Invention Title:
The Smart Device for Evaluating Blood Sample Quality Using AI

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Introduction

Blood samples play a vital role in diagnosing diseases and guiding treatment plans.

Problem State ment

The medical laboratory sector faces challenges related to sample rejection due to blood hemolysis, clotting, sample QNS, overfilled and the use of incompatible tubes for the required test.

This leads to

- ❑ Delays in results and increased turnaround time (TAT)
- ❑ Causing inconvenience for patients
- ❑ Additional costs
- ❑ Reduced efficiency in laboratories.
- ➢ These issues negatively impact the patient experience and the quality of healthcare services.
- ➢ The sample rejection rate reached 2-3%, highlighting the importance of addressing this issue.

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The Solution

The Smart Device for Evaluating Blood Sample Quality

This innovative smart device evaluates the quality of blood samples immediately after collection, before sending them to the laboratory. It is designed to be placed in sample collection rooms and hospital inpatient wards.

Features:

The device uses advanced sensors to verify sample quality, including:

- ❑Ensuring sufficient sample volume.
- ❑Detecting clotting or hemolysis.
- ❑Verifying the compatibility of the tube type with the required test.

How It Works:

1. The blood sample is placed into the device.
2. The device scans the sample and provides instant feedback:

- **Green Light:** Indicates that the sample is acceptable. The device issues a quality certificate attached to the sample to ensure its acceptance in the laboratory.
- **Red Light with Alert:** Indicates an issue, along with a description of the problem displayed on the screen.

If an issue is detected, technicians can immediately draw a new sample, ensuring both patient convenience and sample quality.

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Additional Functions

- **Educational Lectures**:
  Provides video tutorials on the correct blood sample collection process and includes information about tube types, their uses, and additional related content.
- **AI-Guided Test Instructions**:
  Technicians can press the "Ask Me" icon to get AI-driven guidance on the required tube type, collection precautions (e.g., fasting, avoiding antibiotics), and the ideal time for collection.
- **Statistics and Tracking**:
  - Logs technician activity (username and error instances via red light).
  - Monthly performance reports are linked to the hospital system for supervisor review.
  - Implements corrective actions like intensive training if errors exceed thresholds.
  - Tracks rejected samples and analyzes if issues are due to patient conditions (e.g., hemolysis) or collection quality.
- **Settings**

Language, selection Date and Time Setup to match the hospital system and ensure device connected with the hospital system

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To watch the invention video

https://youtu.be/G2Pwsd9R_oQ

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Key Features of the Smart Device

- **Real-time analysis**: Quickly detects hemolysis, clotting, or other quality issues within minutes.
- **User-friendly design**: Easy to operate for technicians in blood collection rooms or hospital wards.
- **Time-saving**: Reduces diagnostic delays by ensuring only viable samples are sent to the lab.
- **Improved efficiency**: Minimizes the need for patient resampling and optimizes laboratory workflows.
- **Educational Tutorials**: Provides step-by-step video tutorials on proper blood sample collection methods and additional educational resources.
- **AI Assistance**: Offers AI-driven support for inquiries regarding the appropriate tube type and precautions to take before sample collection (e.g., fasting or avoiding medications).
- **Performance Monitoring**: Tracks employee performance, monitors errors, and provides detailed monthly reports. This enables targeted training to improve staff efficiency and reduce errors.

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Target Market

Who Can Benefit from This Device?

- Hospitals, clinics, and laboratories.
- Medical institutions focused on improving patient care
- Potential for global adoption due to the universal need for reliable blood sample testing.

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Conclusion

Revolutionizing Blood Sample Collection

- This smart device addresses a critical issue in the healthcare sector, improving efficiency, accuracy, and patient satisfaction.
- By ensuring blood sample quality at the point of collection, we can significantly enhance diagnostic workflows and patient care.

Thank You