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AI Smart AMR Disinfection Covers Duties of 4 Staff Members of Hospital Night Shift

As the public perception of lifestyles shifts, people in Taiwan are now less willing to engage in labor-intensive work, paired with the decline in birth rate, exacerbating the labor shortage crisis. To avoid risks such as hiring unqualified workers or a labor shortage, and to ensure safe medical environments, ADATA Technology has partnered with Advantech to introduce the C-Rob Autonomous Mobile Robot (C-Rob AMR) into a leading Taiwanese hospital. With AI integration, robots can automatically recognize objects and their surroundings, and then perform the optimal disinfection method. This not only reduces the burden on hospital cleaning staff but also saves equivalent manpower of 4-6 people per night, enhancing the effectiveness and quality of disinfection operations and providing a comfortable and hygienic environment for patients.

Facing Labor Shortages, Replacing Manual Labor with AMR for Disinfection Is Becoming a Major Trend

Environmental disinfection is a crucial aspect of infection control in hospitals. Proper environmental cleaning and disinfection methods are essential to reduce surface contamination and minimize the spread of bacteria and viruses. However, during the 2020 COVID-19 outbreak, hospitals faced severe staffing shortages, which significantly impacted routine disinfection operations and increased the risk of contact infections. As a result, the hospital started considering the replacement of manual labor with robots and partnered with ADATA to introduce the first generation of C-Rob AMR.

Alan Tsai, Deputy Project Manager at ADATA Technology, noted that while the first generation of C-Rob AMR addressed labor challenges, it did not significantly improve operational efficiency. This was because AI applications had not yet been implemented at the time, and robots were merely following pre-set points and schedules for disinfection. Considering how hospital equipment such as beds are frequently relocated, and the complex, dynamic space planning of hospitals, the first generation of C-Rob AMR often required human intervention to complete tasks.

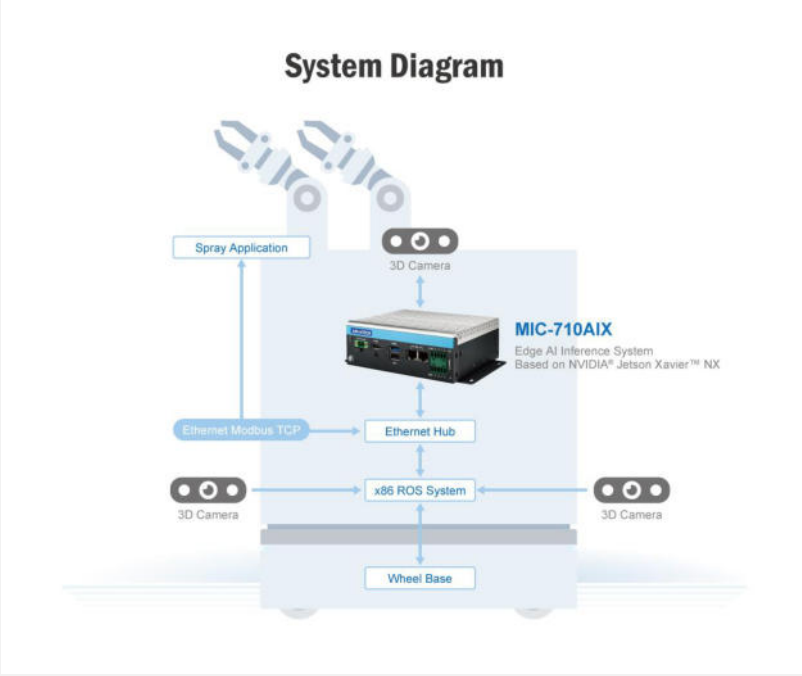
After the COVID-19 pandemic, ADATA continued collaborating with the hospital to launch the second-gen C-Rob AMR development plan. By integrating AI applications, the new AMR could automatically recognize equipment and objects to be disinfected and select the optimal disinfection methods. This approach not only improves operational efficiency but also ensures consistent disinfection quality while helping to avoid potential future labor shortages.

Replacing the Human Eye with AI to Determine the Optimal Disinfection Strategy in Real Time Based on Types of Objects

Alan Tsai further explained the operational structure of the second-gen C-Rob AMR. This new generation of robots comes in two types: a spray disinfection type with a multi-axis vector nozzle, and a UV disinfection type equipped with high-efficiency UVC lamps. Both types utilize ADATA Technology's AI disinfection algorithms, which were developed based on the hospital's current environmental disinfection data, paired with Advantech's MIC-710 as the AI inference mainframe.

The Advantech MIC-710 is responsible for AI object recognition and real-time processing of the AI disinfection algorithm. Once the appropriate disinfection method is determined, commands are issued to the AMR's ROS mainframe through Advantech ADAM, ensuring optimal disinfection results in high standards.

For the spray disinfection robot, when it arrives at the designated location, the AI disinfection algorithm determines the optimal method based on its object recognition results, including spray volume, distance, angle, and the type of nozzle to use. The UV disinfection robot focuses on non-waterproof medical instruments. Upon entering the designated disinfection area, it uses an AI algorithm to determine the UV lamp's exposure distance, angle, and time, then automatically activates the lamp to begin disinfection.



Additionally, after each disinfection task, the second-generation C-Rob AMR reports the results back to the MIC-710, where the AI model recalculates to ensure the validity of the model.

Three Major Benefits of Using AMR for Environmental Disinfection: Reducing Labor Demand, Improving Operational Efficiency, and Ensuring Quality Consistency

Alan Tsai further explained that in terms of labor costs, one robot can handle the workload of 4-6 cleaning workers, effectively reducing labor costs. Improved operational efficiency allows for increased disinfection frequency, enhancing the environmental safety of medical facilities. For instance, the hospital, which previously could only conduct disinfection operations at night, is now planning to clean and disinfect the environment again before morning outpatient hours.

In terms of operational quality, despite the hospital's comprehensive disinfection procedures, individual variations in practice led to inconsistent disinfection quality. Robots, without personal differences, can always follow procedural guidelines impeccably, ensuring consistent disinfection quality.

Advantech's Two Major Advantages: Stable Quality and Diverse Equipment

Of course, the success of the second-gen C-Rob AMR can be partly attributed to the Advantech MIC-710. "Stable quality and the diverse equipment are the two main reasons why ADATA Technology chose to collaborate with Advantech," Alan Tsai said.

In terms of quality, during the development phase, ADATA simultaneously introduced Advantech's MIC-710 and other brand industrial AI mainframes for comparison. However, upon completing development and entering small-scale application, ADATA found that only the Advantech MIC-710 could reliably replicate the setup. The hosts of other brands frequently caused issues, which would impact future mass production plans and potentially erode end-customer trust due to instability.

Additionally, MIC-710's superior heat dissipation prevents overheating during intensive computational tasks, ensuring reliable system operation. Consequently, there have been no customer reports of product defects, underscoring its dependable quality.

Regarding equipment diversity, Advantech has invested significantly in integrating and developing NVIDIA products, continuously releasing new models to align with market trends and meet ADATA Technology's diverse needs in various automation fields. The MIC-710 selected for this project is a mid-tier model with hardware specifications perfectly suiting the AI recognition and computation demands of the second-gen C-Rob AMR. Its support for multiple communication interfaces facilitates seamless hardware integration, and its competitive pricing makes it the optimal choice for ADATA.

Building upon the collaboration with the hospital, ADATA Technology aims to expand the second-gen C-Rob AMR into more hospitals and beyond, even targeting environments like hotels, long-term care centers, and airports that also demand extensive cleaning and disinfection. ADATA also intends to further strengthen its partnership with Advantech, focusing on developing AMRs for diverse applications and utilizing robotic advantages to foster a smarter and more autonomous lifestyle.

Related Product

Advantech MIC-710AIX

AI System Based onNVIDIA® Jetson™ Xavier NX

- Fanless compact design
- Embedded with NVIDIA® Jetson™ Xavier NX up to 21 TOPS
- Supports 2 x GbE, 1 x USB 3.0 , 1 x USB 2.0
- Supports 1 x mPCIe, 1 x M.2 2280 (SATA interface)
- Supports Allxon 24/7 remote monitoring and OTA deployment; Azure Certified Devices