INTELLIGENT BABY MONITORING SYSTEM AND BLUETOOTH CONTROLLED CRADLE

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ABSTRACT

This paper exhibits a plan of a Baby Monitoring System utilizing GSM system and Android application. A model is constructed which gives an imperative part in checking basic parameters of a baby. This system screens basic parameters, for example, body temperature, dampness condition, movement of a baby, crying sound of a baby and utilizing GSM this information is exchanged to their folks and their guardian and thesystem also controls the movement of a cradle through Bluetooth module and with the assistance of a camera guardian canscreen theirbaby through android application. Themodel comprises of sensors for checking basic parameters, LCD screen, Bluetooth module, GSM module, IP camera and all are controlled by a solitary microcontroller unit.

Keywords: Baby monitoring, Essential parameters, Bluetooth module,IP camera, GSMmodule.

I. INTRODUCTION

In the previous couple of decades, female support in the work drive in the industrialized countries has extraordinarily expanded in exhibit society. Accordingly, taking care of child has turned into a test to numerous families in their every day life. Mother is dependably stresses over the prosperity of her child [1].

As we found in India both the guardians need to work and care for their children/babies, so more workload and stress is there on such families particularly on female partners. In the event that a framework is produced which constantly gives refreshed about their baby amid ailment or amid ordinarily routine then it will be of extraordinary help to such individuals as they can work in pressure less condition giving more productive yield. Additionally, earnest circumstance condition can be rapidly being seen and taken care of inside less time. For the most part, when a youthful infant cry, the reason is one of the accompanying things i.e. they are ravenous, tired, not feeling admirably or require their diaper changed. In this way, we built up a model which can screen the exercises of the children as well as new born children alongside discovering one of the above and give this data to their folks and their guardian [2].

This proposed framework gives a true serenity to friends and family when they are far from their baby as they can gat a refresh status of their prosperity. The other preferred standpoint is the programmability of alert conditions can lighten any incorrectness through an ordinary sensor. Communication is done by GSM interface in which Short Messaging Service (SMS) is central piece of the original GSM framework and its encouraging.

II. LITERATURE SURVEY

Many home care systems are available are accessible however great part of this systems are uniquely intended for the matured individuals and patients. These systems can screen their wellbeing status, consequently convey crisis flag, and have different capacities. Be that as it may, the looking after babies are not same. Children and grown-ups require diverse sort of care since they are absolutely reliant for their ordinary capacities on another person. An infant can't give any criticism about their uneasiness or wellbeing grievances. A baby can't convey what needs resemble old individuals, e. g when a baby has a fever, he/she can just express his/her distress by crying. Thus, a home-care system exceptionally intended for a baby is the present need which would significantly help guardians particularly mother's weight. In help of this necessity numerous research papers and licenses for social insurance application are contemplated with the goal of conceivable answers for deal with the baby. Creator had built up a system which depends on business GSM arrange. Indispensable parameters, for example, body temperature estimation utilizing LM35[1,3], Heart rate utilizing IR Transmitter and Receiver, respiratory rate by utilizing Piezo film sensor situated on patient's chest and pulse are detected, amplified with variable gain, sifted and given to microcontroller. Remote subsystem with GSM module gets information which is then send to a server by a USB port. Information are put away on the server and remotely showed in a site. In SMS based telemedicine system, patient's temperature estimated by Infrared temperature sensor MLX90614 and ECG signals obtained with electrodes interfaced with the Arduino microcontroller. A wearable equipment contraption is produced which catches the natural status of the infant, for example, movement, temperature and associated with the Bluetooth module to give remote communication [4].

In paper [5], the temperature and humidity parameters are observed. A skin-temperature test, the air temperature-test was utilized to screen the temperature around the child and humidity of incubator was checked utilizing the humidity sensor from SYSHS2XX arrangement. This sign is interfaced to Arduino Mega 2560 microcontroller and GSM modem is utilized for communication.

Licenses are likewise sought to discover curiosity in child mind observing system. In configuration, (Patent No. 2002/0057202 A1) [6], system is produced which screens berating, fever and volume of child resting in the crib. There is a module having three sensors joined to the diapers. This signal is amplified, transmitted by transmitter and at remote station there is a receiver, multiplexer which applies this signal to perceptible caution to alarm mother to make suitable move. U.S. Patent No.6,043,747 (Altenhofen), wherein a parent unit can record messages which may then be transmitted to baby unit to alleviate or quite the baby [7]. The child unit incorporates an amplifier and can transmit sounds to the parent unit. However, all together for the parent to recognize an issue with the child, the parent should continually screen the sounds being transmitted from the infant unit. The following U.S. Patent NO.6,450,168 B1 [8], includes a baby's rest cover/article of clothing

which is offered as either a rest sack or a rest shirt, contingent upon the age of the baby. The sack with no arm holes for babies and with arm holes and sleeves for older infants. Here thermometers joined to screen the baby's temperature as he rests. U.S. Patent NO. 4,895,162 [9], in which a soft belt containing a couple of electrodes is situated around the middle of a baby with the end goal that the terminals are in position to screen vital signs, for example, breath and heartbeat. Observing lead wires interface the terminals to a screen unit proximate the infant.

III.   PROPOSED WORK

3.1.   System Architecture

The design of the system comprises of both hardware equipment and programming. Block diagram of a system is appeared in Fig. 1. The hardware equipment's are assembled according to the block diagram. The code is composed in Arduino IDE and is singed into the microcontroller.
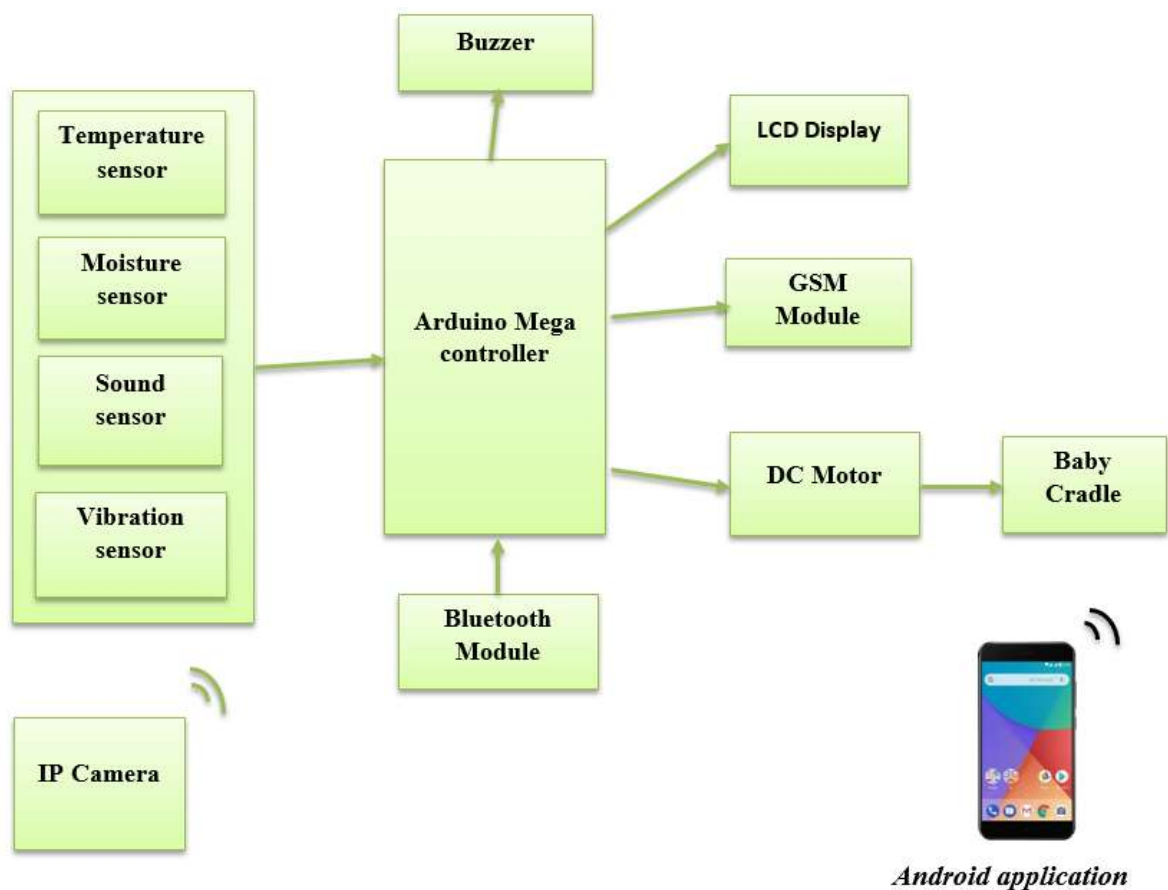

Fig. 1.Block Diagram of Proposed System

The accompanying subsections give more points of interest of the parts utilized as a part of our model:

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3.1.1. Temperature Sensor

The temperature sensor is utilized to gauge the temperature of a body here we are utilizing LM35 temperature sensor in our model [1,3]. It works at 3-5V and can gauge the temperature in the scope of 40 C to +125 C. The output of a sensor is simple DC voltage which is fed as an input to the Arduino controller utilizing the analog pins of the controller where the pins are connected to ADC. The ADC has a resolution of 10-Bits, 1024 levels, and the input voltage extend contingent upon the Ground and VCC with precision $\pm0.5^{O}C$ is changed from voltage to Celsius. The placement of a temperature sensor is also an important for precise estimation. In our model it is put in the socks of a baby wrapped with cotton so that there is no bothering for a baby.

3.1.2. Moisture Sensor

To decide the dampness condition i.e. pee identification, two sets of copper electrode are set under the fabric on which infant is dozing. The signal got is given to microcontroller.
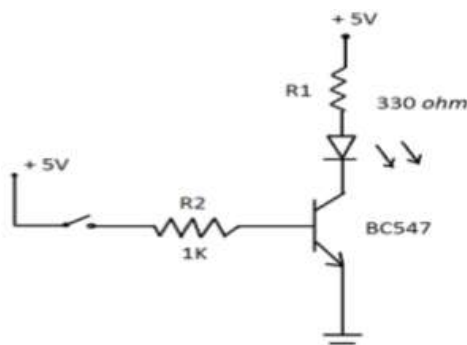

Fig 2. Moisture Detection Circuit

For recognition of pee, transistor as a switch circuit is utilized as appeared in Fig.2. when the pee is available switch is shut transistor turns on. At the point where pee is truant switch is open, transistor is off.

3.1.3. Sound Sensor

The sound sensor module is a basic microphone in view of an opamp LM358 to amplify the sound quality of the condition that is sufficiently boisterous to be gotten by the controller's ADC. The yield estimation of a sound sensor can be balanced with the assistance of a potentiometer. In our model, the sound sensor detects the crying sound a baby along with the environmental sounds where the baby is dozing and at whatever point the sound is identified it sends a signal to the controller.

3.1.4. Vibration Sensor

The vibration module in light of the vibration sensor SW-420 and comparator LM393 to perceive if there is a vibration that past the threshold. The threshold edge can be adjusted by the on-board potentiometer. In our model, the vibration sensor is used to distinguish the movement of a baby or any kind of a vibration in an infant and when the sensor perceives any improvement it sends a signal to a controller.

3.1.5. GSM Module

GSM (Global System for Mobile communication) is a computerized portable communication system. With the assistance of GSM module interfaced, we can send short messages to the required experts according to the application. GSM module is given by SIM utilizes the portable specialist co-op and sends SMS to the particular experts according to customized. This innovation empowers the system a remote system with no predetermined range limits. Along these lines, at whatever the protected scope of the fundamental parameter of a baby is violated, the modified microcontroller produces a caution and GSM Modem interfaced with the microcontroller sends a ready SMS to the parent's versatile number conveying remote innovation.

3.1.6. Bluetooth Module

HC-05 Bluetooth module is a simple to utilize Bluetooth Serial Port Protocol module, intended for straightforward remote serial association setup. Seral port Bluetooth module is completely qualified Bluetooth V2.0+EDR (Enhanced Data Rate) 3Mbps Modulation with finish 2.4GHz radio handset and baseband. In or model, the Bluetooth module is utilized to control the movement of a cradle on the charge got from the client's android portable application.

3.1.7. LCD Screen

In our model 16x2 LCD module is utilized. It has 2 lines and 16 sections in this manner add up to 32 characters are shown. It has two activity modes, one uses every one of the 8 pins and alternate uses just 4 of them. The 4-bit mode was utilized to deal with LCD screen. In our model, the LCD ceaselessly shows the yield of a sensor estimated by the controller for at regular intervals.

3.1.8. Arduino Controller

The Mega 2560 is a microcontroller board in light of the ATmega2560. It has 54 computerized input/output pins (of which 15 can be utilized as PWM yields), 16 simple analog sources, 4 UARTs (equipment serial ports). A 16MHz crystal oscillator, a power jack, an ICSP header, and a reset catch. In our model, the Arduino is the control unit where it gets the amplified and adapted signs from the sensors.

3.1.9. Internet Protocol Camera

An Internet Protocol camera, or IP camera, is a kind of computerized camcorder regularly utilized for reconnaissance, and which, dissimilar to simple closed-circuit television (CCTV) cameras, can send and get information by means of a PC organize and the internet. In our model, the camera encourages the client to screen their baby from long separation with the assistance of a web through android application.

3.2. Software Implementation

Arduino Mega 2560 is utilized as a miniaturized scale controller in a proposed system. The sensor to be specific temperature sensor, dampness sensor, vibration sensor and sound identifier are interfaced with simple channel of ADC of controller. The qualities taken from the sensor are shown after each 2msec of deferral. Power on reset capacity of Arduino Mega miniaturized scale controller resets every one of the qualities. The microcontroller read yield of ADC after at regular intervals. Temperature of a baby is read by the microcontroller, the software is developed such that maximum point of confinement of temperature is set, if crosses that breaking point, buzzer will be on and ready message send to mother. Comparable conditions are considered for sensors. The Bluetooth module is associated with Tx (Transmitter) and Rx (Receiver) pins of the microcontroller where it encourages the client to control the development of a support.

IV. RESULTS

The system was tested, the outcomes observed to be the same as the one's measured by standard instrument. During the execution of the system previews of the display were taken. The system being a total equipment outline and the information accessible on the mobile and LCD screen have been captured. Tests results of the system are given below, indicates the successful implementation of the system. Fig.3 indicates equipment module and the real actualized system. Fig.4 and Fig.5 demonstrates an example reading of baby onto the LCD attached to the module on a baby side. The readings were matched to the readings taken by the standard instrument and observed to be same. Fig.6 indicates the massages got on parent's mobile when some anomalous condition exits. Message demonstrate temperature is high and dampness condition exists.

Fig. 3. Hardware Module of the Implemented System
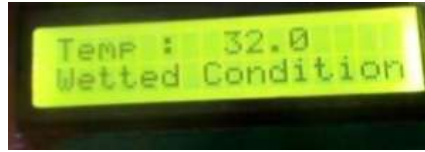

Fig. 4. LCD showing Baby's Temperature

Fig. 5. LCD showing Baby's Pee Detection

Fig. 6. Message got on parent's mobile phone

V. CONCLUSION

Proposed Infant Monitoring System is an economical and easy to utilize, which can enhance the nature of a parent child communication. This system expressively gives the guardians the sentiment confirmation. The steady catching of various parameters of the infant and examination of the general wellbeing causes mother to comprehend the interior status of the child. The Bluetooth innovation is utilized which controls the movement of a cradle trough android application. This is a helpful system to screen the infant's wellbeing condition from any separation. The camera causes the guardian to screen the baby from longer separation with the assistance of a web through android application. As GSM innovation is utilized which makes the guardian to convey for longer separations.

REFERENCES

[1].J.E. Garcia, R.A. Torres, "*Telehealth mobile system* ", IEEE Conference publication on Pan American Health Care Exchanges, May 4,2013.

[2]. Nitin P. Jain, Preeti N. Jain, and Trupti P. Agarkar, "*An Embedded, GSM based, Multiparameter, Realtime Patient Monitoring System and Control*", IEEE Conference publication in World Congress on Information and Communication Technologies 2,2013.

[3].Baker Mohammad, Hazem Elgabra, Reem Ashour, and Hani Saleh, "*Portable Wireless Biomedical Temperature Monitoring System*", IEEE international conference publication on innovations in information technology (IIT), 19 March 2013.

[4]. Elham Saadatian, Shruti PriyaIyer, Chen Lihui, Owen Noel Newton Fernando, Nii Hideaki, Adrian David Cheok, Ajith Perakum Madurapperuma, GopalakrishnakonePonnampalam, and Zubair Amin, "*Low Cost Infant*

Monitoring and Communication System",IEEE international conference publication, Science and Engineering Research, 5-6 Dec. 2011.

[5]. N.S. Joshi, R.K. Kamath, and P.K. Gaikwad, "*Development of Wireless Monitoring System for Neonatal Intensive Care Unit*", International Journal of Advanced Computer Research, Volume-3 Number-3 Issue-11 September-2013.

[6]. Ronen Luzon, "*INFANT MONITORING SYSTEM*", May 16, 2002. Patent No. US 2002/0057202 A1.

[7]. Cynthia Altenhofen," *BABY MONITOR SYSTEM*", Mar. 28, 2000. Patent No. 6,043,747.

[8]. Kellie I. Nguyen, "*INFANT SLEEPING BLANKET/GARMENT FOR USE WITH MEDICAL DEVICES*", Sep.17,2002, Patent No.US 6,450,168 B1.

[9]. Maria Dolliver, "*APNEA MONITOR BELT*", Jan.23, 1990, Patent No. 4,895,162.