INTERNATIONAL JOURNAL OF RESEARCH AND INNOVATION IN SOCIAL SCIENCE (IJRISS)
ISSN No. 2454-6186 | DOI: 10.47772/IJRISS | Volume X Issue I January 2026

Wearable Personal Hygiene Reminder

Lhyrance Ahra Ghem S. Cundiman[1], Ryan Christian M. Hombre[2], Maurice Robie O. Merin[3],Jhanna Samson[4], Jushua Estilo Villalobos[5], Minerva C. Zoleta[6]

Computer Engineering Department, Eulogio "Amang" Rodriguez Institute of Science and Technology, Nagtahan Street, Sampaloc, Manila, 1008, Philippines

DOI: https://doi.org/10.47772/IJRISS.2026.10100214

Received: 18 January 2026; Accepted: 24 January 2026; Published: 31 January 2026

ABSTRACT

This study presents the development and testing of a Wearable Personal Hygiene Reminder that automates toothbrushing alerts using an embedded system approach. The system integrates an Arduino Nano microcontroller, DS3231 Real-Time Clock (RTC), OLED display, active buzzer, magnetic reed sensor, and a 3.7V LiPo battery to monitor and validate brushing schedules. The RTC provides accurate timing for morning, afternoon, and evening alerts, while the buzzer issues continuous notifications until the brushing task is performed. The magnetic reed sensor ensures brushing meets the required duration and reactivates reminders if stopped prematurely.

The system was prototyped and tested in a controlled environment. A total of 10 structured test cases were conducted, evaluating alert timing, brushing validation, buzzer notifications, and display feedback. Results demonstrated reliable alert scheduling, accurate task verification, and continuous feedback, ensuring consistent tooth-brushing behavior.

The study's key contribution is demonstrating an accessible, low-cost, wearable solution for promoting oral hygiene, with potential future enhancements including LCD display integration, wireless notifications, IoT monitoring, and automated brushing tracking for health applications.

Keywords: Wearable Device, Oral Hygiene, Arduino Nano, Real-Time Clock (RTC), Magnetic Reed Sensor, Buzzer Alert

INTRODUCTION

Oral hygiene is a fundamental aspect of health maintenance, yet many individuals fail to adhere to regular toothbrushing routines, resulting in dental complications such as cavities, gingivitis, and halitosis. Inconsistent brushing behavior is often attributed to forgetfulness or insufficient motivation, underscoring the need for automated mechanisms that support disciplined oral care. Advances in embedded systems and wearable technologies provide a viable solution by enabling real-time reminders and task monitoring.

Conventional oral hygiene practices rely predominantly on individual awareness to ensure brushing schedules. In the absence of automated feedback, users may omit sessions or terminate brushing prematurely, thereby compromising oral health outcomes. These limitations including the lack of continuous alerts, absence of task verification, and dependence on manual routines contribute to inconsistent oral hygiene practices and associated health risks.

Prior research on oral hygiene monitoring has explored microcontroller-based wearable devices and sensor integration; however, many existing systems do not offer continuous feedback, real-time verification, or low cost, accessible designs suitable for daily use. This highlights a need for a practical, instructional, and functional wearable platform capable of promoting regular tooth-brushing behavior.

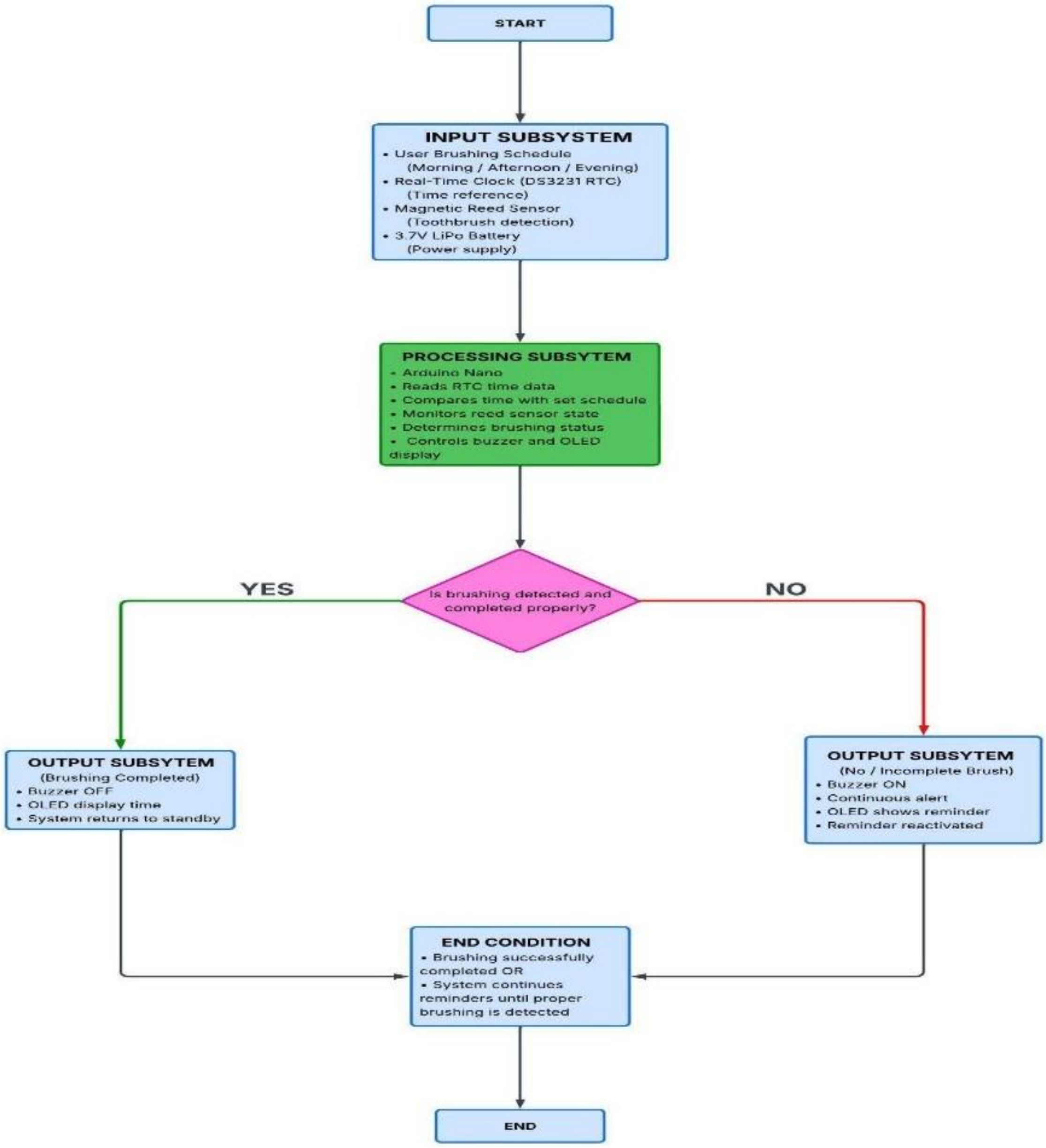
To address this gap, this study developed a Wearable Personal Hygiene Reminder utilizing an Arduino Nano microcontroller. The system integrates a DS3231 Real-Time Clock (RTC), an OLED display, an active buzzer, and a magnetic reed sensor to provide timely alerts and ensure brushing compliance. Housed in a durable acrylic wearable enclosure and powered by a 3.7V LiPo battery, the device delivers visual and auditory feedback, reactivates reminders if brushing is interrupted, and exemplifies a low-cost, practical approach to enhancing consistent oral hygiene habits.

REVIEW OF RELEVANT THEORY, STUDIES, AND LITERATURE

Theoretical Framework

The theoretical framework establishes the scientific and technological principles guiding the design, operation, and evaluation of the Wearable Personal Hygiene Reminder. The system integrates real-time scheduling, sensor based task validation, and automated alert mechanisms to ensure consistent and proper tooth brushing. The Arduino Nano microcontroller processes input from the DS3231 Real-Time Clock (RTC) and the magnetic reed sensor to control the buzzer and OLED display, providing timely reminders and continuous notifications until the brushing task is completed.

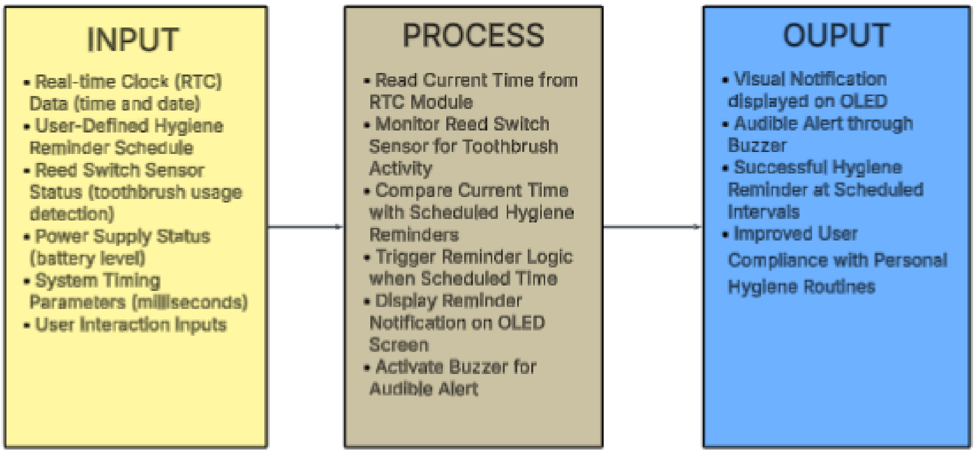
Figure 1. System Theory



The user sets a brushing schedule (morning, afternoon, evening). The Arduino Nano processes input from the RTC and the magnetic reed sensor to control the buzzer and OLED display. The buzzer provides continuous alerts until the toothbrush is picked up, while the OLED shows time and notifications. The magnetic reed sensor validates task completion, and if brushing is stopped prematurely, the system reactivates the reminder.

ISSN No. 2454-6186 | DOI: 10.47772/IJRISS | Volume X Issue I January 2026

Figure 2. Input–Process–Output



The Input–Process–Output (IPO) Model describes the functional flow of the Wearable Personal Hygiene Reminder system. For the input stage, the user's brushing schedule is set, the magnetic reed sensor detects the presence of the toothbrush, and system settings are configured. During the process stage, the Arduino Nano processes the RTC time and sensor data, determines whether it is time to issue a reminder, validates if the brushing task has been properly performed, and activates the buzzer and OLED display accordingly. For the output stage, the buzzer sounds continuously until the toothbrush is picked up, the OLED displays the current time and notification messages, and the system reactivates the reminder if brushing is prematurely stopped. Through this model, the system ensures predictable, consistent, and reliable reminders that promote proper oral hygiene habits.

Framework Summary

This study integrates multiple theoretical and conceptual frameworks to guide the design, operation, and evaluation of the Wearable Personal Hygiene Reminder. The Behavioral Learning Theory underpins the system's approach to habit formation, emphasizing the importance of cues, feedback, and reinforcement in promoting consistent tooth-brushing behavior. Embedded Systems Theory provides the technical foundation, explaining how the Arduino Nano, sensors, and real-time clock work together to execute automated, real-time monitoring and alerts. Control Systems Theory ensures that reminders are issued consistently and continuously, maintaining desired outputs by comparing actual behavior with scheduled brushing routines and making real time adjustments. Human–Computer Interaction (HCI) Theory guides the design of the user interface, emphasizing usability, clarity, and intuitive interaction through the OLED display, buzzer, and sensor feedback mechanisms.

Together, these frameworks support a system that not only automates reminders and validates task completion but also engages the user effectively, ensuring reliable and disciplined oral hygiene practices. By combining behavioral, technological, control, and interaction principles, the Wearable Personal Hygiene Reminder demonstrates a comprehensive approach to improving personal health routines.

RELATED LITERATURE

Recent studies highlight the use of automated and sensor-based systems in promoting health and hygiene practices. These systems demonstrate how technology can improve adherence to recommended routines through timely reminders, monitoring, and task validation.

Smart Hygiene Devices

A study on a Smart Ultrasonic Hand Sanitizer Dispenser (Sari et al., 2020) utilized an ultrasonic sensor and Arduino microcontroller to provide touchless alcohol dispensing. The system accurately detected hand presence, controlled the dispensing volume, and provided reliable alerts, reducing cross-contamination and ensuring consistent sanitizer use. The success of this system shows that sensor-based automation can significantly improve personal hygiene practices.

ISSN No. 2454-6186 | DOI: 10.47772/IJRISS | Volume X Issue I January 2026

Electronic Tooth-Brushing Reminders

Research by Chen et al. (2018) on electronic tooth-brushing reminder devices demonstrated that children and adults increased brushing frequency when using devices with audible reminders and task-validation mechanisms. The study emphasized that continuous alerts and feedback help establish disciplined brushing habits and prevent premature task termination.

Wearable Health Devices

Wearable devices, such as fitness trackers and health monitors, have been widely studied for their ability to influence health behavior (Patel et al., 2015). These devices provide real-time feedback through notifications, vibration alerts, and activity monitoring, leading to increased adherence to exercise, medication, or hygiene routines. Their effectiveness lies in combining convenience, real-time interaction, and task tracking.

Embedded and Sensor-Based Reminders

Several studies on embedded system applications in health monitoring demonstrate that combining microcontrollers, sensors, and displays can create reliable, automated reminder systems. For example, real-time clock (RTC) modules ensure accurate timing, while sensors validate user actions to prevent premature task completion (Khan et al., 2019).

Table 1. Comparison Matrix of Related Studies and Current Research

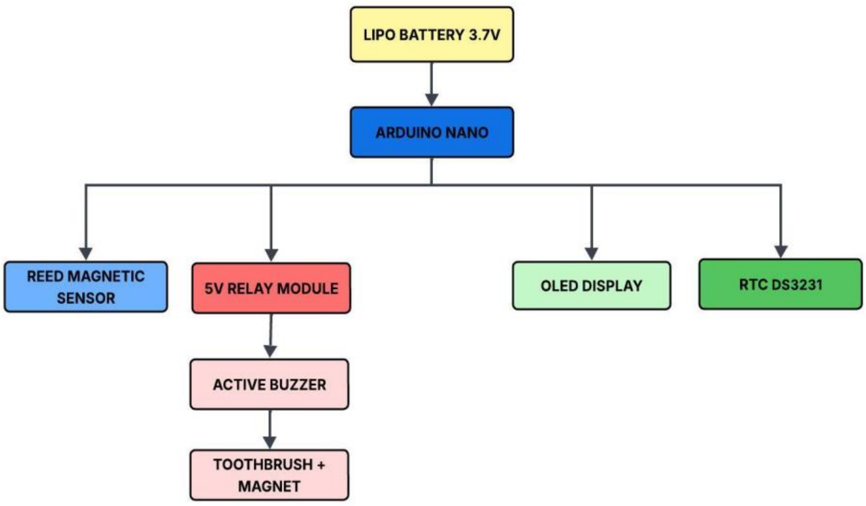
Study / Device	Purpose / Objective	Technology Used	Key Features	Limitations	Relevance to Current Study
Chen et al. (2018)	Increase tooth brushing frequency in children and adults	Timer-based alerts, buzzer	Audible reminders, task validation	Limited portability, no wearable integration	Supports use of reminders and task validation for oral hygiene
Patel et al. (2015)	Encourage healthy behavior (exercise, medication, hygiene)	Microcontrollers, sensors, vibration alerts, displays	Real-time feedback, task tracking, wearable design	General health monitoring, not specific to oral hygiene	Demonstrates effectiveness of wearable devices with continuous
					alerts and feedback
Khan et al. (2019)	Improve adherence to health routines through automated reminders	Microcontrollers, RTC, sensors, displays	Real-time scheduling, sensor validation, automated notifications	Focused on general health, not tooth brush specific	Provides embedded system principles and real-time reminder functionality for the current study

Current Study	Promote consistent oral hygiene through automated, wearable reminders	Arduino Nano, DS3231 RTC, OLED, Buzzer, Magnetic Reed Sensor	Timed reminders, continuous alerts, toothbrush detection, wearable design	Needs testing for long-term user adherence	Integrates lessons from previous studies to create a wearable, fully automated oral hygiene reminder system

METHODOLOGY

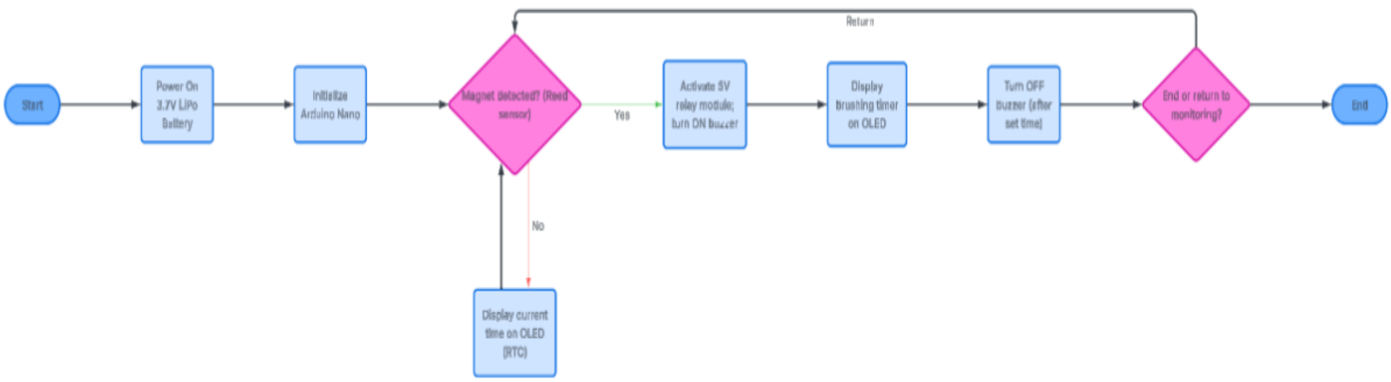
This study employed a descriptive and experimental research design to develop, implement, and evaluate a Wearable Personal Hygiene Reminder system. The descriptive aspect focuses on documenting the design, components, and functionality of the wearable device, while the experimental aspect involves testing the prototype to assess the effectiveness of reminders, task-validation mechanisms, and overall usability.

Figure 3. Block Diagram



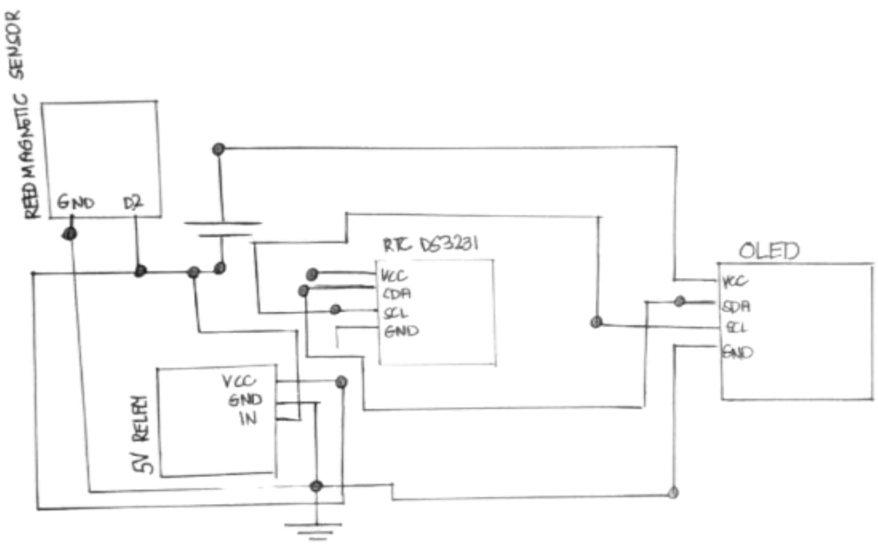
The block diagram shows a system powered by a 3.7V LiPo battery where the Arduino Nano acts as the main controller, receiving input from a reed magnetic sensor that detects the presence of a magnet on the toothbrush, processing the data with time information from the RTC DS3231, displaying output on an OLED display, and activating an active buzzer through a 5V relay module when the set condition is met.

Figure 4. System Logic Flowchart



The system flowchart explains how the device operates step by step, starting when the system is powered on by the 3.7V LiPo battery and the Arduino Nano is initialized. After initialization, the Arduino continuously checks the reed magnetic sensor to detect whether a magnet is present. If no magnet is detected, the system keeps monitoring the sensor and displays the current time on the OLED screen using data from the RTC. When the magnet is detected, the Arduino activates the 5V relay module, which turns on the active buzzer. At the same time, the system displays the brushing timer on the OLED display. Once the set time is completed, the buzzer is turned off and the process ends or returns to monitoring, ensuring the system only activates when the toothbrush with the magnet is detected.

Figure 5. Schematic Diagram



The schematic shows a 3.7V LiPo battery connected to a TP4056 charger module, which regulates power to the Arduino Nano through its VIN pin. The Arduino distributes 5V to peripherals including the OLED display, RTC module, relay, and buzzer, while all components share a common ground. The Reed switch connects to digital pin D2, allowing the Arduino to detect door open or close events. Communication between the Arduino, RTC, and OLED occurs over the I2C bus using pins A4 (SDA) and A5 (SCL). Digital outputs from the Arduino control the relay via D4 and the buzzer via D8, providing both device switching and audible alerts.

System Testing and Evaluation

Testing was conducted in a controlled indoor environment through repeated operational trials of the wearable device. The Wearable Personal Hygiene Reminder was observed to evaluate reminder accuracy, magnetic reed sensor detection, buzzer responsiveness, and system stability. System behavior during scheduled brushing times was compared with expected outcomes to assess the effectiveness of continuous alerts and brushing task validation.

Data Collection and Analysis

Data collected during testing included reminder activation timing, toothbrush detection status, buzzer ON/OFF responses, and OLED display outputs. Observational analysis was used to determine whether the system consistently enforced proper brushing duration and reactivated reminders when brushing was prematurely stopped.

RESULTS

The Wearable Personal Hygiene Reminder consistently provided scheduled tooth-brushing alerts and effectively monitored user activity throughout repeated trials. Accurate timekeeping was maintained via the DS3231 RTC, while the magnetic reed sensor reliably detected toothbrush usage, allowing the Arduino Nano to control the buzzer and update the OLED display in real time.

ISSN No. 2454-6186 | DOI: 10.47772/IJRISS | Volume X Issue I January 2026

The OLED presented clear reminder messages, including "Brush Time," along with the current time, date, and day. The buzzer activated at the scheduled brushing intervals and deactivated only when brushing commenced. If brushing was stopped prematurely—before the three-minute minimum—the system immediately reactivated the buzzer to ensure task completion.

The device performed stably across all test scenarios, issuing reminders as intended without any malfunctions. The coordinated operation of the Arduino Nano, RTC, sensor, buzzer, and OLED display confirmed accurate monitoring and dependable feedback.

Overall, these results demonstrate that the system meets its functional objectives, delivering timely alerts, validating brushing activity, and providing continuous feedback to support proper oral hygiene habits.

Requirements

Functional Requirements:

The Wearable Personal Hygiene Reminder ensures consistent oral hygiene by triggering scheduled brushing alerts in the morning, afternoon, and evening. The buzzer notifies the user until the magnetic reed sensor detects the toothbrush, and it reactivates if brushing stops prematurely before the three-minute duration. The OLED display provides real-time information, including the current time, date and day and reminder messages. All control logic is managed by the Arduino Nano, while the wearable design, enclosed in a durable acrylic casing with a wrist strap, ensures portability and comfort.

Non-Functional Requirements:

The system delivers reliable and responsive operation, immediately updating alerts and displaying information as conditions change. Safety and accuracy are ensured through precise RTC timekeeping and sensor detection, preventing premature task termination. The OLED display provides stable, clear feedback, and the buzzer produces consistent audible alerts. Powered by a 3.7V LiPo battery, the device operates efficiently for extended periods, offering a user-friendly and dependable solution for promoting proper oral hygiene habits.

Table 2. Variables and Conditions of the Wearable Personal Hygiene Reminder

Variable / Component	Type (Input / Output)	Parameter Measured / Controlled	Condition or Range	System Response / Action
Arduino Nano	Controller	Processes RTC & sensor data, controls buzzer and OLED	Always ON during operation	Executes reminder schedule, validates brushing task, activates/deactivates buzzer and OLED
Real-Time Clock (DS3231 RTC)	Input	Current time	Continuous (HH:MM:SS)	Provides time reference for Arduino to compare with schedule
Magnetic Reed Sensor	Input	Toothbrush presence	Detected (lifted) / Not Detected (not lifted)	Arduino stops buzzer when brushing starts; reactivates if toothbrush returned <3 min

Buzzer	Output	Audible reminder	ON / OFF	Alerts user to start or continue brushing; continuous until task validated
OLED Display	Output	Visual feedback	Always ON during operation	Displays current time, date, and brushing reminders
3.7V LiPo Battery	Input / Power	Power supply	Fully charged / Low battery	Provides energy for continuous operation; device requires recharge if low

Table 3. Variables and Conditions of the Wearable Personal Hygiene Reminder

Test #	Input Condition	Observed Output	Expected Output	Pass / Fail	Remarks / Behavior Explanation
1	System powered ON	Arduino initializes RTC, buzzer, and OLED	System components should initialize	Pass	Confirms Arduino Nano is always ON during operation
2	Current time reaches scheduled reminder	Buzzer turns ON; reminder shown on OLED	Buzzer and OLED reminder should activate	Pass	DS3231 RTC provides accurate time for scheduling
3	Toothbrush lifted (reed sensor detected)	Buzzer turns OFF	Buzzer should stop when brushing starts	Pass	Magnetic reed sensor correctly detects toothbrush presence
4	Toothbrush returned in less than 3 minutes	Buzzer turns ON again	Reminder should resume	Pass	Ensures brushing duration is validated
5	Toothbrush lifted continuously for ≥3 minutes	Buzzer remains OFF	Brushing task should be accepted as complete	Pass	System correctly validates brushing activity
6	System running normally	OLED displays time and reminder status	OLED should display time and reminders	Pass	Provides continuous visual feedback to the user
7	Continuous operation	No system interruption	System should remain stable	Pass	Confirms reliable control by Arduino Nano

8	Battery level drops to low	Device continues operating; recharge required	System should notify user to recharge	Pass	3.7V LiPo battery supplies power until recharge is needed
9	Battery fully charged	System runs normally	Device should operate without interruption	Pass	Confirms proper power supply condition
10	Reminder active with no brushing detected	Buzzer remains ON	Buzzer should stay ON until task starts	Pass	Ensures user is consistently reminded

The results confirm that the wearable personal hygiene reminder system effectively enforces proper toothbrushing behavior by prioritizing time-based reminders and toothbrush detection over user inactivity. The consistent activation of the buzzer at scheduled intervals and its deactivation only upon confirmed toothbrush use demonstrate the accurate implementation of the system's hygiene-reminder logic.

The reliable response of the system—where the buzzer stops when brushing begins and reactivates if the toothbrush is returned in less than the required duration—reflects correct application of real-time monitoring and validation principles. Continuous time tracking through the RTC and immediate feedback via the buzzer and OLED display ensure that user actions are accurately detected and appropriately acknowledged.

Furthermore, the integration of the Arduino Nano with the DS3231 RTC, magnetic reed sensor, buzzer, and OLED display provides a simple yet effective wearable solution that balances usability and system reliability. The successful execution of all test scenarios indicates that the system is dependable, responsive, and suitable for educational, health-monitoring, and small-scale wearable electronics applications.

DISCUSSION

The results confirm that the Wearable Personal Hygiene Reminder reliably delivers scheduled tooth-brushing alerts and accurately validates user activity through sensor-based monitoring. The coordinated operation of the Arduino Nano, real-time clock, magnetic reed sensor, buzzer, and OLED display ensured consistent system response, stable operation, and continuous user feedback. These findings support prior research indicating that automated reminders and task validation mechanisms can positively influence hygiene-related behaviors.

Although the system performed consistently during controlled testing, the present evaluation focused primarily on functional validation. Quantitative performance metrics such as response time, detection error rate, and battery efficiency were not formally measured. Incorporating these objective metrics would enable a more rigorous technical assessment and facilitate direct comparison with similar wearable hygiene reminder systems. Future iterations may also benefit from benchmarking the proposed system against existing wearable health devices in terms of responsiveness, power consumption, and accuracy.

The current testing environment allowed reliable observation of system behavior; however, extending evaluation to real-world user conditions would further strengthen the applicability of the findings. Long-term field testing could reveal user interaction patterns, comfort considerations, and potential environmental factors affecting sensor reliability. Additionally, while the system enforces brushing duration effectively, future studies could incorporate statistical methods to validate improvements in user compliance through controlled or longitudinal experimentation.

Overall, the proposed system demonstrates functional advantages over basic timer-based reminders by integrating real-time monitoring and continuous feedback in a wearable form. A more critical comparison with existing wearable hygiene systems would further clarify its relative strengths and limitations within the broader context of wearable health technologies.

CONCLUSION AND RECOMMENDATIONS

This study successfully designed and evaluated a wearable personal hygiene reminder capable of providing automated tooth-brushing alerts and validating user activity through sensor-driven monitoring. The system demonstrated reliable scheduling, accurate toothbrush detection, and stable performance across all test scenarios. These results confirm the feasibility of a low-cost, microcontroller-based wearable solution for promoting consistent oral hygiene behavior.

To enhance the scientific rigor and practical relevance of future work, it is recommended that quantitative evaluation measures—such as response time, system error rate, and battery efficiency—be incorporated into system testing. Expanding evaluation to real-world user environments is also advised to assess long-term usability, comfort, and behavioral impact. Future research may further strengthen findings by applying statistical analysis to measure improvements in user compliance before and after device adoption.

In addition, conducting a concise cost analysis and implementing user satisfaction surveys would provide valuable insight into economic feasibility, user acceptance, and scalability. Refinement of language, formatting, and presentation to align with academic publication standards is likewise encouraged. Collectively, these improvements would strengthen the contribution of the Wearable Personal Hygiene Reminder to wearable health technology research and support its potential deployment in educational and personal health applications.

ACKNOWLEDGEMENTS

The researchers wish to extend their profound gratitude to the Department of Computer Engineering of the College of Engineering at the Eulogio “Amang” Rodriguez Institute of Science and Technology (EARIST),

Nagtahan, Manila, for their invaluable guidance, support, and insightful contributions throughout the course of this project.

Special appreciation is sincerely directed to their adviser, Engr. Minerva C. Zoleta, whose unwavering guidance, expertise, patience, and encouragement were instrumental in the successful completion of this study. Her dedication and professional insights greatly contributed to the refinement and overall quality of the research.

The researchers also express their heartfelt thanks to their families, relatives, classmates, and peers for their continuous encouragement, understanding, and unwavering support. Their sacrifices, trust, and confidence served as a constant source of motivation, especially during the most challenging stages of this research journey.

Furthermore, the researchers acknowledge the contributions of instructors, laboratory personnel, and colleagues who, in various capacities, assisted in validating ideas, refining concepts, and enhancing the overall quality of this study.

Above all, the researchers offer their deepest gratitude to God Almighty for granting wisdom, perseverance, protection, and guidance throughout the completion of this work. His divine grace and providence made every step of this journey meaningful and achievable.

REFERENCES

1. Chen, et al. (2018). [Electronic tooth-brushing reminder devices and their effect on brushing frequency]. PubMed Central. Retrieved from https://pmc.ncbi.nlm.nih.gov/articles/PMC12495205/
2. Khan, U., Raza, A., & Malik, S. (2019). Embedded systems and sensor-based reminders in health monitoring.
3. Patel, M. S., Asch, D. A., & Volpp, K. G. (2015). Wearable devices as facilitators, not drivers, of health behavior change. JAMA, 313(5), 459–460. https://doi.org/10.1001/jama.2014.14781
4. Sari, et al. (2020). Design and implementation of a smart hand sanitizer dispenser using microcontrollers and sensors

5. Wang, H.-C., Li, J.-H., Liu, J.-H., et al. (2024). Machine learning-based toothbrushing region recognition using smart toothbrush sensors. MDPI Sensors, 15(12), 798. https://www.mdpi.com/2079-6374/15/12/798
6. Zeppetella, L., et al. (2024). Automated tooth brushing detection using smartwatch wearable sensors. Retrieved from https://scholarworks.uni.edu/facpub/6509/

About the Authors

Lhyrance Ahra Ghem S. Cundiman is a BS Computer Engineering student at the Eulogio “Amang” Rodriguez Institute of Science and Technology (EARIST). Her interests include embedded systems, hardware–software integration, and emerging computing technologies, and she aims to pursue a career in the computer engineering field.

Ryan Christian M. Hombre is an undergraduate student at Eulogio “Amang” Rodriguez Institute of Science and Technology (EARIST), currently completing his degree. He has a strong interest in deep learning and software development, with a focus on exploring innovative solutions through technology. Ryan is committed to enhancing his skills and knowledge while contributing meaningfully to his academic community and preparing for a successful future in the field of computing

Maurice Robie O. Merin is pursuing a Bachelor’s in Computer Engineering at the Eulogio “Amang” Rodriguez Institute of Science and Technology (EARIST), developing skills in computer systems, electronics, and programming, with interests in embedded systems, hardware–software integration, and emerging computing technologies.

Ms. Jhanna Samson is a Computer Engineering student who is majoring in systems design and technical innovation. At the moment, she is working on her Bachelor of Science in Computer Engineering at Eulogio "Amang" Rodriguez Institute of Science and Technology. Her education has provided her with a solid training in hardware and software development. She is situated in Quezon City and is very much into examining the meeting points of new technology and engineering solutions.

Mr. Jushua E. Villalobos is a student and aspiring practitioner in the field of Computer Engineering at the Eulogio “Amang” Rodriguez Institute of Science and Technology (EARIST). Through academic coursework, hands-on projects, and practical activities, he has developed a solid foundation in computer hardware, programming, and sensor-based systems. He has a strong interest in programming and hardware sensors, particularly in applications involving embedded systems and automation. Driven by curiosity and a passion for technology, he continuously seeks to enhance his technical skills and apply theoretical knowledge to real-world engineering problems, with the goal of contributing to future advancements in the field of computer engineering.

Engr. Minerva C. Zoleta, a Professional Computer Engineer, is a dedicated Computer Engineering Professor at the Eulogio “Amang” Rodriguez Institute of Science and Technology in the Philippines, specializing in Embedded Systems, Operating Systems, and Computer Network and Security. With a strong background in academia and industry. She has been instrumental in shaping the next generation of Engineers through innovative teaching methods and hands-on research. Engr. Zoleta holds a Master’s degree in Electrical Engineering major in Computer Engineering at Technological University of the Philippines, Manila and is pursuing her doctorate degree in Engineering with specialization in Computer Engineering at Technological Institute of the Philippines. She has presented published research on topics such as Embedded System, IoT applications, and wireless communication international conferences and journals. Passionate about technology-driven solutions, She has led various projects integrating smart systems into real-world applications, contributing to the advancement of local and international engineering communities.