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Smart Baby Monitoring Cradle System Using IOT

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ABSTRACT: Smart Cradle System using IOT helps the parent to monitor their child even if they are distant from the home and detect the activity of the baby from any distinct corner of the world. It is an Innovative, smart and protective cradle system to nurture an infant in an efficient way. This system consists of all the care and protection details of the baby in the cradle. The design of smartness and innovation comes with the use of technologies which include Internet of Things (IOT) modules like Raspberry Pi, Humidity and Temperature sensing, cry detecting mechanism, live video surveillance, Cloud Computing and android application. All the conditions which is been taken from the modules will be stored in cloud (thing Speak) and analysed at regular intervals. A healthy algorithm is applied to these data sets to get information about the body conditions which is useful as any regular symptoms of a disease can be identified easily.

KEYWORDS: Raspberry Pi, Moisture Sensor, Camera, Temperature sensor and IOT (Internet of Things).

I.INTRODUCTION

The Baby monitoring cradle system is a kind of alarm system which can detect baby's movements and activities and can convey the message about the condition of babies to the concerned authority via a radio or mobile or even a display. Nowadays parents are thinking about adopting the technological inventions for getting advantages and benefits to provide safety issues to their babies. Nowadays most of the parents are busy with their career, a modern baby monitoring system can be a solution for handling babies securely.

Monitoring a baby continuously is really a tough job as well as it is a risky job for the parents to carry out their baby all the time with them especially while working. Since security of the baby plays a vital role in addition of a person monitoring a baby there is a need for continuous monitoring of the baby at all conditions and reporting the status of the baby to the parents.

In this perspective, C.Nagarajan *et al.*[2,4,7] has proposed the best solution to remove the anxiety and stress of the parents. In this project, we have designed a baby monitoring system using Raspberry Pi whereas all the previous systems were developed using either Microcontroller or Arduino. The Raspberry Pi is a full-fledged credit card sized computer which consists of 512 MB RAM and 700 MHz microprocessor while Arduino is 8-bit AVR microcontroller based board which comprises of hardware prototype platform and Arduino language along with IDE and libraries. Raspberry Pi module is used in this project which has a great advantage over microcontroller based projects. This baby monitoring system consists of condenser MIC to detect baby's crying with a PIR motion sensor to detect baby's movement, a Pi camera to capture baby's motion along with a moisture sensor and a temperature sensor to detect the wetness and temperature respectively. A display is attached to the system to have the video output along with the sound of the baby.

In addition, a buzzer system is setup at 20 feet away from the baby, which gets activated when any of the parameters gets sensed by the sensors, this provides a warning sign for the person who takes care of the baby in that environment.

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II. LITERATURE SURVEY

Aslam Forhad Symon[1] the paper titled as “Design and Development of a Smart Baby Monitoring System based on Raspberry Pi and Pi Camera” which monitors the baby for busy parents so that they can ensure the proper care and safety of their babies. This system can detect the baby’s motion and sound; especially crying and video output of baby’s present position can be displayed on a display monitor so that the mother or another responsible person can watch the baby while away from him or her. This baby monitoring system is capable of detecting motion and crying condition of the baby automatically. The Raspberry Pi B+ module is used to make the total control system of the hardware, condenser MIC is used to detect baby’s crying, PIR motion sensor is incorporated to detect baby’s movement and Pi camera is used to capture the baby’s motion. This proposed system can provide an easier and convenient way for busy parents in terms of taking care of their babies.

Shreya Pai[2] the paper titled as “Advanced Baby Monitor” developed a reliable and efficient baby monitor that can play a vital role in providing better care and protection for any infant. This paper presents the design of an Advanced Baby Monitoring System using Raspberry Pi. This system monitors parameters such as temperature and humidity surrounding the infant, movements made by the infant and also would automatically log the activity and sleep cycles of the latter and act as a means by which parents could monitor their child remotely. For this it uses a camera in order for parents to view their child and it also sends a real time video to the webpage by which it provides reminders to the caretaker or rather parent.

Sonal Cynthia Pereira[3] the paper titled as “Baby Monitoring using Sensor and Wireless Camera” proposed a support system to parents who are busy in their career. For them a monitoring system is used which consists of temperature, moisture, motion and cry detection sensors. The system is based on GSM network to send alert messages to the parents when any of these parameters exceeds the saved values. This system is attached with a video camera which is operated based on the instructions from the microcontroller and is used to capture the video when the motion sensor detects the baby’s movements continuously. The video will be displayed on the screen to monitor the baby lively.

III. RELATED TECHNOLOGY

Internet of Things-based Baby Monitoring System (IoT-BBMS) is proposed as an efficient and low-cost IoT-based system for monitoring in real time. We also proposed a new algorithm for our system that plays a key role in providing better baby care while parents are away. In the designed system, Node Micro-Controller Unit (NodeMCU) Controller Board is exploited to gather the data read by the sensors and uploaded via Wi-Fi to the AdaFruit MQTT Server. The proposed system exploits sensors to monitor baby’s vital parameters, such as ambient temperature, moisture, and crying. A prototype of the proposed baby cradle has been designed using Nx Siemens software, and a red meranti wood is used as the material for the cradle. The system architecture consists of a baby cradle that will automatically swing using a motor when the baby cries. Parents can also monitor their babies’ condition through an external web camera and switch on the lullaby toy located on the baby cradle remotely via the MQTT server to entertain the baby. The proposed system prototype is fabricated and tested to prove its effectiveness in terms of cost and simplicity and to ensure safe operation to enable the baby-parenting anywhere and anytime through the network. Finally, the baby monitoring system is proven to work effectively in monitoring the baby’s situation and surrounding conditions according to the prototype.

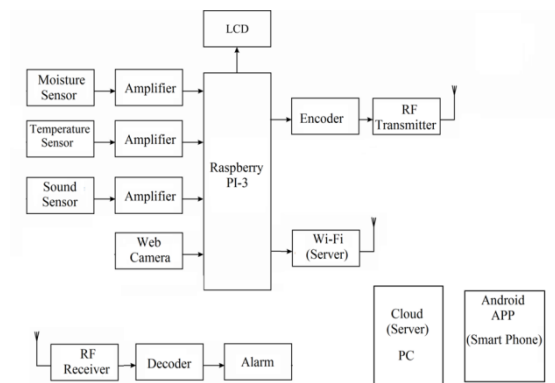
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IV. BLOCK DIAGRAM



V. WORKING

In the Proposed System, the moisture sensor, the temperature sensor and the sound sensors are used which senses the wetness, temperature, and the sound, this data either weak signal get amplified through the amplifiers this data gets stored in the raspberry pi and gets processed. In addition, the web camera provides live video surveillance of the baby along with which the LCD provides the sensor values. Wi-Fi server unit is used for live updates of the baby conditions either using a system or a mobile unit through a app with the help of cloud forecasting. To provide additional support the buzzer unit is used which consists of the RF Transmitter, Receiver, Encoder Decoder and an Alarm. This unit gets activated and give an alarm when the sensed data on comparing with the stored data gets abnormal. Trough cloud forecasting and Wide Area Network the resulting data of the baby conditions can be monitored using web applications and also can control the situation from a remote area anywhere from the world.

VI. HARDWARE CONFIGURATION

Raspberry Pi

The **Raspberry Pi** is a credit card-sized computer developed in the UK by the Raspberry Pi Foundation with the intention of promoting the teaching of basic computer science in schools.

The Raspberry Pi is manufactured in three board configurations through licensed manufacturing deals with Newark element14 (Premier Farnell), The Raspberry Pi has a Broadcom BCM2835 system on a chip (SoC), which includes an ARM1176JZF-S 700 MHz processor, GPU and video core IV was originally shipped with 256 megabytes of RAM, later upgraded (Model B & Model B+) to 512 MB. It does not include a built-in hard disk or solid-state drive, but it uses an SD card for booting and persistent storage, with the Model B+ using a MicroSD.

HUMIDITY SENSOR

A Humidity sensor also called a hygrometer, measures and regularly reports the relative humidity in the air. They may be used in homes for people with illnesses affected by humidity; as part of home heating, ventilating, and air conditioning (HVAC) systems; and in humidors or wine cellars. Humidity sensors can also be used in cars, office and industrial HVAC systems, and in meteorology stations to report and predict weather. A humidity sensor senses relative humidity. This means that it measures both air temperature and moisture. Relative humidity, expressed as a percent, is the ratio of actual moisture in the air to the highest amount of moisture air at that temperature can hold. The warmer the

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air is, the more moisture it can hold, so relative humidity changes with fluctuations in temperature. The most common type of humidity sensor uses capacitive measurement.

SOUND SENSOR:

The Microphone is referred to as a mike or mic, is an acoustic-to-electric transducer or sensor that converts sound into an electrical Microphones are used in many applications such as telephones, tape recorders, hearing aids, motion picture production, live and recorded audio engineering, in radio and television broadcasting and in computers for recording voice, VoIP, and for non-acoustic purposes such as ultrasonic checking



Sound Sensor

Temperature Sensor

A temperature sensor is a device, usually an RTD (resistance temperature detector) or a thermocouple, that collects the data about temperature from a particular source and converts the data into understandable form for a device or an observer. Temperature sensors are used in many applications like HV and AC system environmental controls, food processing units, medical devices, chemical handling and automotive under the hood monitoring and controlling systems, etc.

The most common type of temperature sensor is a thermometer, which is used to measure temperature of solids, liquids and gases. It is also a common type of temperature sensor mostly used for non-scientific purposes because it is not so accurate.

Wi-Fi Server

The Accuris Wi-Fi Server is a secure, flexible, policy-based access and authentication platform designed to interconnect Wi-Fi into the service provider core. The Wi-Fi Server delivers SIM-based authentication for mobile network operators leveraging Wi-Fi for domestic offload as well as international roaming services.

RF TRANSMITTER RECEIVER

Radio frequency (RF) radiation is a subset of electromagnetic radiation with a wavelength of 100km to 1mm, which is a frequency of 3 KHz to 300 GHz,^[1] respectively. This range of electromagnetic radiation constitutes the radio spectrum and corresponds to the frequency of alternating current electrical signals used to produce and detect radio

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waves. RF can refer to electromagnetic oscillations in either electrical circuits or radiation through air and space. Like other subsets of electromagnetic radiation, RF travels at the speed of light.

Encoders

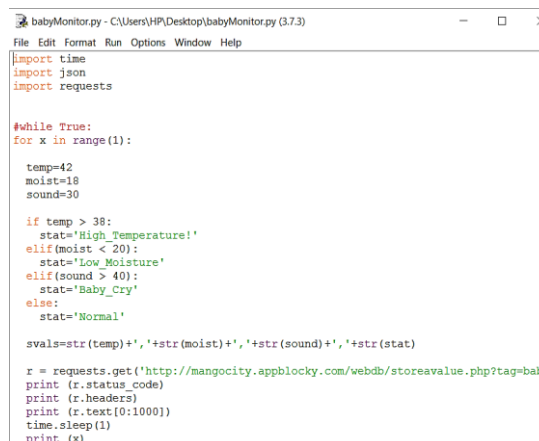
Encoders are digital ICs used for encoding. By encoding, we mean generating a digital binary code for every input. An Encoder IC generally consists of an Enable pin which is usually set high to indicate the working. It consists of 2^n input lines and n output lines with each input line being represented by a code of zeros and ones which is reflected at the output lines. In RF communication, the Encoder can also be used for converting parallel data to serial data.

Decoders

Decoders are digital ICs which are used for decoding. In other words the decoders decrypt or obtain the actual data from the received code, i.e. convert the binary input at its input to a form, which is reflected at its output. It consists of n input lines and 2^n output lines. A decoder can be used to obtain the required data from the code or can also be used for obtaining the parallel data from the serial data received.

VII.SOFTWARE CONFIGURATION

A. Stimulation Results



```
import time
import json
import requests

#while True:
for x in range(1):

    temp=42
    moist=18
    sound=30

    if temp > 38:
        stat='High_Temperature!'
    elif moist < 20:
        stat='Low_Moisture!'
    elif sound > 40:
        stat='Baby_Cry!'
    else:
        stat='Normal!'

    svals=str(temp)+' '+str(moist)+' '+str(sound)+' '+str(stat)

    r = requests.get('http://mangocity.appblocky.com/webdb/storeavalue.php?tag=bab')
    print (r.status_code)
    print (r.headers)
    print (r.text[0:1000])
    time.sleep(1)
    print (x)
```

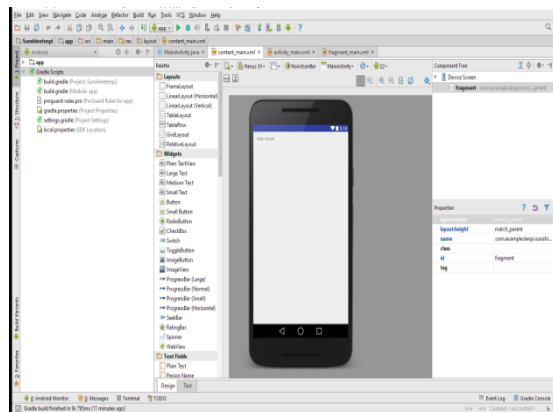
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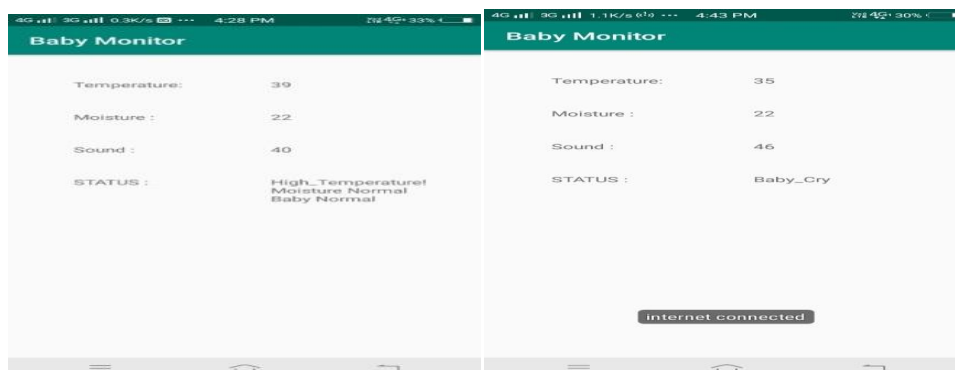
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B. Android Studio



C. INDICATIONS



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VIII. CONCLUSION

According to the system it analyses children Activities with Video Enhancement and Instant WEB App Notification for Better Monitoring of Baby. Atomization of System with Real-Time Database in the cloud, accurate sensors make the monitoring of the baby easy. This system is made in the consideration of giving comfort to working parents. This system can be very much useful for them. It also enhances the use of IOT. People can use the technology to make them more comfortable and quicker. A Smart baby room can be like blessing for the parents. They don't need to pay for maids or caretakers for their babies. They can trust on the system because machines are more reliable than humans.

REFERENCES

- [1] "IoT Based Smart Cradle System with an Android App for Baby Monitoring", 2017 International Conference on Computing, Communication, Control and Automation (ICCUBEA).
- [2] E Geetha, C Nagarajan, "Induction Motor Fault Detection and Classification Using Current Signature Analysis Technique", 2018 Conference on Emerging Devices and Smart Systems (ICEDSS), 2nd and 3rd March 2018, organized by mahendra Engineering College, Mallasamudram, PP. 48-52,2018
- [3] "Sudden Unexpected Infant Death and Sudden Infant Death Syndrome", Centres for Disease Control and Prevention 17 Apr. 2017, May 2017
- [4] C.Nagarajan and M.Madheswaran - 'Stability Analysis of Series Parallel Resonant Converter with Fuzzy Logic Controller Using State Space Techniques' - *Electric Power Components and Systems*, Vol.39 (8), pp.780-793, May 2011
- [5] S. Brangui, M. El Kihal and Y. Salih-Alj, " An Enhanced noise cancelling system for a comprehensive monitoring and control of baby environments", 2015 International Conference on Electrical and Information Technologies (ICEIT), pp. 404-409, 2015.
- [6] R. Palaskar, S. Pandey, A. Telang, A. Wagh and R. Kagalkar, "An Automatic Monitoring and Swing the Baby Cradle for Infant Care", International Journal of Advanced Research in Computer and Communication Engineering, vol. 4, no. 12, pp. 187-189, 2015.
- [7] C. Nagarajan, M.Madheswaran and D.Ramasubramanian- 'Development of DSP based Robust Control Method for General Resonant Converter Topologies using Transfer Function Model' - *Acta Electrotechnica et Informatica Journal* , Vol.13 (2), pp.18-31, April-June.2013