed greatly to the management of health information, to the best of the researcher's knowledge, PAS for occupational safety in health care is rare. In addition, existing PAS lack critical features like evaluation and rewards and are focused mostly on user experience. A reliable PAS must be tailored towards the realities of medical practitioners, specific needs to minimize risk to occupational hazards, and able to ensure that users are persuaded to adhere to the safety rules and regulations in health care environments. In order to achieve this, this study proposed a persuasive technology to promote the occupational safety of medical practitioners in primary health care centres. By modelling and implementing the proposed system, the study will reduce incidence due to occupational hazards, enhance safety compliance, and ultimately ensure the well-being and productivity of health care workers.

RESEARCH METHODOLOGY

The methodology used for this work is the experimental. The software research methodology adopted is hybrid methodology which combined Agile and Behaviour-Driven Development (BDD) Approaches. BDD focuses on understanding the end-user's behaviour, essential in persuasive technology to ensure effective and empathetic user interactions. Agile's flexibility, iterative progress, and regular feedback cycles ensure that user needs and requirements are frequently revisited and adjusted. Combining Agile and Behaviour-Driven Development (BDD) would enhance clarity by establishing safety-related features and functionality through clear, testable scenarios. The use of BDD-driven tests helps validate that each iteration meets defined safety requirements, supporting a persuasive technology that is user-centred and meets practitioners' needs directly and accurately. In realizing this methodology, the first step was to characterize selected healthcare activities and also safety requirements to develop a new data model. Upon the characterization, a persuasive application software model was developed using the user interface design, monitoring algorithm which measures the adherence of users to the safety requirements and also notify them when not adhered to. In addition, the behaviour of the user is recorded and serves as input to a reward and repercussion model which encourages the adherence to the safety requirements and also queries users not following safety requirements. System integration utilized visual studio, MySQL and JavaScript to implement the models while the testing and validation of the model will be done to evaluate the performance of the PAS.

DESIGN OF A PERSUASIVE APPLICATION SYSTEM (PAS)

This section presents the design of the PAS, showing the different main components and sub-system components which collectively makes up the new system. In carrying out the design several modelling approaches such as; Activity Diagram, Block diagram, Tables, were applied.

Main Menu of the System

The main menu is the user-friendly interface that provides quick access to different operations of the system. The aim is to improve usability and ensure that users can effectively navigate through the system. The main menu contains the Dashboard, the Control Panel, the Alert and Notification section, Reports and Logs, then the Help and Support Section as shown in Figure 1.

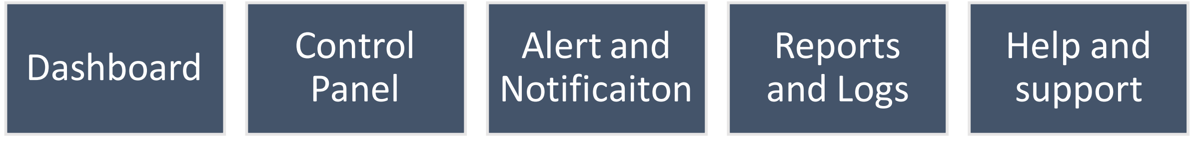


Figure 1: Main Menu of the PAS

The main menu of the PAS contains five major components which are; the Dashboard which provides the overview of the entire system operation, containing section for Task Scheduling, Event Planning, Monitoring and Settings. The Control Panel allows the Real-time Monitoring of User activities and Adherence to PPE when tasks are accepted for execution, the Alert and Notification Section used the tool to persuade users to adhere to PPE application to task. The Report and Logs through the Database Management System recorded activities of users and their adherence to PPE, while the Help and Support Section provide users with customer information and guideline on how to use the system.

System Control Centre Diagram

The Control Centre Diagram presents the major components which made up the new system; these components are shown in the Figure 3.2, which include The User Interface, User Authentication Section, the Event Scheduling Section, Monitoring Section and Central Database Management System.

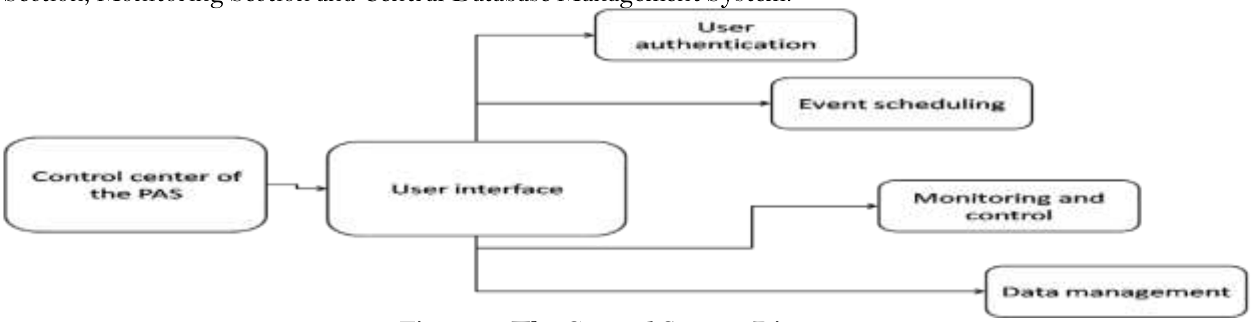
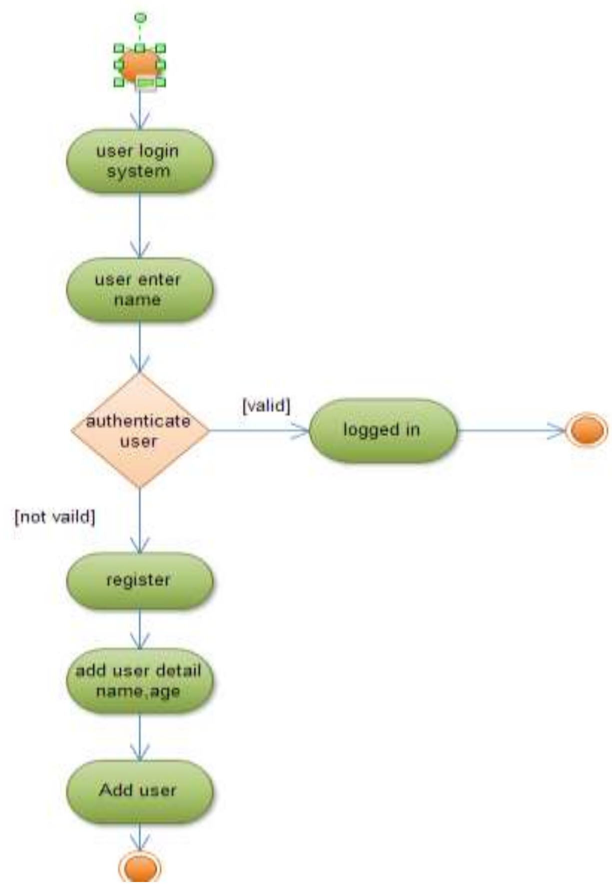


Figure 2: The Control System Diagram

Figure 2 presents the Control System Diagram of the model. It contains the core components of the system which include User Interface Section. This interface facilitates the main point for user to access system functions. The user interface houses other main components such as; the Authentication Section, which is responsible for the user registration and access control, the event scheduling, which is responsible for the selection of tasks to be assigned for workers, selection of PPE for tasks and time control function. The monitoring and control section is responsible for persuading users to adhere to PPE while carrying out duties. The section contains the reward and repercussion algorithm, the user monitoring and notification algorithm. Finally, the database management system stores the historical data, user preference and system logs.

Modelling of the User Registration (UR) Section

This section presents the user registration and login section. The aim is to provide access to legitimate users to the platform, while preventing unauthorized access. The Figure 3 presents the activity diagram of the user registration section, while Figure 4 presents the login activity of registered users.



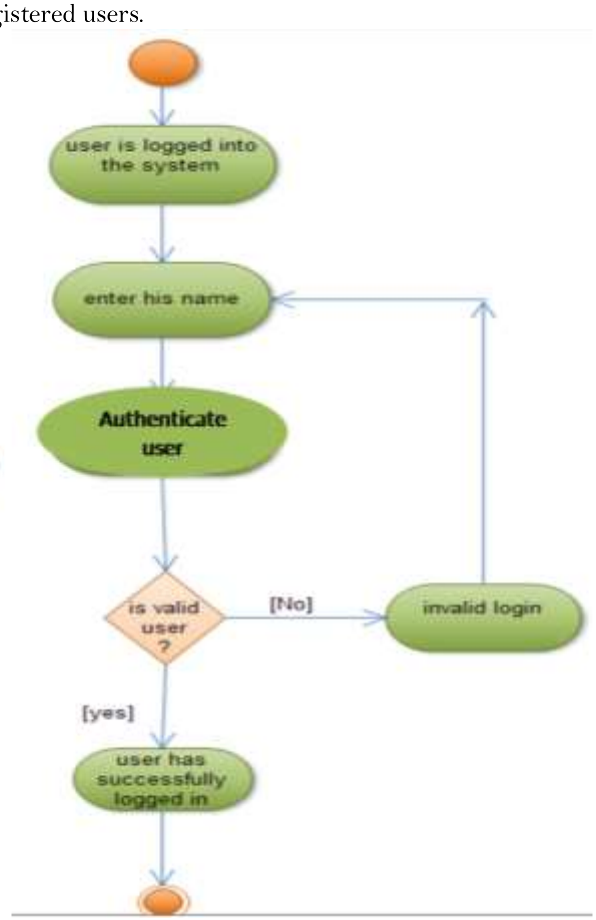


Figure 3: Activity Diagram of UR **Figure 4: Activity Diagram System Login**

The Figure 4 showed the sequence of activities by user to login to the system. The user upon registration in Figure 3 used the assigned user name and password to log into the system. The information provided by the users are then authenticated and when valid, the user is successfully logged into the system else the user is redirected to create new account.

Event Scheduling Model

The event scheduling model provides the design which facilitates the organization and management of tasks to be performed by the Doctors, Nurses and Nurse Assistants. First the model contained three databases which manages task of electronic health records collected from patients, the records of available staff and also the available PPE for each task. In the stored events, the task could include surgery's, blood transfusions, and injections. The available Staff; Doctors, Nurses and Nurse Assistants are the once assigned to these tasks. The PPE records are the protective devices needed or the implementation of a particular task. Collectively these database forms the input foundation of the task scheduling model as shown in the activity diagram of Figure 5.

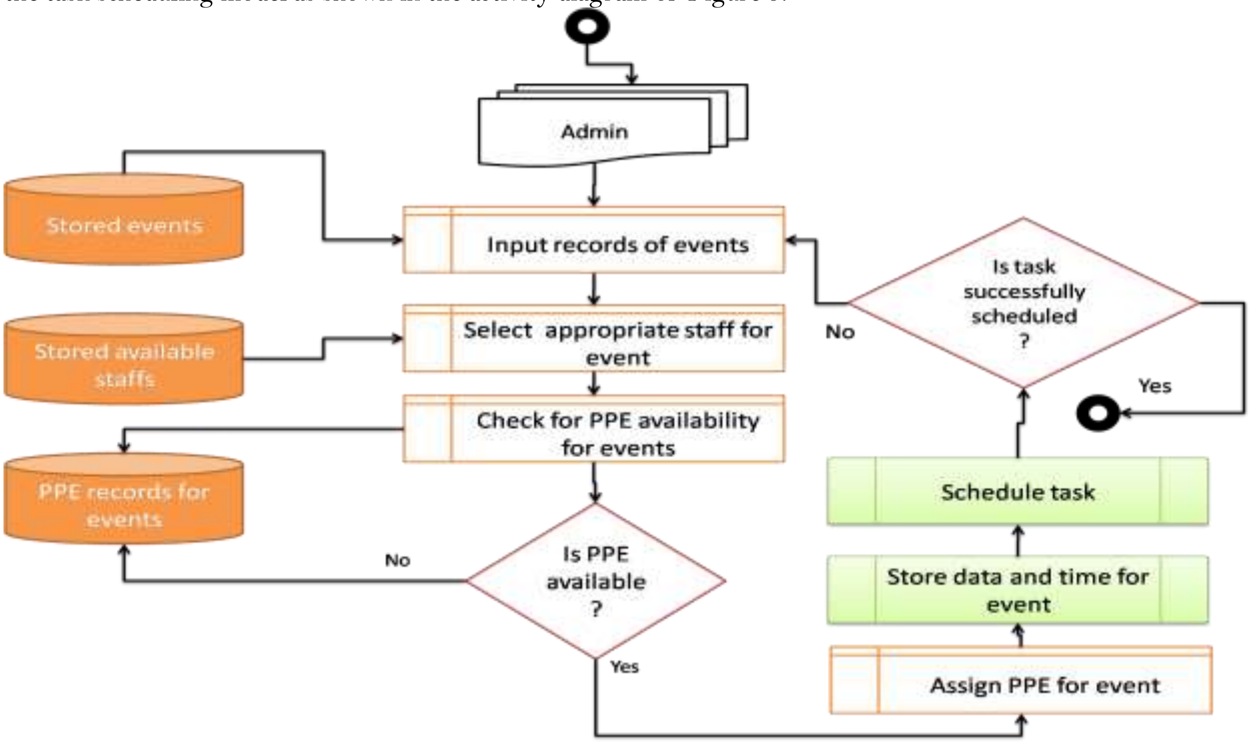


Figure 5: The Activity Diagram of the Event Scheduling Model

Figure 5 presents the model of the event scheduling system used for the PAS design. In the diagram, the admin input records of events to be carried out in the Healthcare Centre. Upon even selection, the appropriate staffs and PPE availability is inspected and if available is assigned for the event and then the data and time of task registered before task is scheduled. When task is successfully scheduled, the next section of the system as shown in control diagram (see Figure 2) continues.

Develop a Real-time Monitoring and Management Algorithm

This section presents a real time monitoring and management model which operates with the reward and repercussion algorithm to promote safety in the workplace, and also another algorithm which monitors user adherence to PPE and then send notification to management. The user monitoring algorithm operates by collecting assigned task information, date and time, then assigned entities to carry out the task. This information serves as input for the system initialization, then a rule-based approach is applied to monitor the acceptance or rejection of task by entities. Upon rejection, the admin receives the notification via email and then reassign the task to another entity, while on acceptance; a time control function is automatically initiated to monitor count down to the near time to task so as to remind the user of adherence to PPE. When the user has adhered to the PPE and accepted, the information is registered in the central database where it serves as input or the rewards and repercussion algorithm. The same principle applies when the user did not use the PPE for the task.

The modelling assumptions

- Time to first reminder = 24hours %% 1440min (24hrs*60min)
- [5min after task schedule was used instead]

- Time to second reminder = 60min %% 60min to the actual task time
- [10mins after first email was used instead]
- Time to final reminder = 30min %% 30min to actual task time
- [5mins after second email was used instead]
- PPE utilization factor of > 80 for recommendation
- PPE utilization factor of > 50 <79 for commendation
- PPE utilization factor of < 50 for query

User Monitoring Algorithm

1. Start
2. Connect to the event scheduling model
3. Load activity logs %% task, entities, date and time
4. Synchronize with GPS system data and time control function
5. Initialize Simple Mail Transfer Protocol %% protocol for email
6. Set PPE adherence status as (true or false) %% to ensure PPE is accepted and used
7. Set task time as T (min) %% Task time
8. Set even status as 1 and 0 %% 1 = accept, 0= reject
9. Check for event status %% activities scheduled and time
10. If
11. Event is status is = 1 %% entity accept to carryout task
12. Then
13. Check T status %% check time of task
14. If
15. T < 1440min %% if task is remaining 1 day (24Hr * 60min=1440min)
16. "Send notification to entity about task in 24hours
17. Else if T < 60min
18. "Send notification of task in less than 1 hour"
19. Else if T < 30min
20. "Send notification reminder of PPE adherence %% remind entity to use PPE"
21. Check for PPE acceptance status
22. If status = true, then
23. Log in report %% register to database as PPE used
24. Return to step 2
25. Else if status = false
26. Then
27. Check T status
28. If T < 15mins
29. Send notification reminder of PPE adherence
30. Wait for T < 10min
31. Check for PPE acceptance status
32. If status = true, then apply step 23
33. Else
34. Apply step 23 and register false
35. End all Ifs
36. Return to step 2
37. End

The algorithm presents the step applied to monitor the adherence to safety and acceptance of task by the user of the PPE. In the algorithm, the system initializes using data collected from the even scheduling model in Figure 3, the information then set conditions such as time of events, time to remind user of event which is 1440mins, time for first PPE adherence reminder which is 60min to task, then further reminder during 30min and 15 min to task. During these periods, the decision of the users forms the input to the repercussion algorithm developed shortly. When users adhere to PPE application for the task, it is recorded in the central database, however when the user did not accept to use the PPE or did not respond when T < 10m, then it is registered that the PPE was not used for the task. This process continues for every task once it has been accepted by the entity. The reward and repercussion algorithm evaluates the performance of the entity in measuring how well they adhere to the PPE adoption for task and then make recommendations for future compliance.

The reward and repercussion algorithm

1. Start
2. Connect the User Monitoring Algorithm (UMA)
3. Set inputs from UMA as integer
4. Fetch total number of task accepted by user as X
5. Fetch records of PPE adherence from log report for users and set as Y
6. Set user adherence factors ($F = \frac{X}{Y} * 100$) % adherence factor to PPE
7. If F >= 80%, then recommend user for award
8. Else if >= 50-79%, then recommend user for commendation
9. Else if < = 50%, then recommend user for query
10. Else
11. Return to step 2
12. End

In the reward and repercussion algorithm developed above began with the connection of the user monitoring algorithm to fetch records such as the number of task accepted by user, number of task time the user adhere to PPE. These values are converted to integer and then used to decide at the end of the year, decision to help improved adherence to PPE application to task. When the total number of adherence of users to the PPE adherence exceeds 80%, then the user is recommended for rewards, while if the rate of user adherence falls from 50% to 79%, then user is recommended for commendation with room for improvement, while when the rate of adherence of user to PPE falls below 50%, then the user is recommended for query. Figure 6 presents the activity diagram of the real time monitoring and management model.

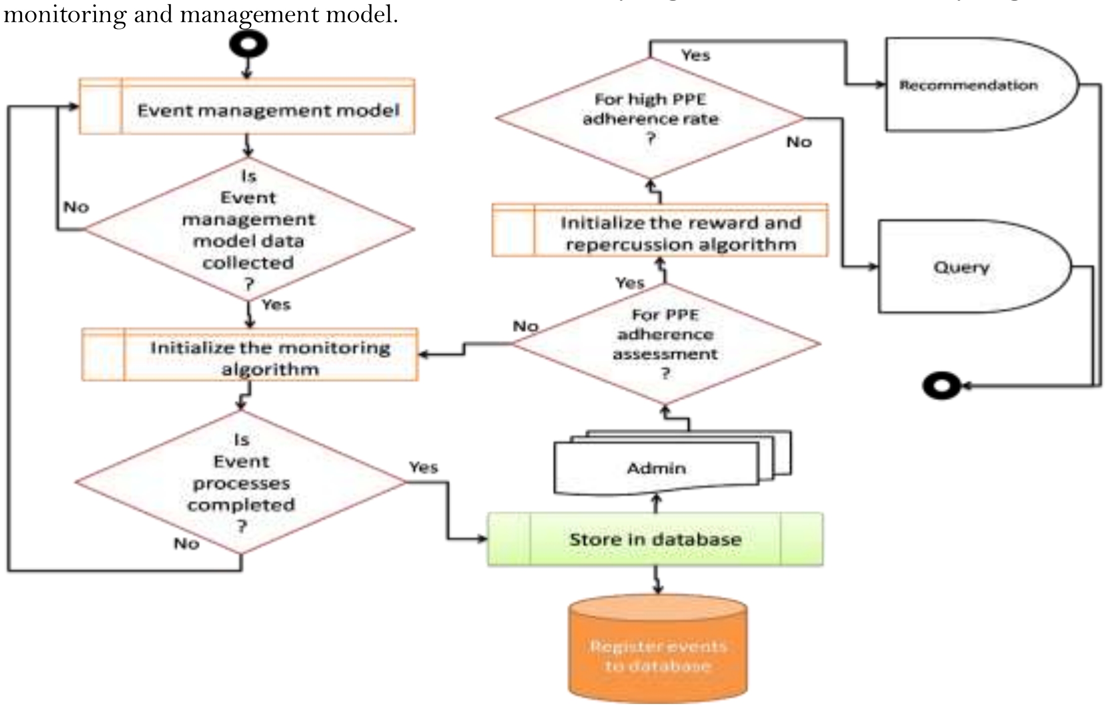


Figure 6: Activity Diagram of Real Time Monitoring and Management Model

The Figure 6 presents the activity diagram of real time monitoring and management model. The event management model provided the necessary data like task, user acceptance to task, date and time of task. This information forms the input to the monitoring algorithm which monitors for event such as acceptance of task, and time to execute the task. This information is stored in database. When the admin wants to access staff adherence to PPE, the repercussion algorithm initializes and compute the rate of staff adherence to PPE, and those identified within high adherence rat are recommended for recommendations while other are recommended for query.

System Database Design

The database design is a critical component of this persuasive application system, ensuring efficient data storage, retrieval, and management. It defines the structure, relationships, and integrity constraints of the system's data, enabling seamless user authentication, event scheduling, monitoring, and management functionalities. This section outlines the key database tables, attributes, and their relationships to support the application's real-time operations. Table 1 presents the database design for the user registration model, while Table 2 presents the database design for the event management system.

Table 1: Table of User Registration Model

Attribute	Format	Description
User_Id	INT (Primary Key, AUTO_INCREMENT)	Unique identifier for each user.
Full_Name	VARCHAR(100)	Full name of the user.
Email	VARCHAR(50)	Email address for login and communication.
Password_Hash	VARCHAR(20)	Hashed password for secure authentication.
Phone_Number	VARCHAR(15)	Contact number of the user.
Role	ENUM('Doctor', 'Nurse', 'Admin')	Defines the user's role in the system.
Registration_Date	TIMESTAMP	Date and time of user registration.
Last_Login	TIMESTAMP (NULL DEFAULT NULL)	Stores the last login time for tracking.

Table 2: Table for Event Management System

Attribute	Format	Description
Personnel_Name	VARCHAR(100)	Full name of the personnel
Contact	VARCHAR(50)	Email of the personnel
Role	VARCHAR(20)	Designation of the personnel (e.g., Doctor, Nurse)
Department	VARCHAR(100)	The department where the personnel is assigned
Completed	INT	Number of successfully completed tasks
Failed	INT	Number of failed or incomplete tasks

User Interface Design

The persuasive application system's user interface design is centred on developing an interactive, user-friendly, and intuitive platform for smooth operation and navigation. The user interface is made to make database management, event planning, real-time monitoring, and user authentication easier. To improve the user experience, it has a well-organized design with distinct menus, buttons, and notification panels. Doctors, nurses, and administrators can effectively handle assignments and receive real-time warnings thanks to the interface's adaptable design, which ensures accessibility across numerous devices. The use case diagram was presented in Figure 7.

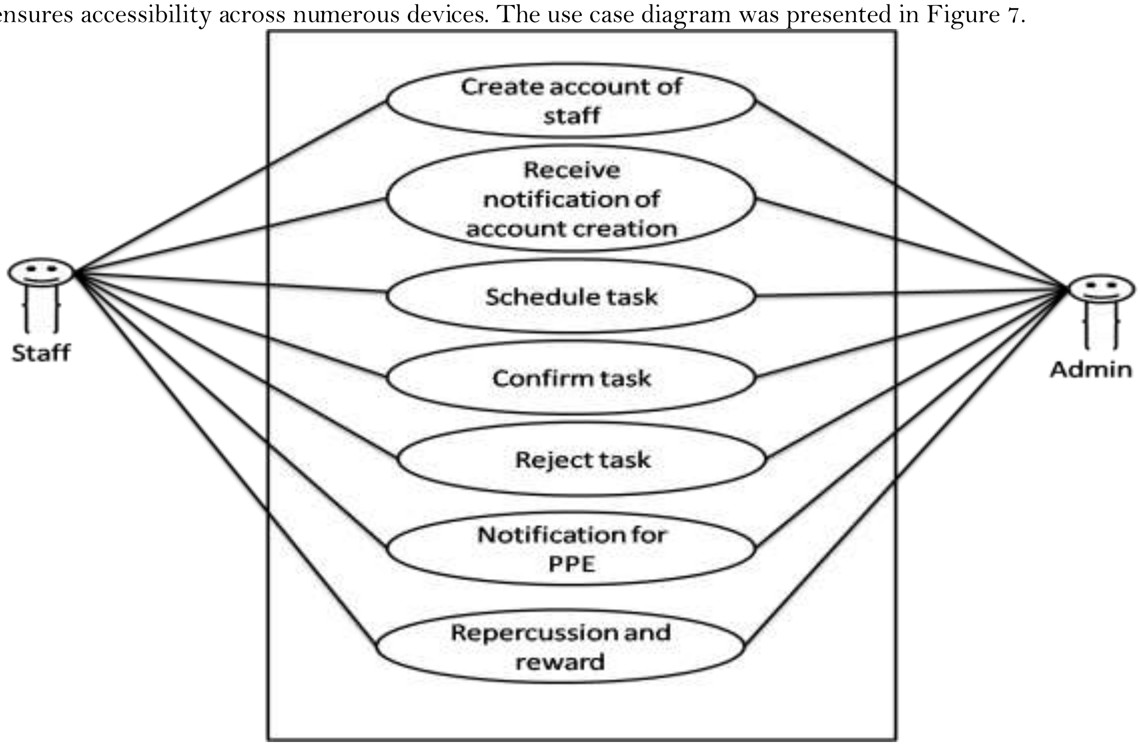


Figure 7: Use case of the PPE system

The use case diagram in Figure 7 outlines the various functions within a healthcare task and safety management system, highlighting the roles of the primary actors Admin and Staff. The main actors are the admin, while the supporting actor is the staff. Both actors are fully involved in every function shown, which indicates a two-way communication and accountability system rather than a one-directional control structure. There are no external supporting actors shown in this diagram, meaning the system operates internally between administrative control and staff execution.

The sequences are

Create account for staff
Receive notification of account creation
Task scheduling
Confirm or reject task
Notification of PPE when task is confirmed
Reward and repercussion

Brief description

The Admin acts as the system controller, responsible for creating staff accounts, scheduling tasks, and implementing the reward and repercussion system. The Staff are the end-users who receive these tasks and respond by either confirming or rejecting them. They also receive notifications regarding PPE usage and feedback on their compliance, which can result in rewards or penalties. This diagram effectively visualizes the interdependent relationship between Admin and Staff, where the Admin oversees and enforces system activities, while the Staff engage with tasks and follow safety procedures. Figure 3.8 presents the sequence diagram of the PPE system for healthcare.

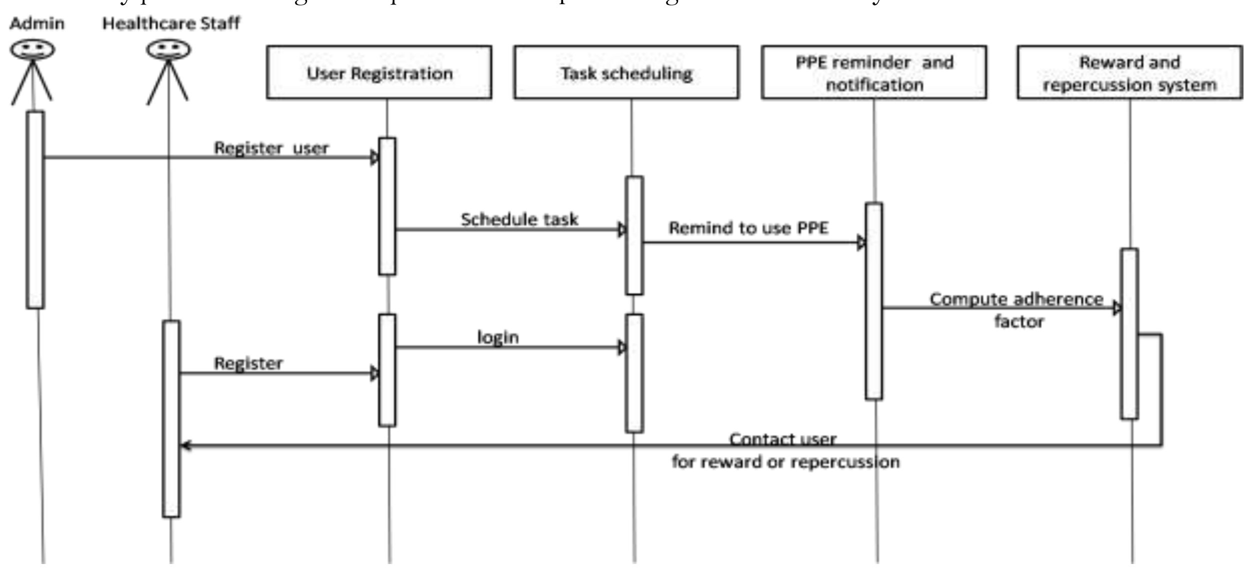


Figure 8: Sequence diagram of the PPE system

Figure 8 presents sequence diagram that describes the chronological flow of interactions between the Admin and Healthcare Staff through various system processes. It begins with the Admin initiating the user registration process by sending a registration request to the Healthcare Staff. Upon receiving and accepting the request, the Staff completes the registration and logs into the system. This triggers the next phase task scheduling where the Admin assigns tasks. The staff is notified and can then begin execution. As part of task execution, the system issues reminders to use PPE, ensuring that safety protocols are followed. The final phase involves evaluating staff performance based on their compliance and task completion, using the reward and repercussion system. Here, the Admin receives compliance data and determines whether to reward or penalize the staff. This sequence diagram highlights a structured, time-sensitive interaction where each step depends on the previous one, reflecting how administrative actions drive staff responsibilities, while the staff's behaviour and responses feed back into the system's assessment and feedback loop. It captures not just who does what, but when and in what order, adding clarity to system timing and behaviour.

SYSTEM IMPLEMENTATION

The implementation of the persuasive application system involves translating the designed models, database structures, and user interfaces into a functional system. This phase includes setting up the development environment, integrating modules, and deploying the system for real-time usage. First the environmental setup is presented. This is achieved using a combination of programming languages and frameworks. The backend is implemented using

Python (Django/Flask) for server-side logic, while HTML, CSS, and JavaScript (React) are used for the frontend. The database is managed using MySQL, which stores user information, event schedules, and monitoring data. In the module integration, the key modules, including user authentication, event scheduling, monitoring, reward/repercussion algorithm, and database management, are integrated into a single system. API Endpoints are developed to facilitate seamless communication between the frontend and backend. A user-friendly interface is designed to allow medical personnel to interact with the system efficiently. The interface includes login functionality, event scheduling forms, and monitoring dashboards to track real-time activities. The system undergoes rigorous testing, including Unit Testing, Integration Testing, and User Acceptance Testing (UAT). Bugs and Performance Issues are identified and resolved before deployment. The system is deployed on a Web Server or Cloud-based Platform for accessibility. Continuous monitoring and updates are performed to improve functionality and security based on user feedback and evolving requirements. Through these steps, the persuasive application system is successfully implemented, ensuring effective task scheduling, personnel monitoring, and performance evaluation in a hospital environment.

TESTING RESULTS OF THE SYSTEM

System testing is a critical phase in the implementation of the persuasive application system. It ensures that each component functions correctly, modules interact seamlessly, and the entire system meets user requirements. The testing process is divided into four main phases:

Unit Testing

Unit testing focuses on verifying the functionality of individual components or functions of the system. Each unit is tested independently to ensure it performs as expected. The objective is to identify and fix errors in individual modules before integration. The testing processes involves login authentication, event scheduling function, database operation and notification algorithm. The Figure 9 presents the result of the login section, while Figure 10 present result of the event scheduling output.

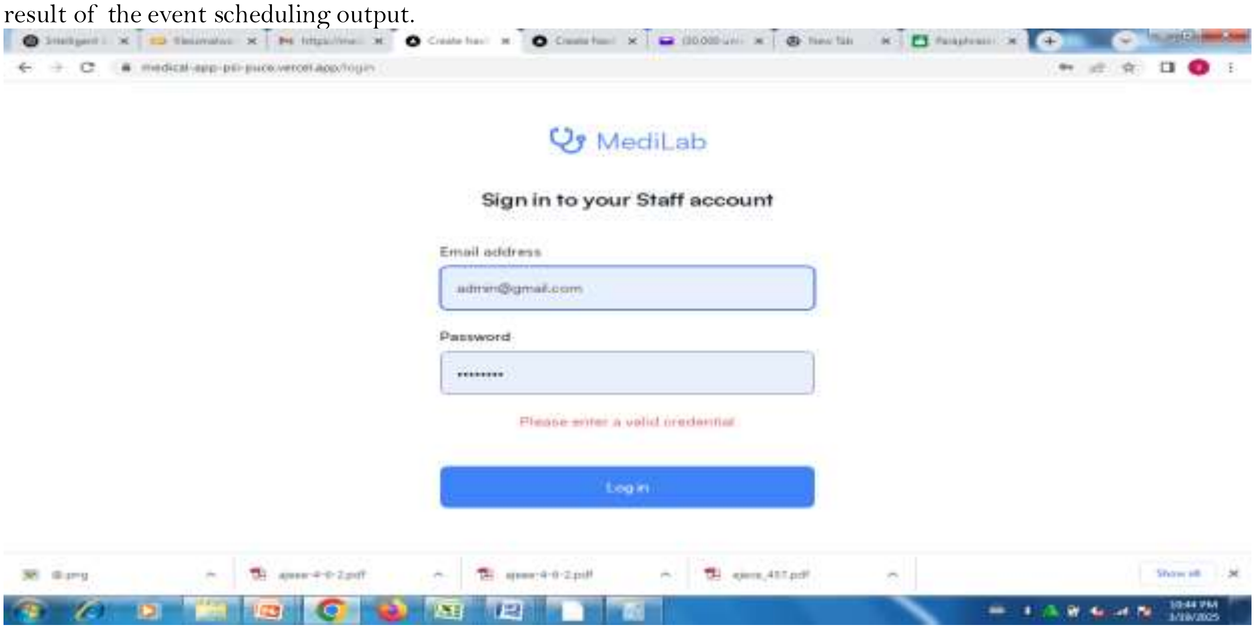


Figure 9: Result of the Login Section

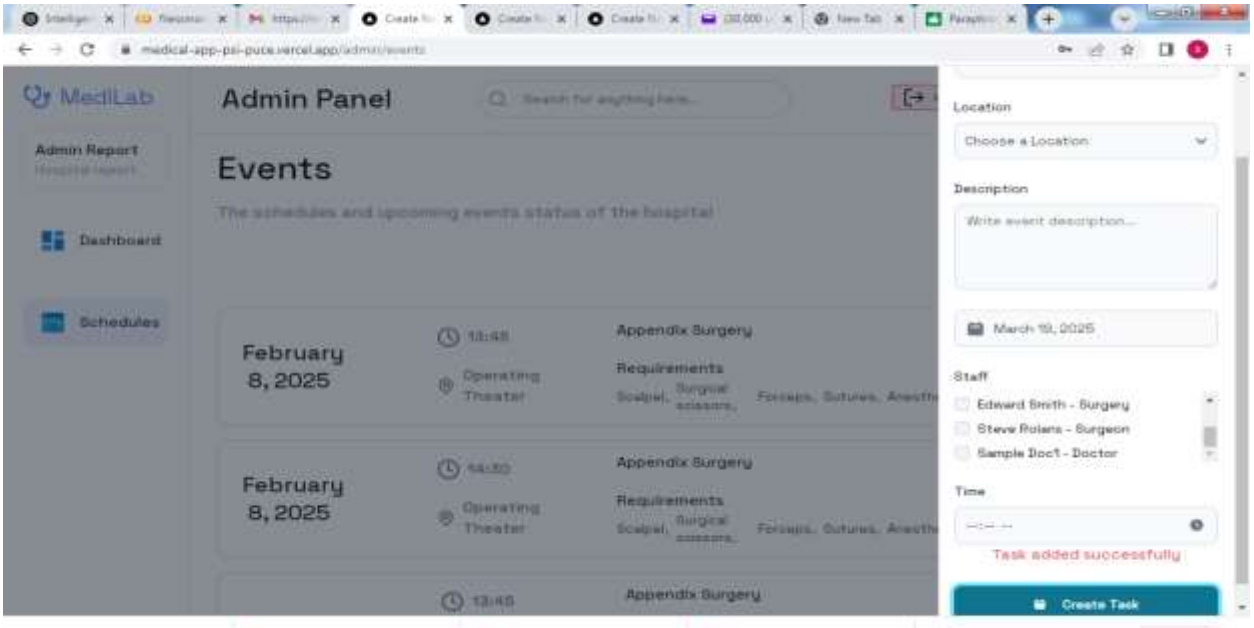


Figure 10: Result of the Event Scheduling Process

Module Testing

Module testing evaluates the performance of grouped components that work together within the system. Each module is tested as a separate unit before full system integration. The aim is to verify the related functions within a module interact correctly. Testing the event scheduling module, monitoring module, and reward/repercussion algorithm module to check if the event scheduling module correctly assigns staff and PPE based on availability. Figure 3.11 presents the results of assigned task.

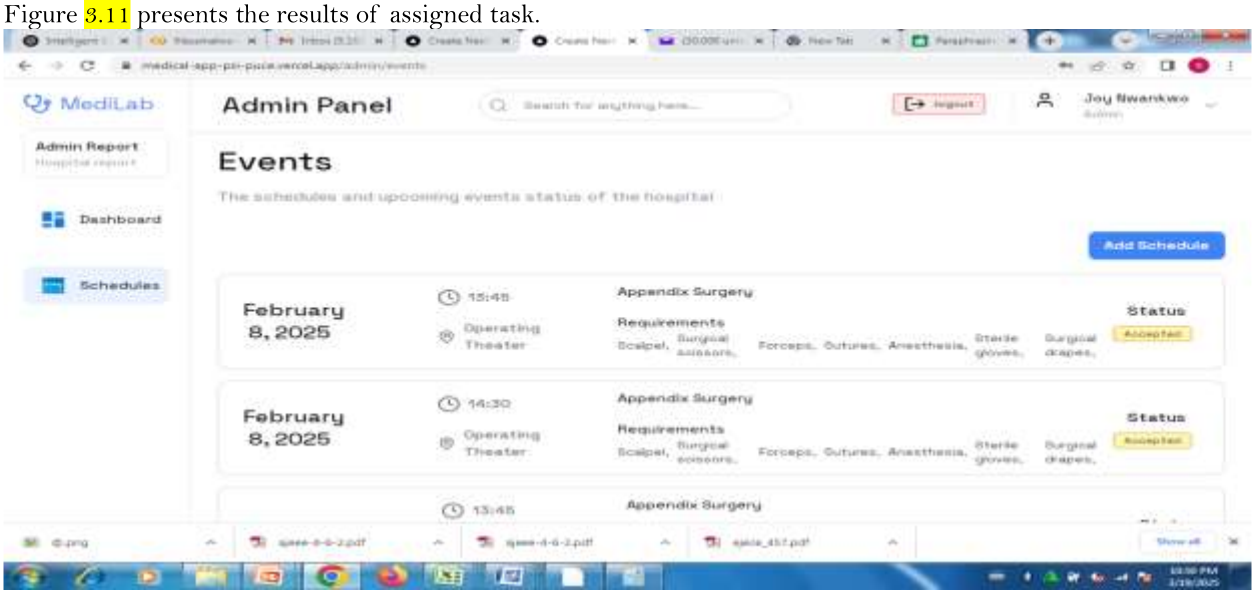


Figure 11: Result of Event Schedules

Figure 11 presents the event scheduling results, showing the event status for staffs when they are scheduled for a particular task. In the results shown above, the user was scheduled for two different tasks on the 8th of February, 2025, and it was observed that the two task was accepted by the user. In the Figure 5.4, another user which failed to accept different task was reported.

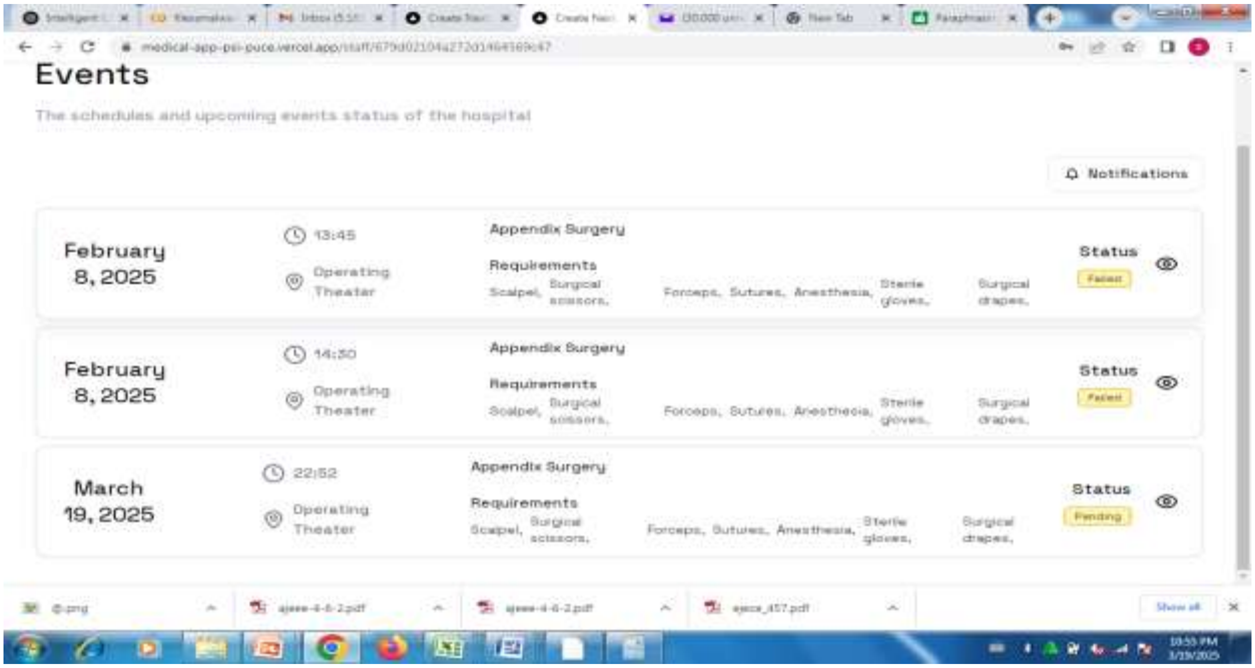


Figure 12: Result when Task was not Accepted

The Figure 12 showed that task scheduled on the 8th of February was not accepted and the status is failed, while the task scheduled on the 19th of February 2025 was still pending. Overall, these results has demonstrated that the software in line with the research design was able to successfully notify clients of task assigned to them, give them preference to either accept or reject task, while also showing the status of task at a particular time. When a particular task was ignored by the user or not accepted, the Figure 5.3 showed the mail received by the user when the task was not accepted. The Figure 12 also showed the database management system, revealing all registered events, and how the reward and repercussion algorithm monitors and compute adherence actor for the model.

Figure 13: Result of Email Notification when Task was not Accepted

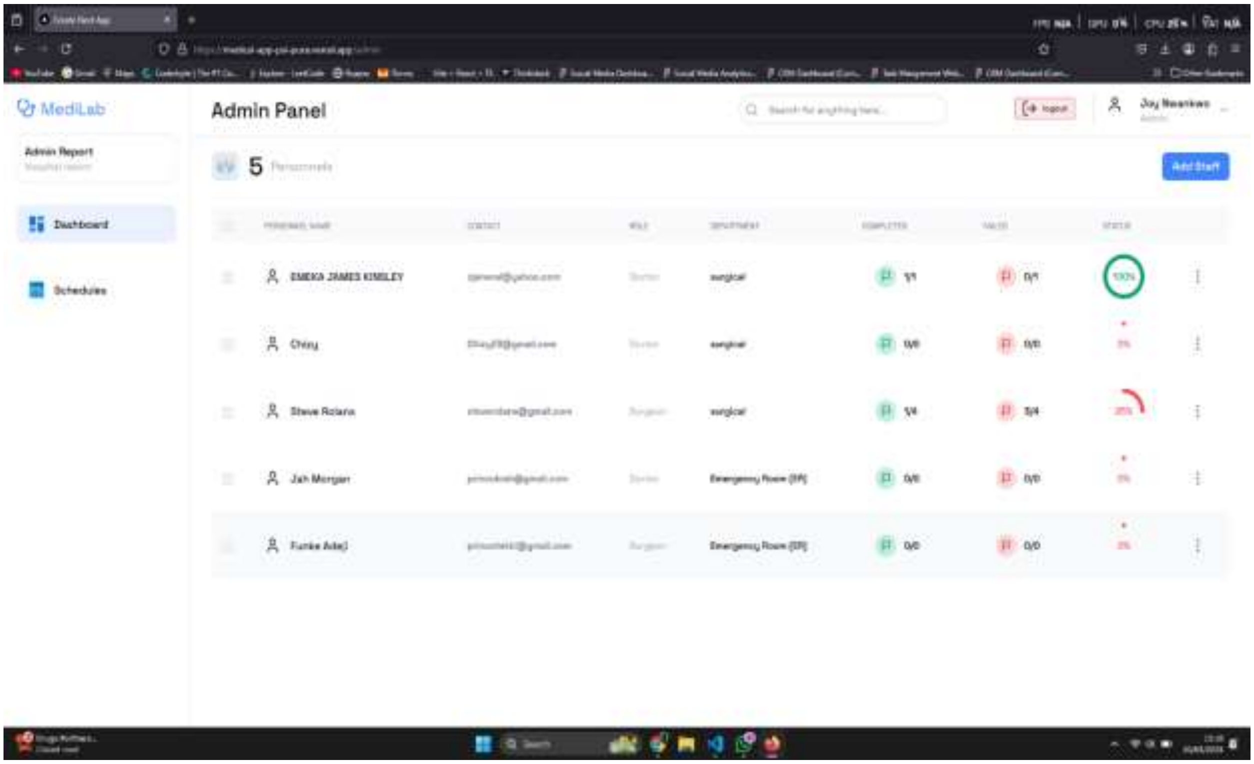


Figure 14: Result of the Repercussion and Reward Algorithm

The Figure 14 revealed the performance of the model notification module and also the repercussion and reward algorithm performance in Figure 14. The results showed the status for all staff, the number of times they have adhered to PPE, number of times they did not comply with PPE and then the PPE adherence factor are in percentage. For instance, it was observed that DR Emeka James recorded 100% adherence factor, while Dr Steve Rolans reported 25% adherence factor. What this means is that Emeka always used PPE for every task, while out of the four tasks performed by Dr. Rolan, PPE was used once.

Integration Testing

Integration testing ensures that different modules communicate and work together seamlessly. It detects inconsistencies in data flow between modules. The aim is to validate interactions between modules to ensure smooth operation. The scopes are testing database interactions, real-time updates, and data sharing between authentication, event scheduling, and monitoring modules. The idea is to ensure that once an event is scheduled, the monitoring system receives real-time updates and notifications are triggered appropriately. Figure 15 reported real time notification when account was created for a staff by the admin, while Figure 16 is the email result when task is schedules for staff by the admin.

Figure 14: Email for account created

Figure 15: Email when task is schedules

CONCLUSION

This study addresses the critical issues of occupational hazard which has claimed several lives of health care workers over the years. The focus is on doctors, nurses and nurse assistants. The primary objective is to design a persuasive application system which ensures that health care workers strictly adhere to safety rules, like the adoption of PPE for task implementation. While several work have been presented which relates to this work, there is critical gap in modelling PAS for improved occupational risk and hazard management in health care environment. The new system is made of four key components which are the login and user registration section, event scheduling and management section, real-time monitoring and notification section, reward and repercussion section. Each of this section was modelled and then integrated as software to enforce mitigation of occupational hazard through persuasive principles. Results revealed that the system not only ensure staffs adhere to PPE before carrying out as task, it also ensures transparency in tracking number of task implemented by the staff over the years, number of times the staff adhere to PPE while carrying out the task and then address bias in making recommendations for awards, commendations or query at the end of the years. In conclusion, the validation of this work at Memphis hospital Enugu, has proven that the adoption of this system in healthcare environments has great potential to save lives of workers, reduce risk of infection, contamination and exposure to dangers within occupational environments.

REFERENCES

1. Karlsson, U. & Fraenkel, C.J. (2020) COVID-19 risks to healthcare workers and their families. BMJ, 371, m3944. DOI: 10.1136/bmj.m3944, PubMed: 33115772.
2. Chaudhry, B.M. & Islam, A. (2022) A mobile application-based relational agent as a health professional for COVID-19 patients design, approach, and implications. International Journal of Environmental Research and Public Health, 19, 13794. DOI: 10.3390/ijerph192113794, PubMed: 36360674.
3. Hindu Bureau (2024) Of nearly 1,600 doctors who succumbed to COVID in India, 92 were from Karnataka. Available at https://www.thehindu.com/news/national/karnataka/of-nearly-1600-doctors-who-succumbed-to-covid-in-india-92-were-from-karnataka/article67793968.ece.
4. Ing, E.B., Xu, Q.A., Salimi, A. & Torun, N. (2020) Physician deaths from corona virus (COVID-19) disease. Occupational Medicine. PubMed, 70, 370–374. DOI: 10.1093/occmed/kqaa088, PubMed: 32409839, PubMed Central: PMC7239175.
5. Hussian, A., Mateen, A., Amin, F., Abid, M.A. & Ullah, S. (2023) Health monitoring apps: An evaluation of the persuasive system design model for human wellbeing. Information, 14, 412. DOI: 10.3390/info14070412. Health, 19, 13794. DOI: 10.3390/ijerph192113794, PubMed: 36360674.

6. Chittaro, L. (2015) Mobile persuasion for health and safety promotion. In: Proceedings of the 17th International Conference on Human-Computer Interaction with Mobile Devices and Services Adjunct, Copenhagen, Denmark. Academic Medicine, 878–882. DOI: 10.1145/2786567.2786570.
7. Lindemann, P., Koelle, M. & Kranz, M. (2015) Persuasive technologies and applications. Adv. Embed. InterAct. Syst, 3, 46.
8. Balcombe, L. & De Leo, D. (2022) Human–computer interaction in digital mental health. Informatics, 9, 14. DOI: 10.3390/informatics9010014.
9. Hamari, J., Koivisto, J. &Pakkanen, T. (2014) Do persuasive technologies persuade?—A review of empirical studies. In: Proceedings of the International Conference on Persuasive Technology, Padua, Italy (edited by A. Spagnolli, L. Chittaro& L. Gamberini). Springer, pp. 118–136. DOI: 10.1007/978-3-319-07127-5_11.
10. Kim, G., Hwang, D., Park, J., Kim, H.K. & Hwang, E.S. (2024) How to design and evaluate mHealth apps? A case study of a mobile personal health record app. Electronics, 13, 213. DOI: 10.3390/electronics13010213.
11. Hensher, M., Cooper, P., Dona, S.W.A., Angeles, M.R., Nguyen, D., Heynsbergh, N., Chatterton, M.L. &Peeters, A. (2021) Scoping review Development and assessment of evaluation frameworks of mobile health apps for recommendations to consumers. Journal of the American Medical Informatics Association, 28, 1318–1329. DOI: 10.1093/jamia/ocab041, PubMed: 33787894.
12. Oyibo, K., Gonzalez, P., Ejaz, S., Naheyan, T., Beaton, C., O'Donnell, D. & Barker, J. (2022). Exploring the Use of Persuasive System Design Principles to Enhance Medication Incident Reporting and Learning Systems. JMIR Preprints https://preprints.jmir.org/preprint/41557.
13. Wang, C. & Qi, H. (2021) Influencing factors of acceptance and use behavior of mobile health application users systematic [Review]. Healthcare, 9, 357, 9030357. DOI: 10.3390/healthcare.
14. Alsyouf, A., Lutfi, A., Alsubahi, N., Alhazmi, F.N., Al-Mugheed, K., Anshasi, R.J., Alharbi, N.I. &Albugami, M. (2023) The use of a technology acceptance model (TAM) to predict patients' usage of a personal health record system the role of security, privacy, and usability. International Journal of Environmental Research and Public Health, 20, 1347. DOI: 10.3390/ijerph20021347, PubMed: 36674105.

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