

CleanItAll is a multifunctional robotic cleaner designed to overcome the limitations of conventional vacuum robots by integrating object-handling capabilities alongside other cleaning mechanisms. The robot autonomously vacuums, mops, and picks up larger items such as bottles using a robotic arm, aiming to provide a cost-effective and efficient solution for household cleaning.

Equipped with side brushes, a central brush, vacuum suction, and dual mopping pads, CleanItAll can clean various surfaces and debris types. Its movement is guided by a zigzag pattern using ultrasonic sensors for obstacle avoidance and IR sensors for fall prevention. A depth-sensing OAK-D camera enables real-time object detection and assists the robotic arm in accurately handling larger objects.

A custom-built web interface, accessible from both mobile and desktop, allows users to remotely monitor and control all robot functions. The system is powered by Arduino and Raspberry Pi, integrating both hardware and software for full autonomy. Testing confirmed strong results in obstacle navigation, object handling, and cleaning effectiveness, particularly on tile and wood floors.