IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 5, November 2025
Impact Factor: 7.67

NXT-GEN Parenting Assistant Robot

Aruna Kumara. B[1], R Shashidhar[2], Pruthvi Raj D S[3], R Raghavendra[4], Rohit Mehta[5]
[1,2]Professor, CS&E Dept, Proudhadeveraya Institute of Technology, Hosapete, Karnataka, India
[3,4,5]Students, CS&E Dept, Proudhadeveraya Institute of Technology, Hosapete, Karnataka, India

Abstract: *This paper presents the design and development of the Nxt-Gen Parenting Assistant Robot, an IoT-based health-monitoring and support robot intended to assist parents in ensuring child safety. The system integrates temperature and heart-rate sensors, Raspberry Pi 3B+, Bluetooth control, automatic navigation, and IoT-based alert features through Telegram and ThingsView. The robot continuously monitors vital parameters and provides real-time updates to parents, improving awareness and child well-being.*

Keywords: Raspberry Pi 3B+, Parenting Robot, Child Monitoring, Temperature Sensor, Heart-Rate Sensor.

I. INTRODUCTION

The demand for automated child-monitoring systems has increased as parents balance professional and personal responsibilities. Traditional monitoring systems only capture audio or video and lack health tracking capabilities. The proposed robot enables real-time monitoring of temperature and heart rate along with movement assistance.

II. LITERATURE SURVEY

Louie et al. [1] investigated parental attitudes, trust, and comfort toward robots caring for children with developmental disabilities. Their findings indicated generally neutral attitudes among U.S. parents, with the highest comfort observed for robots acting as teaching assistants, and the lowest comfort for robots functioning as bus drivers. Trust in robots showed a medium positive correlation with comfort, whereas negative attitudes strongly reduced acceptance.

Li [2] explored the navigation algorithms for gait-assisted mobile robots designed for medical rehabilitation. The study emphasized incorporating ergonomics and human factors to improve usability for patients recovering from neurological disorders. A hybrid navigation algorithm was proposed to ensure safety and effectiveness in dynamic environments.

Barnes et al. [3] presented the "Child-Robot Theater" program, integrating robotics with arts to enhance informal steam education among elementary school children. Their longitudinal study demonstrated positive impacts on engagement, creativity, and learning outcomes when robots were used in educational theater settings.

Aryananda et al. [4] developed an online and unsupervised face-recognition system for humanoid robots, enabling personalized social interactions. This system allowed robots to recognize individuals in real-time, contributing to long-term human–robot social relationships. Scassellati et al.

[5] examined the use of social robots in autism therapy, highlighting improvements in communication skills such as eye-contact and turn-taking. Robots provided structured and predictable interactions.

OBJECTIVES

- To continuously monitor child OBJ parameters such as body temperature and heart rate using integrated sensors for real-time analysis.
- To provide IoT-based remote monitoring by transmitting live sensor data to the ThingsView application for parental supervision from any location.
- To enable instant alert notifications through Telegram when abnormal health readings are detected, ensuring quick parental response.
- To incorporate dual operational modes, allowing both autonomous robot navigation and manual Bluetooth-based control for flexible operation.

DOI: 10.48175/IJARSCT-30067

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 5, November 2025
Impact Factor: 7.67

- To enhance child safety by creating a portable, low-cost, intelligent robotic system capable of assisting parents in daily care activities

III. SYSTEM DESIGN

Hardware Components

The hardware architecture of the Nxt-Gen Parenting Assistant Robot is centred around the Raspberry Pi 3B+, which functions as the primary processing unit responsible for data acquisition, computation, and communication. A temperature sensor is integrated into the system to measure the child's body temperature continuously, while a heart-rate sensor captures the pulse rate in real time. For mobility, the robot utilizes a motor driver module interfaced with DC motors, enabling autonomous as well as user-controlled navigation. A Bluetooth module is included to provide manual control capabilities, allowing parents to operate the robot remotely through a mobile device when required. The entire system is powered through a rechargeable battery pack, ensuring portability and uninterrupted operation within indoor environments.

Software Components

The software framework of the system is implemented using Python on the Raspberry Pi OS environment, enabling seamless integration of sensors, data processing algorithms, and communication modules. The robot employs the ThingsView IoT dashboard to transmit and visualize real-time physiological data such as temperature and heart rate, providing parents with constant access to health information. Additionally, the Telegram Bot API is utilized to deliver instant alert notifications whenever abnormal sensor readings are detected, ensuring timely parental intervention. For manual control operations, the system incorporates a Bluetooth controller application, enabling issue movement commands directly to the robot through a smartphone interface.

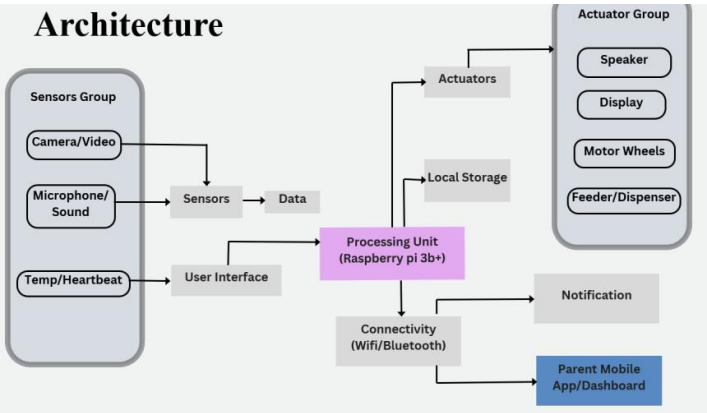


Fig: Flow diagram.

IV. RESULTS AND DISCUSSION

The system was tested in multiple indoor scenarios.

Key outcomes:

- Sensor Accuracy: Temperature and heart rate readings showed high consistency.
- IoT Alerts: Telegram notifications were triggered within 2–4 seconds.
- Mobility: Robot movement was stable in both auto and manual modes.
- ThingsView Dashboard: Real-time vital readings displayed without delay.

The integration of movement, vitals monitoring, and alerts provided a powerful parenting assistant solution.

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 5, November 2025
Impact Factor: 7.67

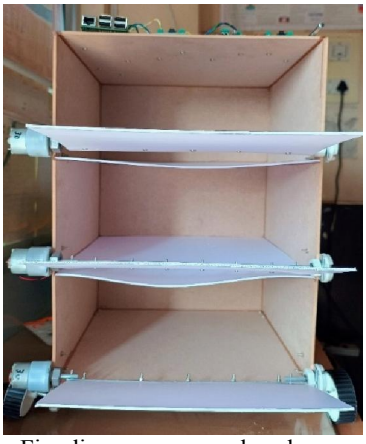


Fig: dispenser open, closed

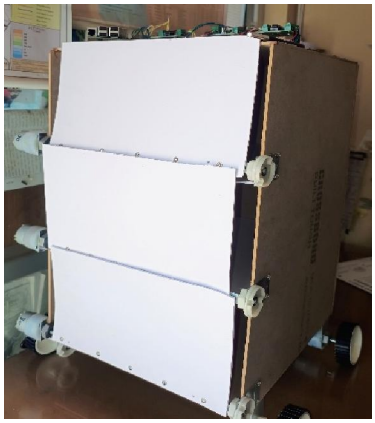
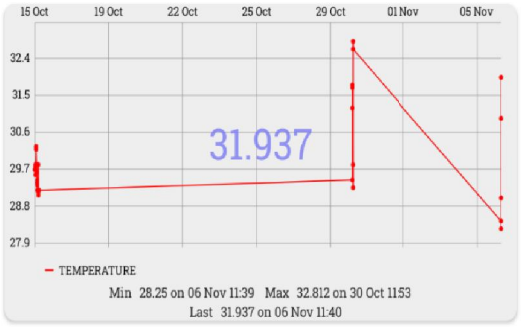
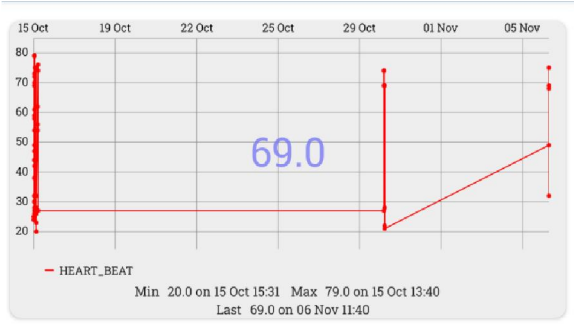


Fig: Temp. and Heart beat sensor result





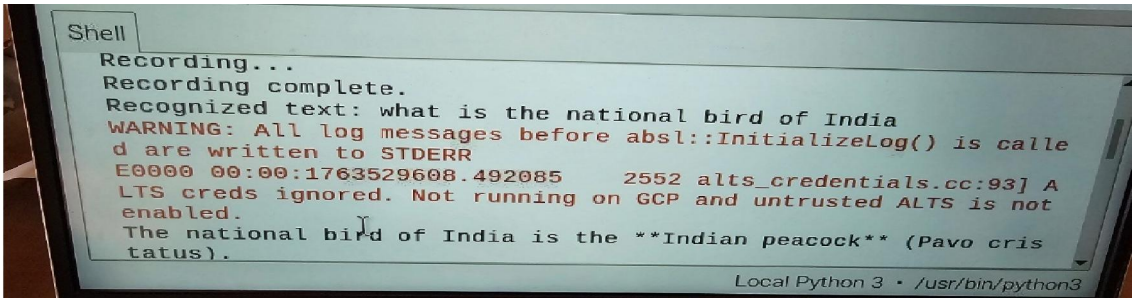


Fig: Gemini chat bot

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 5, November 2025
Impact Factor: 7.67

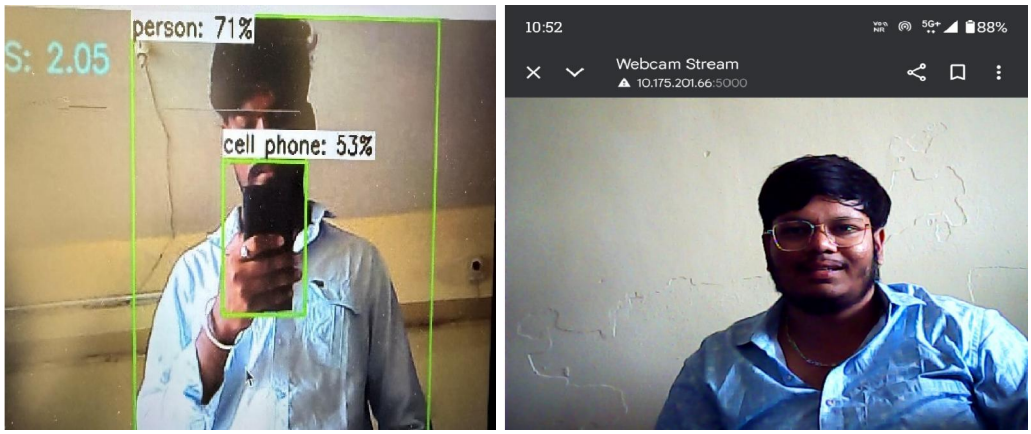


Fig: Cell phone detection and live camera feed

V. CONCLUSION

The Nxt-Gen Parenting Assistant Robot demonstrates a significant step forward in merging robotics, IoT, and health-monitoring technologies to support modern parenting needs. By integrating real-time temperature and heart-rate tracking, automated navigation, IoT dashboards, and instant alert mechanisms, the system provides a comprehensive safety framework for children in both home and institutional environments. The results show that the robot consistently delivers accurate sensor data, reliable mobility, and fast alert notifications, ensuring that parents remain informed and responsive at all times. Its dual operating modes autonomous and Bluetooth-based manual control add flexibility and ease of use, making it adaptable to various daily scenarios. Overall, this project highlights the potential of low-cost, portable robotic systems in enhancing child safety, reducing parental workload, and paving the way for future advancements such as AI-based behavior detection, advanced obstacle navigation, and expanded healthcare applications.

REFERENCES

[1] Boor-Chun Chen, Chu-Song Chen and Winston H. Hsu. “Cross-Age Reference Coding for Age-Invariant Face Recognition and Retrieval”. Institute of Information Science, Academia Sonica, Taipei, Taiwan National Taiwan University, Taipei, Taiwan, (2014): pp. 768-783. (2014)

[2] Sativa Channagoudar, Dr. Srikanta Murthy. “Low Resolution Age Invariant Face Recognition Based on LBP Using Modified Deep Convolution Neural Network Architecture”. Research Scholar, S. T. J. I. T, Ranebennur-581115, India, Principal, N.C.E & T, Bangalore - 562164, India. pp.2897-2904. (2017)

[3] Whiffing L., et al., “A Discriminative Model for Age Invariant Face Recognition,” IEEE Transactions on Information Forensics and Security, vol. 6, no. 3, pp. 1028-1037(2011)

[4] D. Gong, et al., “Hidden Factor Analysis for Age Invariant Face Recognition,” IEEE International Conference on Computer Vision, pp. 2872-2879 (2013)

[5] Gang, X., Zhou, Z.H., Smith-Miles, K.: Automatic age estimation based on facial aging patterns. IEEE Transactions on Pattern Analysis and Machine Intelligence 29 (12), 2234–2240 (2007)