

A Real Time System to Monitor Infants

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Abstract - Newborn baby must be monitored continuously. The system is utilized to minimize human timing with continuous monitoring and using new advent of technology to help with monitoring of baby. This system is utilized to give a warm situation to babies. The system uses technology of Iot with Deep learning to run through monitoring of baby. The system uses IoT sensors to monitor the temperature around baby and moisture level on bedding of baby. As well it involves checking the crying of baby and monitoring sleep mode and wakeup mode of baby. The whole system as one gives alert to parents with any changes in normal conditions of baby. The same can be used in incubator to monitor the newborn baby. The proposed system proto- type is fabricated and tested to prove its effectiveness in terms of cost and simplicity and to ensure safe operation to enable the baby-parenting anywhere and anytime through the network. Finally, the baby monitoring system is proven to work effectively in monitoring the baby's situation and surrounding conditions according to the prototype.

I. INTRODUCTION

At present, female participation in the workforce in the industrialized nations has greatly increased, thereby affecting infant care in many families. Both parents are required to work due to the high cost of living. Working parents cannot always care for their babies. They either send their babies to their parents or hire a baby caregiver while they are working. Some parents worry about the safety of their babies in the care of others. A baby monitoring system that can monitor the babies' condition real time is proposed to solve these problems. A baby monitoring system consisting of a video camera and microphone without limitations of coverage. It can send data and immediately notify the parents about urgent situations, thereby shortening the time needed to handle such scenarios.

Internet of Things (IoT) simply refers to a network of objects that are connected to the internet. It provides devices with the ability to transfer sensor data on the

Internet without requiring intervention. The IoT encompasses many devices and is growing at a rapid rate, because it is such a broad category. A forecast states that in 2019, approximately 26.66 billion IoT devices will be active; by 2025, 75 billion IoT devices worldwide will be available and wirelessly connected to the Internet. Among these connected devices, millions of wearable sensors are widely used in healthcare applications.

The total global spending on the IoT in 2016 was 737 billion dollars and was projected to reach 1.29 trillion dollars in 2020. IoT is a prominent field that will increase and grow exponentially. The function of IoT is 1 'A Real time system to monitor Infants' control, real-time monitoring, and perform autonomy or autonomous function and optimization. Perhaps one of the main reasons why the IoT is extremely large is that it aims to make life more convenient, and people are more likely to invest in things that make their lives easier. Accordingly, the number of IoT applications continues to increase in different fields. In this study, IoT is integrated into our baby monitoring system to achieve a rapid response time and to provide a greater sense of security for parents. It is used to gather data read by the sensors and uploads these data to the server. It also receives commands given by the user to perform specific tasks via the server.

II. OBJECTIVES

1. *This prototype model solves the problem of time and energy usage of busy parents.*
2. *The prototype model of the room contains a sound sensor, frontal face recognition technique, temperature sensor and other electronic devices connected with IOT.*

III. RELATED WORK

1. Face Recognition using Dimensions and Distances

The system proposes a face recognition-based mobile attendance management which is flexible and can be used anytime anywhere. The system performs in real time with smart user-friendly device which helps to reduce the cost of equipment to be used in system.

2. IoT-BBMS: Internet of Things-Based Baby Monitoring System for Smart Cradle

A smart cradle with a baby monitoring system over IoT has been designed and fabricated to monitor a baby’s vital parameters, such as crying condition, humidity, and ambient temperature.

3. Facial Recognition with Feature Extraction

This system encourages use of feature detection for facial recognition. Attendance is ritual in classroom which consumes time and money on equipment used for taking attendance.

4. Strategy of Face recognition with Eigen Face, PCA

There are different strategies accessible for face recognition like Eigen face, PCA and LDA hybrid algorithm. The proposed automated attendance system using face recognition is a great model for marking the attendance of students in a classroom.

5. Mahala Nobis method for classification of extracted facial feature

The use of reconstruction algorithms from 2D images to 3D forms that are used as a database in face recognition. In this study, a study of facial recognition using an approach to the development of 2D to 3D image reconstruction models using Convolutional Neural Network (CNN) and the use of PCA are used as the feature extraction method.

IV. SYSTEM DIAGRAM

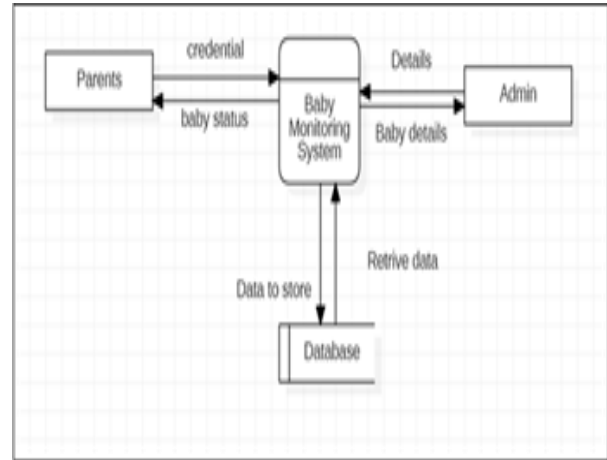
The system includes two sensors for monitoring body temperature and moisture level. One sound sensor helps to detect the crying sound of baby. camera is attached to study sleeping condition of baby.

ESP8266 is used for real time monitoring which helps for continuous monitoring of baby. Real time alerts are given to parents on SMS with any change in condition of monitoring of baby.

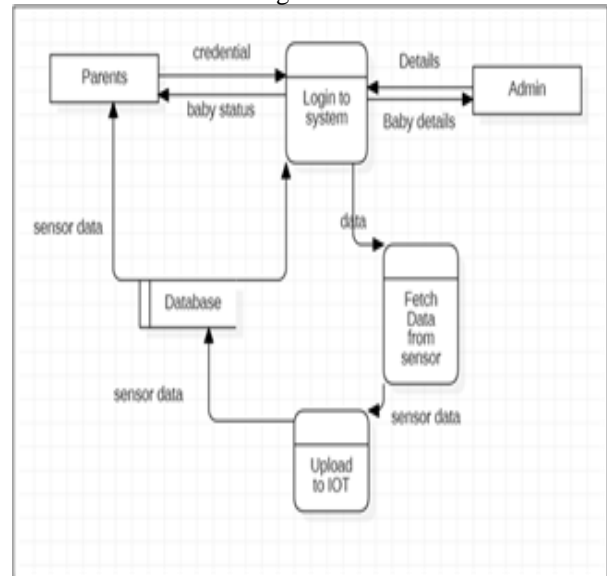
Data Flow Diagram

A data flow diagram (DFD) is a graphical representation of the “flow” of data through an information system, modeling its process aspects. A DFD is often used as a preliminary step to create an overview of the system, which can later be elaborated. DFDs can also be used for the visualization of data processing.

1. Level 0 Data Flow Diagram



2.Level 1 Data Flow Diagram



V. PROPOSED SYSTEM

The system is designed to monitor baby with the use IoT as well as Deep Learning.

1. IOT

The Internet of Things, or IoT, is a system of interrelated computing devices, mechanical and digital machines, objects, animals or people that are provided with unique

identifiers (UIDs) and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction.

- In proposed system DTH11 sensor is used to sense humidity and temperature of system.
- One heating element and a cooling fan is used to control perfect temperature inside the monitoring system by sensing DTH11 sensor.
- Battery section is used to provide power supply to the system. Status of the system can be displayed on LCD or send to server .

2. Deep Learning

Deep learning is an AI function that mimics the workings of the human brain in processing data for use in detecting objects, recognizing speech, translating languages, and making decisions. The Application of Deep Learning varies from vision to natural processing languages.

- In proposed system deep learning is used for facial recognition of baby.
- CNN helps to know crying voice of baby. ‘Baby Care Monitoring System Using IoT’
- Deep Learning also helps to know the wake up mode and sleep mode for baby depending on facial feature.

3. Modules

- Temperature Humidity Detection: The IoT Sensors are used to detect the temperature and humidity around baby. If result is out of normal. The parents are notified about same.
- Crying Detection: Deep Learning CNN module is used to detect the crying voice of baby. If voice is heard parents are notified about same.
- Wakeup Detection: Deep Learning CNN is used for facial recognition of baby to check whether the baby is sleeping or waken up. The Same is notified to parents.

2. Mathematical Model

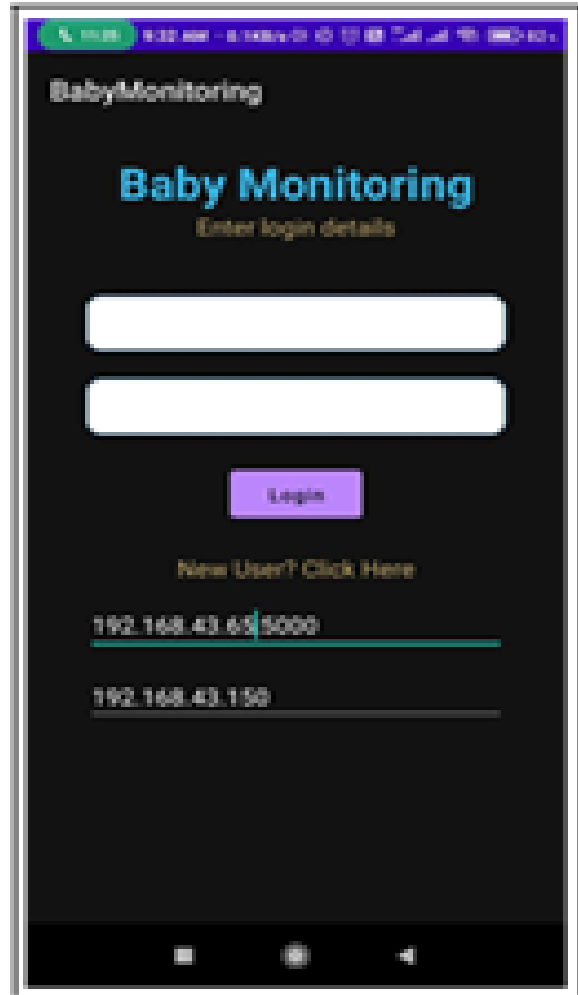
- Let S be the whole System,
- $S = \{I, P, O\}$
- I = Input
- P = Procedure
- O = Output
- $I = \{I0, I1, I2, I3, I4, I5\}$
- I0 =Temperature of Baby
- I1 = Moisture of Baby

- I2 = Fan Status
- I3 = Crying Voice
- I4 = Face Video
- I5 = parent Details
- $P = \{P0, P1, P2, P3, P4\}$
- P0 = Detect Fan Status)
- P1 = Sense temperature , moisture
- P2 = Detect expression of face
- P3 = Classify Crying Face
- P4 = Detect Sleeping Face
- $O = \{O0, O1, O2, O3\}$
- O0 = Classify Face
- O1 = Temperature Status
- O2 = Moisture Status
- O3 = Alert Parent

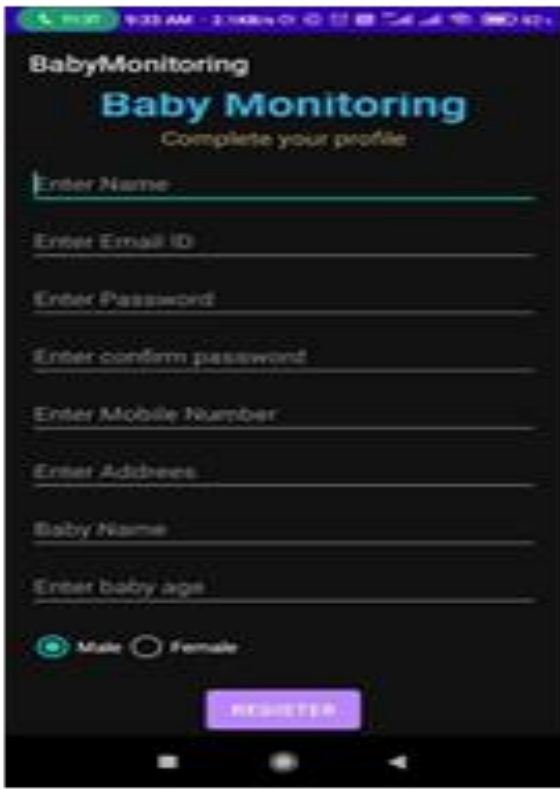
VI. RESULT AND DISCUSSION

Application Result

- App Interface



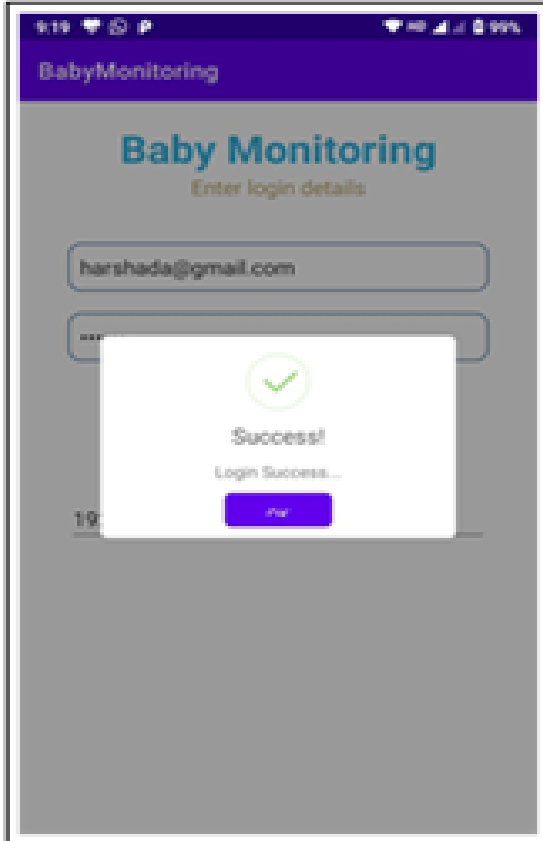
• Registration Screen



• Dashboard

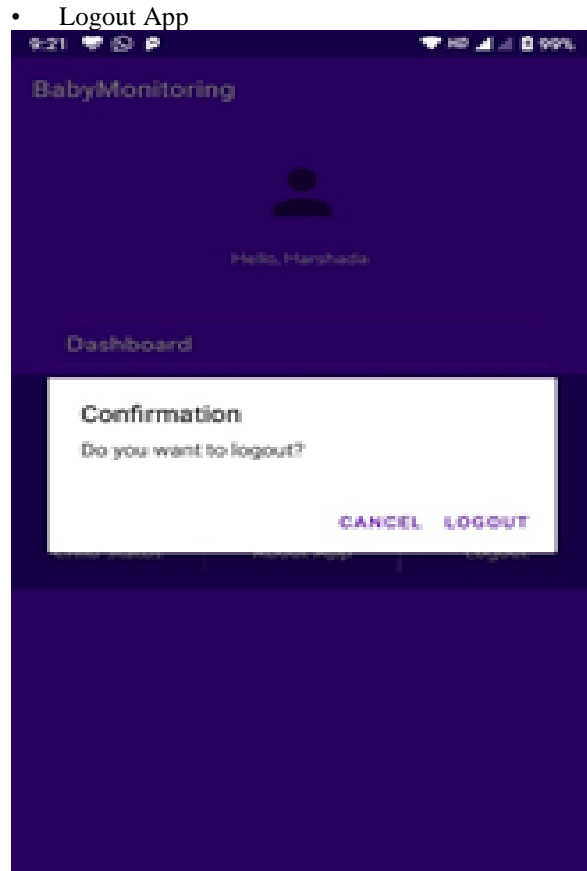


• Login Success Screen



• About App





VII. CONCLUSION

Taking everything into account, this work proposed a model of a newborn baby monitoring system that is reasonable to be utilized for facility in the rural region. A moderate, transportable, and vitality sparing newborn baby monitor was effectively created through this work. The system could give an appropriate and favorable condition which in the long run ready to avert baby that was conceived in the country region from hypothermia condition. They will have the capacity to get the essential care inside a brief period amid the basic condition, thus reducing the mortality case among them.

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