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Smart Cradle for Baby Monitoring Using IOT

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Abstract: IOT-Internet of things, Internet being the ecosystem for physically connected devices, works with no human intervention for exchanging the data. “Smart Cradle”, an automatic cradle, a venture designed especially for those moms who are excessively busy and occupied with work. This system considers all the minute details required for the care & protection of the Baby in the cradle. The design of smartness & innovation comes with the use of technologies/methodologies which include Internet of Things, Cry Detecting Mechanism, Cloud Computing & User Friendly Web application. In order to detect each & every activity of Baby, different Sensors/Modules are attached to the Cradle. Humidity & Temperature Sensing Module for detection of Wetness of the bed, Cry Detection Circuit to analyze Cry Patterns. The data which is been taken from the sensors will be stored in Cloud& analyzed at regular intervals. A Health Algorithm is applied to these datasets to get information about the body conditions which is helpful as any regular symptoms of a disease can be identified easily.

Keywords: Baby monitoring, Smart cradle, Internet of Things, Sensors.

I . INTRODUCTION

There is a need in the world for a baby monitor that can more accurately keep track of a baby’s condition. Many current baby monitors consist of either a video camera or a microphone or a combination of the two. The baby monitoring system is a kind of alarm system which can detect babies’ 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. Since the very beginning of humanity, families have had instincts to secure their babies from probable dangers and risk. However, the way by which parents look after their children has changed with the technological breakthrough]. They are now thinking about adopting the technological and engineering inventions for getting advantages and benefits in terms of safety issues of their babies. In this era when parents are busy with their career, a modern baby monitoring system can be a solution for handling babies properly instead of keeping them in babies’ day care centers or a pointing a nanny for them. Monitoring a baby continuously is really a tough job as well as it is not possible for the parents to carry out their babies all the time with them especially while working.

II. OBJECTIVE

An 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 areaway. The current number of working mothers has greatly increased. Subsequently, baby care has become a daily challenge for many families. Thus, most parents send their babies to their grandparents 'house or to baby care houses. However, the parents cannot continuously monitor their babies' conditions either in normal or abnormal situations.

III. PRPOSED SYSTEM

In this proposed system, both sensors and forecasting cloud is used, so that resulting data having high accuracy about the children condition, also we are using surveillance of the children using camera from a Wide Area Network (WAN) which can be viewed in the Web Application and also can control the situation from are mote area anywhere from the world. The proposed system is a smart crib which is designed for comforting the baby when the attendant or parents are busy. The main aim is to develop/setup for a baby, this has ability to take care of the child when baby is in discomfort.

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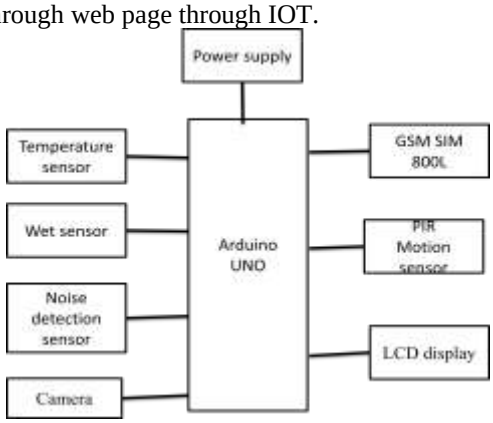
The system can detect the bed-wet condition and keep away the baby from un-hygienic environment and to notify the parent or care takers for attention. The buzzer produces an alarm sound to intimate the abnormal conditions which was detected by the sensors. The instance alert can be sent to the mother via GSM. The information and allotment can be seen by implementing an interface through web page through IOT.



Block Diagram

ADVANTAGES

- A system will always take care of the child.
- The system alerts on any unconditional situations at an instance
- The alert will be sent via GSM.
- The parameters can also be managed by IOT even though the parents not near top the child.

SMART CRADLE

Child care is of most extreme significance for a parent. The present quick paced world makes it hard for parent to continuously look after their kid. After long working hours, it is hard for parent to constantly watch out their kid. Keeping an eye on child or employing care taker is an expensive undertaking which not every parent can bear the cost of it.

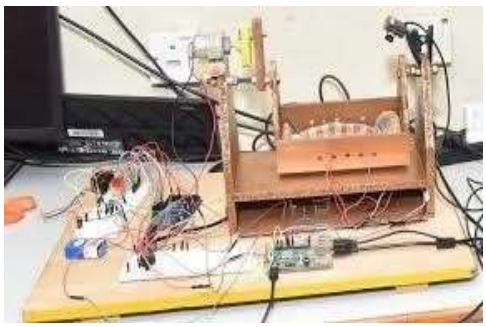


Fig. 1 Smart Cradle

Thus, innovation acts the hero in managing this issue. Smart support enables guardians to screen their child as they get ready messages that furnish them with vital data .In addition, cradle structure consequently swings when it detects noise of cry made by kid. The noise of cry is detected by the sensor when the noise level goes beyond the threshold value. In this manner, the proposed cradle structure bridges the gap between parent and the kid and empowers guardians to take great consideration of their child. The proposed framework gives savvy, basic and effective support to the child. The proposed frame work utilizes PIR sensor that estimate sinf rared lighting emanating from articles in its field of view and consequently identifies the movement of the infant. The noise sensor distinguishes the sound of cry and temperature sensor recognizes the temperature and sends the information to cloud.

ATMEGA328 Microcontroller Description:

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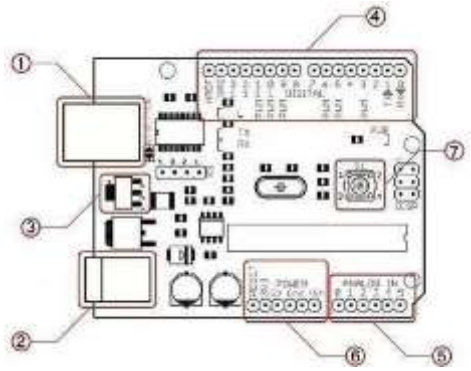

Fig. 2 ATmega328/P

The Atmel AVR® core combines a rich instruction set with 32 general purpose working registers. All the 32 registers are directly connected to the Arithmetic Logic Unit (ALU), allowing two independent registers to be accessed in a single instruction executed in one clock cycle. The resulting architecture is more code efficient while achieving throughputs up to ten times faster than conventional CISC microcontrollers.

The ATmega328/P provides the following features: 32Kbytes of In-System Programmable Flash with Read-While-Write capabilities, 1Kbytes EEPROM, 2Kbytes SRAM, 23 general purpose I/O lines, 32 general purpose working registers, Real Time Counter (RTC), three flexible Timer/Counters with compare modes and PWM, 1 serial programmable USARTs , 1 byte-oriented 2-wire Serial Interface (I2C), a 6- channel 10- bit ADC (8 channels in TQFP and QFN/MLF packages) , a programmable Watchdog Timer with internal Oscillator, an SPI serial port, and six software selectable power saving modes. This allows very fast start-up combined with low power consumption. In Extended Standby mode, both the main oscillator and the asynchronous timer continue to run. Atmel offers the Q Touch library for embedding capacitive touch buttons, sliders and wheels functionality into AVR microcontrollers. The patented charge-transfer signal acquisition offers robust sensing and includes fully de bounced reporting of touch keys and includes Adjacent Key Suppression (AKS™) technology for unambiguous detection of key events. The easy-to-use Q Touch Suite tool chain allows you to explore, develop and debug your own touch applications. The device is manufactured using Atmel's high density non-volatile memory technology. The On-chip ISP Flash allows the program memory to be reprogrammed In-System through an SPI serial interface, by a conventional 372on-volatile memory programmer, or by an On-chip Boot program running on the AVR core**.**

FEATURES OF ATMEG

- 28-pin AVR Microcontroller
- Flash Program Memory: 32 k bytes
- EEPROM Data Memory: 1 k bytes
- SRAM Data Memory: 2 k bytes
- I/O Pins: 23
- A/D Converter: 10-bit Six Channel
- PWM: Six Channels

Contact Sensors: Contact temperature sensors measure the temperature of the object to which the sensor is in contact by assuming or knowing that the two (sensor and the object) are in thermal equilibrium, in other words, there is no heat flow between them.

Noncontact Sensors: Most commercial and scientific noncontact temperature sensors measure the thermal radiant power of the Infrared or Optical radiation received from a known or calculated area on its surface or volume within it. An example of noncontact temperature sensors is a pyrometer, which is described into further detail at the bottom of this section.

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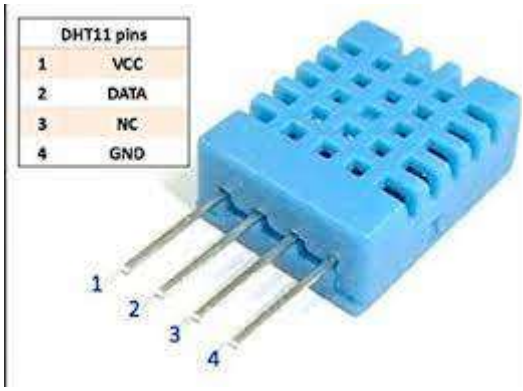

Fig 3. Temperature Sensor

SOFTWARE DISCRIPTION

Embedded C: An embedded system is an application that contains at least one programmable computer (typically in the form of a microcontroller, a microprocessor or digital signal processor chip) and which is used by individuals who are, in the main, unaware that the system is computer-based.

Introduction: Looking around, we find ourselves to be surrounded by various types of embedded systems. Be it a digital camera or a mobile phone or a washing machine, all of them has some kind of processor functioning inside it. Associated with each processor is the embedded software. If hardware forms the body of an embedded system, embedded processor acts as the brain, and embedded software forms its soul. It is the embedded software which primarily governs the functioning of embedded systems.

During infancy years of microprocessor based systems, programs were developed using assemblers and fused into the EPROMs. There used to be no mechanism to find what the program was doing. LEDs, switches, etc. were used to check correct execution of the program. Some 'very fortunate' developers had In-circuit Simulators (ICEs), but they were too costly and were not quite reliable as well.

As time progressed, use of microprocessor-specific assembly-only as the programming language reduced and embedded systems moved onto C as the embedded programming language of choice. C is the most widely used programming language for embedded processors/controllers. Assembly is also used but mainly to implement those portions of the code where very high timing accuracy, code size efficiency, etc. are prime requirements.

Initially C was developed by Kernighan and Ritchie to fit into the space of 8K and to write (portable) operating systems. Originally it was implemented on UNIX operating systems. As it was intended for operating systems development, it can manipulate memory addresses. Also, it allowed programmers to write very compact codes. This has given it the reputation as the language of choice for hackers too.

As assembly language programs are specific to a processor, assembly language didn't offer portability across systems. To overcome this disadvantage, several high level languages, including C, came up. Some other languages like PLM, Modula-2, Pascal, etc. also came but couldn't find wide acceptance. Amongst those, C got wide acceptance for not only embedded systems, but also for desktop applications. Even though C might have lost its sheen as mainstream language for general purpose applications, it still is having a strong-hold in embedded programming. Due to the wide acceptance of C in the embedded systems, various kinds of support tools like compilers & cross-compilers, ICE, etc. came up and all this facilitated development of embedded systems using C. Subsequent sections will discuss what is Embedded C, features of C language, similarities and difference between C and embedded C, and features of embedded C programming.

V. CONCLUSION

We have proposed a smart cradle system using IOT. For an infant, this support will go about as a sitter for around 2 years. Innovation has been created in an extraordinary manner that it makes human work more straight forward. The programmed electronic infant support for the present guardians who don't have adequate time for their children. This programmed child support would let the working mother work as well as take care of the child. It is affordable and easy to use. The programmed child support can be utilized in medical clinics and home. It is helpful for working guardians and medical clinics to take care of infants.

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