IJARCCE

ISSN (Online) 2278-1021
ISSN (Print) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

Vol. 10, Issue 6, June 2021

DOI 10.17148/IJARCCE.2021.106110

INFANT CARE ASSISTANT USING IOT NETWORK

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Abstract: In changing times, working parents have become quite common in today's developing world. This has led to an increase in the demand for products that help parents care for their children. This paper aims to show the Infant Care Assistant who uses the IoT sensor network and the Raspberry Pi to collect information on the baby's current state and its surrounding and changing ways to soften a troubled baby's. The facilitator also includes a cry detection unit based on the vector classifier support, a cry analysis unit according to the random forest layout and an emotional awareness unit according to the mini Exception convolution neural network model. In addition, it saves data using phpMyAdmin and private servers and installs graphical interface built using HTML5 and CSS. The results of the proposed tests show that this helper can reduce the burden on parents and make them more able to care for their children.

Keywords: Audio processing , IOT sensor Network.

I.INTRODUCTION

Many parents are unable to devote enough time to their children because of office work or because of short stature. Additionally, there are many parents for the first time, who have no experience in raising children. On the other hand, children need constant care and attention. Simple ways to quickly reduce irritated infants need to be developed. Therefore, there is a need to help parents care for their children by giving them one product to do monitor their children at all times, send alerts in case of need, raise warnings for emergencies, and provide real-time communication between parents and children. In addition, a market research report suggests that birth rates in a few countries have increased. Awareness of child safety has also risen. The world's smartest child monitoring market was valued at USD 972.6 million in 2018. These findings greatly strengthen the need for an active infant caregiver. There is huge problem the working parents are facing is proper take care of their babies or toddlers. They cannot pay proper time for their babies. Toddlers and babies need 24×7 observation of their parents, which is very difficult for working parents. This prototype model solves the problem of time and energy usage of such parents. The prototype model of the room contains a movement sensor, gas sensor, voice recognizer and other electronic devices connected to Arduino. The room appliances are working with coordination of sensors and Arduino. Parents can set the electronic devices work according to the conditions they have given and they can operate these devices by their mobile phones even when they are away from the baby room. There are many project works done for baby monitoring but they only works to monitor baby's temperature, heartbeat and some other baby's physical conditions. But there is no work done on the whole caretaker baby room. This room is multitasking.

II .RELATED WORK

Title: Automatic E-Baby Cradle Swing Based on Baby Cry

Explanation: The launch of a new low-cost E-Baby Cradle process that automatically changes when a baby cries. Birth speed can be controlled as required by the user. The system has a built-in alarm that shows the water mattresses and the duration of the ring. In Perception of Children in Home Children Using In-Depth Reading (Yizhar Lavner, Rami Cohen, Dima Ruinskiy, Hans Ijzerman) [3], the authors propose two algorithms for machine learning to detect child sounds automatically in audio recordings. . The first algorithm is a systematic algorithm. To train this separator, features such as Mel-frequency cepstral coefficients, sound and forms are extracted from the recording. The second algorithm uses a convolutional neural network (CNN), which works on the log Mel-filter bank to represent audio recording. Performance testing of algorithms was performed using a database containing recordings of infants (0–6 months of age) in the home environment and relevant tags. The recordings contain the sounds of a baby crying, the parents talking and the doors opening and closing. The CNN

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separator shows better performance when compared to the system interface. Methods for Imaging Facial Imaging Imaging (A. Mercy Rani, R. Durgadevi) [4] include facial detection, extraction of non-skin region and morphological analysis to detect emotion. After that the image quality is analyzed. Facial area was detected using the viola-jones algorithm. Extrusion of non-skin region and morphological function is used in the extracted image to remove the facial feature of facial sensory recognition.

III. EXISTING SYSTEM

The existing system features the formation and implementation of a new low-cost E-Baby Cradle system that automatically changes when a baby cries, as this has a crying analysis system that detects the baby's crying and appropriately changes the infant until the baby stops crying. Birth rate can be controlled according to user need. The system has a built- in alarm that indicates two conditions conditions - firstly when the mattress is wet, which is an important parameter for keeping the baby in a hygienic condition, secondly when the baby does not stop crying for a set period of time, which means the baby needs attention. The program helps parents and nurses care for children without physical care.

IV.PROPOSED SYSTEM

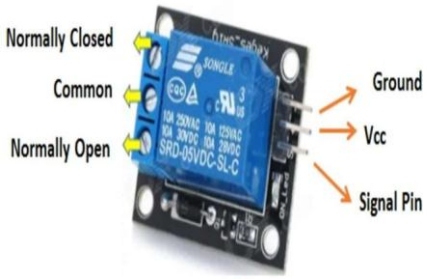
The proposed solution is the Infant Care Assistant which contains infant monitoring, data transfer, data analysis and user interface units. The infant control unit collects data from various sensors and creates a comfortable environment for the baby by controlling the umbilical cord. The data transfer unit is a method of transferring data between the user, the infant monitoring unit and the data analysis unit. The data analysis unit consists of the detection of crying, the analysis of the crying and the sensory units that determine the emotional state of the baby. The user interface gives the user visual control and operation of the infant monitoring system.

INFACT MONITORING UNIT

(i) HARDWARE DETAILS:

1.ARDUINO: Arduino is an opensource electronic hardware-based platform and software that is easy to use. Arduino boards can read input - turn on the sensor, finger button, or Twitter message - and turn it into a result - activate the car, turn on the LED, and publish something online. You can tell your board what to do by sending a set of instructions to the microcontroller on board.

2.RELAY: Transfer is a switch intended to close and open circuits electronically and electronically. Controls the opening and closing of regional circuit electrical contacts. When the forwarded contact is open (NO), the transfer does not enable open contact. However, when closed (NC), the relay has no power to supply the closed contact. However, when energy (electricity or tariff) is provided, provinces are prone to change. Transfers are commonly used in control panels, manufacturing and building automation to control power by changing small amounts of current in the control circuit. However, given the magnification effect can help to control large amperes and voltages because if a low voltage is applied to the transmitted coil, the maximum voltage can be changed by the contacts.



3.DC MOTOR: A DC car is any category of rotating electric motors that convert current energy into electrical energy. The most common types depend on the energy produced by the magnetic field. Almost all types of DC motors have certain internal mechanisms, either electromechanical or electronic, to periodically change the current direction in the vehicle component. Small DC motors are used in tools, toys, and machinery. The universal car can work right now but is a lightweight brushed car used for portable powertools and equipment.

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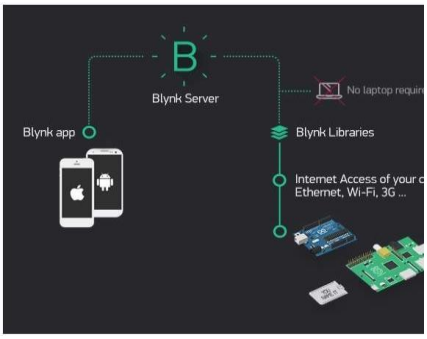
4.SENSOR: The analog temperature sensor is easy to define, it is the chip that tells you These sensors use a solid process to detect temperature. That is, they do not use mercury (like older thermometers), bimetallic strips (like other home thermometers or stoves), and they do not use thermostats (sensitive resistors). Instead, they take advantage of this fact as the temperature rises, the diode'sability to jump increases at a known rate. (In fact, this is actually a decrease in the power supply between the baseand the emitter - Vibe - of the transistor. temperature**.**

(ii) SOFTWARE DETAILS:

1.BLYNK APP: Blynk is a toolkit for all manufacturers, badass founders, designers, teachers, nerds and geeks whowould like to use their smartphones to control electronic devices like Arduino, Raspberry pi and more. We've done all the hard work of establishing an internet connection, building an app and writing hardware code. With Blynk, you simply combine the amazing interface from the various widgets we offer, uploadthe example code to your hardware and enjoy seeing the first results in less than 5 minutes! It works perfectly for newbie makers and saves tons of time from bad genius.



2.SYSTEM ANAYLSIS: The system consists of an Arduino UNO microcontroller that is inbuilt with a Wi-Fi module. The UNO is a microcontroller based on ESP8266.It has 17 GPIO PINS(0-16) out of which 6 pins (GPIO 6-11) are connected to the flash memory chip .It has both input/output digital pins ,a single analogy inputs, inbuilt Wi-Fi module and a USB connection . It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with an AC- to-DC adapter or battery to get started. The micro- controller is attached with a temperature and humidity sensor (DHT11), a sound sensor, APR module, BJT and a servo motor. The sound sensor is used in order to detect the sound of the baby that is mainly when the baby cries it detects the sound and notifies the MCU. The MCU in turn notifies the Servo motor that makes the cradle swing.

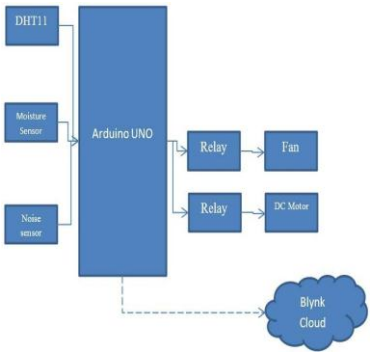


Fig: System Architecture

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3.DATA FLOW DIAGRAM:

When a baby cries in the cradle, the microphone detects it and converts the sound signal into an electrical signal. The electrical signal is then fed into an amplifier. The microcontroller then notifies the blynk server which in turn notifies the parent that the baby is crying. At the same time the microcontroller also notifies the servo motor that swingsthe cradle. If the baby relaxes and stops crying the parent is again notified that the baby is fine and stopped crying. The cradle stops swinging after a certain time. The temperature and humidity sensor consists of a material called thermistor and an IC on the back side of the sensor. So as long as the humidity change, the conductivity of the substrate changes or the resistance between these electrodes changes. On the other hand, for measuring temperature this sensors use a thermistor. A thermistor is actually a variable resistor that changes its resistance with the change of the temperature. These sensors are made by sintering of semi conductive materials such as ceramics or polymers in order to provide larger changes in the resistance with just small changes in temperature.

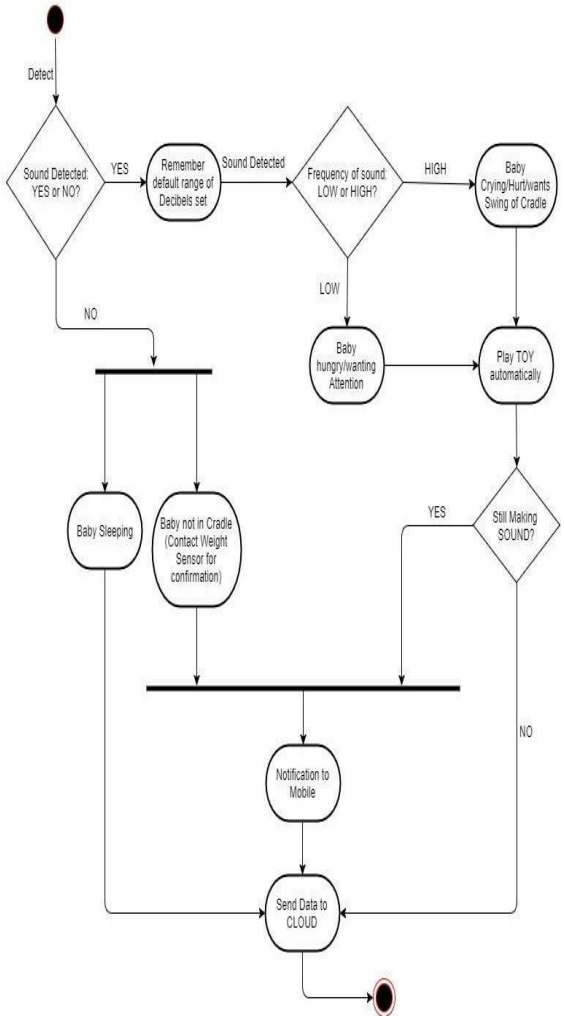

Fig: Data Flow Diagram

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EXPECTED RESULTS

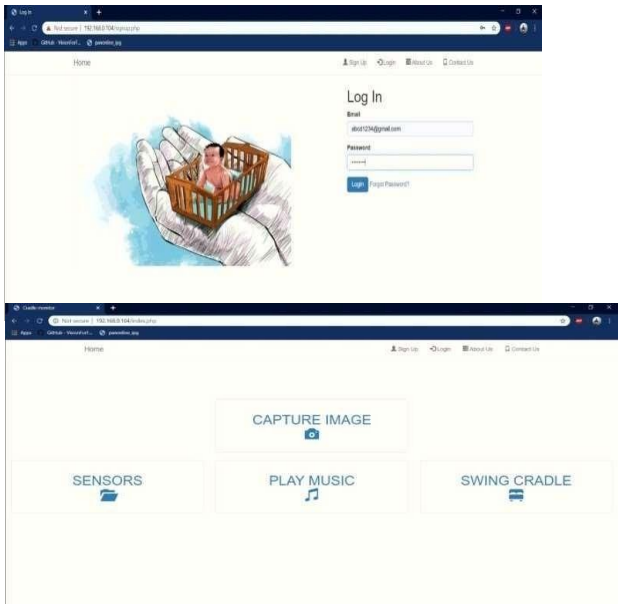

Fig: Home Page of GUI

Graphics User Interface (GUI) was developed to facilitate user-infant interaction. Enables the user to monitor the temperature and humidity of the baby's surroundings and whether the bed is wet. Other things include getting a picture of the baby that helps the user decide if there is a need to play music or swing the cradle to calm the crying baby. Web pages serve the purpose of the GUI fully and can be accessed from anywhere on the Internet with the correct username and password. Web page layout is done using HTML5 language. CSS (Cascading style sheets) is used to make pages more interactive and reduce the flow of commands from user to bed. PHP language is used to enhance the background functions of web pages that include receiving sensor data from the database and transmission and receipt of raspberry signals in relation to birth, sensors, camera and speaker control.

V. CONCLUSION

The Infant Care Assistant is able to collect essential information about the infant and its surrounding through sensors, process this information to determine the state of the infant through audio and image processing and soothe the crying infant by automatically rocking the cradle, playing music or regulating the room temperature. The Infant Care Assistant is able to effectively assist busy parents in caring for their children. Furthermore, the system is able to store important data and raise alerts. Finally, it is made user friendly and interactive by the incorporation of a GUI.

LIMITATIONS

In cases such as wetting the bed or infant trying to skip the crib there are no immediate responses from the system other than raising warnings. Prompt response from parents would be needed in such cases. The sensors used are basic and in a real-life model, complex sensors will be required. The computer power of the raspberry pi reduces the response time and efficiency of the system.

FUTURE SCOPE

Additional features such as the Android app can be integrated with live baby feeding, music control, baby crawling and adjusting temperature and other parameters as needed. By studying the behaviour of the infant, an in- depth learning model can be trained to detect and apply better infant conditions.

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REFERENCES

[1] Grand View Research, "Smart baby monitor market size, share &trends analysis report by product (audio & video, tracking devices), by distribution channel (offline, online), by region, and segment forecasts, 2019-2025", September 2019

[2] Misha Goyal and Dilip Kumar, "Automatic E-Baby Cradle Swing based on Baby Cry", International Journal of Computer Applications 71(21):39-43, June 2013

[3] Y. Lavner, R. Cohen, D. Ruinskiy and H. Ijzerman, "Baby cry detection in domestic environment using deep learning," *2016 IEEE International Conference on the Science of Electrical Engineering (ICSEE)*, Eilat, 2016, pp. 1-5

[4] Mercy Rani, R. Durgadevi, "Image Processing Techniques to Recognise Facial Emotions", International Journal of Engineering and Advanced Technology (IJEAT) ISSN: 2249 – 8958, Volume-6 Issue-6, August 2017

[5] Punith Kumar M B And Dr. P.S. Puttaswamy, "Videoto Frame Conversion of TV Science And Engineering, IJARSE, vol. No.3, issue no.3, march 2014 issn-2319-8354(e) 95.

[6] Kanchan Lata Kashyap, Sanjivani Shantaiya "Noise Removal of Facial Expression Images Using Wiener Filter", National Conference on Emerging Trends in Computer Science and Information Technology (ETCSIT) 2011 proceedings published in International Journal of Computer Applications.