

## **Automatic Cradle System for Infant Care**

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**Abstract:** *To improve the household management and decrease the young parent's labour intensity a new baby bassinet is made. The kind of bassinet can realize adaptive sway to baby status. Some sensors can perceive the movement of baby and other information such as baby cry. Alarm signal can be produced according to baby abnormality status. A kind of artificial metabolic algorithm is proposed in the paper. The algorithm can be applied for adjusting the bassinet extent. There is a need to develop a new low cost indigenous electronic cradle because the existing cradles are imported and costly. This paper presents the design and implementation of a new indigenous low cost baby cradle that swings automatically when baby cries. The speed of the cradle can be controlled as per the user's need. This system helps parents and nurses to take care of babies without physical attention. In the present days we see both the husband and the wife are working. So it becomes quite difficult to take care of their infant. Many a times there are no grandparents in the house; the mother alone has to manage with the household activities. Thus it may lead to improper attention towards her infant. It is found that when the baby is in cradle he feels comfortable and also sleeps well when he is there in cradle. The system designed is an automated cradle, which helps the mother in giving fair attention towards her child along with managing of other household activities. This system is also beneficial for the babies as we have used fluid sensor which helps to avoid diseases like pneumonia, rashes which are caused due to wetness. The IR sensors used in the system help to detect the presence of the baby in the bassinet.*

*The baby when in the womb of the mother senses three parameters of the mother: Voice, heartbeats and temperature. All these parameters have been used to create a virtual environment for the presence of the mother.*

**Keywords:** *Virtual environment, Cradle inclination, Wet mattress, Baby warmer, GSM module.*

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### **I. INTRODUCTION**

A cradle is a baby's bed or cot, typically one mounted on rockers. In the present scenario where both the parents are busy in their professional life, it has become very difficult for them to get sufficient time to take care of their infants. Sometimes it is not affordable for them to hire a care taker. This results in admitting their child to child homes during their job timings. It is found that most of the times baby stops cry and sleeps well when they are in a cradle. In today's life style, it is very difficult for parents and care takers to sit nearby their child and sooth them whenever they cry or sleep. Thus, the designed system would help the parents in the child care without physical attention. Automatic cradle is a device that provides an aid to swing the baby cradle automatically.

Once the crib is manually tilted in one direction and released, this permits the inertia to actuate the locking and actuating arms to operate under the biasing force of spring in conjunction with the gear. Thus, the spring loaded motor begin to operate and the lever which is attached to crib is oscillated in back and forth movement.

### **II. BACKGROUND**

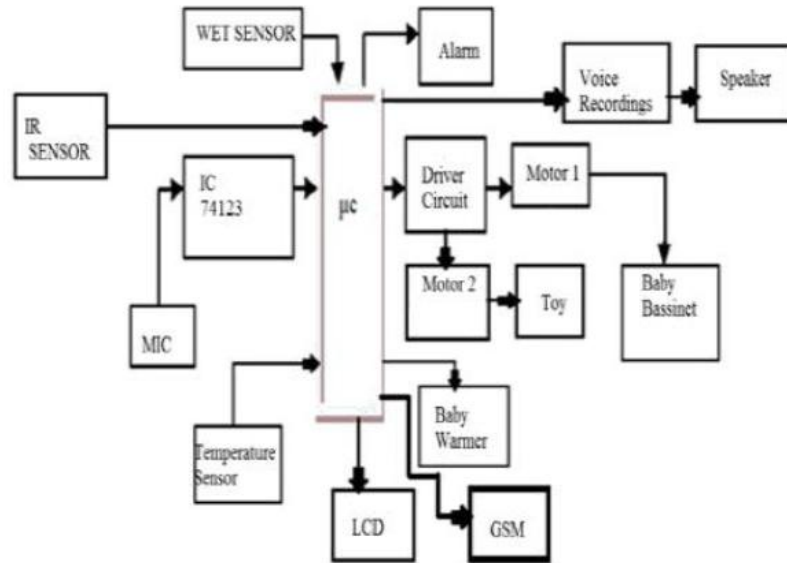
The traditional method to make the baby sleep was to put him into a saree tied at the two corners of a room. The traditional method proved to be uncomfortable for the child as it gave some jerks to the baby. Moreover the problem of the baby making its mattress wet was also not detected. This resulted into the occurrence of the diseases like pneumonia, rashes, cough, etc. This may sometimes prove even fatal. The baby sometimes is more cunning. It may try to come out of the cradle. Many-a-times it has been seen that in the absence of the mother the baby tries to come out of the cradle. This may cause serious injuries to the baby. From the above discussion, it is clear that the traditional cradle systems are not as comfortable as the proposed system. They are comparatively less reliable.

### **III. PROPOSED SYSTEM**

The proposed system is more reliable. The status of the baby is known by the father even if he is at the office, as a GSM message is fired to the father at every movement of the baby like crying, wetting of the mattress, etc. When the baby cries the motor rotates which in turn moves the cradle. If the baby still continues to

cry, the recorded sound of the mother is played. And the father is sent a text message. The baby when tries to come out of the cradle, the inclination of the cradle above the specified limit, blows the buzzer in the kitchen and a text message is fired to the father who is sitting in the office. Moreover, the mattress if made wet by the baby also fires a text message and blows an indicator.

The block diagram can be as follows:



#### IV. BLOCK DIAGRAM DESCRIPTION:

**1. MIC:** When baby cries in the cradle, microphone detects it and converts the sound signal in the form of pulse. A unidirectional microphone is used to detect the baby cry. If the child continues to cry over long period of time then the MIC circuitry would get activated and generate signals and send it to the buzzer. Timer IC 74123 is used as mono shot. The electrical signal from MIC is provided as input to this IC. The output from IC is in the form of pulse which is recognized by microcontroller easily.

**2. Baby Bassinet:** Baby bassinet is the infant bed. This is connected to a motor which sways the baby bassinet based on the power it receives from the driver circuit. The bassinet used here is made up of wood or some insulating material like fibre so that the baby would not get fatal shock. The bassinet is connected to the motor so that when the baby cries the crying sound would be sensed by the sensors and the motor starts oscillating thus giving some relaxation to the infant.

**3. Speaker:** Mother's voice and her heartbeats recorded are played via speaker, so that the child feels the presence of his mother. Thus the baby feels comfortable and may stop crying.

**4. LCD:** We are using 2 lines 16 segments each for the display purpose. The values of 2 set points and the actual data which is to be compared for the operation of the relays are displayed on the LCD. It is connected to the D port of the microcontroller. The LCDs are available in 4 bit and 8 bit mode. The LCD is normally in default 4-bit mode. We are using in our system, the LCD in 4-bit mode.

**5. Fluid sensor:** To avoid the problems like pneumonia, cough a sensor circuit can be used to detect the wetness of the mattress.

Such a sensor is called as fluid sensor. It is a simple circuit where a LED (or an alarm) is used along with some water, breadboard, connecting wires, 12V battery. It helps the parents to know whether mattress got wet and the diaper needs to be changed. This may help in proper attention towards the child.

**6. Alarm:** Alarm will be generated on two conditions:

a) When mattress is wet, indicating parents that mattress and baby clothes need to be changed.

b) When baby cries for a specific time. This indicates that the baby needs attention.

**7. Temperature sensor and baby warmer:** Warmer would be placed under the bed. Default temperature of the warmer would be the temperature of the mother. Warmer is on if bed temperature is 37.0 C.

The algorithm can be prepared as follows:

1. When the cry is detected, the motor rotates and the cradle is moved.
2. If the baby is still not quiet, the recorded voice of the mother is played and a text message is fired to the father.
3. If the mattress is wet then, the indicator glows and a text message is fired
4. If the inclination exceeds the specified value, the SOS alarm will be blown and text message would be fired.
5. If the bed temperature exceeds 37.0 c, then the warmer would turn on.

## V. RESULTS

### 1. Baby cry detected



Fig. 1: Crying sound of the baby is detected.

### 2. Bed wet detected



Fig. 2: Bed wet Detected

### 3. Bed temp. Is detected and displayed.



Fig. 3: Bed temperature is detected and is displayed.

#### 4. Cradle inclined



**Fig. 4:** Cradle is inclined.

#### VI. ADVANTAGES

Fully automated system where interference of humans is generally not required. System is secure and reliable .Simultaneously parents can manage with their career activities and house hold activities .Due to the use of wet sensor, diseases caused due to wetness like pneumonia, rashes, etc. are prevented .Use of IR sensor helps to avoid severe injuries to the child as it helps to detect position of the cradle. Helps to keep the baby warm even in cold conditions. Safe and comfortable.

#### VII. CONCLUSION

Thus this system reduces the work of working parents as well as in hospitals where there are large number of babies. This cradle system comforts the baby in all the possible ways. Diseases like pneumonia, rashes etc. are avoided. Virtual environment that the mother is present is created so that the feels safe and comfortable and stops to cry.

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