Smart Alarm System for Neonatal IV Catheters Using Fuzzy Logic and Multimodal Sensors

A sensor-integrated alarm system for intravenous (IV) catheters in neonates uses fuzzy logic to detect early signs of infusion failure, helping clinicians intervene before complications arise.

What is the Problem?

Peripheral intravenous (IV) catheters are commonly used in neonatal care to deliver fluids and medications. However, these catheters are prone to failure due to infiltration, occlusion, or dislodgement—issues that can lead to serious complications in vulnerable newborns. Current monitoring methods rely heavily on visual inspection and manual checks, which may not detect problems early enough. There is a need for a more reliable and proactive way to monitor catheter function and alert caregivers before failure occurs.

What is the Solution?

This technology integrates a multimodal sensor system into the IV catheter setup, combined with a fuzzy logic-based alarm algorithm. The sensors measure key physiological indicators—pressure, pH, and oxygen saturation—at the catheter site. These data points are analyzed using fuzzy logic, a method that mimics human reasoning to interpret complex or uncertain information. When the system detects patterns associated with impending failure, it triggers an alert for clinical staff. This approach enables earlier detection of problems, potentially reducing harm and improving outcomes for neonatal patients.

What is the Competitive Advantage?

-Multimodal Sensing: Combines pressure, pH, and oxygen saturation measurements to provide a more comprehensive view of catheter function.

-Fuzzy Logic Algorithm: Uses a reasoning model that can interpret subtle changes and ambiguous data, improving detection accuracy.

-Real-Time Alerts: Provides timely notifications to caregivers, allowing for quicker intervention.

-Designed for Neonatal Use: Tailored to the specific needs and vulnerabilities of newborns, where early detection is especially critical.

Technology ID

BDP 7732

Category

Device/Cardiovascular
Device/Other
Selection of Available Technologies

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Patent Information:

US11540783B2

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