

# “Smart and Secure IoT based Child Monitoring System”

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**Abstract:-** IOT is getting upgraded day by day simultaneously its security is also upgraded. In this proposed system, we are mainly focusing on child remote monitoring system also we are using the radar devices as well as obstacle sensors which will detect the alert when the child enters the danger zone or else he/she is approaching towards harmful object then alert will be given to the caretaker through the mobile using an alarm or notification. For sensing purpose we are using Waterproof Ultrasonic Obstacle Sensor which are placed in the simple locket that is given to the baby so that locket will give alert to the caretaker through the mobile and for battery backup we are using solar panel through which the energy will get stored in the care taker's shoes and this energy will be dependent on the steps covered by the care taker. In this proposed system a general method for rapid peak detection is used for depth/height measurement. First, the signals curve is equal divided and maximum and minima values in each segmentation are collected. The repeated maximum and minima values are removed and all fake peaks are merged in the case of ensuring true peaks remained. Experimental results showed that: compared with traditional methods, the proposed method is more accurate and faster in peak detection, and suitable for a variety of waveforms.

**Keywords:-** *Internet of Things (IOT); peak detection algorithm for vital sign detection using radar sensors algorithm.*

## Introduction

Among the enormous applications enabled by the IOT(Internet of Things), smart and secure monitoring system is a particularly important one. IOT is getting upgrading day by day simultaneously its security is also important. As IOT is the vast concept it includes many types of subtopics in which we are working on the small project named as “Smart and Secure IOT Based Child Monitoring System”. Main motive of this project is to solve the problems of baby guardian and also secure the baby from entering the danger zone. As soon as the baby enters the danger zone the guardian will be notified through the various methods either by SMS system or via the warning buzzers. Warning buzzers are also bifurcated in three types according to the danger faced by the baby. Warning buzzers are also of different colored LED's. When the baby is near the danger zone it will alert the guardian by blinking with red LED and if the baby is far away from the danger zone then yellow LED will blink similarly when baby is in intermediate of the danger zone green LED will specify the guardian. This project includes radar sensors, Wi-Fi module, image processing, temperature sensors and display device. For operating purpose we are connecting our device to the baby and alerts as well as notifications will be given to the guardians display device.

## Literature Review

[1] Binu P K, Akhil V, Vinay Mohan“Smart and Secure IoT based Child Behaviour and Health Monitoring System using Hadoop”, 16 Sept. 2017, IEEE:

**a. Methodology:** This system uses hadoop and C4.5 algorithm for predicting the disorders using the collected data.

**b. Findings and Application:** It monitors the baby and gives an update of his health and mind status of the children.

**c. Remark (Future scope and conclusion):** Including more health based sensors in the system will help in the health monitoring and guided with medicinal care in case of any abnormality.

[2] Sagar S Bachhav, Dr.Nilkanth B Chopade, “IoT Based HealthyBaby Cradle System”, 2018, IJRREE:

**a. Methodology:** This system uses Internet of Things, Amazon Web Service, Smart Baby Cradle and provides parents a smart system help these parents monitor and comfort the baby.

**b. Findings and Application:** Cradle system is a device which is used instead of caretaker which soothes a child by playing music and by speaking with him.

**c. Remark (Future scope and conclusion):** The present work reduces the human effort and particularly mother's stresses in working times. The overall mechanism is mobile which allows easy movement from room to room.

[3] Chinlun Lai, Lunjyh Jiang, "An Intelligent Baby Care System Based on IoT and Deep Learning Techniques", in the year 2018, international scholarly & scientific research & innovation.

**a. Methodology:** This system uses Baby care system, internet of things which works for the infant care work. It also uses deep learning techniques.

**b. Findings and Application:** This device monitors the baby's conditions such as position, body's temperature, and posture through deep learning which helps parents to know the baby's condition.

**c. Remark (Future scope and conclusion):** The assistance of the proposed baby care system, it can detect the potential dangerous events immediately and thus prevent the baby from possible harm or death

[4] M Nandini Priyanka, S Murugan, K N H Srinivas, T D S Sarveswararao, E Kusuma Kumari, "Smart IOT Device for Child Safety and Tracking" June 2019, Published By: Blue Eyes Intelligence Engineering Retrieval Number & Sciences:

**a. Methodology:** This system uses IoT, Children Safety using GPS, GPRS Sensors. It also includes Serial camera and LinkIt ONE board.

**b. Findings and Application:** This system is developed for the guardian to locate the exact location of their child and gives child health information through message.

**c. Remark (Future scope and conclusion):** This research demonstrates Smart IoT device for child safety and tracking helping parents to locate and monitor their children. The main scope for this is to ensure the device which gives total safety of child.

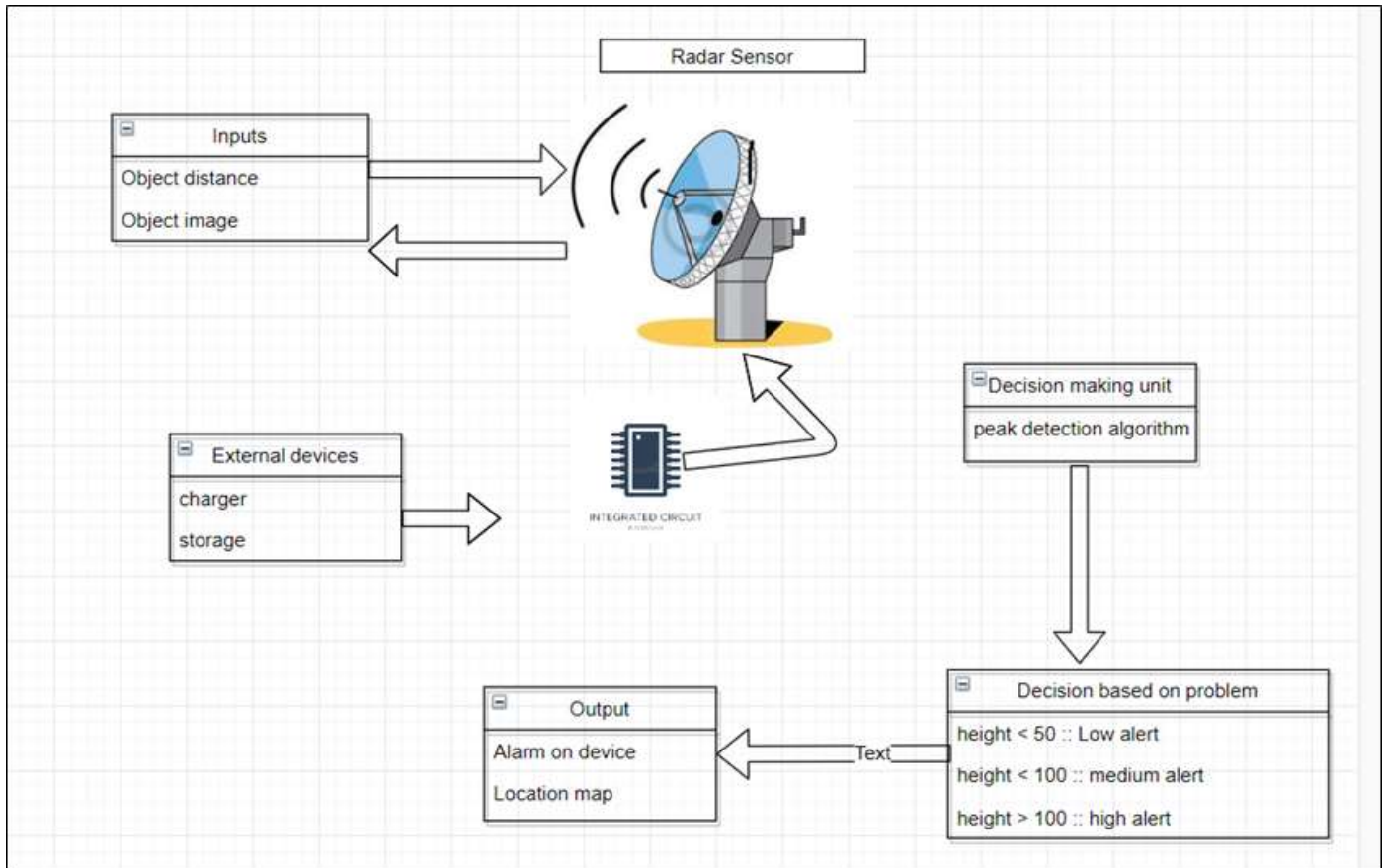
[5] Aslam Forhad Symon, Nazia Hassan, Humayun Rashid, Iftekhar Uddin Ahmed, 1S M Taslim Reza. "Design and Development of a Smart Baby Monitoring System based on Raspberry Pi and Pi Camera" sept 2017, IEEE:

**a. Methodology:** The Raspberry Pi B+ module is used to control system of the hardware. MIC is used to detect baby's crying, PIR motion sensor is incorporated to detect baby's movement.

**b. Findings and Application:** This system helps the busy parents to detect the child motion and sound simultaneously it also displays the position of child on the display monitor

**c. Remark (Future scope and conclusion):** An automatic baby monitoring system is the best solution for parents to observe their babies in this busy era.

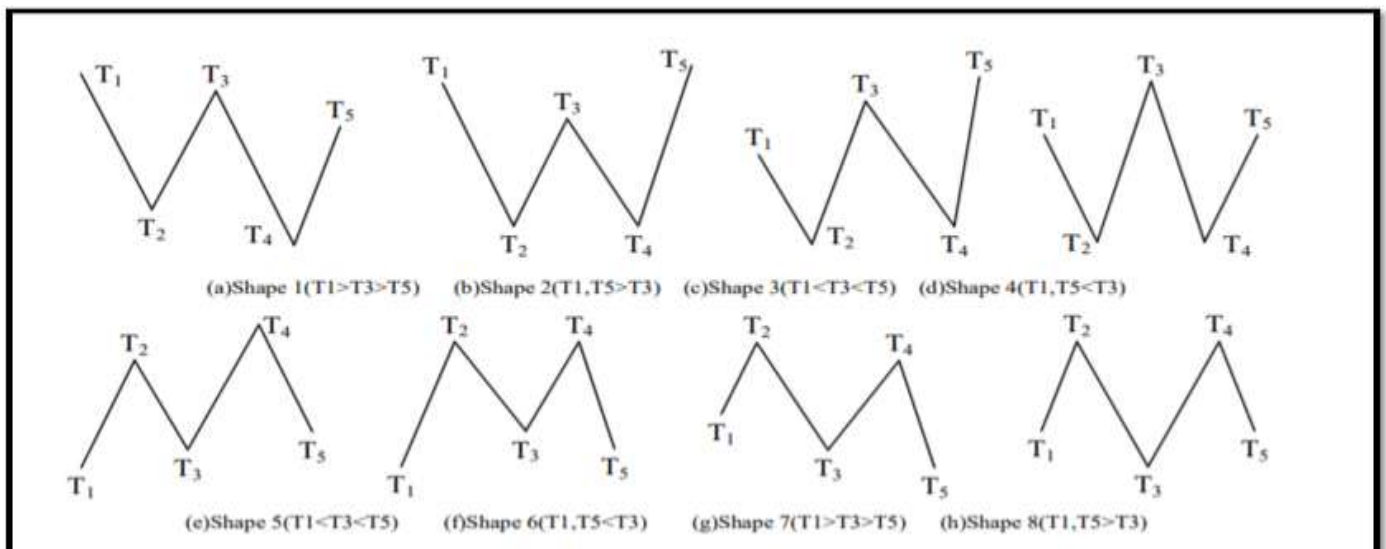
**Relative works:**



**Figure1:-System architecture**

This architecture shows the working flow of the system. When the baby is on height then radar sensor takes the distance between the baby and the object .then decision making will take place. When the depth is below the height 50, then low alert will be given to the caretaker and when the height is greater than 50 then high alert will be provided to the caretaker for the alert purpose the display device like mobile, tablet etc.

**Methodologies:**



**Algorithm:**

Step 1: Divide signals curves  $\{X_i\}$  and collect maximum and minimum value into set  $\{T_i\}$ .

Step 2: Remove all coincident points in set  $\{T_i\}$ .

Step 3: Search in  $\{T_i\}$  to find shapes of class 1-5, and process all matched shapes until all shapes of class 1,2 are removed and all shapes of class 3,4,5 satisfy the following conditions:  $\text{Dis}(T_1, T_3) \geq \beta$  and  $\text{Dis}(T_2, T_4) \geq \beta$  and  $\text{Dis}(T_3, T_5) \geq \beta$

Step 4: After processing of the previous step, the rest maximum points of  $\{T_i\}$  are exactly target peak and the rest minimum points of  $\{T_i\}$  are exactly target troughs. The results of calculating the distribution of number, height, distance of maximum/minimum points are the requested number, height and width of peaks/troughs of target signals

**FUTURE SCOPE AND CONCLUSION**

For implementing the IOT devices which ensures the complete solution for baby safety problems. A new idea to implement an automatic system for baby monitoring to remove the anxiety of the parents. This project proposes Smart IOT Devices for child safety and tracking helps the guardian/parents to locate and monitor the baby. If any abnormal values are read by the sensors then an SMS is sent to the guardian/parents mobile.

**ACKNOWLEDGEMENT**

This paper presents a general method for rapid peak detection. First, the signals curve is equal divided and maximum and minima values in each segmentation are collected. The repeated maximum and minima values are removed and all fake peaks/ troughs are merged in the case of ensuring true peaks/ troughs remained. Experimental results showed that: compared with traditional methods, the proposed method is more accurate and faster in peak detection, and suitable for variety waveforms.

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- [6] John Georg, Johnson "Radar Applications in Level Measurement, Distance Measurement and Nondestructive Material Testing", 12 sept, IEEE paper
- [7] Yanpeng Wu<sup>1, 3</sup>, Xiaoqi Peng<sup>1, 2</sup>, Jianzhi Zhang<sup>1</sup> and Ye Zhang<sup>1</sup> "A rapid peak detection algorithm", june 2014, Journal of Chemical and Pharmaceutical Research.