A SMART BABY CRADLE SYSTEM BASED ON IOT

Javlon Tursunov
a final-year Master's student at
Tashkent University of Information Technologies
named after Muhammad al-Khwarizmi.

Annotation: this thesis proposes the development of a software and hardware complex for a Smart House element, specifically a Smart Baby Cot. The project involves the use of heuristic models and incorporates both Wi-Fi and GSM modules to extend the range and facilitate communication. The baby cot can be controlled through an Android app, offering both manual and automatic control options, making it a truly smart device. This work fills a research gap as most Smart House and IoT projects do not incorporate the use of both Wi-Fi and GSM modules. To support the proposed work, this literature review explores the latest developments in Smart House Development and related sensors. Through the review of some of the latest references, the potential benefits of the proposed Smart Baby Cot are highlighted, including increased convenience and control through the use of mobile devices and the ability to facilitate communication through the use of both Wi-Fi and GSM. Overall, this work presents a novel approach to Smart House elements, specifically in the area of baby monitoring, and holds significant potential for improving the quality of life for parents and caregivers.

Keywords: Heuristic models, GSM communication, Wi-Fi communication, Android app development, Baby care, Sensors, Real-time monitoring

Introduction. Smart House Development has gained significant attention in recent years due to the increasing demand for comfortable and safe living spaces. Smart House systems provide solutions to modern challenges by creating automated and intelligent environments that enhance energy efficiency, safety and convenience. These systems typically consist of interconnected devices that can communicate with each other through the internet or local networks. In this thesis, we propose the development of a software and hardware complex that uses heuristic models to create a Smart House system that can take care of a baby in a safe and comfortable environment. The system incorporates Wi-Fi communication and GSM modules to facilitate communication and extend the range of the system.

Literature review. Based on the research that has been carried out so far, it is evident that there is a growing interest in the development of smart cradle systems utilizing the Internet of Things (IoT) technology. The IoT-BBMS system proposed by Jabbar [1] is an example of a smart baby monitoring system that utilizes a wireless network of sensors and cameras to monitor the baby's status and transmit the data to a cloud-based platform for real-time monitoring. Similarly, the smart baby cradle system proposed by Alswedani and Eassa [2] is an IoT-based system that incorporates sensors to monitor the baby's heart rate, temperature, and humidity levels. Sentiment analysis has also been proposed as a method for controlling smart cradles. The smart crib control system proposed by Yangala et al. [3] utilizes sentiment analysis to control the cradle's motion and music based on the baby's mood. Furthermore, several studies have proposed the development of smart cradles using IoT technology. Sanjana et al. [4] proposed the SMART CRADLE system that incorporates sensors to monitor the baby's vital signs and a mobile application for monitoring and controlling the cradle. Tupkar et al. [5] proposed an IoT-based smart baby cradle that incorporates sensors to monitor the baby's vital signs, and a mobile application for monitoring and controlling the cradle. In terms of reviewing the literature, Karkhanis et al. [6] conducted a review of the smart cradle system, highlighting the importance of developing a system that can monitor the

baby's vital signs and control the cradle's motion to provide a safe and comfortable environment for the baby. Similarly, Muradnar et al. [7] conducted a review of the smart baby cradle monitoring system, emphasizing the need for developing a system that can monitor the baby's status and provide timely alerts to parents. One of the research gaps in this area is the lack of a standardized protocol for data transmission and analysis in smart cradle systems. Additionally, there is a need to incorporate more advanced sensors to monitor the baby's status accurately. Despite these gaps, the proposed systems demonstrate significant achievements in providing real-time monitoring and control of smart cradles using IoT technology. Another recent development in Smart House Development is the use of voice control systems, which allow users to control various devices in the house using their voice. Voice control systems have become increasingly popular due to their convenience and ease of use. For instance, users can control the lighting, heating, and security systems in their house by simply issuing voice commands.

Proposed work. The proposed work aims to develop a comprehensive Smart House system that can cater to the needs of a baby in a safe and comfortable environment. To achieve this, the system will be equipped with an Android app that can be used to control the baby cot automatically or manually, based on the user's preference. The system will incorporate various sensors such as temperature, humidity, and air quality sensors to monitor the baby's environment in real-time. The smart baby cot will also feature a motion sensor and other sensors to detect if the baby is crying or not, allowing the system to automatically swing or play music to comfort the baby. The Android app will enable the user to control the swing's level and set the time during which the baby cot should swing. To ensure seamless communication, the system will use both Wi-Fi and GSM modules. If the user is out of Wi-Fi range, the system will notify the user via the GSM network, and the user can still communicate with the system and control the smart baby cot remotely. Overall, the proposed system will fill the research gap as most Smart House and IoT projects do not incorporate the use of Wi-Fi. The combination of Wi-Fi and GSM communication will facilitate seamless communication and extend the range of the system, making it more reliable and efficient.

Conclusion. In conclusion, this work proposes the development of a Smart House system for baby care that utilizes heuristic models and incorporates Wi-Fi and GSM communication to extend the range and facilitate communication. The system will allow for real-time monitoring of the baby's environment through various sensors and will provide remote monitoring and control through an Android Studio software. The proposed system aims to bring convenience to parents and caregivers by providing a safe and comfortable environment for babies. The scientific novelty of this work lies in the integration of Wi-Fi and GSM communication, which fills a research gap in existing Smart House and IoT projects that only utilize one type of communication. Additionally, the use of heuristic models will enable automatic control of the baby cot, providing convenience and ease for parents and caregivers. The benefits of this proposed system include the ability to remotely monitor and control the baby's environment, providing peace of mind to parents and caregivers. Additionally, the automatic control features of the system will provide convenience and ease for parents, especially for those who may have limited mobility or may not be able to physically attend to the baby at all times. The system will also promote a safe and comfortable environment for babies, which can contribute to their overall health and wellbeing. In summary, this proposed work offers a novel and convenient solution for baby care, utilizing the latest developments in Smart House and IoT technology. The system aims to provide a safe and comfortable environment for babies while promoting ease and convenience for parents and caregivers.

References:

1. Jabbar, W. A. (2018). IoT-BBMS: Internet of Things-Based Baby Monitoring System for Smart Cradle. International Journal of Engineering and Technology (UAE), 7(4), 231-236.

2. Alswedani, S. A., & Eassa, F. (2018). A Smart Baby Cradle Based on IoT. International Journal of Computer Science and Network Security, 18(6), 84-91.

3. Yangala, S., Bodla, S., & Reddy, Y. P. (2018). Smart Crib Control System Based on Sentiment Analysis. International Journal of Pure and Applied Mathematics, 118(24), 1-7.

4. Sanjana, B., Reddy, Y. P., & Smruthi, Y. (2019). SMART CRADLE. International Journal of Engineering and Advanced Technology, 8(5), 527-531.

5. Tupkar, A. B., Chahare, P., Rade, S., Wakade, R., & Bahirseth, S. (2019). Development of IoT Based Smart Baby Cradle. International Journal of Scientific Research in Computer Science, Engineering and Information Technology, 4(4), 1-9.

6. Karkhanis, D., Kendre, Y., Hande, S., & Dhawale, S. (2019). A Review Paper on "Smart Cradle System". International Journal of Engineering and Advanced Technology (IJEAT), 8(6S), 523-525.