# Smart Cradle

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**Abstract— In this rapidly advancing new era a constant monitoring of infant/child (1 year) becomes difficult for jobholders. Infants or a child needs parents' attention twenty four hours a day and seven days a week, which is very important but it is practically impossible due to other priorities like house hold activities, official works and personal works. There are two options available for parents to take care of their baby one is baby care centre and other is to hold a nanny is which involves lot of passion. Now a day's there are many incidents are happening in social media featuring human attack to the toddlers in a cruel way. So, there is a need of safe and secure place to take good care of the children's need with minimum human involvement. So here we are with a solution "the automated cradle" which gives a reliable and efficient baby monitoring system. A cradle is one of the safest places for baby to comfort and babies' like the cradle and they enjoy in the cradle because they are habituated. The automated cradle is designed with sensors to detect cry of baby through voice module and swing the cradle with music till baby stops crying. It also sounds an alarm when mattress gets wet. This project is useful for parents who are busy in their career, nurses in infant care.**

**Keywords: MSP430 microcontroller, Music, Swinging, Wet sensor, Voice Module, Servo Motor, Alarm.**

## I. INTRODUCTION

In the past few decades, female participation in the labor force in the industrialized nations has greatly increased in present society. Subsequently, infant care has become a challenge to many families in their daily life. Mother is always worries about the well being of her baby. Parents in the present world are busy in their professional life, so they do not get sufficient time to take care of their babies. It may be expensive for the household to afford a nanny. After long working hours, they have to take care of the home along with the baby. They may not get enough time to swing the cradle manually and sooth the baby. Moreover, in today's life style, it is very difficult even for the housewives to sit nearby their infants and sooth them whenever they cry. Hospitals have neonatal and maternity units. Nurses in these units have to take care of baby and sooth them whenever they cry. As we seen in India both the parents need to work and look after their babies/infants, so more workload and stress is there on such families especially on female counterparts.

If a system is developed which continuously gives updates about their infants during illness or during normal routine then it will be of great help to such members as they can work in stress less environment giving more fruitful output. Also urgent situation condition can be quickly be noticed and handled within less time. Usually, when a young baby cries, the cause is one of the following things i.e. they are hungry, tired, not feeling well or need their diaper changed. So we developed a prototype this can monitor the activities of the babies and infants along with finding one of the above causes and give this information to their parents. Before the use of cradle in society, baby caring was completely by caretaker but in the nuclear family baby caring is very difficult.

So there is a need for automation in the cradle section. As the baby needs more care and safety automation of cradle is very much difficult for safe design. Cost is much important to develop a cradle with an automated mechanism. Our project aims at the design and fabrication of an automatic swinging baby Cradle for the purpose of using it in nuclear family with medium income. The principle used here is that voice recognition when baby cries then it will recognize the sound and swing the cradle with music until baby stops crying. To determine the moisture condition of a baby i.e. urine detection by using moisture sensor and sensed input is given to the MSP430. Thus, if mattress gets wet, alarm is on to alert parents.

## II. EXISTING SYSTEM

In the existing system to determine the moisture condition two pairs of copper electrodes are placed under the cloth on which baby is sleeping. This may harm the baby. As well as there were separate systems for each individual module and they are used DC motors which will rotate the cradle in clock wise or anti clock wise direction and there will be an occurrence of disturbance while rotating the cradle. Baby may fall down when the cradle is rotating in clock wise or anti clock wise direction.

## III. PROPOSED DESIGN

In proposed system instead of using copper electrodes we are using moisture sensor. This moister sensor will not harm to the baby. In our project we are combining all the systems into a single system. Each system acts as an individual module. Instead of using DC motor here we are

used servo motor which acts like a torque. There will be no disturbance or sound while swinging with the help of servo motor.

## IV. BLOCK DIAGRAM

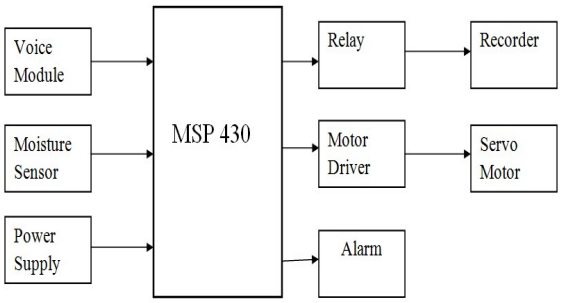


Fig: Block diagram of smart cradle

## V. WORKING

The main components used in this project are MSP430 microcontroller, wet sensor, voice module, power supply, alarm, servo motor. The cry of a baby is already recorded in the recorder. Whenever the baby cries voice module will detect the cry of a baby and swing the cradle with sooth music till the baby stops crying. With the help of motors the baby cradle will swing smoothly without any disturbance. Servo motor will swing the cradle both in clock wise and anti clock. First the cradle will be in initial state then it will move right or left side and it will come back to the initial state. Then will move left or right side and come back to the initial state without occurring any noise or disturbance. So that baby can sleep in a peaceful way. Power supply is given to the motors. We use wet sensor to detect whether the mattress is wet or not i.e. Urine. When the mattress gets wet it sounds an alarm to alert the parents. This smart cradle is easy portable from one place to other and easy for parents to monitor their baby.

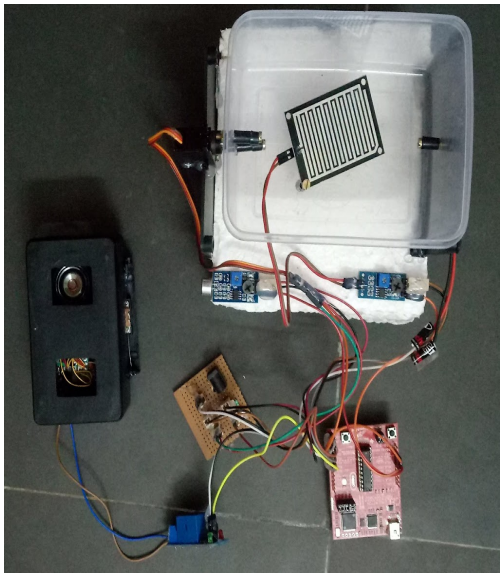

Fig: Experimental setup of smart cradle

## VI. FLOW CHART

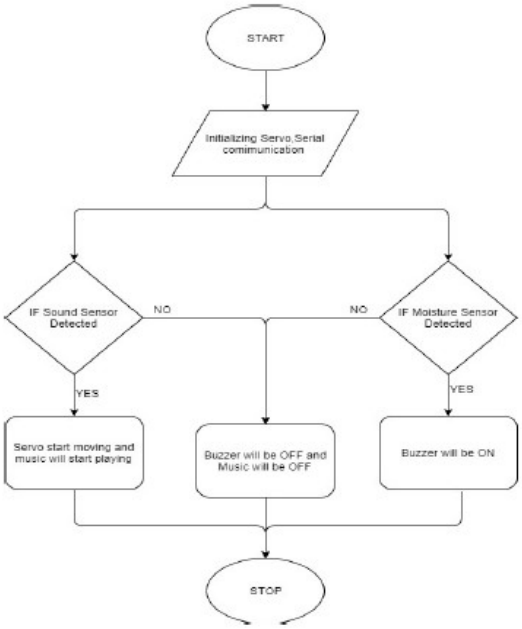


Fig: Flowchart of smart cradle

The cradle will be in the initial state i.e. zero state. If the baby is crying then the input the cry sound is given to the voice module which will detect the baby cry. If it matches then the servo motor starts moving and also it will play music so that the baby may stop crying and go back to sleep. If the moisture sensor is detected that baby mattress is wet then it will sound an alarm i.e. the buzzer will on. When both will happen at a time i.e. baby crying and mattress is wet then the cradle will swing with the help of music and buzzer will on. If the baby is not crying and mattress is dry then buzzer will off, cradle will not swing and music will be off. It will in the initial state.

## VII. RESULTS

The presented system is designed. The system is able to detect the cry of a baby. The system will respond to each state according to a specific program which is coded and installed in the MSP430.

Case 1: The cradle will be in the Zero state position.

Case 2: It will determine the moisture condition whether it is wet or dry.

Case 3: If the moisture sensor is wet then it sounds an alarm.

## VIII. CONCLUSION

The automatic baby cradle is the finest solution for parents and nurses who cannot find the sufficient time for their babies. These requirements are used by Baby Rock

as a guide to developing the Smart Baby Cradle. With these requirements, Baby Rock will provide a safe efficient product for the user. It has been split amongst seven requirements:

System**:** The system as a whole.

Cradle: The Protective Environment for the Baby.

Servo Motor: The mechanism that rocks the Cradle.

Speaker: Provides relaxing music for the baby.

Moisture sensor: To determine the moisture condition of the baby.

Voice module: Ability to detect the crying of a Baby.

Microcontroller: The heart of the System.

The Smart Baby cradle will provide the User a convenient simple way to monitor their baby.

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