Smart Cradle System for Automated Baby Monitoring

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***Abstract*—Parents of attending to newborns often suffer from sleep deprivation. Our smart cradle attempts to reduce parents' loads by attempting to put the baby to sleep without parental intervention. The system uses a combination of a motion sensor and a camera system to detect the baby waking up, and employs an AI component to decide the appropriate lullabies to play and the intensity of the cradle's rocking motion depending on the baby's current mood. The system notifies the parents via WiFi only if it fails to put the baby to sleep within a certain time threshold, thereby allowing parents to sleep better without needing to attend to their newborn unless absolutely necessary. The AI component can be used to monitor for other signs of distress and notify the parents accordingly.**

***Index Terms*—baby-monitor, computer vision, cry detection, cradle**

I. Introduction

The reason behind our idea was the endless complaints from parents of toddlers from all over the world, be it our close relative, a mentor, a colleague and posts on social media, about one thing, "Sleep". The recommended hours of sleep for an adult would be at least 7 hours, but for parents with toddlers, it's just a dream. To make it a reality, we have proposed this idea where it will take care of both parties, the child and the parent. Our main goal is to create a device that will be very customisable according to the baby's needs. It will act as a part-time nanny to take care of a baby's immediate tantrums and the system will be built in such a way that the robot will only alert the parents if the baby's cry is a cry for help. Primary users of this system are going to be both parents as well as neonatal wards of healthcare facilities. The system will reduce the stress on caregivers and the babies.

A survey was carried out to understand the difficulties of new parents that they go through regularly, especially while the baby is asleep and wakes up suddenly for certain needs. The responses are supposed to be effective enough for us to understand how an automated cradle system would reduce the troubles of new parents so that they can maintain a better lifestyle at that point.

Out of 70 participants that were mostly around the age of 25-40, it was found that 72.7% of new parents are suffering from sleep deprivation, and it's also seen that more than half (54.5%) of the people ask for help from family and friends, which seems to be a hassle for both parties. Also, most people believe that it is very difficult to respond to the baby when he/she wakes up in the middle of the night. The baby might wake up due to any possible reasons like hunger, defecation, etc., but the results show that 50% of the people delay in responding, which turns the situation into a risk-taking one. Also, most people (91%) believe that getting the baby back to sleep requires extremely hard work and is also time-consuming. Hence 72.7% of people voted yes to the fact that an automated cradle system would be of great help to them, and they would buy it if it were available in the market, which proves the necessity and market demand for the automated cradle.

II. Related Works

Summaries of summaries

III. Methodology

IV. System Design

A. Hardware

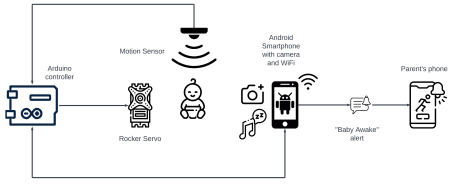

Fig. 1. Hardware Components of Smart Cradle

B. Software

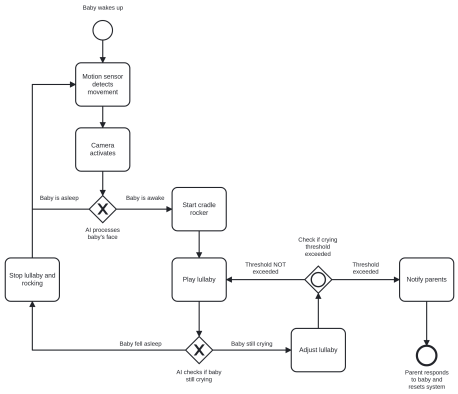

Fig. 2. Event Loop of Smart Cradle

V. Results

VI. Discussion and Conclusion

Acknowledgement

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