



Child Diaper Wet Detector Using Wireless System

V. P. Krishnammal¹, J. Shalini², G. Kowshika³, S. Vigneshwari⁴

¹Assistant Professor, Department of Biomedical Engineering, Adhiyamaan College of Engineering (Autonomous), Dr. M. G. R. Nagar, Hosur, Tamil Nadu, India

²⁻⁴Student, Department of Biomedical Engineering, Adhiyamaan College of Engineering (Autonomous), Dr. M. G. R. Nagar, Hosur, Tamil Nadu, India

ABSTRACT

In humans, Urinary tract infection (UTI) is a commonly found infection. UTI is easily treatable using antibiotics if identified in early stage. However, if it is not identified in early stages, UTI becomes a serious complication in elder patients, in particular, those suffering from neurodegenerative diseases. UTI leads to serious diseases in neonates because it leads to difficulty in describing their symptoms. In this project, we present a diaper-embedded wireless system. UTI at an early detection is possible by using an autonomous UTI monitoring sensor module with minimal effort. The sensor module consists of a wet sensor, smell sensor, a Bluetooth low energy module used for wireless transmission, a low-power sensor interface utilizing pulse width modulation and a boost dc–dc converter. Better results are produced experimentally when compared to conventional dipstick testing. By pressing the studs, detector unit is decoupled from the diaper and the soiled diaper is discarded. Our experimental setup show that the designed system perfectly produces the intended buzzer and light indication.

Keywords : Wet sensor, UTI monitoring sensor, Bluetooth low energy module for wireless transmission

I. INTRODUCTION

In the past few decades, females are well employed in industrialized nations has greatly increased in present society. Subsequently, infant care has become a challenge to many families in their every possible cause of the baby. Nappies were excellent invention, controlling infants waste in a clean and healthy way daily life. Mother is always worrying about the well-being of her baby. As we can notice today that every parents of an infant are either employed or working in house so they have less or no time to look after their baby. Our system is smart enough to detect There are several types of diaper such as disposable diapers and cloth. As of now our smart system mainly targets two applications oriented. Primarily checks

the diaper condition of the baby. Secondary gives the status of the baby's location. Our system is designed with stable output and no harmful components have been used in the process and design. There will be no effect on the baby in any case from our proposed system. Our system will generate output from the sensors. This project also uses sensors like wet sensor to detect moisture content and indicates whether the baby has passed urine or not. All the sensor outputs are sent to controller and the response is processed and sent to parents through wireless network platform.

II. METHODS AND MATERIAL

BLOCK DIAGRAM

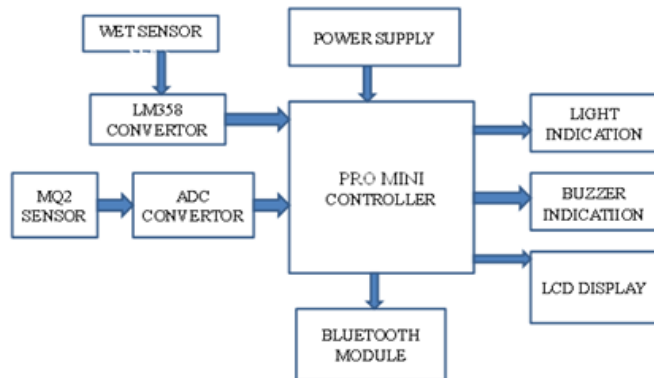


Figure 1. Block Diagram of wet detector

The block diagram consists of Pro mini controller, Power Supply, wet sensor, smell sensor (MQ2 Sensor), Bluetooth module, light, buzzer, ADC convertor and LM358 Convertor. The Wet sensor detects the wet in the diaper and then send the signal to the LM358 which reduces noise and fluctuation and then to the pro mini microcontroller. Likewise, the MQ2 sensor senses the smell of the baby's faces. Smell sensor is otherwise called as MQ2 sensor. The analogy signal from the MQ2 sensors converted into digital signal by using ADC convertor. The acquired output signal is fed to the pro mini microcontroller and then displays the output in the LCD screen. Diaper condition of the baby will also indicate by Light and Buzzer. Bluetooth modules sends the low energy output signal to the paired mobile to alert the mother via SMS to clean diaper. If the baby is out of mother's vision, the Bluetooth module indicates that the "baby is away" to paired mobile.

CIRCUIT DIAGRAM

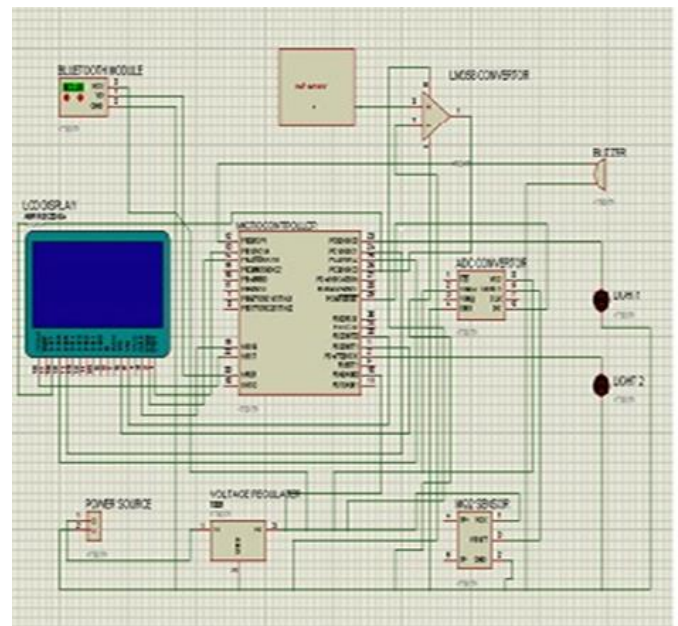


Figure 2. Circuit Diagram

The circuit diagram describes that pro mini Microcontroller has 32 pins i.e. (A0-A7)8 analog pins and (D0-D13)14 digital pins. In these 14 digital pins 0's and 1's are transmitter and receiver respectively. LCD Display has 16 pins. It is the output device. Second pin of the microcontroller is connected to the register select of the Liquid Crystal Display. Enable pin is connected to the third pin of the microcontroller. There are 8 digital pins in the LCD and out of these 8 pins any 4 pins are connected to the any 4 digital pins of the microcontroller. LED+ is connected to the VCC of the LCD and LED- is connected to the ground of the LCD. Bluetooth (HC05) has four pins. They are VCC, GND, transmitter and receiver. The transmitter (0) and receiver (1) pins of the microcontroller is given to the transmitter and receiver pins of the Bluetooth module respectively. The output signal from the wet sensor is fed to the LM358 convertor and the output signal from the LM358 convertor is then connected to the digital pin of the microcontroller. MQ2 sensor (smell sensor) is connected to the ADC convertor. Voltage

regulator is used to regulate the voltage i.e. 3.3v and 5v based on the version of the board. In this circuit we need 12v so we use booster to boost the voltage from 5v to 12v.

III. RESULTS AND DISCUSSION

In this method has digital wet detector sensor circuit detects the status of the diaper such as if the diaper is wet sent signal to LM358 convertor and signal transfer to Pro mini microcontroller. After that Bluetooth module sent the warning signal to the pair smart phone. MQ2 sensor is used for smell detection. MQ2 sensor has analog signal that is sent to the ADC and transfer to the Pro mini microcontroller. The smart phone receiver and starts alarming sound using buzzer indicator as well as light indication. As this part consists of very small component as in it can be fabricated into smaller chip, to ensure diaper wearers comfortable and safety. The cost of the diaper is low, easy to wear and compact. It should provide comparatively large detection range.

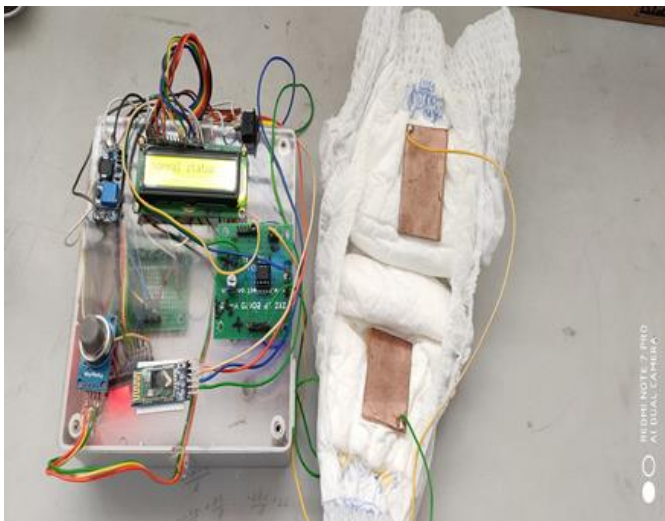


Figure 3. Child Diaper Wet Detector using wireless system

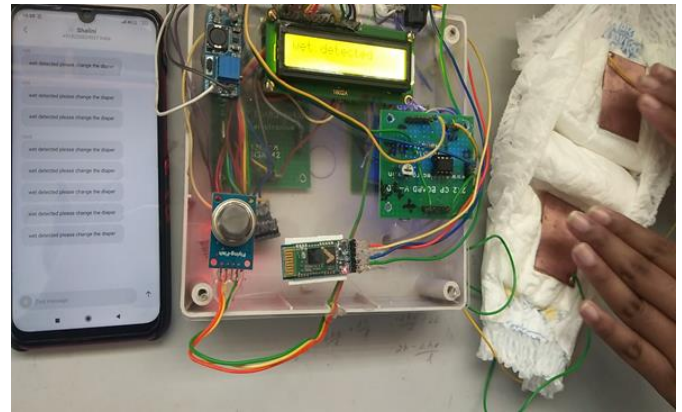


Figure 4. Wet Detected Display

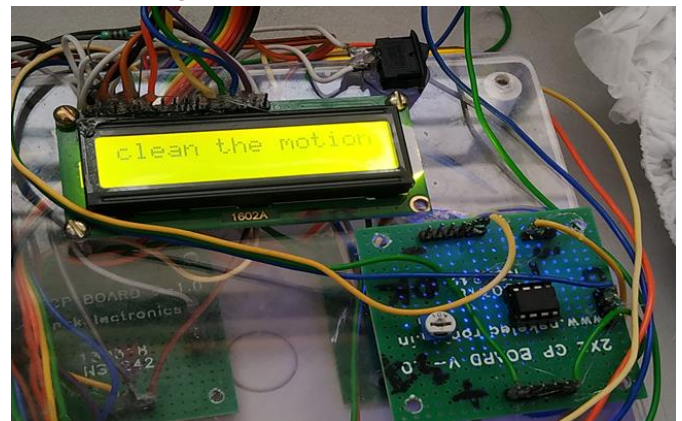


Figure 5. Motion Detected Display

IV. CONCLUSION

Using this system, we can generally monitor the baby in real time environment and it can also be very much effective in the absence of the baby's mother. Our proposed system does not emit any type of harmful radiation that can affect the baby in any direct or indirect way. Our project focus on advanced baby care method. All the data are continuously monitored and sent to parents in case of any issue or bad situation. Bluetooth module works perfectly in sending notifications to the parents.

V. REFERENCES

- [1]. Simik, Mohamed YE, Feng Chi, Abdel dimeAbdelgader, and Randa S. Saleh. "Automated Alarm System for Diaper Wet Using GSM.

- [2]. "Diaper Facts," Real Diaper Association, vol. Retrieved Nov 15, 2018.
- [3]. "Marion Donovan, Solver of the Damp-Diaper Problem". New York City Times.
- [4]. R. M. Nair, "Self-learning diaper wetness detector and toilet trainer,"
- [5]. R. Zimmerer, K. Lawson, and C. Calvert, "The effects of wearing diapers on skin," Pediatric dermatology, vol. 3, pp. 95- 101.
- [6]. H. Prasad, P. Srivastava, and K. K. Verma, "Diapers and skin care: merits and demerits," The Indian Journal of Pediatrics, vol. 71, pp. 907-908.
- [7]. K. W. Buckingham, "Methods for the treatment and prophylaxis of diaper rash and diaper dermatitis,".

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