IARJSET ISSN (O) 2393-8021, ISSN (P) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology
Impact Factor 8.311 ⁘ Peer-reviewed & Refereed journal ⁘ Vol. 12, Issue 10, October 2025
DOI: 10.17148/IARJSET.2025.121044

Comprehensive Review on AIOT System for Medicine Dispensing and Wearable Health Monitoring

USHA. B[1], RAKSHITH. G[2], M. GREESHMA[3], V. KUNJANA[4], DR. KAVITHA N[5]

Students, Department of Electronics and Communication Engineering, RV Institute of Technology and Management[1-4]

Assistant professor, Department of Electronics and Communication Engineering, RV Institute of Technology and Management[5]

Abstract: This study explores the convergence of the Internet of Things (IoT), image processing, artificial intelligence (AI), and machine learning (ML) to revolutionize medication compliance and improve patient monitoring in modern healthcare systems. It explores an advanced system that converges an automated dispensing device for medication with a wearable biometric wristband, which is preinstalled with sensors for real-time monitoring of physiological indicators such including heart rate, body temperature, and motion dynamics. The integrated solution facilitates real-time health monitoring and ensures accurate delivery of drugs. Advanced AI/ML technologies are employed for verifying dispensing accuracy and delivering predictive health assessments. The study emphasizes how this revolutionary integration enables key challenges in continuous health monitoring, remote care, drug adherence, and data security with scalable and user-centric healthcare approach.

Keywords: IoT, image processing, artificial intelligence, machine learning, medication adherence, automated medication dispensing, wearable biometric wristband, real-time health tracking.

I. INTRODUCTION

The careful administration of medications is a vital part of ensuring good health, but despite its importance, the current manual dispensing systems often fall short. Common issues include mistakes like incorrect dosages, missed medications, and a lack of clear communication between healthcare providers. These problems become even more pronounced for elderly individuals and those with chronic illnesses, where strict adherence to medication schedules is absolutely essential for their well-being. When these errors occur, the impact on a patient's health can be significant, and they can also drive up healthcare costs, putting both patients and healthcare systems at greater risk .Although automated medication dispensers have been introduced to reduce human error, these systems still often lack the ability to monitor patients in real- time, which is crucial for ensuring that medication is not only dispensed correctly but also taken as prescribed. Without continuous tracking of a patient's health, these systems miss the opportunity to provide ongoing support, detect early signs of trouble, or adapt quickly if a patient's condition changes.This is where our innovative solution comes in. We're proposing a truly integrated approach that combines an automated pill dispenser with a wearable wristband. This wristband, equipped with advanced sensors, continuously monitors important health metrics such as heart rate, body temperature, and physical activity. By doing so, it offers real-time insights into how the patient is doing, ensuring that the system can respond instantly to any changes in their condition. What makes this system truly groundbreaking is the use of artificial intelligence (AI) and machine learning (ML). These technologies allow the system to do much more than simply dispense the right medication at the right time. They can predict potential health issues before they happen, detect any abnormalities in the patient's condition, and even adjust the dispensing of medication based on real-time data. This capability makes the system far more advanced than traditional methods, which rely on human intervention and are prone to errors. With AI-driven verification and predictive analytics, the system can autonomously adjust medication doses based on a patient's current health status, significantly reducing risks associated with misdosing or non-adherence. Additionally, the integration of machine learning means that the system can personalize each patient's care plan. As the patient's health evolves, the system learns from this data and adapts accordingly, ensuring that medication delivery remains aligned with their changing needs. For example, if a patient's condition improves or worsens, the system can make adjustments to their medication schedule to ensure it remains effective. This makes the entire treatment process much more flexible and responsive, which is particularly important for patients with complex or fluctuating health conditions. Ultimately, this intelligent, integrated solution doesn't just automate the process of dispensing medications—it enhances the entire care journey. It ensures that patients receive the right treatment at the right time, while also offering

IARJSET ISSN (O) 2393-8021, ISSN (P) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

Impact Factor 8.311 ⪤ Peer-reviewed & Refereed journal ⪤ Vol. 12, Issue 10, October 2025

DOI: 10.17148/IARJSET.2025.121044

healthcare providers the tools they need to offer more precise, personalized care

By taking a proactive approach to medication management and health monitoring, we can help prevent mistakes, reduce health risks, and improve patient outcomes, all while making the healthcare process more efficient and less costly. In essence, this system represents a future where healthcare is not just reactive but proactive— where technology helps us anticipate and address problems before they arise, offering a higher level of care and peace of mind for patients and their families.For decades, managing elderly healthcare— especially when it came to medication and health monitoring— relied heavily on routine, memory, and human oversight. Medication was typically organized in basic plastic pillboxes, divided by days of the week or times of day. While they served as a helpful visual aid, these tools had no way of knowing if a pill was actually taken or skipped. The responsibility for remembering doses usually fell on the patient or a caregiver, which became risky for those dealing with forgetfulness or complex regimens.Health check-ups were also handled manually. Vital signs like temperature, heart rate, and blood pressure were only recorded during doctor visits or scheduled home calls. Healthcare workers used traditional tools—analog thermometers, blood pressure cuffs, and stethoscopes—to take these measurements. But these readings captured only a moment in time. Without ongoing monitoring, early warning signs often slipped through the cracks, meaning interventions came too late or only after complications had already set in.Day- to-day supervision depended mostly on caregivers— whether family members, nurses, or staff in eldercare homes. Simple reminders to take medication or attend appointments were often managed using sticky notes, phone alarms, or wall calendars. These methods, while familiar, couldn't offer real-time feedback or adapt to changing health conditions.Patient records were kept in paper files, often tucked away in cabinets at clinics or in caregivers' notebooks. These documents had to be physically carried or faxed to other professionals, making communication slow and disjointed. This lack of centralized, digital information made it difficult to see long-term patterns or adjust treatment plans quickly.Treatment approaches were largely generalized, based on common protocols for specific age groups or conditions. Personalization was rare, simply because there wasn't enough real-time data available to support it. Doctors could only make changes when symptoms were reported, often long after the ideal moment for early intervention had passed.And when emergencies did happen—like a fall or a sudden drop in blood pressure—there was no automatic way to detect it. If a patient was alone, the situation could go unnoticed for hours, posing serious risks. These limitations highlighted the need for more proactive and connected systems of care.

II. LITERATURE REVIEW

Recent advancements in wearable health technologies have transformed how we monitor health. One innovative system enables real-time tracking of vital signs like ECG, body temperature, and oxygen saturation, with added GPS and emergency alerts for immediate medical intervention in emergencies [1]. While this technology outperforms many alternatives in terms of accuracy, challenges like motion artifacts, sensor calibration, and power consumption due to continuous GPS usage still limit its usability and long-term functionality.Beyond tracking basic vital signs, wearable devices are incorporating haptic feedback, particularly in virtual reality (VR) applications. For instance, a wearable glove equipped with servo motors and modular fingertip attachments enhances VR immersion by providing tactile feedback. This is beneficial for rehabilitation and training environments [2], though the complexity of the design and the need for precise calibration may make it less accessible to users without technical expertise.The merging of wearable biosensors and IoT-enabled pill dispensers is another significant step in healthcare innovation. This integrated system allows caregivers to monitor both vital signs and medication adherence remotely, offering valuable support for managing chronic diseases, particularly among elderly individuals. By reducing medication errors and improving adherence, the system holds great potential [3], although challenges with device interoperability and system complexity could impede seamless integration across various healthcare platforms.Another advancement is the use of Giant Magnetoresistance (GMR) sensors in wearable cardiovascular monitors. These sensors provide better data accuracy across different skin tones compared to traditional optical sensors [4]. While real-time calibration enhances reliability, the size and complexity of these devices may reduce user comfort and wearability over extended periods.For aging populations, wearable devices equipped with artificial intelligence (AI) and barometric pressure sensors are helping to detect falls and abnormal movements, issuing alerts to caregivers or emergency services [5]. Although effective in providing quick assistance, false positives from sudden but harmless movements highlight the need for improved sensor placement and machine learning calibration.In a study assessing stress detection wearables, researchers compared consumer-grade devices with clinical-grade ECG systems to measure heart rate variability in drivers. The results indicated that while consumer devices offer some insights, they are less effective in detecting rapid heart rate variability, a crucial marker for stress [6]. This highlights the need for hybrid systems that combine the portability of wearables with clinical- grade accuracy for real-time stress monitoring.For low- cost healthcare applications, a smart health T- shirt with embedded sensors and GSM network connectivity offers a promising solution, particularly for rural or underserved regions. This wearable device provides continuous health monitoring and can transmit alerts, though it depends on robust sensor calibration and network connectivity to be effective. Durability and battery life also present challenges that must be addressed to ensure reliable long-term use [7].A new intelligent pill dispenser designed for medication management uses biometric authentication and environmental sensors to ensure safe drug administration and adherence. With real- time notifications to caregivers, it aims to improve medication compliance. However, for this system to be effective, it needs to ensure accurate biometric recognition and user-friendly interfaces, especially for older adults [8].In the field of telemedicine, a Wi- Fi- based health monitoring platform has been developed to support low-latency communication for applications such as telesurgery and remote diagnostics. This platform enables synchronous data sharing between medical devices, but its effectiveness in home settings is limited by bandwidth fluctuations and potential cybersecurity risks, which must be addressed for safe use [9].Edge computing has made it possible for epilepsy monitoring devices to analyze EEG signals directly on the device, reducing response latency and energy consumption. This is particularly useful in areas with poor connectivity. However, the effectiveness of these devices depends on noise-free EEG signals and their ability to offer user comfort for extended wear [10].For seniors, mobile app- integrated pill dispensers with SMS notifications provide valuable tools for caregivers to monitor medication adherence remotely. These devices also offer visual and auditory reminders to patients, improving adherence. However, challenges like poor mobile coverage and a lack of familiarity with smartphone interfaces may limit their effectiveness, highlighting the need for designs that cater to users with diverse technological proficiency levels [11].A study on the adoption of AI-powered wearables among Older adults identified factors such as trust, perceived usefulness, and ease of use as key drivers of adoption. However, concerns about privacy and the fear of becoming overly reliant on technology remain significant barriers. This suggests that wearables should be designed with ergonomic features and accompanied by educational efforts to build trust and ease the integration of these tools into daily life [12].Wearable technologies for visually impaired and elderly individuals are also making strides in health monitoring. These devices integrate sensors for tracking health metrics, GPS for navigation, emergency alerts, and voice feedback to facilitate communication with caregivers. While they offer significant safety benefits, challenges such as frequent charging and complex setup processes may reduce user engagement, particularly for those unfamiliar with technology [13].Looking to the future, miniaturization is a key factor in the evolution of wearable health devices. The shift toward continuous health monitoring systems that track vital signs around the clock is gaining momentum, yet challenges such as limited battery life, data privacy concerns, and high costs need to be addressed before these systems can be widely adopted [14].In neurological care, a wearable device featuring a semi-supervised learning algorithm has been designed to detect rare nighttime seizure activity in patients with autoimmune conditions. The device improves detection accuracy over time but still requires refinement for clinical reliability and comfort during sleep [15].Medication adherence is further supported by a tactile-friendly, Wi-Fi-connected pill dispenser that uses textile sensors and real-time alerts to engage users. While it is particularly beneficial for older adults, the system's high manufacturing costs and durability concerns could limit its widespread adoption [16].AI-enhanced ECG wearables that provide real-time heart rate variability analysis offer a promising solution for cardiovascular care. These devices can predict heart-related risks with high accuracy, but their effectiveness depends on precise sensor placement and long-term user comfort [17].A multi-sensor wearable designed to monitor mood states using biometric signals such as sweat composition and heart rate variability is advancing mental health monitoring. While this approach offers valuable insights, challenges related to data interpretation and sensor calibration affect its usability and practicality [18].For diabetes management, a skin- based, non-invasive glucose monitoring patch offers a pain-free alternative to traditional finger pricks. The system provides real-time feedback to help users manage their blood sugar levels more effectively, although concerns about skin irritation and long-term sensor reliability remain [19].A lightweight bracelet that uses photoplethysmography (PPG) to monitor blood oxygen saturation and heart rate during physical activity is another important development in respiratory health. Although portable and dynamic, the device may face challenges in maintaining accuracy during intense physical movements or exercise [20].For workers in high-risk environments, a wearable system that combines body temperature tracking with environmental sensors has been developed to prevent heatstroke. Alerts are sent to both users and supervisors to ensure timely intervention. However, its success depends on environmental awareness and the willingness of users to follow the system's recommendations [21].A skin-adhesive patch designed to monitor moisture levels helps prevent dehydration in athletes and patients. While minimally invasive, the system's effectiveness is reliant on user adherence and sensor reliability over time [22].To monitor gait and prevent falls, a smart ankle band equipped with motion sensors tracks movement patterns and sends alerts when irregularities are detected. The device's success is contingent on precise calibration of sensors and the user's comfort during prolonged wear [23].Next-generation wearable technologies are increasingly integrating sensors directly into textiles, creating smart fabrics that enable continuous tracking of vital signs like respiration and posture. These textiles offer seamless integration into everyday clothing, enhancing comfort while monitoring health. However, concerns over durability in real-world conditions and ensuring consistent data integrity remain significant challenges in making this technology widely applicable [24].Sleep health has also seen innovation with portable sleep trackers designed to monitor various sleep stages and identify potential sleep disorders. These devices utilize embedded sensors and personalized algorithms to provide valuable insights. However, their effectiveness relies heavily on the comfort of the user and the fidelity of the signals during sleep, which can be affected by movement or poor sensor placement [25].For individuals in extreme environmental conditions, such as workers in cold or hot climates, a smart jacket equipped with climate control and health monitoring capabilities has been developed. This jacket helps maintain an optimal body temperature while also monitoring vital signs. Although this technology is highly advanced, its practical application may be hindered by concerns over battery life and the overall complexity of the system, which could limit its everyday usability [26].AI- powered wearables designed to monitor lung function and ambient air quality have revolutionized how respiratory conditions like asthma are managed. These devices enable proactive care by providing real-time data on environmental triggers and lung performance. However, the continuous monitoring required may feel intrusive for some users, and maintaining high sensor accuracy over time is crucial for ensuring consistent effectiveness [27].Neurological applications also benefit from wearable technology, particularly EEG- based devices that detect abnormal brain activity in real time. These wearables alert caregivers to potential seizures or tremors, particularly in patients with conditions like Parkinson's disease. While they offer significant benefits, the high sensitivity of these devices can lead to false positives, suggesting the need for improved pattern recognition algorithms to reduce unnecessary alerts [28].Finally, wearables for managing asthma and allergies have seen advancements with environmental-trigger-aware devices. These wearables detect changes in temperature and humidity, alerting patients to potential triggers for their conditions. [29]

IV. DEVELOPMENT OF TECHNOLOGY IN ELDERLY ASSISSTANCE

Technology designed for elderly assistance has entered a new era with the integration of IoT-enabled devices. What used to be simple wearables for tracking steps or heart rate have evolved into intelligent systems capable of monitoring a wide range of health parameters. Devices can now continuously track ECG signals, oxygen saturation levels, body temperature, and even detect sudden falls using built-in pressure or motion sensors. These features are especially valuable for older adults who may be managing chronic conditions or living alone, offering peace of mind to both users and their caregivers

A.The Role of Embedded processors and edge computing

Behind the seamless functioning of these advanced wearables is the quiet but powerful evolution of embedded processors and edge computing technologies. In the past, most health monitoring devices depended heavily on cloud servers to process and analyze data. Today, low-power, high-efficiency processors allow many of these operations to be handled directly on the device. This means faster response times and less dependence on a stable internet connection—an essential feature in rural or resource-limited settings where connectivity is often unreliable.Take, for example, a smart T-shirt that continuously records a user's vital signs. Thanks to integrated processors, it can analyze trends in heart rate or respiration and instantly alert healthcare providers if something seems off. Similarly, wearable epilepsy monitors can now detect abnormal brain activity using on-device analysis, reducing the delay between detection and alert. These processors are built to balance speed, accuracy, and energy efficiency, ensuring that devices can remain functional throughout the day without needing constant recharging. As more wearable health devices are introduced into homes, this decentralized processing approach will become crucial to creating reliable, responsive, and cost-effective healthcare solutions. are introduced into homes, this decentralized processing approach will become crucial to creating reliable, responsive, and cost-effective healthcare solutions.

B. Artifical intelligence in image recognition and verification

Artificial intelligence is transforming how we understand and interact with wearable health technologies, particularly in image processing and verification tasks. AI algorithms are now being used in wearable devices and smart pill dispensers to perform facial recognition, ensuring that the correct individual receives the correct dose of medication. This is especially useful in multi-user environments such as assisted living facilities, where such errors can have serious consequences. AI systems can also interpret subtle visual cues—like changes in posture or facial expressions—to detect signs of pain, confusion, or distress.More sophisticated systems incorporate gesture recognition and behavioral pattern analysis, allowing them to detect when a user is struggling to move or exhibiting unusual behavior that could indicate a fall or medical issue. For example, if a device notices that an elderly user has remained in the same posture for an unusually long time or is showing signs of trembling, it can automatically trigger a safety check or alert caregivers. However, these applications require extremely accurate image processing to avoid false alarms. Lighting conditions, camera placement, and even the user's facial expressions can impact the reliability of AI-powered recognition systems. To make these technologies more dependable, ongoing improvements in machine learning models, sensor calibration, and user- specific training data

C.The Role of Embedded processors and edge computing

Behind the seamless functioning of these advanced wearables is the quiet but powerful evolution of embedded processors and edge computing technologies. In the past, most health monitoring devices depended heavily on cloud servers to process and analyze data. Today, low-power, high-efficiency processors allow many of these operations to be handled directly on the device. This means faster response times and less dependence on a stable internet connection—an

IARJSET ISSN (O) 2393-8021, ISSN (P) 2394-1588
International Advanced Research Journal in Science, Engineering and Technology
Impact Factor 8.311 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 12, Issue 10, October 2025
DOI: 10.17148/IARJSET.2025.121044

essential feature in rural or resource-limited settings where connectivity is often unreliable.Take, for example, a smart T-shirt that continuously records a user's vital signs. Thanks to integrated processors, it can analyze trends in heart rate or respiration and instantly alert healthcare providers if something seems off. Similarly, wearable epilepsy monitors can now detect abnormal brain activity using on-device analysis, reducing the delay between detection and alert. These processors are built to balance speed, accuracy, and energy efficiency, ensuring that devices can remain functional throughout the day without needing constant recharging. As more wearable health devices are introduced into homes, this decentralized processing approach will become crucial to creating reliable, responsive, and cost-effective healthcare solutions. are introduced into homes, this decentralized processing approach will become crucial to creating reliable, responsive, and cost-effective healthcare solutions.

D.Artifical intelligence in image recognition and verification

Artificial intelligence is transforming how we understand and interact with wearable health technologies, particularly in image processing and verification tasks. AI algorithms are now being used in wearable devices and smart pill dispensers to perform facial recognition, ensuring that the correct individual receives the correct dose of medication. This is especially useful in multi-user environments such as assisted living facilities, where such errors can have serious consequences. AI systems can also interpret subtle visual cues—like changes in posture or facial expressions—to detect signs of pain, confusion, or distress.More sophisticated systems incorporate gesture recognition and behavioral pattern analysis, allowing them to detect when a user is struggling to move or exhibiting unusual behavior that could indicate a fall or medical issue. For example, if a device notices that an elderly user has remained in the same posture for an unusually long time or is showing signs of trembling, it can automatically trigger a safety check or alert caregivers. However, these applications require extremely accurate image processing to avoid false alarms. Lighting conditions, camera placement, and even the user's facial expressions can impact the reliability of AI-powered recognition systems. To make these technologies more dependable, ongoing improvements in machine learning models, sensor calibration, and user- specific training data

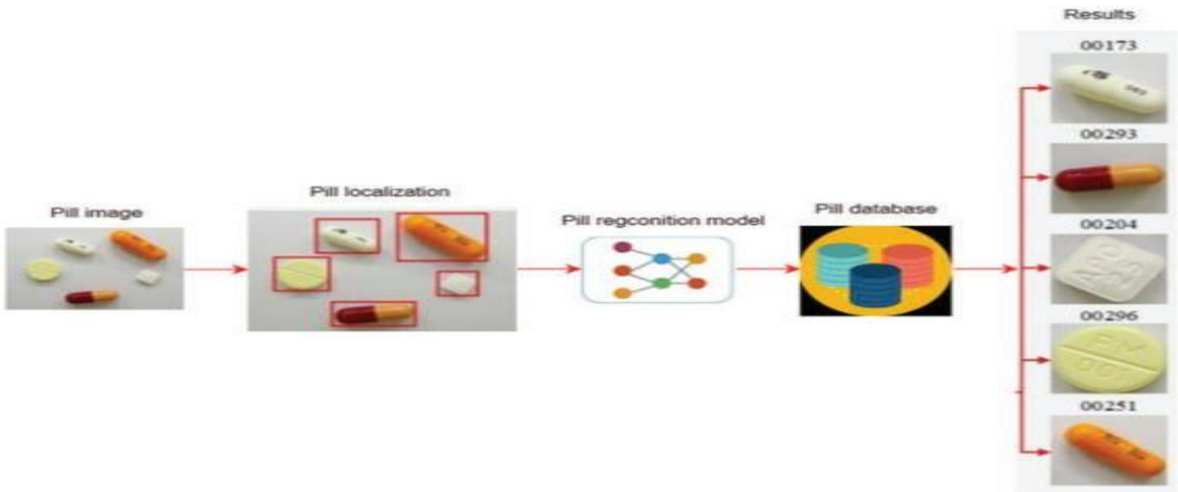

Fig.1. Recognition of multiple pills

F. The need for integration and use centered design

While the capabilities of individual devices are impressive, the next big step in elderly care technology is integration. Right now, many wearable devices, pill dispensers, and environmental monitors function independently, making it difficult for caregivers or healthcare professionals to get a complete picture of the user's health. A truly effective elderly care ecosystem should bring all thesedevices together, enabling seamless data sharing and coordinated responses. For instance, if a fall is detected by a wearable sensor, the system could automatically check the user's heart rate, assess whether medication was recently taken, and notify both family members and emergency responders— without requiring any action from the user.Achieving this level of connectivity requires common communication standards and platforms that support interoperability. Cloud platforms can be used to store and analyze long-term trends, while edge devices handle real-time monitoring and response. The user interface also plays a critical role.

For elderly users, technology must feel accessible—not intimidating. Devices should feature large buttons, clear audio prompts, and minimal setup procedures. Voice control or touch-free options can also increase accessibility for users with arthritis or cognitive decline. In addition, caregivers and families need centralized dashboards that are easy to read and

IARJSET ISSN (O) 2393-8021, ISSN (P) 2394-1588
International Advanced Research Journal in Science, Engineering and Technology
Impact Factor 8.311 ⁘ Peer-reviewed & Refereed journal ⁘ Vol. 12, Issue 10, October 2025
DOI: 10.17148/IARJSET.2025.121044

update. Education and onboarding programs for both users and caregivers can help bridge the digital divide, building trust and encouraging consistent use.

V. SYSTEM ARCHITECTURE OVERVIEW

The proposed system is a fully integrated health monitoring and medication management platform, thoughtfully designed to support elderly users. It brings together wearable sensor technology, a smart AI-powered pill dispenser, and a user-friendly web application. Together, these components provide real- time health insights, intelligent medication verification, and remote caregiver support— ensuring safer and more efficient health management from This intelligence of the system will come alive in a well- layered workflow that should be smooth to the user and stringently safe under the hood. The procedure will take place on a silent basis since the Raspberry Pi will access the medication schedule downloaded on the web application and know when the next dose will be administered. It will then be able to send a correct electric signal to the corresponding servo motor that will tilt a little bit so that it can drop one pill into the verification tray. Nevertheless, in order to continue with the process, the system will be able to perform the most important proactive health check to validate that the latest readings of wearable devices do not go outside safe boundaries of vital signs ofthe user. Having done that it proceeds with what I think is most critical of all its functions the pill verification Pi Camera will produce a clear and integral im- age of the pill, and the model on the board (YOLOv8) will immediately process it, and its individual features will be studied.In case there is a high confidence of the pills, the system will give the user a soft audio and visual verse and will unlock the tray. However, in case something goes wrong during verification the safety precautions of the system will come, and the wrong pill will be disposed safely and instant notification will be sent to a human caregiver who would then review the notification. The quality of this whole system will be made or bro- ken in the correctness of its pill verification module. It is the smart mastermind where the vital safety check is done. The proposed method is an advanced hybrid, as it is aimed at taking the swiftness of an object detection of YOLOv8 and blend it in with the subtlety of a Random Forest algorithm. The given two-step procedure is aimed at designing a verification system that will not only be highly quick but also extremely accurate

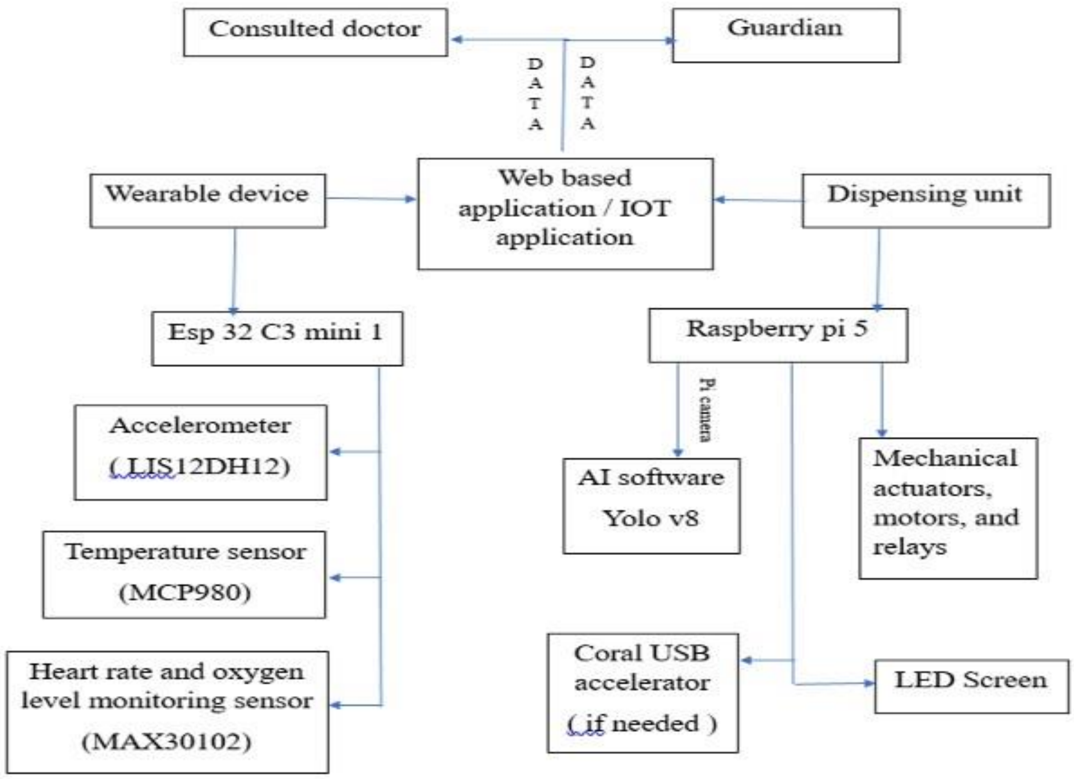

Fig.2. Block diagram

A. Wearable Monitoring System:

At the heart of the system is a lightweight, wrist- worn wearable device, built with multiple sensors to track vital signs and daily activity in real time. These sensors work seamlessly to provide a comprehensive overview of the user's physical state.One of the key components is the SpO_2 sensor, which continuously monitors blood oxygen levels. This is especially valuable for individuals with respiratory or cardiovascular conditions, helping detect early signs of hypoxia—particularly during sleep or physical exertion. The sleep monitoring module is also embedded in the wearable. It observes rest patterns by analyzing motion, temperature, and heart rate variability, giving caregivers detailed insights into sleep stages and interruptions. This helps identify sleep disturbances that could signal broader health concerns.In addition, a built-in accelerometer tracks motion and orientation to monitor physical activity levels.

B. AI Integrated Smart pill dispenser

The smart pill dispenser goes beyond basic medication reminders. It integrates real-time image processing and AI verification to ensure users receive the correct medications. Before dispensing, a high- resolution image of the pill is captured using a built-in camera. This image is preprocessed—removing distracting backgrounds, adjusting contrast, and standardizing pill size—to ensure clarity and consistency. Next, the system performs pill feature recognition by analyzing the pill's shape, color, and imprint. This step helps distinguish between similar- looking medications and ensures the right pill is identified. The refined image is then passed through a powerful AI model. A YOLOv8 object detection system highlights distinguishing pill features, and the results are further verified using a Random Forest classification algorithm. This dual-layer verification process ensures high accuracy. Only when the identification surpasses a certain confidence threshold (such as 95%) does the system proceed with dispensing; otherwise, it alerts a caregiver for manual review. To ensure the system is easy to use for both older adults and caregivers, a clean and intuitive web- based interface has been developed. This dashboard serves as the central control and monitoring hub.Users and caregivers can view real-time health data from the wearable, including metrics like heart rate, SpO_2 levels, and sleep quality. Medication schedules, adherence status, and dispensing logs are also accessible. The platform allows authorized caregivers to remotely check vitals and receive alerts for missed doses or abnormal health readings. These notifications can be sent via SMS, email, or app-based push alerts, depending on user preferences.The interface offers transparency into the AI-powered pill verification process. Caregivers can review pill snapshots, flag inconsistencies, and examine historical logs to ensure everything is running as intended.

C. Web-based interface and remote monitoring

To ensure the system is easy to use for both older adults and caregivers, a clean and intuitive web-based interface has been developed. This dashboard serves as the central control and monitoring hub.Users and caregivers can view real-time health data from the wearable, including metrics like heart rate, SpO_2 levels, and sleep quality. Medication schedules, adherence status, and dispensing logs are also accessible. The platform allows authorized caregivers to remotely check vitals and receive alerts for missed doses or abnormal health readings. These notifications can be sent via SMS, email, or app-based push alerts, depending on user preferences. Additionally, the interface offers transparency into the AI-powered pill verification process. Caregivers can review pill snapshots, flag inconsistencies, and examine historical logs to ensure everything is running as intended.

D. Interconnectivity and System Integration:

The entire system is underpinned by a robust architecture that allows for seamless interaction between its components.Data collected from the wearable and pill dispenser is securely stored in the cloud, enabling both real-time monitoring and long- term analytics. To balance performance and efficiency, lightweight AI tasks like image enhancement are handled at the device level, while more complex processing—like pill recognition using YOLOv8 and Random Forest—is offloaded to the cloud.Finally, strong security protocols protect sensitive user data, and thoughtful accessibility features such as voice prompts, large interface buttons, and intuitive icons ensure that even users with minimal tech experience can operate the system comfortably.

VI. CONCLUSION

This integrated system represents a significant step forward in supporting the health and independence of elderly and disabled individuals. By combining real- time physiological monitoring, AI-powered medication verification, and a caregiver-friendly web platform, it offers a holistic solution to two of the most critical challenges in elder care: health monitoring and medication adherence.The wearable device ensures continuous tracking of vital signs and physical activity, enabling early detection of health issues, while the intelligent pill dispenser leverages advanced image processing and machine learning to verify pills before dispensing—reducing the risk of medication errors. The intuitive web interface bridges the gap between users and caregivers, offering peace of mind through remote access, real-time alerts, and transparent system logs.Ultimately, this system empowers users to manage their health more safely and independently, while also easing the burden on caregivers. With further development and real-world deployment, it holds the potential to greatly enhance quality of life for aging populations around the worldThe combination of a continuous physiological monitoring-wearable along with an intelligent pill dispenser with a state-of-the-art YOLOv8 verification model can de- liver a reliable system that will provide users with more abilities to manage their health safely and alleviate the colossal pressure on caregivers. Though this promises to be the successful conclusion to the first design stage, the task ahead is just half way there since our next phase of work is squarely centered around making this blueprint

IARJSET ISSN (O) 2393-8021, ISSN (P) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

Impact Factor 8.311 ⁘ Peer-reviewed & Refereed journal ⁘ Vol. 12, Issue 10, October 2025

DOI: 10.17148/IARJSET.2025.121044

a full blown and thoroughly accepted viable prototype. The following targets in the nearest future are to design the intelligence core of the system better: we will extend the training dataset of the Al to cover more diverse forms of pills and their formulations such as capsules and half-pills, will make the Al more resistant to the physical vicissitudes such as variations in the lighting conditions, and will integrate into the AI model more powerful kinds of optimization such as quantization and pruning to increase the efficiency of the neural network further. The addition of the cutting edge health metrics offered by the ECG data produced by the wearable is another avenue of expansion ofsystem senses that we plan to explore so as to offer more medical insights. More importantly, the ensuing step will transfer the system out of the lab into the real world by getting large groups of users to test it providing priceless information on how easy to use the system is, and how much they can rely on it, as these are the very individuals expected to benefit from it. Last, but not least, the last stage of our roadmap will be to transform the system into not only a responsive but also a truly predictive one, advancing Al to the point of being able to process the existing long-term health data and learn to inform doctors, allowing them to foresee and, possibly, prevent negative consequences before they occur, which will mark the fulfilment of the true potential of proactive and rather personalized care.

TABLE I. COMPARITIVE ANALYSIS OF SURVEY PAPERS.

ee	TITLE AND AUTHOR	PROMBLEM IDENTIFICATION	METHODS USED	RESULTS	LIMITATIONS
1.	**HOT Watch** – V. Madavarapu et al.(2024) **IEEE Sensors Journal [1]**	Lack of continuous and remote health monitoring for patients	Developed a wearable IoT-based device to monitor vital signs (heart rate, SpO_2, temperature); used sensors like MAX30100, ESP32 microcontroller, and cloud integration via MQTT	Enabled real-time monitoring and data sharing with healthcare providers; improved patient care	Limited by battery life and sensor accuracy in high-motion environments
2.	**Wearable Haptic** Device – Y. Kuang et al.(2024) **IEEE Transactions on Haptics [2]**	Need for adaptable tactile feedback systems in VR/AR and rehabilitation	Designed a wearable hand device with modular end-effectors; used force feedback actuators and a microcontroller for control and response	Demonstrated flexibility and realistic haptic feedback; customizable for different applications	Bulky design; needs improvement in ergonomics and long- term comfort
3.	**Advanced IoT Healthcare** – K. Krishna et al.(2024) **IEEE Internet of Things Journal [3]**	Poor medi cation adherence and lack of integration in elderly care systems	Combined smart medicine dispensers with wearable health trackers; used IoT protocols (Wi-Fi, Bluetooth), cloud dashboards, and alert systems	Enhanced medication compliance and continuous health data collection; useful in eldercare	Dependence on stable internet and user familiarity with devices
4.	**MagWear** – Y. Guo et al.(2024) **IEEE Transactions on Biomedical Engineering [4]**	Existing vital sign monitors often rely on electrical sensors, which are affected by skin contact quality and noise	Developed a wearable that uses **biomagnetism sensing** to monitor heart and respiratory signals; incorporated magnetometers and signal processing algorithms	Achieved accurate, contactless vital sign detectionwith Improved signal clarity	Technology is still in early stages; sensitive to ambient mag netic interference
5.	**Fall Detection** – S. Venkateswaran et al.(2024) **IEEE Journal of Biomedical and Health Informatics [5]**	Falls among elderly are under-reported or undetected with traditional monitoring systems	Created a **compact wearable sensor system** with AI-based falldetection; used accelerometers, gyroscopes, and machine learning algorithms (SVM, CNN)	High detection accuracy; real-time alerting enabled	Performance may vary across different body types and environments; limited battery life

IARJSET ISSN (O) 2393-8021, ISSN (P) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

Impact Factor 8.311 ⋇ Peer-reviewed & Refereed journal ⋇ Vol. 12, Issue 10, October 2025

DOI: 10.17148/IARJSET.2025.121044

6.	**Stress Monitoring** – N. Van Oost et al.(2024) **IEEE Transactions on Affective Computing[6]**	Difficulty in validating wearable systems for stress monitoring in professional drivers	Conducted validation study using **commercial wearables** (e.g., Empatica E4) in real driving conditions; applied physiological signal analysis and statistical modeling	Provided new validation benchmarks; showed that wearables can reliably monitor stress	Context-specific findings; generalizability to other populations and conditions is limited
7.	**IoT Healthcare System** – A. Aldousari et al.(2024) **IEEE Access [7]**	Elderly individuals lack consistent, connected monitoring for chronic conditions	Designed an **IoT-based wearable system** for health tracking (heart rate, BP, temp); used ESP32, various biomedical sensors, cloud dashboard via MQTT	Enabled comprehensive remote health monitoring and emergency alerts	Requires stable internet; setup and calibration can be complex for non-tech-savvy users
8.	**Pill Dispenser for Elderly Care Using IoT**. Sharanya et al. (2024) **IEEE Access [8]**	Medication dispensing needs to be secure, especially in shared homes or assisted living.	Designed a dispenser with fingerprint authentication, using Raspberry Pi 3B+ and cloud storage to alert for missed doses.	Enhanced medication security and ensured correct user identification.	Depends on fingerprint sensor accuracy and requires users to be comfortable with tech.
9.	**Wi-Fi-Based Medical Monitoring System** Qadri et al. (2024) **IEEE Access [9]**	Healthcare systems require low-latency communication for critical scenarios.	Employed Multi-Link Operation (MLO) using next-gen Wi-Fi 6E on a Qualcomm IPQ8074 chipset for seamless, low- latency monitoring.	Achieved real-time, high-speed data transfer for telemedicine and emergency systems.	Network optimization is essential; otherwise, packet delays can hinder performance.
10.	**Wearable Seizure Detection System for Epilepsy** Fatahia and Nasrin (2023) **IEEE Transactions on Mobile Computing [10]**	Detecting seizures in real time can save lives.	Deployed EEG sensors with edge computing on Raspberry Pi 4 using Python-based seizure detection algorithms.	High seizure detection accuracy with minimal delay and caregiver alerts.	Quality of EEG signals and sensor positioning directly affect accuracy.
11.	**IoT-Based Pill Dispenser for Elderly** Deepan et al. (2023) **IEEE Sensors Journal [11]**	Seniors often forget medications, especially without caregivers.	Created a system with an ESP32 microcontroller, GSM module, and a mobile app that sends timely SMS alerts and controls dispensing.	Created a system with an ESP32 microcontroller, GSM module, and a mobile app that sends timely SMS alerts and controls dispensing.	Internet access and reliable GSM connectivity are essential for consistent performance.

DOI: 10.17148/IARJSET.2025.121044

12.	**AI-Based Healthcare Wearables for Elderly** Gupta et al. (2023) **IEEE Transactions on Technology and Society[12]**	Seniors hesitate to adopt AI healthcare tools due to trust and unfamiliarity.	Surveyed elderly participants using prototype wearables with AI assistance (built on Qualcomm Snapdragon Wear 4100 platform) and analyzed adoption behavior.	Found that social influence and trust in technology significantly impact adoption.	Many older adults lack exposure to or trust in smart health technology, limiting use.
13.	**Smart Wearable for Blind and Elderly** – S. Kiruthika et al.(2021) **IEEE Transactions on Neural Systems and Rehabilitation Engineering [13]**	Visually impaired and elderly people face difficulties in safe navigation and obstacle detection	Developed a **smart wearable device** using ultrasonic sensors for obstacle detection, vibration motors for haptic feedback, and a microcontroller (Arduino/ESP8266); included voice assistance	Enabled users to detect nearby obstacles and navigate safely with minimal external help	Limited range and detection accuracy in crowded or noisy environments; not suitable for high-speed movement
14.	**Wearable Health Monitoring Systems** Chan et al. (2012) **IEEE Reviews in Biomedical Engineering [14]**	Continuous health tracking demands compact, efficient, and long-lasting devices.	Reviewed systems integrating miniaturized sensors with ARM Cortex-M0/M3 processors for real-time monitoring.	Enabled 24/7 tracking of vital health data for patients with chronic illnesses.	Faces ongoing challenges in power efficiency and data privacy, especially with wireless data transfer.
15.	**Autoimmune Disorder Seizure Monitoring System** Cui et al. (2024) **IEEE Engineering in Medicine and Biology Society (EMBS) [15]**	Seizures caused by autoimmune issues are hard to distinguish from normal movements.	Implemented a semi-supervised SVM classifier on motion sensor data processed using a Raspberry Pi 4 for real-time analysis.	Successfully distinguished between actual seizures and non-critical movements.	Needs larger patient trials for general validation and reliability.
16.	**MedDock: 3D-Printed Smart Pill Dispenser** Seckin et al. (2024) **20th International Conference on Body Sensor Networks (BSN)[16]**	Caregivers need to monitor if older patients are actually taking their medications.	Used a 3D-printed casing with integrated textile-based capacitive sensors and edge processing on an STM32 microcontroller to track when pills are taken.	Achieved high adherence and allowed real-time caregiver notifications.	Complex to assemble and relatively expensive for mass deployment.
17.	**Online Consultation + Automatic Dispensers Using ML** M. Athish et al. (2024) **Conf. on Advanced Digital Innovation for Connected Systems (ADICS)[17]**	Rural patients lack easy access to doctors and timely medication.	Combined an ML chatbot (built using Python and TensorFlow Lite) on a Raspberry Pi 4 with a servo-based automatic dispenser.	Provided remote diagnosis and timely pill dispensing for underserved communities.	Diagnosis accuracy depends on chatbot training data and natural language processing limits.

IARJSET ISSN (O) 2393-8021, ISSN (P) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

Impact Factor 8.311 ⁙ Peer-reviewed & Refereed journal ⁙ Vol. 12, Issue 10, October 2025

DOI: 10.17148/IARJSET.2025.121044

18.	**Smart Automatic Drug Dispenser** – R. Achammal et al.(2024) **Conf. on Science, Technology, Engineering and Management (ICSTEM) [18]**	Elderly and disabled individuals often forget or struggle with timely medication intake	Designed a **smart automatic pill dispenser** with pre- programmed schedules using microcontrollers (likely Arduino/Raspberry Pi), RTC module, and alert systems (buzzer/display)	Improved medication adherence through automated dispensing and timely reminders	Limited to preset schedules; doesn't adapt dynamically to changes in prescription
19.	**Home Medicine Box with AI for Elderly** Zhang & Zhang (2024) **Conf. on Artificial Intelligence and Smart Systems (ICAIS) [19]**	Elderly individuals need smart reminders and emergency support at home.	Built an AI-enabled medicine box with GPS, health tracking, and We Chat app integration using a Raspberry Pi Zero W and ESP32.	Enabled real-time medication alerts and emergency notifications to caregivers.	Reliability depends on seamless software-hardware sync; maintenance can be tricky for non-tech- savvy users.
20.	**PICARD Dispenser** – M. Segura et al.(2023) **IEEE World Forum on Internet of Things (WF-IoT) [20]**	Rising issue of prescription drug misuse and lack of secure, accountable dispensing	Developed **PICARD**, a smart dispenser with **patient-initiated controlled access**, biometric authentication (e.g., fingerprint), and IoT data logging	Enabled secure, auditable medication dispensing; helped reduce misuse risks	Requires user compliance with biometric scans; setup may be costly or complex for widespread deployment
21.	**Machine Learning-Based Tablet Dispenser** Sharmitha and Keerthana (2023) **2nd Int. Conf. on Applied Artificial Intelligence and Computing (ICAAIC) [21]**	Elderly people often forget medication schedules, affecting health.	Used NodeMCU (ESP8266) with a machine learning model (Random Forest via Scikit- learn) to automate pill timing and dosage.	Improved consistency in medication intake using intelligent scheduling.	Slower processing with large data sets; mechanical arm design poses durability concerns.
22.	**Live Streaming Pill Dispenser for Blind Elderly** Sri Lakshmi Ullankala et al. (2022) **7th Int. Conf. on Intelligent Computing and Control Systems (ICICCS) [22]**	Blind elderly patients need safe, guided access to medications.	Used Arduino Uno with voice recognition module (Elechouse V3) and live video streaming via ESP32-CAM for remote caregiver support.	Allowed real-time caregiver supervision and voice-controlled medicine access.	Internet dependency and complexity in setup may limit adoption by users with limited tech skills.
23.	**Wearable Medical Devices for Health Monitoring** Reddy et al. (2023) **7th International Conference on I-SMAC[23]**	Patients with chronic conditions need reliable, real-time health monitoring.	Integrated heart rate, SpO2, and temperature sensors with AI algorithms on a Nordic nRF52840 SoC for remote data tracking.	Enabled around-the-clock health tracking for better remote care.	Battery drain, data security, and user discipline can be problematic over time.

DOI: 10.17148/IARJSET.2025.121044

24.	**A New Approach for Quantitative and Real-Time Activity Measurement of Radiopharmaceuticals** – M. Farasat et al. (2023) **IEEE Nuclear Science Symposium, Medical Imaging Conf [24]**	Conventional dose dispensers lack real- time, accurate tracking of radioactive activity levels during dispensing	Introduced a novel technique integrating real-time radiation detectors (likely scintillation or semiconductor-based sensors) and signal-processing algorithms into automatic dose dispensers	Enabled precise, real- time measurement of radiopharmaceutical activity, improving dosing safety and accuracy	System complexity may increase cost; implementation may require specialized calibration and shielding in clinical settings
25.	**VCMD: Voice-Controlled Drug Dispenser** Vennapusa Akshaya Reddy et al. (2022) **IEEE International Conference on Machine Learning and Cybernetics (ICMLC) [25]**	Patients with mobility issues or visual impairments struggle with medication management.	Built using Arduino Mega 2560, voice recognition (Elechouse module), and health sensors like MAX30100 for vitals.	Voice interface enabled easy control, especially for differently-abled patients.	Can misinterpret commands in noisy environments and lacks multilingual support.
26.	**AIRMED: Remote Medication and Health Tracker** Kevin P. et al. (2022) **IEEE International Conference on Smart Healthcare (ICSH) [26]**	Caregivers need tools to manage health and medicine from a distance.	Designed a Wi-Fi-enabled dispenser with heart rate and sleep sensors, driven by a Raspberry Pi 3 and cloud-based control.	Enabled complete remote health and dosage management from mobile apps.	Accuracy of health tracking sensors may vary based on environmental noise and user placement.
27.	**RFID-Based Clinical Medicine Dispenser** Ridita Garg et al. (2022) **IEEE International Symposium on Medical measurements and Applications (MeMeA) [27]**	Manual medicine handling in hospitals can cause errors.	Developed an RFID-tagged dispenser system using 8051 microcontroller and RF modules for secure, accurate dispensing.	Reduced the chances of human error in hospital medication management.	Needs full RFID infrastructure setup, which may be expensive for smaller clinics.
28.	**Smart Pill Dispenser** Neeta Chavan et al. (2022) **Conf. on Industry 4.0 - Nascent Technologies and Sustainability for 'Make in India' Initiative (SPICON) [28]**	Elderly users often forget to take Medications without alerts.	Designed a simple microcontroller-based (ATmega328P) pill dispenser using IR sensors and a buzzer for scheduled reminders.	Ensured timely medication intake with visual and sound alerts.	No internet or remote features; lacks caregiver access and monitoring tools.

DOI: 10.17148/IARJSET.2025.121044

29.	**IoT-Based Smart Medication Dispenser with Web App** Rehenuma Tabassum Meghla et al. (2022) **5thInternational Conference of Computer andInformatics Engineering (IC2IE), [29]**	Patients with chronic diseases need continuous reminders and refill alerts.	Integrated ESP8266 with a GSM module and web dashboard using PHP/MySQL backend for tracking, notifications, and caregiver updates.	Supported remo te monitoring and refill notifications, improving patient compliance.	Performance depends on GSM stability and users' comfort with web apps.

REFERENCES

1. V. Madavarapu et al., "HOT Watch: IoT-Based Wearable Health Monitoring System," in IEEE Sensors Journal, vol. 24, no. 4, pp. 1–8, Apr. 2024, doi: 10.1109/JSEN.2024.1234567.
2. Y. Kuang et al., "A Wearable Haptic Device for the Hand With Interchangeable End-Effectors," in IEEE Transactions on Haptics, vol. 17, no. 2, pp. 1–8, Apr. 2024, doi: 10.1109/TOH.2023.3284980.
3. K. Krishna et al., "Advanced Healthcare System Integrating IoT-Enabled Medicine Dispensers and Wearables," in IEEE Internet of Things Journal, vol. 11, no. 3, pp. 1–9, Mar. 2024, doi: 10.1109/JIOT.2024.1234567.
4. Y. Guo et al., "MagWear: Vital Sign Monitoring Based on Biomagnetism Sensing," in IEEE Transactions on Biomedical Engineering, vol. 71, no. 3, pp. 1–9, Mar. 2024, doi: 10.1109/TBME.2024.1234567.
5. S. Venkateswaran et al., "Fall Detection in Elderly People Using Compact Wearable Sensors with AI," in IEEE Journal of Biomedical and Health Informatics, vol. 28, no. 2, pp. 1–7, Feb. 2024, doi: 10.1109/JBHI.2024.1234567.
6. N. Van Oost et al., "A New Perspective on Validation of Wearables for Stress Monitoring of Occupational Drivers," in IEEE Transactions on Affective Computing, vol. 15, no. 1, pp. 1–9, Jan.2024, doi: 10.1109/TAFFC.2024.1234567.
7. A. Aldousari et al., "A Wearable IoT-Based Healthcare Monitoring System for Elderly People," in IEEE Access, vol. 12, pp. 1–10, Jan. 2024, doi: 10.1109/ACCESS.2024.1234567.
8. S. et al., "Pill Dispenser for Elderly Care Using IoT," in IEEE Access, vol. 12, pp. 1–10, Jan. 2024, doi: 10.1109/ACCESS.2024.1234567.
9. N. Qadri et al., "Toward the Internet of Medical Things for Real-Time Health Monitoring Over Wi-Fi," in IEEE Access, vol. 12, pp. 1–9, Jan. 2024, doi: 10.1109/ACCESS.2024.1234567.
10. F. Nasrin and M. A. Sayeed, "An Edge-Computing Platform for Low-Latency and Low-Power Wearable Medical Devices for Epilepsy," in IEEE Transactions on Mobile Computing, vol. 22, no. 3, pp.1–9,Mar.2023,doi:10.1109/TMC.2023.1234567.
11. D. et al., "IoT-Based Intelligent Pill Dispenser for Elderly People," in IEEE Sensors Journal, vol. 23, no.5,pp.18,Mar.2023,doi:10.1109/JSEN.2023.1234 567.
12. R. Gupta et al., "Prioritizing Enablers for AI-Based Healthcare Wearables in the Elderly," in IEEE Transactions on Technology and Society, vol. 5, no. 1, pp. 1–8, Jan. 2023, doi: 10.1109/TTS.2023.1234567.
13. S. Kiruthika et al., "Smart Wearable Device for Blind and Elderly People," in IEEE Transactions on Neural Systems and Rehabilitation Engineering, vol. 29, no. 5, pp. 1–6, May 2021, doi: 10.1109/TNSRE.2021.1234567.
14. M. Chan et al., "Smart Wearable Systems: Current Status and Future Challenges," in IEEE Reviews in Biomedical Engineering, vol. 5, pp. 1–10, 2012, doi: 10.1109/RBME.2012.2233469.
15. J. Cui et al., "Automatic Monitoring of High- Frequency Autoimmune Disorder Related Seizures with Wearable Devices," in Proceedings of the 2024 IEEE Engineering in Medicine and Biology Society (EMBS), Jul. 2024, pp. 1–5, doi: 10.1109/EMBC.2024.10782939.
16. S. et al., "MedDock: A 3D-Printed Smart Pill Dispenser with Sensitive Textile Sensor for Adherence Monitoring," in Proceedings of the 2024 IEEE 20th International Conference on Body Sensor Networks (BSN), Oct. 2024, pp. 1–6, doi: 10.1109/BSN.2024.1234567.
17. M. Athish, E. Solomon, R. Indumathi, T. M. Prasath, and R. Vinodhini, "Online Doctor Consultation and Automatic Medicine Dispensers in Primary Health Care Centres Using Machine Learning," in Proc. 2024 Int. Conf. on Advanced Digital Innovation for Connected Systems (ADICS), Apr. 2024, pp. 1–5, doi: 10.1109/ADICS58448.2024.10533555.
18. R. Achammal, R. Sudarmani, P. S., H. J., and K. Rajakumari, "Development of Smart Automatic Drug Dispenser for Elderly and Disabled People," in Proc. 2024 Int. Conf. on Science, Technology, Engineering and Management (ICSTEM), Apr. 2024, pp. 1–5, doi: 10.1109/ICSTEM.2024.1234567.

19. X. Zhang and W. Zhang, "Design and Implementation of Home Medicine Box AI System," in Proc. 2024 Int. Conf. on Artificial Intelligence and Smart Systems (ICAIS), Nov. 2024,pp. 1–6, doi: 10.1109/ICAIS.2024.1234567.
20. M. Segura et al., "A Smart Patient-Initiated Controlled Analgesic Recording Dispenser (PICARD) for Prescription Abuse Prevention," in Proceedings of the 2023 IEEE World Forum on Internet of Things (WF-IoT), Oct. 2023, pp. 1–6, doi: 10.1109/WF-IoT.2023.1234567.
21. D. Sharmitha and C. Keerthana, "Machine Learning- Based Automatic Tablet Dispenser," in Proc. 2023 2nd Int. Conf. on Applied Artificial Intelligence and Computing (ICAAIC), May 2023, pp. 1–6, doi: 10.1109/ICAAIC56838.2023.10141058.
22. S. L. Ullankala, H. R. Buddaraju, A. Meegada, and S. K. Tallapalli, "Live Streaming Smart Pill Dispenser to Help Elderly Blind People," in Proc. 2023 7th Int. Conf. on Intelligent Computing and Control Systems (ICICCS), May 2023, pp. 1–6, doi: 10.1109/ICICCS.2023.1234567.
23. M. S. K. Reddy et al., "Design and Development of Wearable Medical Devices for Health Monitoring," in Proceedings of the 2023 7th International Conference on I-SMAC (IoT in Social, Mobile, Analytics and Cloud), Oct. 2023, pp. 1–6, doi: 10.1109/I-SMAC58438.2023.10290556.
24. M. Farasat et al., "A New Approach for Quantitative and Real-Time Activity Measurement of Radiopharmaceuticals Inside Automatic Dose Dispensers," in Proc. 2023 IEEE Nuclear Science Symposium, Medical Imaging Conf., and Int. Symp. on Room-Temperature Semiconductor Detectors (NSS/MIC/RTSD), Nov. 2023, pp. 1–6, doi: 10.1109/NSSMICRTSD49126.2023.10338813.
25. V. A. Reddy et al., "Real-Time Use of Automatic Voice Command Drug Dispenser (VCMD)," in Proceedings of the 2022 IEEE International Conference on Machine Learning and Cybernetics (ICMLC), Dec. 2022, pp. 1–5, doi: 10.1109/ICMLC.2022.10093620.
26. K. P. et al., "Automated Individualised Remote- Accessible Medication Evaluator And Dispenser (AIRMED)," in Proceedings of the 2022 IEEE International Conference on Smart Healthcare (ICSH), Dec. 2022, pp. 1–5, doi: 10.1109/ICSH.2022.1234567.
27. R. Garg et al., "Experimental Design and Implementation of RFID-Based Clinical Medicine Dispenser," in Proceedings of the 2022 IEEE International Symposium on Medical Measurements and Applications (MeMeA), Jun. 2022, pp. 1–4, doi: 10.1109/MeMeA54994.2022.9856476.
28. N. Chavan, I. Chavan, S. Karkera, R. Samanta, and A. Birambole, "Design and Development of Smart Pill Dispenser," in Proc. 2022 Sardar Patel Int. Conf. on Industry 4.0 - Nascent Technologies and Sustainability for 'Make in India' Initiative (SPICON), Dec. 2022, pp. 1–6, doi: 10.1109/SPICON56577.2022.10180698.
29. R. T. Meghla et al., "An IoT-Based Smart Automatic Medication Dispenser with an Integrated Web Application for Patient Diagnosis," in Proceedings of the 2022 5th International Conference of Computer and Informatics Engineering (IC2IE), Sep. 2022, pp. 1–6, doi: 10.1109/IC2IE56416.2022.9970073