A Review Paper on Infant Baby Care and Monitoring System

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Abstract-For Infant babies a lot care is needed to be taken. This paper presents a prototype of Infant Baby Care & Monitoring System that helps to monitor certain parameters of baby when it is unhealthy and under observation. Vital parameters of baby such as pulse rate, respiration, moisture condition, movement of baby, cry detection of baby are monitored and using GSM network the information is transferred to their parents or doctors. Buzzer is used for giving instant warning to the parents to take appropriate actions. The system consists of several sensors for monitoring vital parameters, LCD screen to display parameters, GSM interface to give message to parents, camera to record movement of infant and a sound buzzer all controlled by a single microcontroller core.

Index Terms – LCD, GSM, Infant Baby Care & Monitoring System(IBCMS), Advanced Baby Care System(ABCS).

I. INTRODUCTION

In the present world the female participation in labour force is tremendously increased. And it is also observed that many working women does not continue their job sincethey have delivered a baby. Also there are cases of premature delivery in which the infant is to be kept under observation.

In all such cases it is not possible that the parents are always near to their baby. Or even in hospitals nurses and doctors cannot be always there for taking care of baby. In such cases there should be a system which can 24x7 monitor the baby.

In this project the infant baby is monitored which is literally unhealthy and is needed to be taken care of. Different sensors are used to monitor vital parameters of baby. These sensors are pulse rate sensor, respiratory sensor, moisture sensor, motion sensor and cry detection sensor.

The vital parameters of baby such as pulse rate, respiration, motion of baby, moisture condition, crying of baby are monitored using the sensors and displayed on the LCD. When the motion of baby is detected the camera is activated to keep watch on the baby. If the health status monitored is not good then the message regarding the health of the infant is send to the parents and respective doctors.

II. LITERATURE SURVEY

A. Intelligent Baby Monitoring System

As we seen in India both the parents need to work and look after their babies infants, so more workload and stress is there on such families especially on female counterparts. If a system is developed which continuously gives updates about their infants if they are ill or under observation then it will be of great help to such members as they can work in stress less environment giving more fruitful output. Also urgent situation condition can be quickly be noticed and handled within less time. Usually, when a young baby cries, the cause is one of the following things i.e. they are hungry or not feeling well. So we are trying to develop a prototype which can monitor the activities of the babies and/or infants along with finding one of the above causes and give this information to their parents.
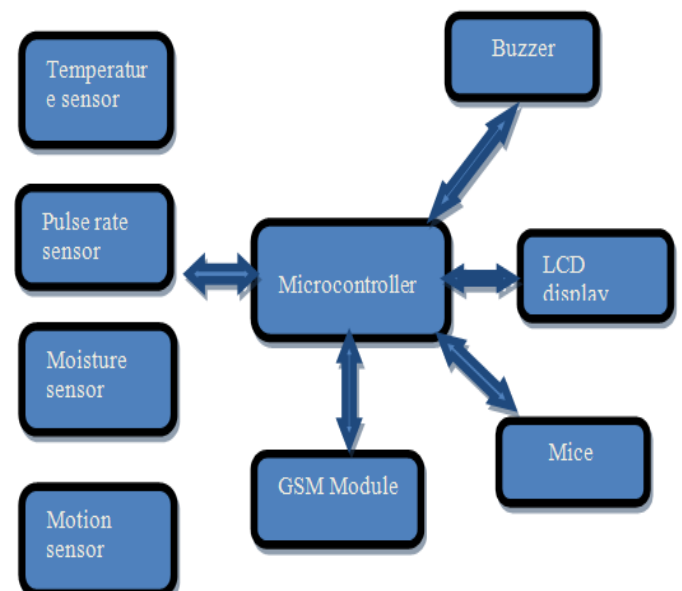

Fig 1: Block diagram of proposed system.

B. Advanced Baby Care System

Currently, most popular baby monitoring devices allow parents to monitor their child through motion and sound. Devices such as walkie talkies and video cameras are used for this purpose. These are stationary devices, helpful in situations where the baby is confined to its crib, when the baby is asleep or in early stages of development. Also, the parent has to constantly look at the baby monitor in order to know what their child is doing. There is no way of knowing if they are in danger, until it's too late. ABCS is a device capable of following children who able to crawl or walk and thus helping parents keep track of them, while being engaged in their tasks. ABCS has been designed as a device which can serve as a helping hand to a parent, following the child and automatically alerting them so that the child does not wander off to unsafe zones around the house .
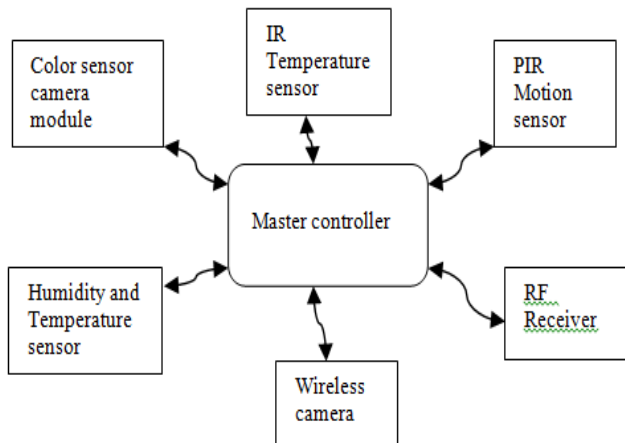
Fig 2: System architecture of ABCS.

C. Wearable Health Monitoring System for Babies

The number of infant deaths occur due to improper care taken. Mothers with newly born baby have to stay away from their babies due to various reasons. During such situation, health status of babies is hard to detect. The sudden fluctuations in the health of infant baby may lead to the sudden infants deaths syndrome(SIDS) and may lead to Apparently Life Threatening Events[1]. The aim of the project is to incorporate sensory functions in the wearable hardware making it capable of measuring the physiological parameters (temperature and heart beats) accomplishing the need of continuous health monitoring. The microcontroller based hardware includes integrated sensors for the parameters heart rate, temperature. It will notify for the potential life threatening events, also recognize the development of any disease. The hardware will be able to output the analogue values of sensed data which in term will be synchronized with cloud server via middleware architecture. Wearable hardware will communicate with middleware architecture through wireless communication.
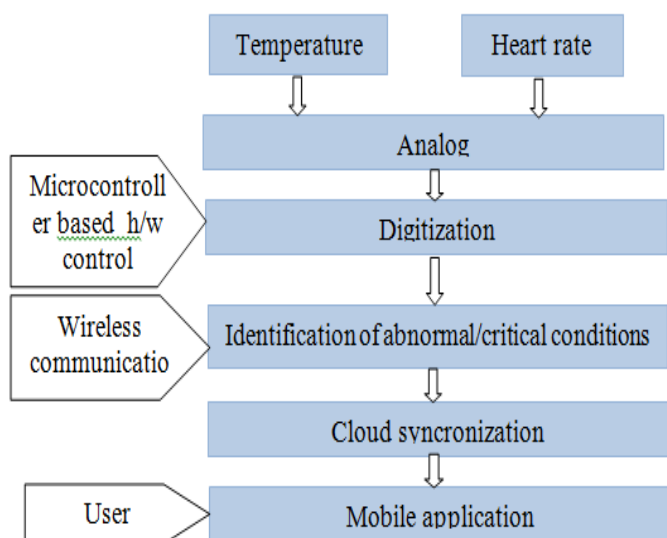

Fig 3.Wearable Health Monitoring System for Babies

III. COMPARATIVE STUDY

We compare the proposed system with other three papers, according to that comparative analysis is represented as follows.

In first paper very few parameters are monitored such as temperature, pulse rate, moisture & movement of an infant. In our system, vital parameters such as pulse rate ,respiration, moisture, movement of an infant and cry detection of baby are monitored [1]. In second paper the device is capable of following the children who are able to crawl or walk. But still parents have to continuosly look after their baby since there is no way of getting information. In our system, there is a GSM module provided which regularly updates parents and respective doctors about the health status of the infant[2]. The second paper proposes the sudden infant deaths and measures only few paramaters of the baby. Those parameters are heartbeat and temperature. While our paper monitors many other vital parameters and also measures respiration of baby incase to detect the chances of sudden infant death[3].
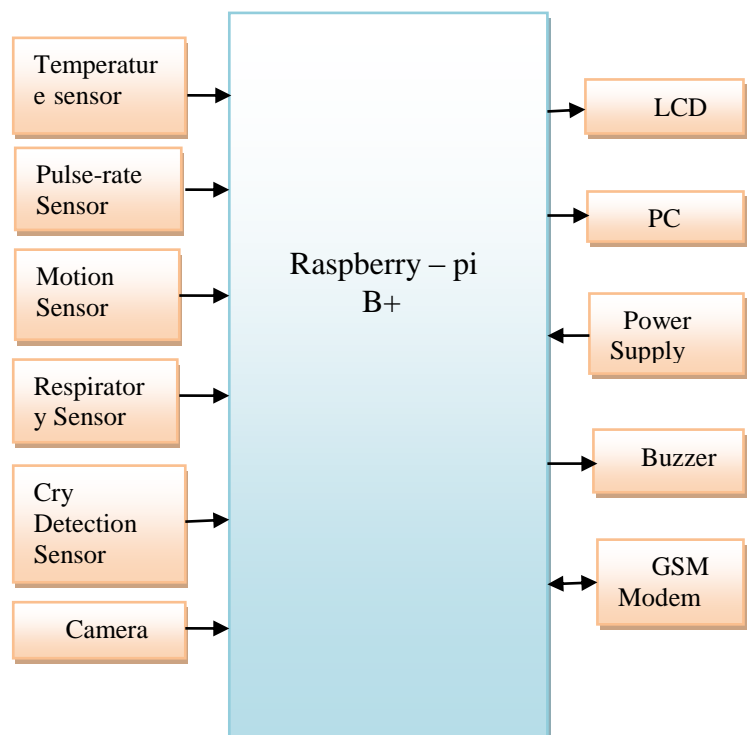
IV. PROPOSED SYSTEM

Fig. 4 Block diagram of Proposed System.

i Raspberry-pi

The processor at the heart of the Raspberry pi system is a Broadcom BCM2835 system-on-chip (SoC) multimedia processor. It includes central & graphics processing unit along with the audio & communications hardware. It has 256 MB memory chip. Raspberry pi board have its own operating system is known as raspbian which is linux based operating system &compatible with raspberry pi board. .

ii Web Camera

Camera captures the movement of the baby only when the baby is not sleeping. The video captured by the camera is displayed on the PC or laptop.

iii   Motion Sensor

Ultrasonic sensor is used as a motion sensor to detect the movements of the baby. The ultrasonic sensor is programmed in such a way that if the baby move towards the sensor within the range of 5cm distance then movement is detected and the camera is set on. Even the message is forwarded to the parents.

i v   LCD

In our prototype 16 X 2 LCD module is used. It has 2 rows and 16 column therefore total 32 characters are displayed. It has two operation modes, one uses all 8 pins and the other uses only 4 of them. The 4-bit mode was used to manage the LCD screen. All sensor output is displayed continuously as it is being measured.

v GSM Modem

GSM (Global System for Mobile communication) is a digital mobile telephony system. With the help of GSM module interfaced, we can send short text messages to the required authorities as per the application. GSM module is provided by SIM uses the mobile service provider and send SMS to the respective authorities as per programmed. This technology enable the system a wireless system with no specified range limits. In this way, whenever the safe range of the vital parameter of an infant is violated, the programmed microcontroller produces an alarm and GSM Modem interfaced with the microcontroller sends an alert SMS to the parent's mobile number deploying wireless technology.

vi Cry Detection Sensor

When the sensor detects a noise, it outputs a low signal. This value is accessed in the program though the specified gpio pin. For each low signal detected, a counter is incremented and when this counter reaches a preset value, it is considered as continuous cry from the baby and an email notification is sent to the users.

vii Respiratory Sensor

Our piezoelectric respiration sensor is an affordable option for respiratory analysis in a wide range of applications. It has a localized sensing element that measures displacement variations induced by inhaling or exhaling.

viii Pulse rate Sensor

The photodiode and light emitting diode are the components of a pulse rate sensor. The system consist of IR transmitter and receiver, high pass filter, amplifier and comparator. By using this circuit component biological signal in milli volt is converted to larger magnitude about one to two volt and then send it to the microcontroller. Pulse rate will be measured from the finger using optical sensors and displayed on the LCD.

ix Temperature Sensor

The temperature sensor is a device that detects the body temperature of the baby. The normal body temperature of the infant baby is 37 degree celsius. If the body temperature of the baby exceeds the threshold value then the fever is considered and the message is send to the respective parents or doctors.

V. CONCLUSION

There is variation in temperature and humidity in the environment surrounding the infant over a period of time. The Intelligent Baby Care & Monitor is a paper represented to touch the lives of parents and ease their ways of operation. It has been pumped with several functions sufficient enough to ease the workload of parents and to take proper care of critically ill infants. The functions offered by this device will continuously monitor the health status of the child and thereby provide notifications to parents when their baby is in need of them. Hence monitoring a baby 24x7 will not remain any issue for both parents and doctors.

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