

ARTIFICIAL INTELLIGENCE-BASED RADIO STICKERS TECHNIQUE TO PREVENT NEWBORN KIDNAPPING / SWAPPING IN HOSPITALS

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Abstract— Currently, the most common way to identify a hospitalized newborn is based on the bracelet on the child's wrist. It provides a cheap and convenient way to match baby and parent information but does not prevent the baby from being abducted. While the possibility of infants being abducted from hospital pediatric wards is often overlooked, its impact can be devastating for families and healthcare workers. To improve the safety of infants in the hospital, we have developed an integrated system based on radio waves with infrared sensors and real-time cameras. The system uses an infrared sensor mounted near the baby, to ensure the baby's presence. Whenever someone has an unauthorized radio tag or doesn't even try to get the baby out of the crib, the radio sticker in the crib reads the sticker details, detects the anomaly, and corrects the problem. If there is no sticker, the reader will only read the infrared sensor that will detect the child being removed from the place. In this case, the camera will capture the baby's face. In addition, the system uses a facial signature algorithm to check if the person is authorized. The faces of parents, doctors, and caregivers (nurses) will be pre-registered in the database and when one of them approaches the crib nothing happens and if someone is not the person trying to try to place a child, it's face will be detected as the missing face. database. The camera will then capture the face and it will then be emailed using the SMTP protocol. It will provide a cost-effective approach to digital hospitals, improving neonatal safety and overall hospital management. As a result, our system prevents the abduction and exchange of newborns in the hospital, causing psychological stress for parents and hospital administrators.

Keywords— RADIO STICKER, the SMTP protocol

I. INTRODUCTION

A. OVERVIEW

Changing a baby's clothes is a horrible thing. During those months of dreaming of holding your baby in your arms, it was hard to imagine coming home to a baby that wasn't your own. It was an emotional ending to a baby swap in Shimla. The pain of parting with the child they had breastfed for five months and the joy of being reunited with their own made the two parents uneasy. Earlier this summer, on May 26,

two mothers gave birth at a city hospital but gave the wrong baby. The families then care for the child - until Wednesday, when they exchange the babies for the right one. The system includes a camera and a radio sticker to provide real-time security against the perpetrator lifting the baby out of the crib. In addition, an infrared sensor is used to monitor whether the baby is present or not in the crib. In this system, real-time monitoring of authorized and unauthorized people makes it easy to find out who is lifting the baby out of the crib. The message will be generated as an email asking unauthorized persons to notify a parent or guardian.

B. OBJECTIVES

- The system includes a camera and a radio sticker to provide real-time security against the perpetrator lifting the baby out of the crib.
- In addition, an infrared sensor is used to monitor whether the baby is in the crib or not.
- In this system, the authorized and unauthorized person's real-time monitoring will easily find who is lifting the baby out of the crib.
- The message will be generated as an email that will be clicked by an unauthorized person to notify the parent or guardian.

II. LITERATURE SURVEY

1. Lin, T. Lee, S. Syu and B. Chen, Application of NFC Technology and Intelligent Agents for Indoor Locations: Examples of Kindergarten Security,”

NFC combines with images to locate a child in a kindergarten, and the system can alert nurses when a child is in a danger zone. The NFC tag also has a temperature acquisition function, so that caregivers can promptly know the child's temperature change. Saranya et al. use an ARM processor, GSM and GPS chip, and audio chip to build the device for children. The main function of these systems is to track the location of the children and send them to their parents and the control room. In addition, they can also measure and identify fussy babies and refer them to parents and schools for timely treatment.

2. Child tracking system Mohammed Rafi, K. Niranjan Reddy developed an Android-based child tracking system using voice recognition. The system consists of Mega Controller, Global Positioning System (GPS), (GSM), Speech Recognition Development Module, NFC, and ATMEGA644 Controller.

3. Vibhor Gupta Active NFC and ESP8266 based child monitoring system

In this paper, infants are continuously monitored to avoid mismatches due to their lack of different characteristics in them. This is done using the NFC and WiFi module. The system also indicates an alarm if the number of babies in that particular room decreases. This is identified by the unique identifier of the tags associated with the infant.

4. Yuichiro MORI, Hideharu KOJIMA, Eitaro KOHNO, Shinji INOUE, Tomoyuki OHTA, and Yoshiaki KAKUDA, "A self-configurable next-generation child tracking system based on a special mobile network including terminals Android mobile

It includes beacons that collect subgroup information, an Android terminal attached to each child, and a server that stores tracking information. Signaling consists of a wireless local area network that builds a network that simultaneously receives and transmits information from beacon to beacon about the child's location and it is transmitted to a computer server located in the child's control room. 'school. The system will alert the school that one of the children is missing, but it does not indicate where the child is at the moment. Also, it doesn't focus on whether the baby is crying or not.

5. S.Sundar, Rohan Ghosh, Harris Shahil Design, and Implementation of a Versatile Child Monitoring System

This article introduces the tracking system used to monitor children by RF signal and sed for home computers for security purposes. Data can be transmitted and received by the RF module and can also be affected by external radiation waves. The child module sensor will generate a signal when a child lock violation is detected. This signal will be sent from these sensors to the parent module via GPS and the microcontroller.

III. EXISTING SYSTEM & PROPOSED SYSTEM

A. EXISTING SYSTEM

The RADIO STICKER Reader is positioned in the little one room. This reader is used to examine records from all indicators internal to this room. In case of card sign loss (checked robotically after one minute), the gadget will annoy that this card isn't always available and, an alarm sound may be activated.

- Employee and determine permissions are adjusted thru the gadget interface to boom gadget flexibility. When a mom proceed the go outdoor with a child, the gadget suits the mom's tag with the kid's tag, and if there's a mismatch, audible alarms -are activated. In case it's far important to transport the child o

every other room, the gadget shshopecards indicate that the nurse has transferred the child.

- Wristbands with RADIO STICKER pastime tags should be lightweight, tamper-evidence, and disposable to keep away from organic hazards. Any try to eliminate or reduce the bracelet will cause an alarm if the man or woman isn't always authorized.

B. PROPOSED SYSTEM

- The gadget proposed in our task makes use of radio and digital digicam stickers to discover unauthorized people.

- In that we use a face landmark set of rules and we can interface the sensor and radio sticky label with the controller.

- First of all, we installed a digital digicam in the room and this digital digicam may be interfaced with the gadget. It will screen the child constantly, pix of mother and father, doctors, nurses, and loved ones pix may be shaped and saved withinside the database.

- If an unauthorized man or woman attempts to change the child out of the crib, the gadget will locate the unauthorized man or woman primarily based totally on a saved database photo primarily based totally on a facial landmark set of rules and the digital digicam will seize a photo of the child. unauthorized man or woman and could ship thru email to mother and father and certified customers the use of the SMTP protocol.

- We then use a passive radio sticky label organized via way of means of writing unique records on a readable sticky label. Whenever a person with an unauthorized radio sticky label or maybe without one attempts to get a child out of the crib, the radio sticky label withinside the crib will examine the information and locate an anomaly and if no sticky label is a gift is saved, meaning an audible alert may be triggered.

- Even if we use an IR sensor to constantly screen the little one gift withinside the crib may be displayed on the LCD and if the child isn't always gifted withinside the crib the buzzer sound indicator may be activated.

C. SYSTEM FUNCTION

ARCHITECTURE DESIGN

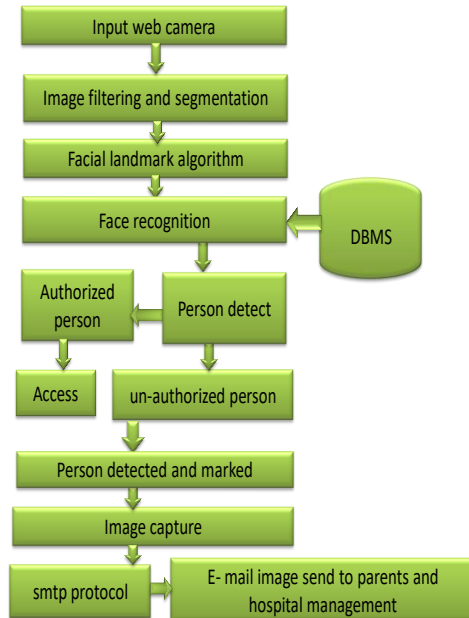


Fig no: 3.1.1 Architecture design for the proposed system

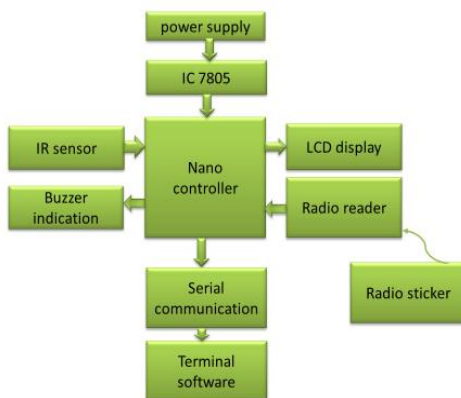


Fig.no.3.1.2 Hardware block diagram

SYSTEM MODULES

There are six modules used in this project

- Newborn monitoring module
- Radio sticker module
- Database module
- Identification module
- Hardware module
- Alert module

1. Newborn monitoring module:

In this project, infants can be monitored in two ways. One is based on facial recognition and the other is based on radio tag

communication. In this module, the baby in the crib can be monitored using a web camera. He will observe the baby constantly.

2. Radio sticker module:

We use passive radio stickers prepared by writing specific information to make stickers readable. Whenever someone has an unauthorized radio sticker or doesn't even try to get the baby out of the crib, the crib radio sticker reads the details and detects the anomaly and if the sticker is not present, that means an audible alert will be triggered.

3. Database module:

Images of parents, caregivers, and doctors can be pre-formatted and stored in the database system for reference.

4. Identifier module

The webcam will continuously monitor the baby in the crib. If the person tries to hold the baby, the facial recognition algorithm will recognize whether the person is authorized or not by comparing pre-registered images in the database.

5. Hardware model:

The hardware module includes a controller, sensor, and radio sticker. Whether the baby is in the crib or not, it can be monitored using an infrared sensor. If the baby is not in the crib, an alarm will sound.

6. Alert module:

If the unauthorized person tries to remove the baby from the crib, recognized by the facial tracking algorithm, an image of the unauthorized person can be captured and sent to an email alert using the SMTP protocol.

FACIAL LANDMARK ALGORITHM

- Landmarks are unique points on an object by which we can easily identify different shapes of the object. Eg. for the hand, it could be the fingertips. For faces, multiple spots can be detected regardless of age, gender, race, etc. These pimples are usually located on the eyebrows, the corners of the eyes, the tip of the nose, the corners of the mouth, and the chin. These dots are often high-contrast or edge-to-edge, and this data is used for landmark detection. Facial landmarks can be used to define facial expressions and facial posture, and extract facial features.

1. Remember that we have training data containing faces and XR, yr scale references.

2. We calculate the average position of each landmark and this becomes our sample

3. Now for each frame we put the model in the frame and we calculate the current position as xi, Yi

4. From xi, yi we have to gradually change to XR, yr for all landmarks. We can do 10 steps or 100 steps. It is not possible to cover the entire distance in one step. And when moving house, you need to make sure you meet both criteria

5. So for motion we calculate HOG. a function

The face landmarks detection algorithm automatically determines the location of key landmarks on the face in a face photo or from a video. Key landmarks typically include areas of the face such as the tip of the nose, the corners of the eyes, the eyebrows, and the top of the chin. Landmarks are the preferred visual feature for many computer vision tasks such as image measurement, registration, camera calibration, motion analysis, 3D scene reconstruction, and object recognition. Note that the term landmark includes both man-made landmarks and natural landmarks. Facial recognition algorithms usually start by looking for the human eye, which is one of the easiest features to detect. The algorithm can then try to detect eyebrows, mouth, nose, nostrils, and iris. The methods used in face recognition can be based on knowledge, characteristics, pattern matching, or appearance.

Estimating facial landmarks involves identifying key facial points, such as the tip of the nose and the center of the eyes. There are different estimation models based on the number of facial landmarks. The 5-point figure is the simplest model that detects only the edge of each eye and the base of the nose.

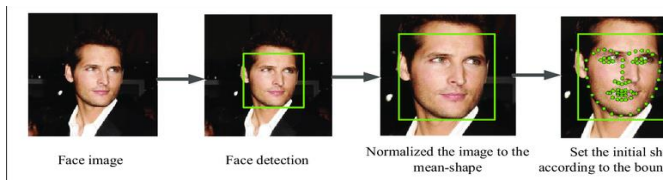


Fig.no:3.1.3 face recognition image

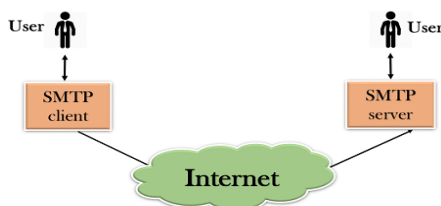


Fig.no: 3.1.4 SMTP Protocol Image

SMTP protocol

Email is becoming one of the most valuable services on the Internet today. Most Internet systems use SMTP as the method of transferring mail from one user to another. SMTP is a push protocol and is used to send emails while POP (Post Office Protocol) or IMAP (Internet Message Access Protocol) is used to retrieve these messages from the recipient side.

SMTP Fundamentals

SMTP is an application layer protocol. The client that wants to send the message opens a TCP connection to the SMTP server and then sends the message over the connection. The SMTP server is still in listening mode. As soon as it listens for a TCP connection from any client, the SMTP process initiates a connection on this port (25). After successfully establishing a TCP connection, the client process immediately sends a message.

SMTP protocol

The SMTP model is of two types:

1. End-to-end method
2. Storage and Transfer Methods

The end-to-end model is used for communication between different organizations while the store and search approach is used within an organization. The SMTP client that wants to send the mail will contact the destination SMTP server directly to deliver the message to the destination. The SMTP server will keep the message to itself until it is successfully copied to the recipient's SMTP.

The SMTP client is the client that initiates the session, let's call it the SMTP client and the SMTP server is the server that responds to the session request, and let's call it the SMTP receiver. The client's SMTP will initiate the session and the receiver's SMTP will respond to the request.

D. SYSTEM SPECIFICATION

HARDWARE SPECIFICATION

- Processor: INTEL I5 (9th generation)
- RAM : 4 GB RAM
- Hard disk: 1TB
- Monitor: 20' color monitor

5.2 SOFTWARE SPECIFICATION

- Front end : GUI
- Back end : python
- Software tool used: PyCharm
- Platform: Windows 8

5.3 HARDWARE COMPONENTS

- Nano controller
- Power supply
- LCD
- Radio sticker
- Buzzer
- IR sensor

IV. CONCLUSION

Baby swapping/kidnapping are very essential troubles throughout the world. Face detection and radio sticky label generation were evaluated to lessen the range of such incidences. This study plays an initial observation on the use of computerized face reputation for figuring out unauthorized persons. A facial landmark set of rules has been proposed that extracts neighborhood texture functions from specific stages of Gaussian smoothed snapshots. Experimental consequences on a database of snapshots display that computerized face reputation for legal is feasible. The radio stickers generation is likewise being applied to this project.

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