HackOrbit 2025

THE FIXERS

THEME

Healthcare Technology + Web3 + Open Innovation

PROBLEM STATEMENT

India is facing a serious public health threat due to the widespread circulation of fake and substandard medicines, especially in rural and poorly regulated areas.

- As per studies, 1 out of 5 medicines sold may be fake.

- These lead to ineffective treatment, drug resistance, severe health complications, and death.

- Currently, no transparent system exists to trace and verify medicines across the supply chain.

- There is a need for an end-to-end, secure, and intelligent solution to verify drug authenticity and prevent counterfeit distribution.

PROPOSED SOLUTION

MedLock is a Blockchain and AI-powered platform that ensures the authenticity of medicines from manufacturing to consumption.

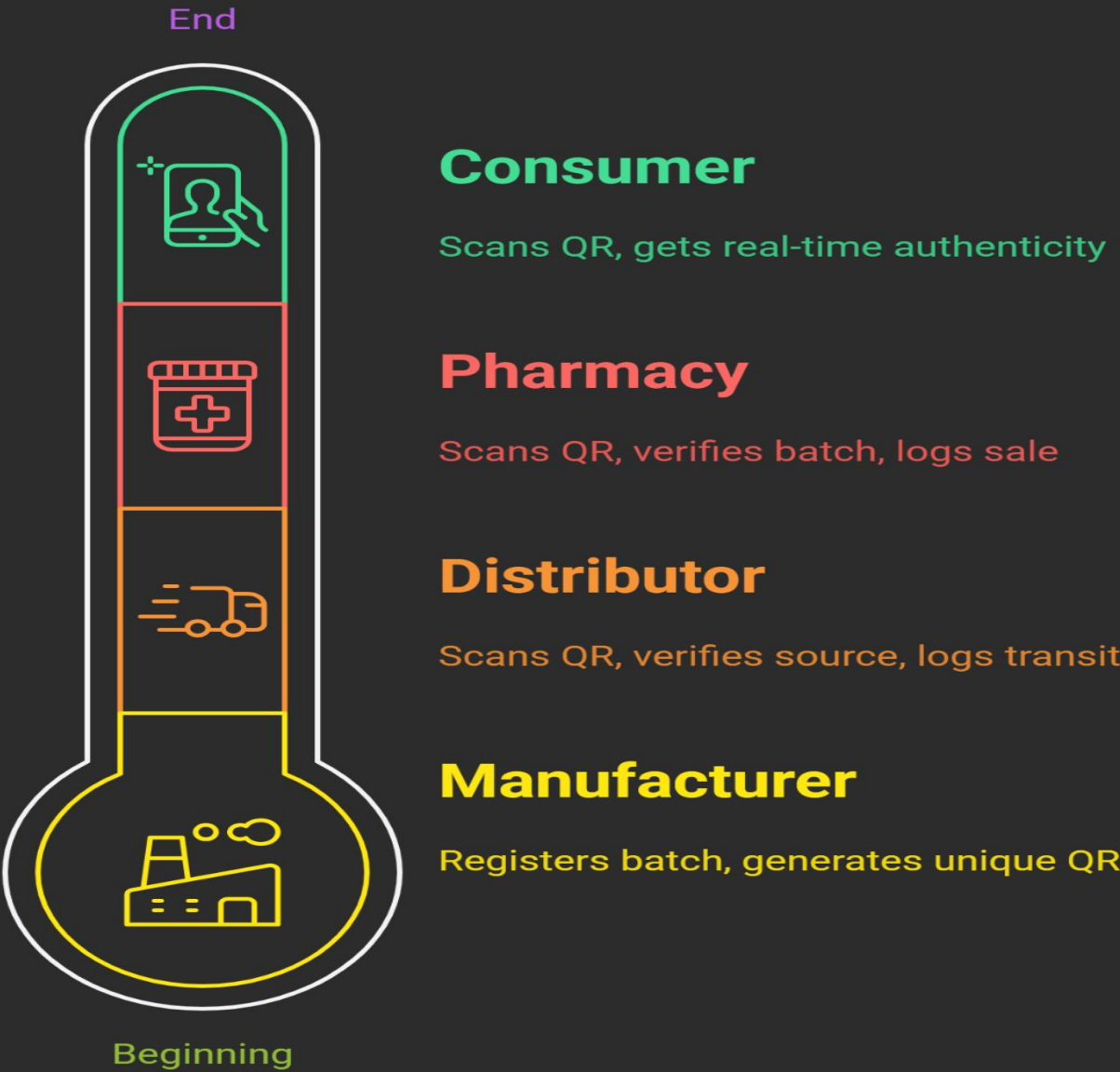**Core   Idea:**

- **Every medicine batch is linked to a unique blockchain-based QR code that records and verifies every step in the supply chain.**

- **Consumers, pharmacists, or authorities can scan the code using a mobile app to instantly check the medicine's authenticity.**

- **AI continuously monitors supply chain activity to detect and flag suspicious patterns or counterfeit behaviors.**

FLOWCHART / DIAGRAM

Tracking product authenticity across the supply chain stages

End

Consumer
Scans QR, gets real-time authenticity

Pharmacy
Scans QR, verifies batch, logs sale

Distributor
Scans QR, verifies source, logs transit

Manufacturer
Registers batch, generates unique QR

Beginning

Pharmaceutical Supply Chain Cycle

Admin Dashboard
Views supply chain journey and flags

Manufacturer Registers Batch
Registers batch and generates unique QR codes

AI Engine Scans Data
Scans data and detects anomalies

Distributor Scans QR
Scans QR, verifies source, and logs transit

Blockchain Stores Data
Stores immutable QR data and records steps

Pharmacy Scans QR
Scans QR again, verifies batch, and logs sale

Consumer Scans QR
Scans QR via app for authenticity

FLOWCHART / DIAGRAM

- The left diagram (Pharmaceutical Supply Chain Cycle) visually represents the full-cycle tracking of a medicine batch using Blockchain and AI. It starts with the manufacturer, who registers the batch and generates a QR code linked to the blockchain. The distributor then scans and verifies the batch during transit. The pharmacy scans it again before selling, ensuring batch integrity. The consumer uses the mobile app to verify the medicine in real-time. The blockchain records every event immutably, while the AI engine scans for anomalies like duplicate QR codes or suspicious routes. An admin dashboard helps pharma companies and health authorities monitor the entire process, ensuring transparency, traceability, and trust across all stakeholders.

- The right diagram (Stepwise Pill Tracker) simplifies this journey into a linear, easy-to-understand process, showing the flow from manufacturer to consumer. It is ideal for non-technical audiences and investors. Together, both diagrams show how MedLock works technically and narratively. However, certain risks exist—like blockchain cost, user adoption challenges, and false positives in AI detection. These can be mitigated using Polygon testnets, training & awareness programs, and real-world AI training data. This layered system of prevention, detection, and transparency ensures that every pill reaching the consumer is authentic, verified, and life-saving.

FEATURES AND NOVELTY

Key Features

- **Blockchain QR Codes:** Unique, tamper-proof QR for every medicine batch.

- **Full Supply Chain Tracking:** From manufacturer to consumer – all steps logged.

- **Real-Time Verification App:** Anyone can scan and check medicine authenticity.

- **AI Anomaly Detection:** Flags duplicate, missing, or suspicious activity.

- **Admin Dashboard:** Central monitoring for pharma companies & health authorities.

Novelty

- Combines **Blockchain + AI** for proactive fake medicine prevention.

- **Empowers users** (patients, doctors, pharmacists) to verify instantly.

- Tackles a **critical real-world problem** with modern, scalable tech.

How to mitigate drawbacks in the project?

Hardware Requirement

Start with mobile-compatible QR scanning for low-cost rollout.

Stakeholder Adoption

Implement phase-wise onboarding with awareness and incentives.

False Positives

Use real supply chain data for better AI model training.

Blockchain Cost

Use Polygon testnet or private chains like Hyperledger Fabric to reduce gas fees.

Consumer Trust

Partner with government health bodies and verified pharma companies.

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Thank you