

MediCleanX: Intelligent Automated Hospital Cleaning Robot with UV & Spray Sterilization

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Abstract: *The rapid spread of infectious diseases and hospital-acquired infections (HAIs) has highlighted the urgent need for efficient and intelligent sterilization systems in healthcare environments. MediCleanX is an intelligent automated hospital cleaning robot designed to ensure effective and contactless disinfection using a dual-action mechanism combining UV-C light and spray sterilization. The system operates autonomously under microcontroller supervision, utilizing wheels and motors for mobility and ultrasonic/IR sensors for obstacle detection and path correction. A robotic arm equipped with a UV-C light source provides targeted sterilization, while a ground-mounted UV module ensures floor-level disinfection. A PIR motion sensor enables a safety protocol that instantly halts the robot and switches off UV-C light when human presence is detected, preventing harmful exposure. The robot also records distance covered and displays operational data on-screen for monitoring. Powered by a rechargeable battery and controlled via an intelligent algorithm, MediCleanX offers a reliable, efficient, and human-safe solution for continuous hospital disinfection. Its automation reduces manpower, minimizes infection risk, and ensures consistent sanitization, making it a vital step toward smart, hygienic healthcare infrastructure.*

Keywords: Sterilization Robot, Hygiene Technology, Sanitizing Robot, Public Healthcare

