

Design of Smart Cradle System Using Iot

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Abstract

In the age of modernization, A Parent's life undergoes various changes due to child monitoring. Our project focuses on the relevant problems faced by parent in monitoring and nurturing their child while working. This project aims at reducing the challenges faced by parent by developing an IOT based Smart Cradle monitoring System that will assist Parent in monitoring their child. This cradle is equipped with a swinging mechanism which swings automatically on detection of baby crying sound. This proposed smart cradle has been integrated with a camera to provide continuous surveillance to parents. An Arduino, sound sensors, wetness sensor, swinging mechanism along with other electronic components are used to upgrade existing cradle to meet the Present-day requirements. This project is quite efficient and reliable which can deliver result better than conventional cradle.

Keywords: Smart Cradle, Iot, Swinging Mechanism, Video Monitoring. 1.
INTRODUCTION 1.1

INTRODUCTION

From last few decades there is a large migration of people in metro cities in search of better job opportunities (specially women workforce).[1] At present couples who both are working may find it difficult to give proper time and care to their baby

[2]. In corona times many people were working from home and it was difficult for them to balance workload and parenting. [1][12]. This put extra burden on parent, Situation aggravates when baby is ill where it requires a constant monitoring which results in taking leave from works.

[3] This not only affect the career of parent but also put a stress on them so there is a need to reduce burden of monitoring and nurturing on parents.

[4] This cradle system is equipped with an automated Swing mechanism which will swing automatically on detection of baby crying sound also it has an certain time limit to send an notification to parent if baby don't stop crying[7]. Along with it has an wetness detector to detect the wetness detector or detect the witness of mattress and send SMS to parent's stop crying[8]. A camera is attached at top of the cradle so that Parent can have continuous surveillance on their baby while they are at work[9]. This cradle also has an automatic toy for baby's entertainment which will reduce the possibility of baby crying.[10].This cradle system have temperature sensor if baby get wet the alert SMS will send to the phone,[10][11] to change the baby diaper[11]. In this cradle has mic if the cry it detect through Mic send SMS to the phone alert baby is crying.

Our project is an innovative idea to resolve this problem by developing an automated smart cradle system using IOT to monitor and nurture child in an efficient way[5.] . We ought to create an IOT based smart cradle system to assist parent in monitoring of their child regardless of their presence whether they are at worker in home[6].

1.2 Scope of the Project

This proposed smart cradle has been integrated with an camera to provide continuous surveillance to parents. An arduino, sound sensors, wetness sensor, swinging mechanism along with other electronic components are used to upgrade existing cradle to meet the Present-day requirements [4].

2. Literature Review

Marie R. Harper and Maxine R. Blea developed the first automatic rocking cradle which swings side by side on a horizontal axis which replicate the motion same as achieved by human oscillation of cradle. Spring motors are used to provide oscillatory motion to crib. Springs motors are attached to the crib of cradle that produce motion same as human efforts. The spring motor is of any known type in which the gear –operating means is easily stopped when the slightest resistance or opposition to its movement is encountered, thereby providing on extremely safe device for use with small children or babies [10][18].

The advantages of this system is cost effectiveness, safe for small babies as it has mechanism to stop swinging of crib whenever a resistance is occurred, require less human efforts and presence. The limitation of this system is it does not support video monitoring Yang HU developed an

algorithm to control the speed of motors based on the parameters obtained from baby monitoring this model help the user to control the speed of swinging on pattern of intensity of baby crying.

In [3] authors have designed a cradle system with an android app to monitor baby, which swings automatically after detection of baby crying sound. The principle behind this mechanism is that a sound sensor detect sound made by baby during crying and compare it to Preset value in microcontroller if sound made by baby is greater than preset value a signal is generated by microcontroller who activates the swing mechanism also an SMS is sent to parent phone using GSM module. Additionally, a camera is placed at top connected with cloud server so that parent can request video from camera from any place. In [4] authors have used a Gas sensor (MQ135), Temperature sensor (LM-35), sound sensor (KY-038) and a cloud server to integrated it with Raspberry pi in order to upgrade the conventional cradle system to meet the needs of parents [10][16].

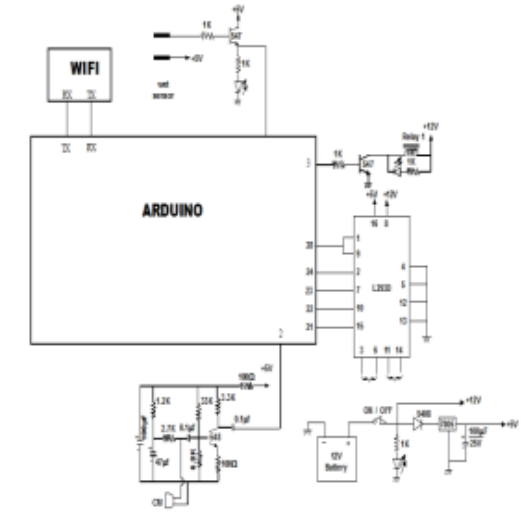
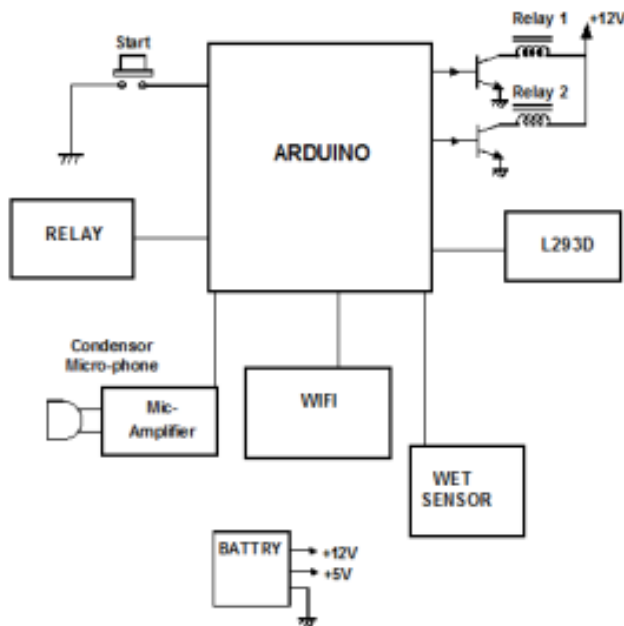
The three sensors record the data collected from baby body parameters and all the information taken from sensors is stored in cloud which keep on sending SMS to parent regarding baby parameters at regular interval of time. This system is user friendly as it requires less hardware components and cost effective. The limitation of this system is that it only informs the parent about baby status but don't take any action to make him/her stop crying. In introduced a framework which observe all necessary indication of the child like heartbeats and the internal heat level utilizing remote innovation and sound sensors which is used for observing the cry pattern of the child. Additionally, the live images of the infant is obtained through camera module through a Wide Area Network (WAN) which can be sent through mail and it can keep surveillance on the baby from distant areas around the world. The camera module is also induced which is responsible for observing the activities of the child and keeping an eye on the infant's development in a limited area. This framework is easy to use and quite cost effective. [10]

3. Proposed System

3.1 Proposed System Overview

This proposed smart cradle has been integrated with an camera to provide continuous surveillance to parents. An arduino, sound sensors, wetness sensor, swinging mechanism along with other electronic components are used to upgrade existing cradle to meet the Present-day requirements.

BLOCK DIAGRAM



4. Implementation

4.1 Implementation project images

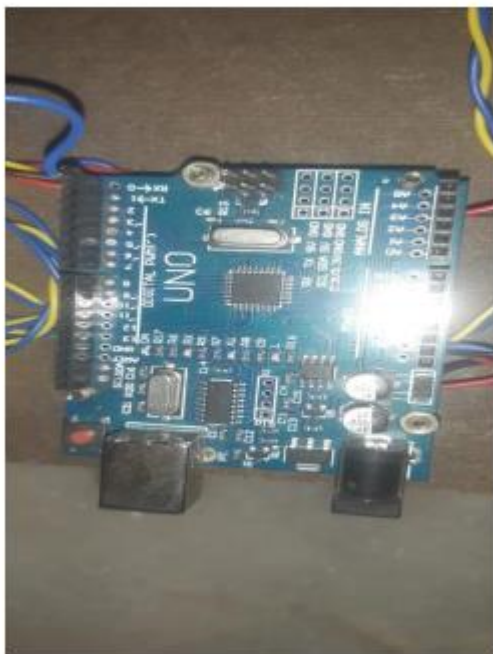


Fig1:Arduino Uno R3 Pinout



Fig2: switch button of cradle