

OFFICIAL ABSTRACT and CERTIFICATION

Addressing SIDS: Analyzing the respiratory rate of infants using image processing algorithm

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The most predominant cause of death of infants, age 2-4 months, is Sudden Infant Death Syndrome (SIDS) (1). A main cause is when infants sleep on their stomachs (2). While most baby monitors provide a video/audio feed, none can detect any signs of SIDS directly. Thus, the image processing algorithm designed in this project aims to provide an infant monitoring system that visually measures breathing. Built with Java in Processing 3, an algorithm was designed and tested, specifically to subtract each pixel independently and sum up the positive differentials for two frames. Experimental data was collected by self-testing, utilizing different breathing conditions. Through the data collected, the threshold was measured as approximately 0.02285106383 percent brightness per two frames. The threshold can be calibrated, in correlation with the average respiratory rate of infants, which is 30-60 breaths per minute. If the measured value is below the threshold, a corresponding smartphone app sends a notification with both sound and vibration to alert parents in the event SIDS is a threat. The app, which was built with Java in Processing 3 using the Android mode, displays the video feed and the difference in pixels for each frame, and provides the calculated average brightness for each. The app functions on a timer and takes the average of the frames per two seconds. Based on the technology and accuracy embedded in the designed image processing algorithm, infants can be sharply monitored to immediately notify parents if an infant's breathing status changes during sleep.

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