Automatic Baby Cradle Swing Based on Baby Cry

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Abstract:The customary Automatic child cradle frameworks are excessively lavish and they additionally don't offer much usefulness. This venture intends to help those moms who are excessively occupied and don't have a cleaning specialist or sitter to deal with their infants. This paper portrays the configuration of a programmed cradle which fundamentally chips away at the location of infant development with the assistance of a PIR sensor. PIR sensor detects the movement of infants. After the location of enlivening of the infant various occasions are terminated which incorporate sending notices to mother by SMS, swinging of cradle with the goal that the child feels good. In the event that the child does not rest and/or quiets down after a certain period, a warning (SMS) is sent to the folks saying that the infant needs their consideration. The cradle likewise incorporates extra gimmicks like observing the temperature of the infant to give therapeutic thoughtfulness regarding the child and cautions the folks if the body temperature of the child goes above the given threshold temperature. The cradle additionally incorporates a wet sensor which will caution the folks or the attendant/sitter for bunk wetting of the infant. It will help to keep the infant in a hygienic environment. The framework is kept negligible as far as fittings as the greatest measure of usefulness of the cradle is performed through Arduino. The cradle is vitality productive and obliges no physical consideration.
***Index Terms* - Automatic cradle, bed-wet sensor, PIR sensor, swinging of cradle, movement detection.**

1. INTRODUCTION

Generally, the baby cradle is used to make sleep and soothe the baby. For example, guardians have to take care of their child till they fall asleep. However, conventional cradles are not electronically equipped such as a battery or adapter to automate the cradle automatically. In Addition to that, this kind of conventional cradle is used in villages areas or non-developed cities due to its low prices. But the problem with this kind of designated cradle is that you need manpower to take care of your child and your child may not be safe and feel comfortable in the conventional cradle. Thus, we need an automatic cradle to take care of a child which uses the battery or power source.

Besides, there are extra features or functions provided by the newly automatic cradle that is beneficial for parents. Because in the present world people are very busy in their professional life so they do not get ample time to take care of their infants. It will be very difficult to control the babies and if someone is hiring professionals to take care of their infants. It may increase your expenses from monthly expenditure. Moreover, in today's life it is very hard even for the homemakers (mummy) to sit near their babies and sooth them whenever they feel uncomfortable. Though it is automatic, this application is very useful for the nurses in maternity units of the hospital.

2. RESEARCH METHODOLOGY

The proposed prototype of a smart baby cradle will monitor the activities of the infant. The cradle has a motor which will rotate the mobile toy. The smart baby cradle has noise detection which will sense the noise when the baby is crying or making loud noise. A servo motor will rotate (swing) the cradle up to an angle that is safe when the infant is inside the cradle. A camera will be used to track the baby inside the crib. A GSM module to communicate with a remote device that is operated by parents. And an Arduino microcontroller to control and monitor the activities of the cradle.
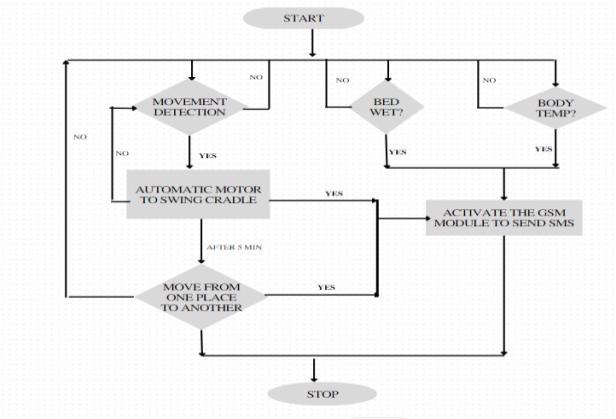
Figure 1: Block diagram of proposed system

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2.1 COMPONENTS USED

MicroController 89S52: The AT89S52 is a low-power, high-performance CMOS 8-bit microcontroller with 8K bytes of in-system programmable Flash memory. The device is manufactured using Atmel's high-density nonvolatile memory technology and is compatible with the industry-standard 80C51 instruction set and pinout.

GPRS Shield: The GPRS Shield gives an approach to utilize the GSM cell phone systems to receive information from remote areas, the shield permits to accomplish this by means of any of the three routines.

Wet Sensor: It is used to detect wet conditions in the crib. When the baby wets the crib due to urine, it will send the feedback to Arduino and Arduino will do the further processing.

DC Motor: DC motors are configured in many types and sizes, including brush less, servo, and gear motor types. A motor consists of a rotor and a permanent magnetic field stator

LED : A light-emitting diode (LED) is a semiconductor device that emits light when an electric current flows through it. When current passes through an LED, the electrons recombine with holes emitting light in the process. LEDs allow the current to flow in the forward direction and block the current in the reverse direction.

Line Follower Robot : The line follower robot is a simple robot that is based on automation that follows a specific direction based on a particular line, usually a dark line on a light surface. The robot consists of two sensors that are installed at the front end of the robot body and two wheels that are driven by DC motors. The circuit board present in the robot controls the wheel speed based on the input signal from the sensors. The controlling of the robot is done like that when the robot sees a black line it stops.

2.2 WORKING

The below algorithm describes the function of the smart baby cradle.

A. ALGORITHM FOR SMART BABY CRADLE

STEP 1:Turn ON the cradle.

STEP 2:Monitor conditions of the cradle as well as the baby.

STEP 3:Issue alerts and activate-deactivate module.

STEP 3.1.1:If urine is detected Arduino sends a message to parent and alarm is activated.

STEP 3.1.1(a):Parents can send "start swing" message to Arduino to start the swing motion.,

STEP 3.1.1.(b):To stop swing motion parents can send to Arduino or the swing motion will stop automatically after 5 minutes.

STEP 4:If noise (baby cry) is detected for longer duration (approx. 1 minute) then send message to parent device and led glows

STEP 5 : step 3.1.1(a) and step 3.1.1(b).

STEP 6: If a parent can't go near the cradle it moves from one room to another room.
The whole methodology is divided into following algorithms whose explanation is given further.
1) ALGORITHM FOR CRY DETECTION
STEP 1:Start
STEP 2:Detect for noise
STEP 3:If noise is detected for longer duration (approx. 1 minute) then send message to parent device and glow LED
STEP 4: Switch off LED after 10 seconds.
The algorithm describes the function of the cry detection
2) ALGORITHM FOR URINE DETECTION
STEP 1:Start.
STEP 2:Detect wet conditions.
STEP 3:If noise is detected for a longer duration (approx. 1 minute) then send a message to the parent device and activate the alarm.
STEP 4:Stop the alarm after 10 seconds.
The above algorithm describes the function of the urine detection module.
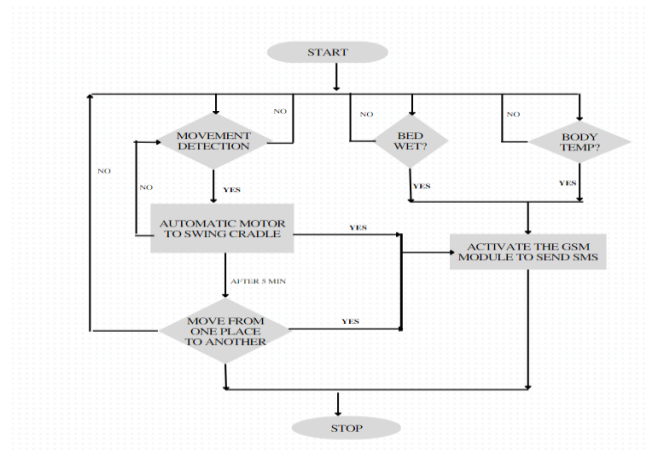**2.3 FLOW CHART**

Figure 2: Flowchart of proposed system
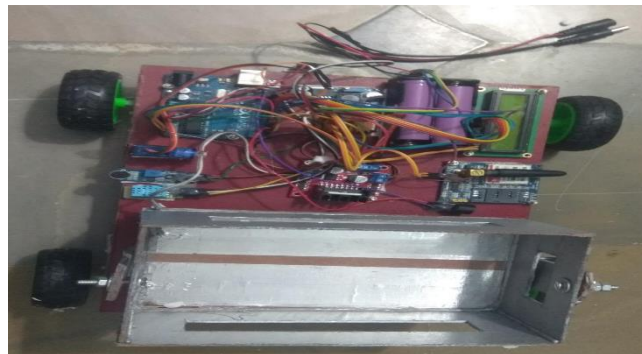
3. RESULTS

A) Hardware
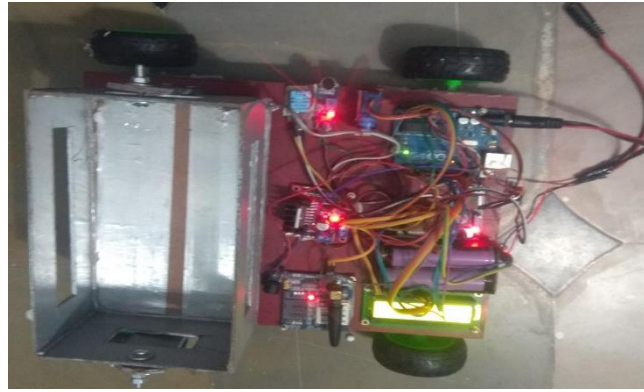

Figure 3.1: battery off

Figure 3.2: battery on
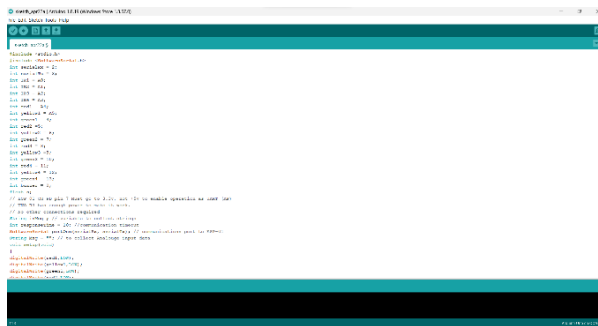
B) Arduino IDE

Figure 3.3: Arduino IDE

4. CONCLUSION

In the present study, an intelligent baby cradle system was developed. The cradle was capable of detecting the movement of the baby and initiating cradle swing. In the event of Bed- wet or hyperthermia, the developed device is capable of sending SMS. Additionally, the cradle moves from one place to another place which is monitored by parents. The device can be used to minimize the workload of the parents and nurses in home and hospitals respectively.

5. FUTURE SCOPE

Modules of noise detection and urine detection have been implemented. Our future scope includes modules of attaching a toy which can be used to ease the baby, when he is bored or crying. A set of servo motors will be used to rock the cradle, Also a camera will be attached to see the movement of the baby inside the crib. All the components of the cradle will be synchronized with GSM modules which will be used to communicate with smart cradles and messaging will be used as a medium of communication.

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