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Patent Search

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Abstract:

A smart infant incubator is designed to provide the essential care and warmth that preterm infants require, mimicking the conditions of a mother's womb. Preterm infants experience significant discomfort and pain during the incubation period. To alleviate this and enhance their comfort, a specially designed pillow has been integrated into the incubator to simulate maternal characteristics. This incubator is equipped with a monitoring camera to track and detect the baby's movements, ensuring close observation times. Additionally, the system continuously monitors the vital signs of the infant, such as heart rate, temperature, and respiration. This real-time data is then transmitted to parents and medical staff using a Wi-Fi module connected to an IoT system embedded in the pillow unit, which operates on an Arduino platform. Caregivers can access this information conveniently through the Blynk app, enabling them to stay informed about the baby's condition and respond promptly to any changes. The smart incubator is designed to maintain a clean and controlled environment, providing the perfect warmth and safety needed for the infant's development. It combines advanced technology with nurturing design to support the delicate needs of preterm infants, offering them a more comfortable and soothing experience during a crucial period of their growth. By replicating the comfort of the maternal womb and ensuring constant monitoring, this innovative incubator aims to improve the overall well-being and development outcomes for preterm babies.

Complete Specification

Description: The block diagram of this system comprises several key components connected in a systematic manner. At the center is the Arduino Mega 2560 microcontroller which serves as the primary processing unit. Sensors such as the LM35 (temperature sensor), DHT11 (humidity sensor), and MAX30100 (heart rate and SpO2 sensor) are connected to the Arduino. The sensors continuously collect data and send it to the Arduino for processing. An LCD display is also connected to the Arduino to show the real-time values of the monitored parameters.

An ESP8266 Wi-Fi module interfaces with the Arduino, facilitating the wireless transmission of data to the Blynk app. This module connects to a local Wi-Fi network, allowing the system to update the IoT platform continuously. The Blynk app serves as the user interface, displaying data in a user-friendly format and sending alerts if a parameter exceeds the predefined thresholds. Additionally, a camera is installed within the incubator and linked to the system, providing a live video feed to caregivers. A power supply unit powers the entire system, ensuring stable and uninterrupted operation. Together, these components form a comprehensive monitoring and alert system, enhancing the care and comfort of preterm infants in the incubator.

Table 1 Hardware components and its feature
Pillow Unit

Fig 2. Block diagram of Pillow unit

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