Internet Connected Baby Monitoring System with Live MJPEG Video Streaming

Dr.M.Madheswaran[1], R.Vijayakumar[2]

[1]Professor, Department of Electronics and Communication Engineering
Mahendra Engineering College (Autonomous), Namakkal, Tamilnadu, India
[2]Assistant Professor, Department of Electronics and Communication Engineering
Mahendra Engineering College (Autonomous), Namakkal, Tamilnadu, India

Abstract

Each infant needs consistent consideration, and you can't be in his or her room each hour of consistently. That is the thing that child screens are for. What began as sound just newborn child mind devices to give you a chance to tune in on your youngster from another room, have since included camcorders and associated highlights to the blend so you can simply watch out for your little one. There are still some awesome sound screens out there—here we're concentrating on screens that additionally give some video encourage. A large number of the infant screens we've tried are web associated, giving you a chance to watch newborn child with your telephone or tablet through an application similarly as though you were checking a home surveillance camera. Along these lines, you may not get an independent show to oblige the camera. The Baby Delight monitor is amazing in that it the two accompanies a tablet and doesn't have an application by any stretch of the imagination; you watch it through the included tablet, yet there's no real way to screen it with your own cell phone.

Keywords: STM32F429 cortex-M4F microcontroller, OV2640 2 MP camera, LPC1313 cortex-M3 microcontroller, DP83848 Ethernet transceiver and Temperature sensor.

Introduction

Since the start of humankind, guardians have had impulses to secure their infants against potential perils, for example, diseases, burglary, and passing. The need to control the infant's condition pushed guardians to have their children in a zone that they as of now have control upon: guardians' room. Be that as it may, the way guardians take care of their descendants has developed with the mechanical advances. Radio transmission gave more flexibility and gave the likelihood to screen any stable that originates from the infant's room.

Also, propelled observing frameworks that read the status of a few variables (room temperature, moistness level, clamor level, light level) were produced keeping in mind the end goal to give greater perceivability over the child's condition. A moving robot that screens diverse factors in various regions in the room was proposed in [1]. Notwithstanding, this robot does not have the control over these elements. The issue of control was talked about in [2] where a framework that screens and

controls the temperature, moistness, and light in a house utilizes Tag4M innovation to gain and process information. For this, a NI Lab-VIEW State diagram Module was proposed as a programming interface. Notwithstanding, for execution contemplations in an infant room, remote correspondence is to be abstained from following health limitations [3]. Rather, an intranet convention can be considered as an elective correspondence convention.

The framework talked about in [4] controls the workplace condition for specialists; be that as it may, it requires promoting adjustments for its execution in an infant domain. The solace level of grown-up specialists is not the same as that of an infant, and both solace levels could be portrayed utilizing parametric attributes [4]. For example, the warmth created by a child's body would be not the same as that delivered by a grown-up's body. Consequently the parametric normal for warm disseminated in nature would vary.

Embedded video observation has turned into a pattern in video checking at home and abroad, now implanted devices, particularly portable sound and video hardware, it contrasted and earlier years has been incredibly created, and the execution likewise has been enormously enhanced. However the implementation and the handling capacity of the processor is still exceptionally restricted, for video codec, it requires outer encoder or actualized by programming, so it can't fulfil the necessities of the advancement of video observation.

The Overall design of the system

Monitoring and Control of Baby Room

The block diagram presented in Fig. 1 summarizes the overall system design. The used components are detailed. A project of this sort needs a very capable microcontroller with a large amount of RAM. Thus STM32F429 from STMicroelectronics is chosen as the main MCU, which is one of the powerful microcontrollers currently available in the market. This is an ARM Cortex-M4 based microcontroller that can run up to 180 MHz.

It has got 2MB of Flash memory and 256 KB RAM. More importantly, it has got a DCMI (Digital Camera Interface) peripheral to interface with cameras. A FAT-32 formatted MicroSD card (2GB) stores the lullaby tracks in MP3 format. LPC1313, an ARM Cortex-M3 microcontroller is chosen as the second MCU which is dedicated to playback the audio tracks stored in the memory card with the help of VS1011E, an MP3 audio decoder DSP chip. The device consists of a microphone sound sensor to detect loud noise and PIR sensor to detect any unwanted motion. An array of IR LEDs driven by a high current driver circuit provides the night vision capability.

Result

Our project is an internet-connected baby monitoring device that streams live camera images and other vital information about the surrounding environment and make it available on the web. This helps the parents to monitor the baby from anywhere at any time, whether in the next room or away from home. The device can be kept physically at a safe distance away from the baby. All the parents need to do is to have a connected device such as a smartphone or tablet or a PC with an internet browser.

There is no need to install and maintain a separate mobile app. The hardware implementation of the device acts as a web server and connects to the internet over an Ethernet connection as shown in figure 2. The microcontroller firmware runs on top of an RTOS.
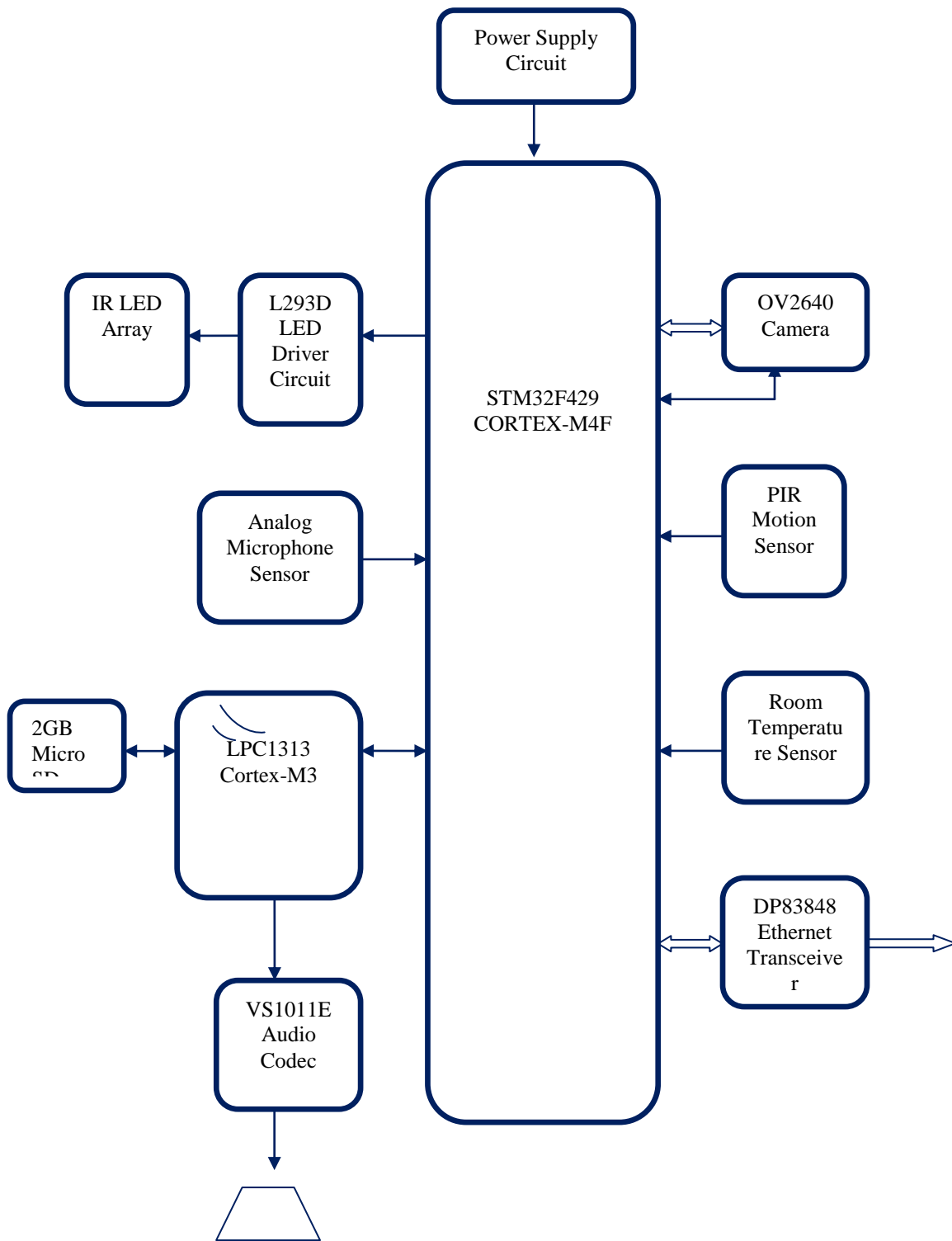
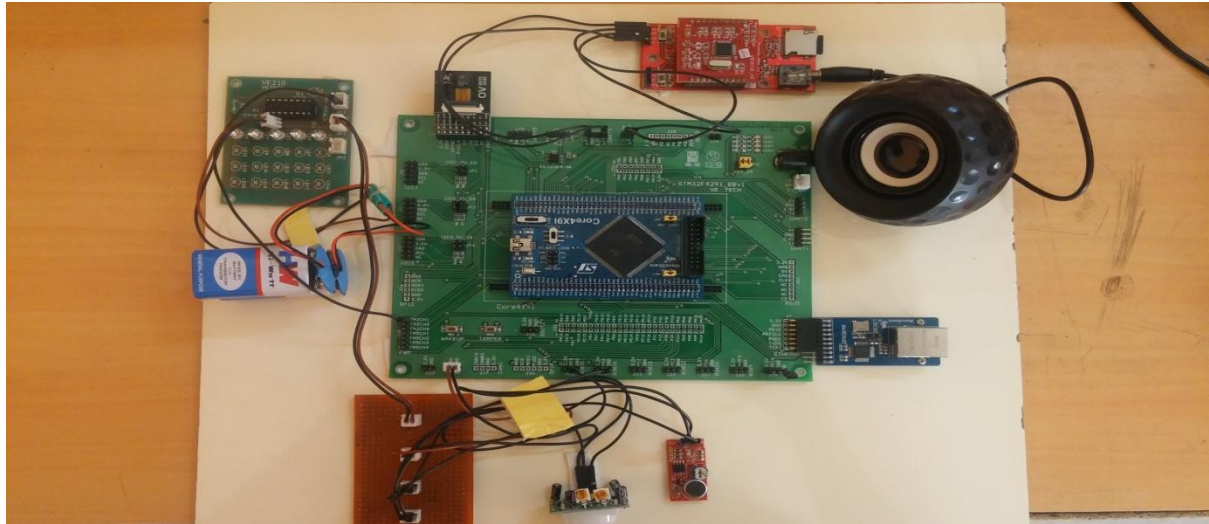**Figure 1. Block Diagram of proposed design**

Figure 2. Hardware Implementation of the proposed design

Conclusion

On a final note, the device can be used to monitor not only babies but even kids and those who need constant attention such as bedridden patients and people in their old age. The system has low bandwidth consumption, fast compression speed, low CPU occupancy rate, less heat, efficient, flexible and stable operation etc. Because this system adopts the standard protocol, it can use RTOS so that multitasking is available for this system. RTOS is provided the priority so that in this system depends on priority scheduling. This system is suitable for indoor household use of real-time monitoring.

References

[1] S. Folea, D. Bordencea, C. Hotea and H. Valean, "Smart home automation system using Wi-Fi low power devices," Proc. IEEE International Conference on Automation Quality and Testing Robotics AQTR, pp. 569-574, May 2012.
[2] C. Xiang and J. Yang, "Design guidelines for indoor intelligent environmental monitoring and control system," Proc. IEEE 3rd International Conference on Software Engineering and Service Science ICSESS, pp. 737-740, June 2012.
[3] C. Bujdei and S. A. Moraru, " Ensuring comfort in office buildings. Designing a KNX monitoring and control system," Proc. 7th International Conference on Intelligent Environments, pp. 222-229, July 2011.
[4] Z. Yongliang, X. Yong, X. Jun and Z. Jiang, "Design of remote monitoring and controlling system for unattended machine room," Proc. 4th International Conference on Intelligent Computation Technology and Automation, vol. 1, pp. 646-649, Mar. 2011.