



AAROGYA
Catalysts



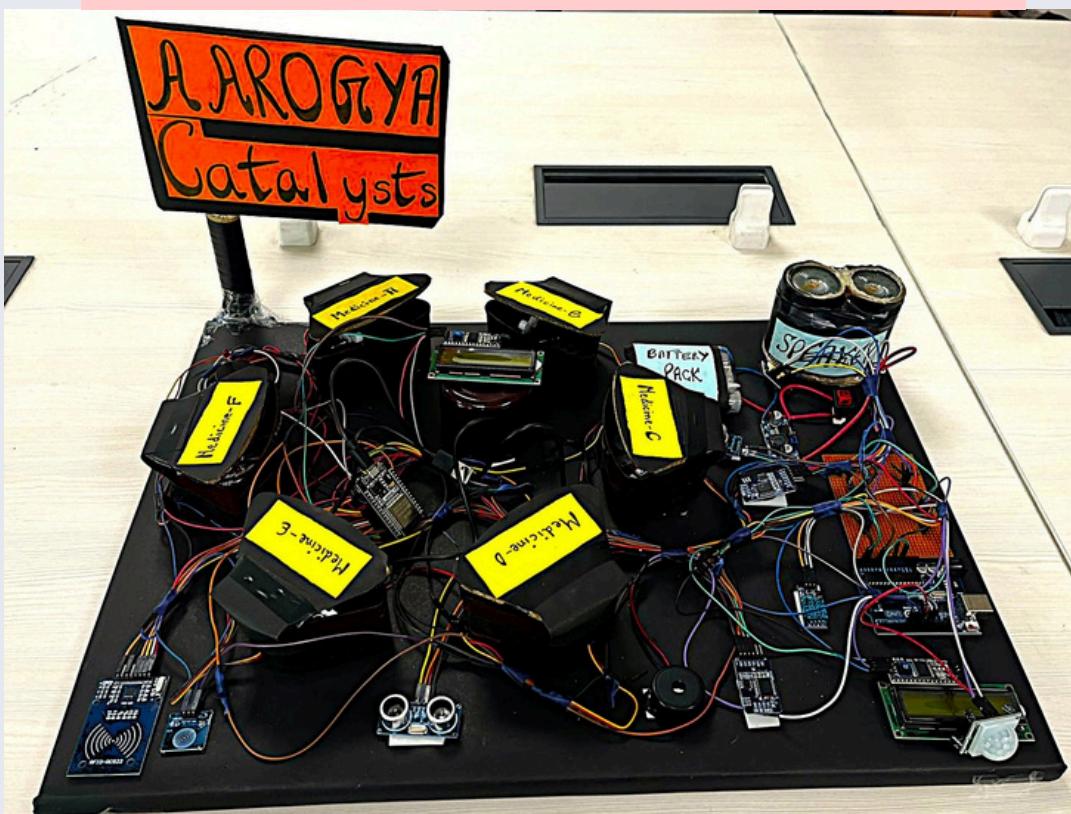
Aarogya Catalysts

Presents

IOT-based Smart Medicine Dispenser

Ensuring Every Dose, Every Time

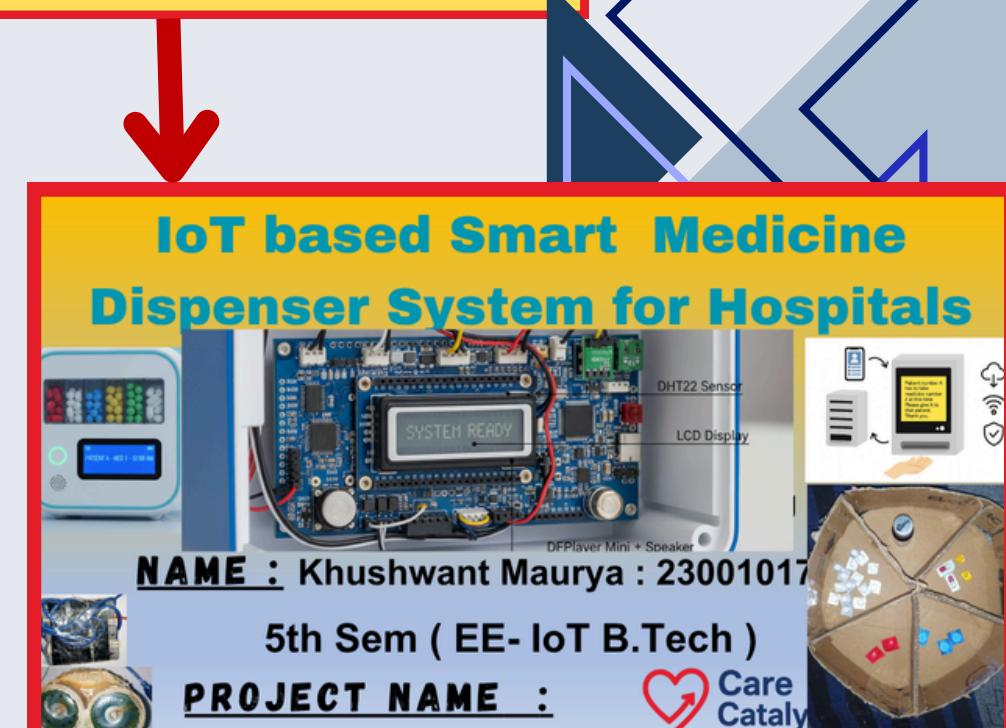
Real Pic of Our Project



- 1. Deepak Shokeen
- 2. Karan Pruthi
- 3. Khushwant Maurya

[Click here to
download App](#)

[Watch our Video
by Clicking here](#)





Problem Statement

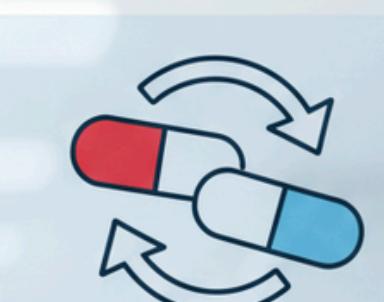
In hospitals with multiple patients, nurses struggle to manage and dispense the right medicines at the right time, leading to missed doses, medication errors, and increased workload.

Daily Struggles

- Nurses managing 15+ patients simultaneously
- Manual tracking across paper charts and spreadsheets
- Fatigue-induced errors during 12-hour shifts
- Missed doses during emergencies or handoffs



Missed Doses



Wrong Medicine



Delayed Administration



Incomplete Records

Key Problems:

- Extended hospital stays and delayed recovery
- Rising costs for families and institutions
- Risk of dangerous medication errors
- Disrupted treatment protocols





IOT-based Smart Medicine Dispenser



💡 Proposed Solution

- **Voice-Enabled Smart Scheduling:** Doctor sets schedule (HTTPS); Buzzer/Voice (DFPlayer) alerts nurse.
- **Triple-Layer Authentication:** Requires RFID + Fingerprint verification to proceed.
- **Precision Rotor-Servo Dispensing:** Stepper Motor positions; 6 Servos open lids for specific dose.
- **Uninterruptible Power & Time:** Battery (BMS) ensures operation; RTC provides precise logging.
- **Secure, Fast IoT Protocols:** Uses HTTPS (App) and lightweight MQTT (Alerts) for network reliability.

💡 Problem Solving

- **Eliminates Human Error:** System automates scheduling and counting, preventing mismatched doses.
- **100% Dose Verification:** Authentication layers ensure Right Patient, Right Nurse, Right Time.
- **Reduces Nurse Cognitive Load:** Converts complex manual tracking into a simple Alert → Verify routine.
- **Creates Immutable Audit Trail:** RTC-stamped log data for doctors to track 100% compliance.
- **Enhances Ward Safety:** Integrated Smoke/Temp Sensors monitor device operating environment.

💡 Unique Innovation

- **Security & Reliability Edge:** Triple Authentication (RFID/Fingerprint/Hand) + Dual ESP32 for stability.
- **Offline Data Assurance:** Local SD card logging ensures data capture even during network failures.
- **Actionable Voice Alerts:** DFPlayer provides clear, language-flexible vocal instructions to nurses.
- **Cost-Effective Scalability:** Modular design using low-cost components (Servos, ESP32) for easy scaling.
- **IoT Protocol Expertise:** Leveraging MQTT for high-speed, reliable alerts in low-bandwidth hospital settings.



Doctor sets patient, time and medicine data.

RFID verifies nurse and triggers alert.

Servo opens specific compartments.

App records dose history and missed doses.

Doctor reviews logs and adjusts treatment.

FEASIBILITY AND VIABILITY



Feasibility

- Technically achievable with current tools and technology.
- Moderate investment of time, resources, and cost.
- Can integrate into existing systems with minimal disruption.
- Scalable for small and large operations.
- Compatible with regulatory and safety standards.
- Accessible with available workforce and skills.

Potential Challenges

- High initial setup or implementation cost.
- Resistance to change from staff or stakeholders.
- Requires technical expertise or specialized training.
- Ongoing monitoring and maintenance needed.
- Possible integration issues with existing systems.
- Uncertainty in achieving expected outcomes.

Mitigation Strategies

- Implement step-by-step or phased strategy.
- Conduct training and awareness programs for stakeholders.
- Use cost-effective and efficient tools or solutions.
- Schedule regular monitoring and updates.
- Engage experts for technical support.
- Develop contingency plans to address risks.



AAROGYA
Catalysts

App Integration & Our Video



Our
Personalised
App

[Click here to
download app](#)

Doctor Login

Email

Password

Sign In

Create an account

Doctor Dashboard

khushwant@gmail.com
Device: medicine_dispenser_1

+ Create Schedule

View Device Events

Create Schedule

Slot: Slot 3

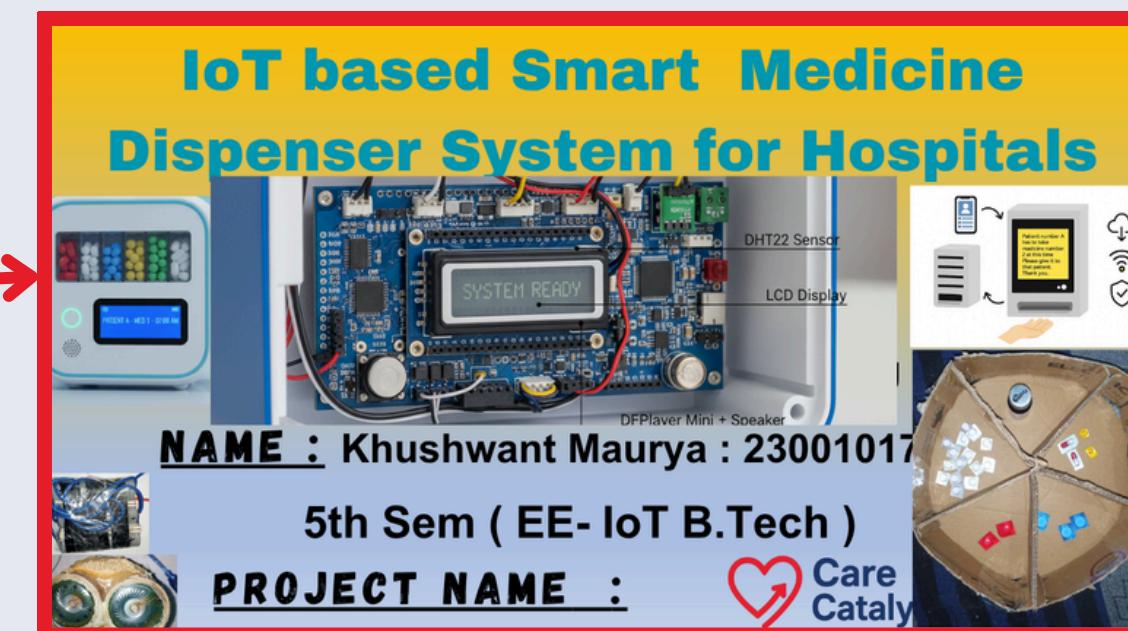
Patients (A,B,C e.g.) Rohan

Pick Time 20:10

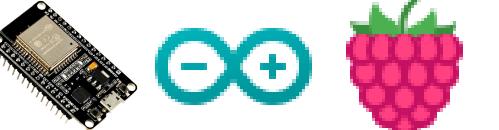
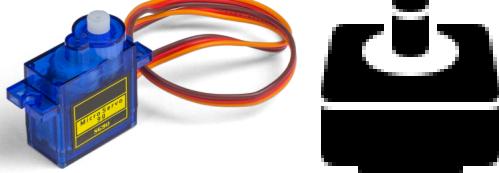
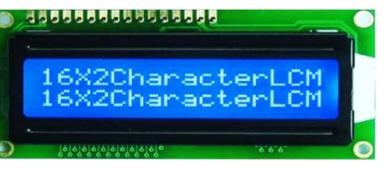
Display Message (optional) Plz take medicine after Meal.

Send Schedule

[Watch our Video
by Clicking here](#)



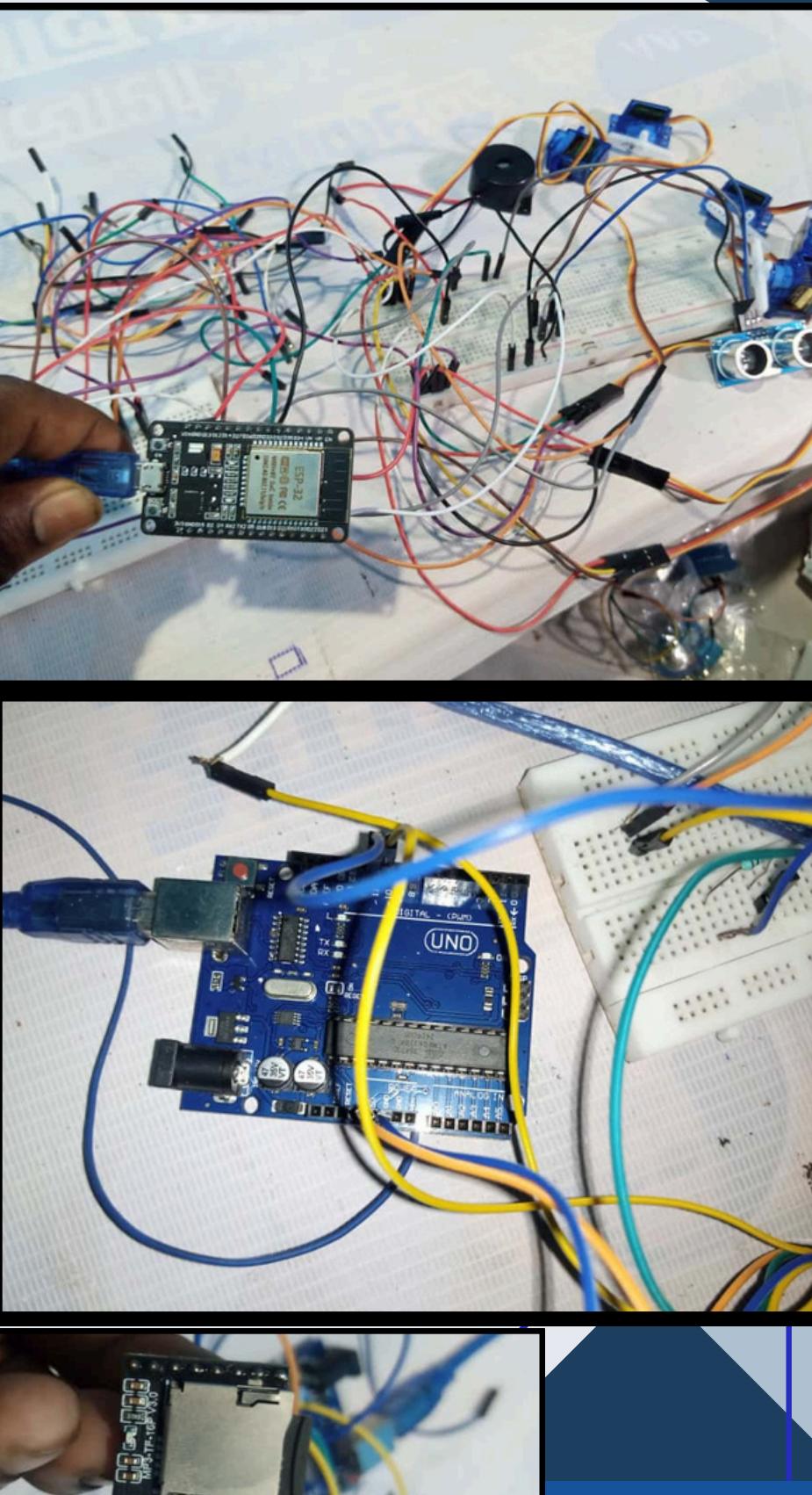
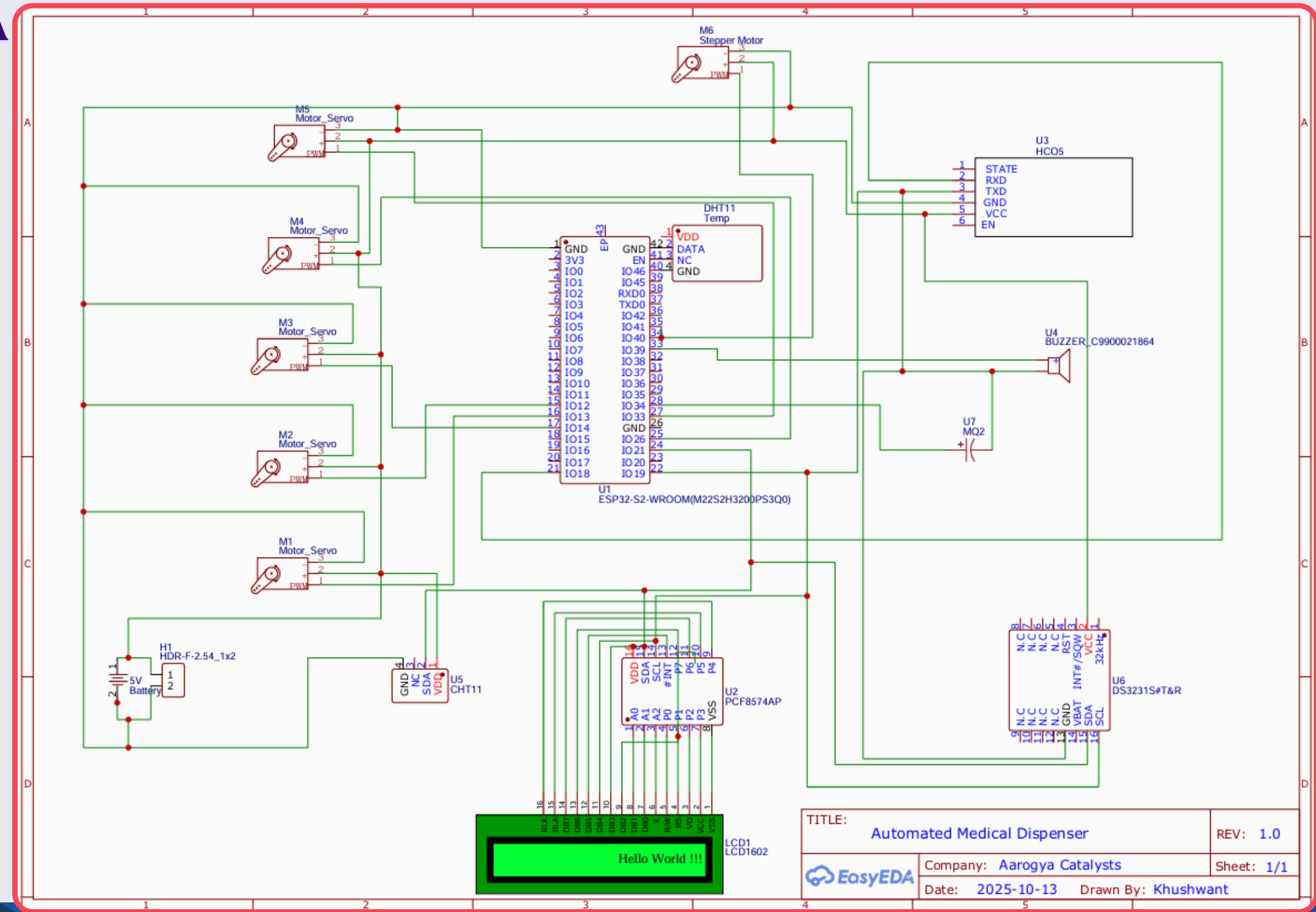
TECHNICAL APPROACH

Category	Technologies	Images	Purpose
Sensing	Ultrasonic / IR Sensor		Detects pill presence and intake
Control	Arduino / ESP32		Offline AI inference, sensor integration, local decision-making
Dispensing	Servo / Stepper Motor		Releases accurate dose at scheduled time
Notification	Buzzer / Mobile App		Alerts user for timely medication
Display	LCD / LED		Shows schedule, dosage, and status
Connectivity & Login	Wi-Fi / Bluetooth / Cloud		Tracks adherence and enables remote monitoring



AAROGYA
Catalysts

Circuit Diagram



Research & References

Report	About	Link
Gargioni L. (2024) – Systematic Review on Pill & Medication Dispensers	Smart dispensers improve dose accuracy (\uparrow 90%) and adherence (\uparrow 70–90%) through timed release, IoT alerts, and locking systems.	https://PMC11052969/
Patel T. et al. (2022) – In-Home Medication Dispensing System	Real-world trial showed adherence rose from 54% \rightarrow 92%, caregiver workload dropped, and patients felt safer.	https://formative.jmir.org/2022/5/e34906/
WHO (2003) – Global Report on Medication Adherence	About 50% of chronic-disease patients fail to take medicines properly, causing preventable illness and deaths.	https://PMC3068890/#:~:text=In%20its%202003%20report%20on,not%20take%20medications%20as%20prescribed
Tariq R.A. (2024) – Medication Dispensing Errors & Prevention	Human fatigue and manual counting cause major dosing errors; automation cuts such mistakes by up to 90%.	https://www.ncbi.nlm.nih.gov/books/NBK519065/
Hodkinson A. et al. (2020) – Preventable Medication Harm Study	1 in 30 patients faces medication-related harm; 25% are preventable through smart monitoring and dispensing.	https://bmcmedicine.biomedcentral.com/articles/10.1186/s12916-020-01774-9