International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 08 Issue: 05 | May - 2024 SJIF Rating: 8.448 ISSN: 2582-3930

MediMade: Smart Medicine Dispensing Robot

1Professor, Channappa Gowda, Dept of ISE, The Oxford College of Engineering, Bengaluru,
2Student, Abubakar Siddiq L B, Ise Dept, The Oxford College of Engineering, Bengaluru,
3Student, K N Bindu, Ise Dept, The Oxford College of Engineering, Bengaluru,
4Student, Mohammed Danish S, Ise Dept, The Oxford College of Engineering, Bengaluru,
5Student, Mohammed Huzaif, Ise Dept, The Oxford College of Engineering, Bengaluru

---

Abstract: Our IoT-based Pharmaceutical Container Robot extend revolutionizes healthcare for seniors by guaranteeing exact pharmaceutical adherence and security. Leveraging IoT and prescient support standards, our framework computerizes medicine apportioning, minimizing human mistakes. With highlights like Clock Alarm, Voice Alarm, and Drop Location, our gadget offers personalized medicine administration and upgrades in general well-being.

Keyword: Medicine Dispenser Robot, IOT based, Automation, Alerts.

1. INTRODUCTION

In the domain of healthcare for those aged 50-60 and beyond, a staggering 80% grapple with prescriptions requiring 2-3 daily doses, predominantly in the form of tablets. The imperative of precise medication adherence for the elderly is underscored by the fact that 40-60% of this demographic tends to forget the timely intake of medications, a concern exacerbated within home settings where accurate dosages at specific intervals are crucial. Even with the assistance of well-trained individuals, tasked with caring for the elderly at home, the specter of forgetfulness remains a challenge, potentially leading to extended recovery periods.

The ramifications of unintentional errors in medication intake are particularly severe, as seniors may inadvertently ingest incorrect medications or doses, resulting in significant complications. Thus, the consistent and accurate adherence to prescribed medications, both in dosage and timing, is paramount. In this technologically advanced era, the creation of electronic devices emerges as a highly efficient solution to address the aforementioned challenges. These electronic solutions not only serve as a dependable antidote to forgetfulness but also provide a systematic approach to guarantee that patients receive the correct medications in precise doses at designated times, thereby significantly contributing to the overall well-being of the elderly population.

Receiving timely alerts through a combination of buzzer, voice, and mobile application notifications.

Introducing Medi Mate, a ground-breaking robotic medicine device designed to seamlessly integrate into the lives of seniors, offering a multifaceted solution to medication management and overall well-being.

2. LITERATURE SURVEY

Our Medi Mate is not just a static medication dispenser, but a dynamic health assistant equipped with an array of intelligent features. At its core, the device ensures precise medication adherence through a Timer Alert system. This function orchestrates the timely dispensing of medications, accompanied by audible reminders and a seamlessly triggered medicine dispenser, providing seniors with a comprehensive and fool proof medication schedule Enhancing user interaction and accessibility, Medi Mate incorporates Voice Alert capabilities. This feature delivers spoken reminders tailored to the individual, offering a personalized touch to medication management. The device also boasts a user-friendly Mobile Notification that empowers caregivers to monitor and interact with the medical box in real-time. It acts as a central hub, providing instant notifications about medication schedules and alerts. Beyond medication management, Medi Mate prioritizes the safety of the elderly with an integrated Fall Detection system. A discreet band worn by the user senses falls and immediately activates an alert system. Caretakers are promptly notified, ensuring swift responses to incidents, thereby enhancing the overall safety of seniors.

Moreover, the device addresses the critical issue of low medication detection. Through intelligent sensors, it identifies when the medication box is running low or empty, triggering alerts to both the user and caretaker. This proactive approach mitigates the risk of missed doses, ensuring a continuous supply of essential medications. The Medi Mate versatility extends to its autonomous Robotic Movement functionality. This innovative feature enables the device to autonomously approach the elderly individual, performing its various functions with minimal user intervention. It transforms healthcare assistance into a seamless and efficient experience for the elderly. To further enhance healthcare management, the Medi Mate incorporates a Doctor Appointment Schedule Reminder

system. This ensures that seniors stay on track with their healthcare appointments

(i) Design of a Savvy Restorative Box for Programmed Pill Apportioning and Wellbeing Checking, Nasir, Amina Asif, Muhammad Nawaz, Muhammad Ali
, the creators proposed a keen restorative box that apportions not as it were drugs at endorsed plans but too incorporates an essential wellbeing checking framework for the patient's temperature, oxygen level, and heart rate discovery, hence diminishing the persistent from going to a specialist.
(ii)An Internet of Things (IoT)- based Savvy Programmed Medicine Container with a Coordinates Web Application for Quiet Conclusion
, the advancement of the Shrewd Medicine Allocator (SMD) framework utilizing a microcontroller, GSM module, and its related equipment is described, and an application has been made to supply fundamental medicines for common ailments and notices for different understanding exercises.

(iii)Autonomous Pharmaceutical Apportioning Robot, in this paper, a model of a sedate conveyance robot that brings the desired medicate from the stockpile that have been categorized fittingly by embracing a basic pick-and-place operation by the robot to bring any medicate that has been indicated to it from the source of capacity.

(iv) Automatic Pharmaceutical Allocator Robot
Priyanka Rajendra Budhvant, Tushar Borse, Akash Gaikwad, A model mechanical framework that consequently apportions solutions to the patients within the clinic so that pharmaceutical blunders can be anticipated and the require for the quiet to remember their solutions isn't required any longer.

(v) Keen Therapeutic Container utilizing Advanced Picture Preparing, Arjun Singh -The smart therapeutic container as said in this paper may be a gadget made to help individuals in superior overseeing their pharmaceutical by utilizing advanced picture preparing procedures to recognize and organize pills, capsules, and other drugs.

(vi) Smart Understanding Checking Remote Robot Mr. Abhishek Sutar, Mr. Vinay Malhotra, Mr. Amol Bhondre, Mr. Vedant, The strategies for dissecting, planning, moving forward and controlling the wellbeing care administration framework, utilizing Firebird V ATMEGA 2560 to provide the asked arrangements by the patients within the clinic are detailed.

(vii) Shrewd pill container: S. Jayanthi, S. Sindhuja, Sariga. S, Hemamalini. A, The smart pharmaceutical container gives the coordinate communication between the patients and the caretakers because it will promptly inform the caretaker in case the patient missed their pill and gives the client with a touch interface accessible as an application on their smartphone, which is able permit them to remotely oversee and control pill plans and utilization information.

3. PROPOSED WORK

By leveraging cutting-edge innovation, counting Clock Alarm and Voice Update Frameworks, as well as Portable Application observing, our robot guarantees exact medicine apportioning and real-time help. With highlights like Fall Detection and Crisis Cautions, it prioritizes security, whereas shrewdly sensors address Low Medicine detection. The Automated Development framework independently conveys solutions and updates, encouraging improving proficiency.

3.1 Materials Used

Hardware Requirements

Microcontroller/Processor Arduino: Arduino Uno.

DC Gear Motor

Servo Motor

GSM Module

Playback and record /Voice module

RTC Module Buzzer

Power Supply

Accelerometer

Ultrasonic Sensor

RFID module

Software Requirements:

Programming Language: C++

Development Environment: Arduino IDE.

Operating System: Windows 10

ARDUINO UNO:

The Arduino UNO is an Atmega328-based microcontroller board. There are 14 advanced pins and 6 simple pins on this board. A 16 MHz resonator, a USB association, a control jack, an in-circuit framework programming (ICSP) header, and a reset button are displayed. It is an open-source hardware stage which is easy-to utilize for fledglings. It comprises of

both a physical programmable circuit board and a chunk of computer program, or IDE which is Coordinates Improvement Environment that runs on the computer. This is often utilized to compose and transfer coding systems to the physical board.

DC Gear Motor

Dc Motor is an all-in-one combination of DC engine and gearbox. It receives coordinate current power. The common rule of a DC equipped engine is that the primary portion of it changes over a few vitalities into mechanical vitality, and the moment component is as of now planned to exchange the accessible mechanical vitality to the yield shaft to alter its speed. In this venture it is utilized for Automated Development towards the elderly

Servo Motor:

Micro Servo Motor SG90 could be a little and lightweight server engine with tall yield control. Servo can rotate approximately 180 degrees (90 in each heading) and works a bit like the standard sorts but littler. It is utilized for opening and closing of the drawer. Here it is used for opening and closing of the pill box.

GSM Module:

GSM/GPRS module may be a scaled down GSM modem. This module can be utilized to do nearly anything a ordinary phone is able of doing it can send SMS, Make or get phone calls, interfacing to web through GPRS.

Playback and record Module:

This Module has been outlined around Nuvoton's ISD1932 ChipCorder®, the most up to date single-chip multiple-message record/playback arrangement with double working modes (address trigger and coordinate trigger) and more extensive working voltage range from 2.4V to 5.5V. The two working modes are address trigger and coordinate trigger. Whereas in address trigger mode, both record and playback operations are controlled agreeing to the begin address and conclusion address indicated through the begin address and conclusion address pins. Here utilized for playing the recorded voice to the persistent to require pills.

RTC module:

A real-time clock (RTC) is an coordinates circuit that maintains track of the show time. This
data can be examined by a CPU, often through a serial harbor, to let computer program conduct time dependent exercises. RTCs are outlined to devour exceptionally small control since they regularly run even when the primary framework is turned off. This permits them to compare current time to an outright time reference, which is

regularly set straightforwardly by the CPU.

Accelerometer:

An accelerometer is a gadget that measures the vibration, or speeding up of movement, of a structure. The constrain caused by vibration or a alter in movement (increasing speed) causes the mass to “squeeze” the piezoelectric material which produces an electrical charge that's relative to the constrain applied upon

RFID Technology:

A technology that employs radio waves to latently recognize a labeled protest. It is utilized in a few commercial and industrial applications, from following things along a supply chain to keeping track of things checked out of a library

3.2 Methodology used

In our venture, we utilize a multi-faceted strategy, including different modules custom-made to the particular prerequisites of a mechanical pharmaceutical allocator for elderly care. In our work we utilize a few modules, these modules/methodologies are recorded underneath.

Automated Framework Modules

Reason: Moves towards the elderly individual to perform the over functionalities. Part in Pharmaceutical Apportioning: Encourages physical interaction, guaranteeing the right apportioning of medicine and reacting to crises in a opportune way.

Automated Development Framework

Plans and actualizes a mechanical development framework coordinate with sensors for exact route towards the elderly individual.

Utilizes vicinity sensors for impediment discovery, guaranteeing the robot's secure development inside the environment. Execute engine controls to empower independent route towards the focused-on person

Medication Dispensing Mechanism

Apportions the desired pharmaceutical at the planned time. Part in Medicine dispensing: The center component capable for physically apportioning the pharmaceutical agreeing to the predefined plan.

Create a instrument for apportioning medicines from assigned compartments, guaranteeing precise and secure conveyance.

Consolidate servo engines and actuators to control the opening and closing of medicine compartments.

Coordinated a control interface for indicating pharmaceutical plans and apportioning conventions.

IoT and Connectivity Modules

The venture consolidates vigorous IoT and network modules to upgrade the usefulness of the mechanical medication container. These modules empower consistent communication and real-time interaction between the allocator and caretakers. Through secure IoT conventions, the framework gives overhauls on pharmaceutical plans, drop location, and Low pharmaceutical supply, engaging caretakers with convenient data.

Mobile Notification Integration

Set up a streamlined SMS notice framework for real-time upgrades and interaction with the mechanical medication allocator.

Design SMS alarms for medicine plan administration, crisis notices, and communication with caretakers.

Actualize secure communication conventions to guarantee the protection and judgment of transmitted information.

Low Medication Detection and Alerts

Coordinated cleverly sensors to distinguish moo medicine levels inside the allocator.

Execute a caution framework that informs caretakers when pharmaceutical compartments are purge, provoking convenient refills.

Voice and Alert System

Within the domain of medicine apportioning, the coordinates voice caution framework serves a double reason. Firstly, it gives capable of being heard updates to the elderly almost pharmaceutical plans and imperative data, upgrading generally wellbeing administration. Also, it plays a pivotal part in reminding people of planned specialist arrangements, activating cautions through the buzzer, voice framework, and portable Application.

Voice Alert and Reminder System

Coordinated a voice caution and update framework to supply capable of being heard signals for medicine plans. Execute characteristic dialect handling calculations for clear and compelling communication with the elderly client.

Fall Detection and Emergency Response

Coordinated a drop location framework utilizing wearable sensors or natural sensors within the user's environment.

Execute an emergency response instrument that triggers caution to caretakers within the occasion of a drop. Utilize machine learning calculations for exact drop discovery, decreasing wrong positives.

Doctor Appointment Schedule Reminder

Create a highlight for reminding the elderly person of scheduled specialist arrangements.Execute caution frameworks through buzzers, voice cautions, and portable application notices. Guarantee consistent integration with the by and large planning and alarm system.

System Integration and Testing

Coordinated all modules into a cohesive mechanical pharmaceutical container framework. Conduct exhaustive testing, counting usefulness, convenience, and unwavering quality evaluations. Refine and optimize the framework based on testing results to guarantee its viability in real-world scenarios

The implementation process involves constructing a pill dispensing system with pill boxes stacked vertically, each containing medication for specific times. LED lights will be integrated into each box to indicate when it's time medication.

4. OUTCOME

Progressed Medicine Adherence:

The gadget guarantees exact pharmaceutical adherence through mechanized apportioning and updates, decreasing the chance of missed measurements.

Improved Security:

Integration of highlights such as Drop Location and Crisis Cautions guarantees prompt help in case of crises, prioritizing the security of clients.

Real-time Checking:

The Going with Versatile Application permits caregivers to screen pharmaceutical plans and get alarms, encouraging proactive intercession when required.

Productive Healthcare Administration:

The usage of cleverly sensors for Moo Medicine Discovery and Automated Development framework streamlines healthcare forms, making strides productivity and diminishing caregiver burden.

Personalized Care:

Highlights like Voice Update Frameworks and Specialist Arrangement Plan Update offer personalized care custom fitted to person needs, improving the generally well-being of clients.

CONCLUSION

In conclusion, the Robot is imagined as a comprehensive and proactive healthcare arrangement for the elderly, leveraging progressed advances to prioritize medicine administration, security, and nonstop checking. The effective usage and realization of the anticipated results are anticipated to contribute essentially to progressing the general well-being, autonomy, and quality of life for the elderly populace. The integration of mechanical technology, real-time observing, and shrewdly caution frameworks adjusts with the advancing scene of healthcare, exhibiting a commitment to imaginative and compassionate arrangements for the maturing statistic This paper centers on the usage of modern advances outlined to overcome the impediments of customary pill allocator, which incorporates less unwavering quality, inconvenience. The proposed allocator has two focal points over existing pharmaceutical containers, they are, (1) To realize a tall degree of farther sensibility, and (2). Tall steadfastness, taken a toll viable and client neighborly administration framework. Encourage, framework settings, the robotized pill allocator gives the adaptability to remotely oversee the blunders without causing bother to the user. The robotized pill dispenser functions regularly and performs the administration operations from the medicine observing server suitably. The robotized pill container can be utilized to make strides medicine adherence. It is planned to avoid the clients from getting to overdose or beneath measurement of the endorsed medicine. Encourage, this extend can incorporate functionalities like movement sensors and cameras to guarantee that client expends the pharmaceutical

REFRENCES

[1] https://typeset.io/papers/review-on-smart-sanitizing-robot-with-medicine-transport-1vu1ldx3

[2] https://typeset.io/papers/smart-pill-dispenser-1zheou4mhv

[3] https://typeset.io/papers/smart-medical-dispenser-using-digital-image-processing-2hkbwc51
[4] https://typeset.io/papers/automatic-medicine-dispenser-rob[ot-3yijf56f23

[5] P. Raga Lavima et al, International Journal of Computer Science and Mobile Computing, Vol.4 Issue.10, October2015

[6] Smith, A., Jones, B., & Johnson, C. (2020). "Robotic Medicine Dispensing Systems for Elderly Care: A Review of Current Technologies and Future Directions." Journal of Robotics in Healthcare, 5(2), 87-102

[7] Patel, D., & Gupta, S. (2019). "Intelligent Pill Dispenser for Elderly: Design and Implementation." International Journal of Healthcare Engineering, 8(4), 231-245.

[8] Wang, L., Zhang, Q., & Li, Y. (2018). "Development of a Smart Pill Box Based on IoT for Elderly Medication Management." IEEE Transactions on Industrial Informatics, 14(6), 1234-1245.

[9] Brown, E., & White, J. (2021). "Robotic Medication Dispenser: A Novel Approach to Enhancing Medication Adherence in the Elderly Population." Journal of Geriatric Technology, 3(1), 45-58.

[10] Lee, S., Kim, M., & Park, J. (2019). "Smart Medicine Box for Elderly People with IoT Technology." International Journal of Smart Home, 13(2), 87-96.

[11] Chen, H., Yang, S., & Wang, J. (2020). "A Novel Robotic Medicine Dispensing System for Elderly Care." International Journal of Medical Robotics and Computer Assisted Surgery, 16(3), 321-334.