Microfluidic Dispenser for Automated, High-Precision, Liquids Handling

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ABSTRACT

Researchers at the University of California, Davis have developed a robotic dispensing interface that uses a microfluidic-embedded container cap – often referred to as a microfluidic Cap-to-Dispense or µCD - to seamlessly integrate robotic operations into precision liquids handling.

FULL DESCRIPTION

Liquid handling is an essential step involved in many laboratory procedures. Samples must be transferred or dispensed quickly and accurately. To limit the human error often involved in manual operations, automated liquid handling workstations that use robotic interfaces to mimic pipetting functions have been developed. However, a major limitation of these current robotic technologies is the lack of precision during low-volume (sub-microliter) operations. Precise dispensing technologies now require expensive components to support high-precision nozzles for low-volume processing - and also need frequent washing to minimize cross-contamination. Thus, there is a need for a practical, automated, platform that can handle low-volume samples precisely. Recent developments in microfluidic-derived dispensing technologies - also known as microfluidic adaptive printing (MAP) - have emerged as a potential, low-cost, alternative to existing, nanoliter, dispensing solutions.

Researchers at the University of California, Davis have developed a robotic dispensing interface to seamlessly integrate liquid handling and robotic operations. The interface offers a simple and modular way to connect the robotic drive with a standard liquid container, thus exploiting the accuracy and flexibility of a robotic system to achieve the high-precision, on-demand, dispensing of liquids. This technology includes multiple laboratory automation functions - including target/sample recognition, contained catch-and-release and high-precision positioning, dispensing and multiplexing. With its modular connectivity, nanoliter processing functionality, high adaptability and multi-task capacity, this technology has the potential to become the robotic platform standard for future laboratory automation.

APPLICATIONS

- High-precision liquids handling system
- Multi-purpose, laboratory automation, functionality

FEATURES/BENEFITS

- Fully-automated robotic interface
- High-precision, adjustable, microfluidic dispensing
- Multi-task operations
- Broad applicability and flexibility for a variety of biological operations
- Sample storage in tubes with reusable caps for rare or expensive samples

PATENT STATUS

Patent Pending

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OTHER INFORMATION

KEYWORDS

Automation, liquids handling, microfluidic dispensing, robotic laboratory operations

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