

OPTIMIZATION OF ACTIVE SLEEP ASSISTANCE DEVICES FOR SUDDEN INFANT DEATH SYNDROME(SIDS) PREVENTION

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Keywords: SDIS, Design Optimization, FSR Pressure Sensor, Airbag Inflation Device

Abstract

SDIS(Sudden Infant Death Syndrome) is one of the major effects of death that continues to occur in Korea. Conventional products and solutions developed for the purpose of preventing SIDS have a limitation - it is difficult to regard them as solutions through active intervention in that intervention takes place fundamentally after a risk has already occurred.

This study proposes an automated system that can actively secure the infant's airway, in situations where guardian intervention is difficult to be in charge of infants aged 2 to 4 months. The proposed system is designed to monitor changes in the infant's head position using a FSR(force sensitive resistor) pressure sensor and secure airway by expanding the built-in airbag to smoothly rotate the head when detecting a risk slope. The head rotation angle compared to the safety pressure threshold was predicted through the optimization process, and based on this, the optimal installation location, quantity, and airbag specification of the pressure sensor were calculated. Based on the Arduino Uno R3, five FSR402 sensors were placed at 2 cm intervals and an airbag module that can expand up to 3 cm was integrated. As a result of the experiment, the developed algorithm accurately detected pressure situations above the threshold (10mmHg) and proved the technical feasibility of returning the head to the safety area through the driving of the airbag. This study proposes the possibility of a next-generation infant safety system that can actively block accidents within golden time beyond the existing passive notification method. In future research, we plan to develop it into a commercial smart monitoring system by integrating PCB-based miniaturization and IoT interworking functions.