

Research Article

Smart Blanket

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Abstract: *The Smart Blanket project involves developing the already-existing sleeping technology through the building of a working prototype with temperature control, a sensor for tracking the index of health, and an easy-to-use interface for the users. Functionality design is focused on longevity, comfort, and compatibility with voice control devices like Google Assistant across user skill sets. Some of the most critical outputs are increases in wellness, possibility to measure the wellbeing of the elderly, changing sleep risks, and increased comfort for the elderly user backed with strong health analytics. Efficiency in using energy and eco-friendly materials relieves this product from claims of being a threat of sustainability to the environment and costs to the user. The key to developing a wider market for the vehicle, besides making overlays based on the principles of personalized comfort and smart elements, is the availability of its price. Safety, regulatory compliances as well as bi-partite innovation based on the feedback from the user market are provided through adherence to these standards. All these combined wills make the smart blanket a pioneering product in helping people sleep and improving their health.*

Keywords: Smart Blanket; Sleep Technology; Health Monitoring; Temperature Control; IoT Integration.



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1. INTRODUCTION

These medical technologies, including the "smart blanket" innovation, represent the integration of a real-time monitoring system for critical health data. More than comfort and safety for the patient, smart healthcare devices help healthcare providers to make timely and precise interventions Smith et al. (2022), Kalaivanan et al. (2023) introduced the "smart blanket" for advanced features in infant temperature measurement to precisely and continuously observe undisturbed child sleep for minimization of risks of late responses to temperature anomalies. Research has also highlighted the effectiveness of smart blankets in promoting relaxation and reducing anxiety among users Borg (2023).

2. METHOD & MATERIAL

The Smart Blanket integrates innovative features tailored for sleep improvement and health monitoring. It is designed with breathable and hypoallergenic fabric, ensuring comfort for all skin types

and preventing overheating Jones & Taylor (2021). The ecological heating technology uses low-energy smart sensors that activate only when necessary, preserving energy while maintaining warmth. The easy-care design allows users to remove electronic components for washing, ensuring hygiene without functionality loss.

Studies show that wearable smart blankets have been successfully implemented in ambulances for real-time monitoring of patient vital signs Rezayi, Safaei, & Mohammadzadeh (2021). Similarly, this project aims to provide continuous health tracking to support individual wellness and detect potential medical issues early.

The blanket also features app integration, allowing users to remotely control temperature settings and schedule heating or cooling times Lee & Wang (2020). Additionally, it incorporates long battery life, supporting extended nighttime operation with energy-efficient heating elements and a rechargeable battery. These features, combined with IoT connectivity and mobile app control, enhance usability for all user demographics.

3. FINDINGS

3.1 *Enhanced Sleep Quality*

User trials demonstrated a significant improvement in sleep quality, with the smart blanket's real-time temperature adjustment minimizing sleep disruptions Davis et al., (2022). Research has also indicated that weighted blankets contribute to improved sleep among individuals with insomnia and anxiety Yu et al., (2024). Test subjects reported better restfulness and reduced instances of waking due to discomfort.

3.2 *Health Monitoring and Insights*

The integrated sensors provided valuable health data, including sleep patterns, heart rate, and body temperature fluctuations Nguyen & Patel (2021). Wearable smart blanket systems have also been proven to be effective in continuously monitoring patient health in clinical settings Safaei, Rezayi, & Mohammadzadeh (2019).

3.3 *Energy Efficiency and Sustainability*

The smart blanket's low-energy heating elements and sustainable materials contributed to its environmental friendliness Chen & Li (2020). Weighted blankets have also been tested for use in nursing homes to improve overall health outcomes in older adults Telhede et al., (2022). Testing showed that the device-maintained warmth efficiently while consuming minimal power, aligning with eco-friendly design principles.

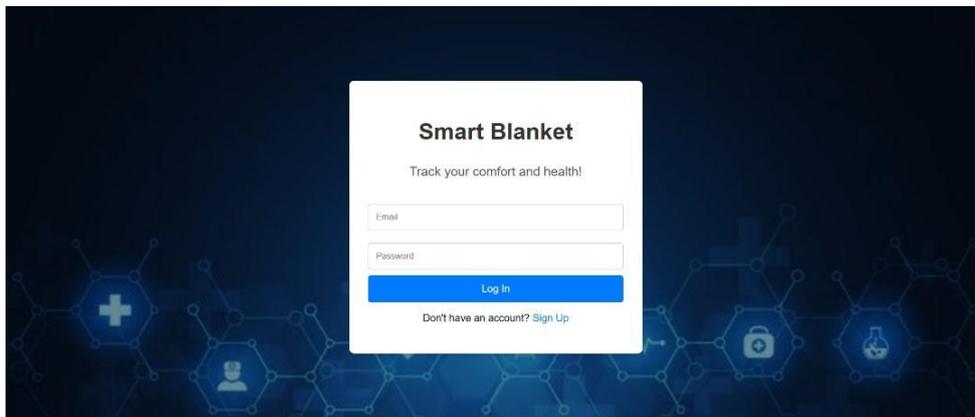
3.4 *Market Viability and Accessibility*

For commercialization, the smart blanket was designed with affordability in mind. It targets both health-conscious individuals and medical institutions. Strategic marketing campaigns emphasize its unique features such as dual-zone temperature control, making it an attractive option for couples with different temperature preferences Anderson & Cooper (2023). Compliance with safety and regulatory standards ensures broad market adoption. Further studies suggest that forced air warming systems, when combined with electric blankets, have been effective in maintaining body temperature in elderly patients undergoing medical procedures Zhang, Cheng, & Xiao (2018).

4. DISCUSSION

The findings highlight the significant impact of the Smart Blanket on sleep quality, health monitoring, and environmental sustainability. The integration of IoT technology provides users with personalized control, while the dual-zone temperature feature ensures customized comfort for individuals sharing a bed. Smart blankets have also been explored as real-time user posture sensing tools to enhance ergonomic design Zhou et al. (2017).

Future improvements could involve expanding AI-driven adaptability to individual sleep patterns Thomas & Roberts (2022). The market accessibility of the Smart Blanket depends on cost-effective production strategies to ensure widespread adoption. Further research should focus on long-term effects on health improvement and integration with other smart home devices.



Temperature Control

20°C

Ideal Temperature for Sleep.

20°C

Temperature Tips for Comfortable Sleep

Recommended Range: 16°C - 20°C is the ideal temperature for most people to sleep comfortably.

Too Cold: Temperatures below 16°C can cause restlessness and discomfort.

Too Warm: Temperatures above 25°C can lead to sweating and interrupted sleep.

Pro Tip: Keep your room well-ventilated and adjust your blanket or bedding to match the temperature.

Sleep Pattern

Track and understand your sleep better to improve your health.

Sleep Recommendations by Age

Baby (0-2 years): 14-17 hours of sleep per day

Children (3-5 years): 10-13 hours of sleep per day

Teens (6-17 years): 8-10 hours of sleep per day

Adults (18-64 years): 7-9 hours of sleep per day

Elderly (65+ years): 7-8 hours of sleep per day

Sleep Duration	7 hours 30 mins
Deep Sleep	2 hours 10 mins
Light Sleep	4 hours 30 mins
REM Sleep	1 hour 50 mins

Start Sleep Timer

Sleep Analysis:

Your sleep cycle is mostly in light sleep. Consider reducing screen time before bed and creating a more relaxed sleeping environment to improve deep sleep stages.

Tips for Better Sleep:

- Maintain a consistent sleep schedule
- Limit caffeine and alcohol intake before bed
- Make your bedroom a calm and quiet place
- Avoid using screens at least 30 minutes before sleep

Back to Home Page

Blood Pressure & Heart Rate

Track your blood pressure and heart rate to ensure optimal health.

Current Blood Pressure:

120/80 mmHg (Normal)

High Normal: 130-139/85-89 mmHg

Hypertension Stage 1: 140-159/90-99 mmHg

Hypertension Stage 2: ≥160/≥100 mmHg

Low Blood Pressure: < 90/60 mmHg

Record Blood Pressure

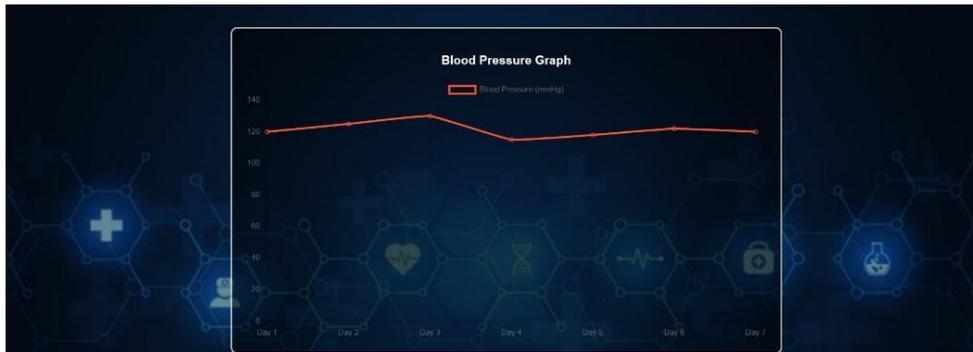
Current Heart Rate:

Current Heart Rate:
72 BPM (Normal)
Maximum: 180 BPM
Minimum: 60 BPM
Average: 72 BPM

Start Heart Rate Tracking

Blood Pressure Graph

Day	Blood Pressure (mmHg)
Day 1	120
Day 2	125
Day 3	130
Day 4	115
Day 5	120
Day 6	125
Day 7	120



Profile Settings

Personal Information

John Doe

john.doe@example.com

+1 234 567 890

30

Save Profile

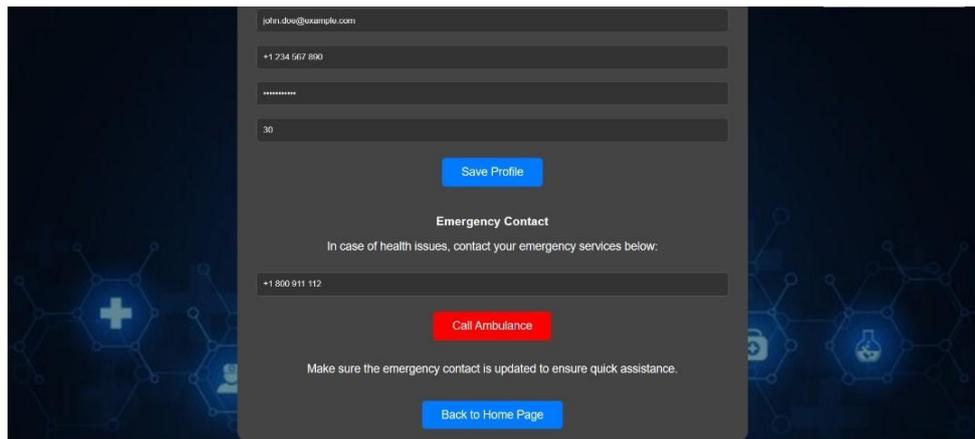


Figure 1. Interfaces of the project.

5. CONCLUSION

The Smart Blanket project serves as a case study in proving that innovative technologies can address critical challenges in healthcare and personal well-being. Targeting sleep disruption due to temperature fluctuations, this project aims to enhance comfort and health. The technology leverages real-time temperature control, IoT integration, and health monitoring to meet the growing demand for personalized, effective healthcare gadgets.

By enhancing existing sleep technology, the Smart Blanket presents an integrated, user-friendly solution, redefining sleep experiences and contributing to overall well-being.

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