AUTOMATIC BABY CRADLE AND MONITORING FOR INFANT CARE

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ABSTRACT

This paper presents a design of an Automatic Baby Cradle System which gives a reliable and efficient baby monitoring system that can play a significant role in providing better infant care. This system monitor parameters such as baby cry, environment temperature, moisture condition, and using cloud this information is accessed by parents to initiate the proper control actions. The system architecture consists of sensors for monitoring vital parameters, dc motor for cradle movement, cloud where data is stored and a sound buzzer all controlled by a single Arduino Mega microcontroller core.

Keywords: Cloud, Cradle, Information Storage, Microprocessor, Sensors.

I. INTRODUCTION

Both the parents in today's life are working and busy. Thus, they don't get enough time to take care of their babies.Many parents don't want to hire caretakers because of safety issues and expenses. An automatic baby care system can help the parents to look after their babies without being physically present with the baby all the time. The design of the system aims at following points:

1. Recognize baby cry through microphone and swing the cradle through a webpage button when   baby cries.

2. Sounds an alarm when mattress gets wet.

3. Monitor environment temperature to check baby's well being.

II. DETAILS EXPERIMENTAL

2.1. Architecture

Our system is designed to help parents and nurses in infant care. The aims of the system are:

1. Swinging cradle when baby cries till baby stops crying.

2. Sounds an alarm when mattress gets wet.

3. Sensing environment temperature and alerting parents.

4. Monitoring all thebaby's information through a through cloud.

Architecture of system is as shown **Figure 1.**
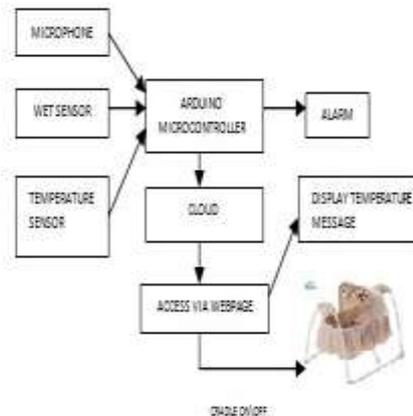
Figure 1: Architecture Diagram

2.2. Implementation

The architecture of the system consist of both hardware and software. Block diagram is shown in figure 1.The code is written in embedded C++ and is burnt into the microcontroller. The main designing blocks of system are as follows:-

2.2.1. Cradle movement when baby cries.

Microphone captures the baby cry sound and the generated sound level in dB x is compared with a preset value y and if x is greater than y, it indicates that the baby is crying.

If it is sensed that baby is crying, parent can see this information through a button on webpage which shows baby is crying message ,and parent can

swing the cradle just by clicking "on" button and stop swinging by clicking "off" button after seeing the message that baby is fine. Baby's sound data is stored on cloud so that parent can access the data from anywhere.

Cradle movement is controlled by dc which will provide back and forth motion.Motor's clockwise and anticlockwise movement moves the cradle on the either side and in this way the system will keep working.

2.2.2. Wet sensing

To determine the moisture condition i.e. urine detection, two pairs of copper electrodes are placed under the cloth on which baby is sleeping. The signal obtained is given to microcontroller.

When urine is present switch is closed transistor turns on. When urine is absent switch is open, transistor turns off. Thus, if mattress gets wet, Alarm is buzzed to alert parents.

2.2.3. Environment temperature sensing

Environment temperature sensor operates at 5 V and can measure temperatureupto125 C which is sufficient for the targeted environment temperature range. If the temperature is too high, parents can monitor through webpage and switch on the fan or AC when required.

III. RESULTS AND DISCUSSION

3.1. Automatic baby cradle system

The developed prototype is shown in **Figure 3.**

Here three samples of sound levels of baby cry voice sound level are taken i.e. 25dB, 30dB and 20dB. Least value 21dB among the three sound levels is set as preset value. Even when the baby is quiet there is an input due to environmental noise ranging 0dB-5dB which is less than the preset value 20dB and therefore baby cry is not detected. When baby starts crying, an input due to baby cry voice and environmental noise is detected in range 25dB-35dB which is greater than the preset value 21dB and therefore baby cry is recognized and shown on webpage and thus the cradle can be swinged. This is

shown in Fig 3 and Fig 4.

When baby stops crying, cradle can be stopped slowly so that baby totally goes to sleep.

Wet sensor detects wetness effectively and alarm is initiated. **Figure 4** shows message when wetness is detected.

Figure 4 and **Figure 5** shows changes in temperature effectively.
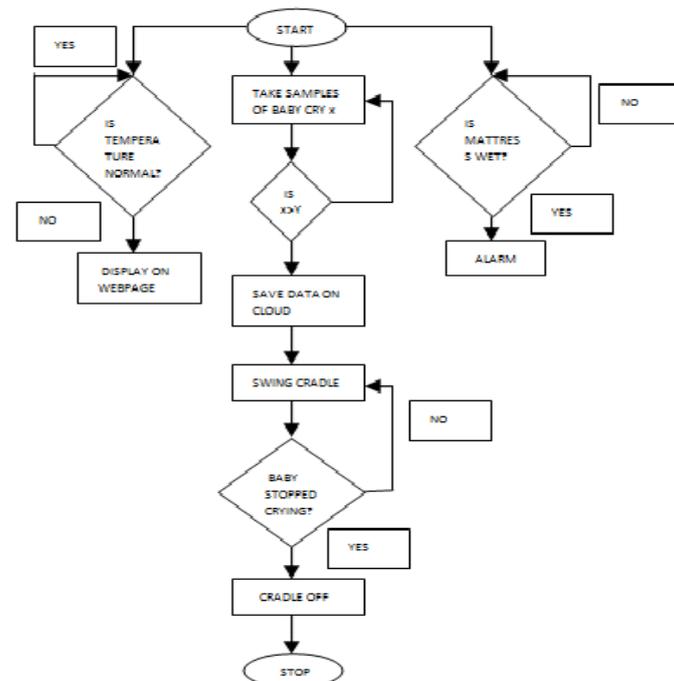
Fig.2. Flow Diagram of System
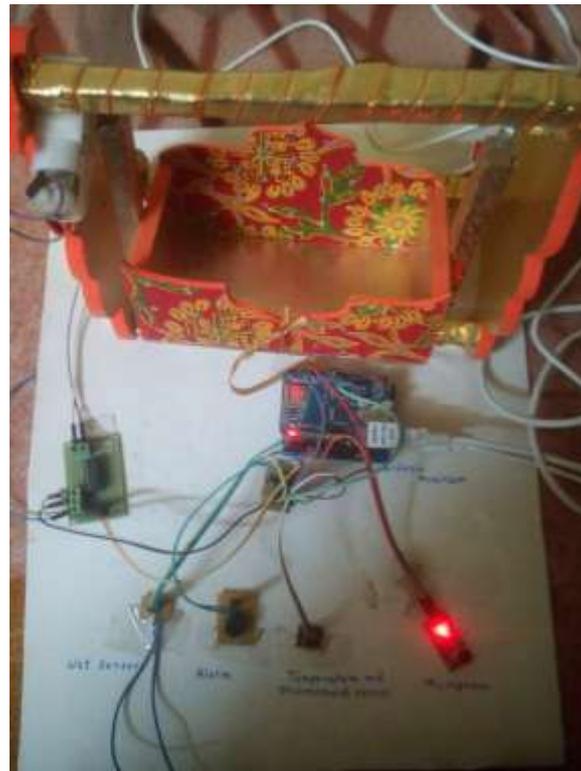
Fig.3.System Working
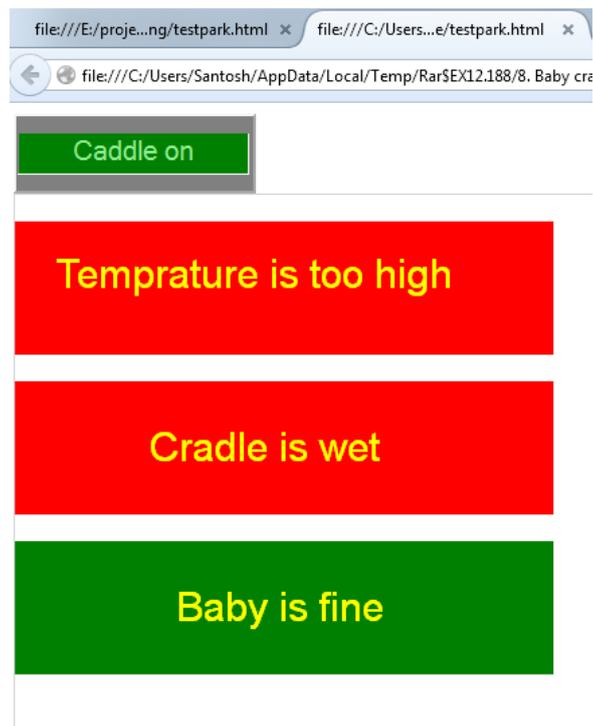
Fig.4 System output shows high temperature and wetness detection

Fig.5 System output shows high temperature and baby crying message

IV. CONCLUSIONS

Baby Monitoring System is an inexpensive and simple to use, which can improve the quality of infant-parent communication. Thus, the designed system would be of great use to the working parents to take care of them in their busy schedules and hospitals for taking care of infants. Parents can monitor their baby live via webpage.

V. ACKNOWLEDGMENTS

This system can be used by working parents who can't be with their babies all the time and don't want a caretaker.
It can be used effectively in hospitals where a large number of infants need to be monitored.

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