Guided Yoga Nidra: Somaesthetic Design for Deep Relaxation and Meditative States

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Abstract - This paper proposes an intelligent Yoga Nidra mat designed to enhance deep relaxation and meditative awareness through a multisensory experience. The mat uses Somaesthetic Design principles to engage your senses more deeply and create focused relaxation through haptic feedback. The mat integrates guided audio narration, real-time breath and pulse monitoring, and targeted heat zones to support practitioners in achieving and maintaining the tranquil state characteristic of Yoga Nidra.

I. Introduction

Recent work in Human-Computer Interaction (HCI), somaesthetic design and felt body experiences has explored the role of technology in engaging the senses in deeper, more focused states such as body awareness, reflection, and inward turning. The Somaesthetic Design framework developed by Höök et al. emphasises the importance of deepening users' awareness of their bodily sensations by designing for introspective and embodied experiences rather than external stimulus-response interactions. Somaesthetic design [3] encourages designers to explore their bodily awareness through practices such as Feldenkrais, which involve slow, reflective movements that cultivate presence and embodied self-awareness. These insights have been materialised into prototypes like the Soma Mat and Breathing Light [1], which use directed heat and ambient lighting to subtly guide users' attention inward and enhance meditative bodily introspection.

The yogic practice of Yoga Nidra is a systematic method of guided relaxation that leads practitioners into a deeply restful, meditative state between wakefulness and sleep, instilling feelings of calmness, safety, and groundedness. It traditionally relies solely on auditory guidance and breathing for grounding, inducing awareness and deep relaxation. The proposed prototype intends to extend the practice by using embedded sensors to track physiological signals and deliver personalised feedback. The heat elements, positioned along the spine and extremities, are activated in sync with key stages of the guided session to promote grounding and bodily awareness. Thermal feedback has been shown to support bodily awareness, regulate attention, and deepen emotional introspection [5]. In designing the proposed Yoga Nidra mat, thermal affordances that are both perceptible and subtle, and biofeedback offer a way to augment traditional audio guidance. The mat design aims to help users sustain inward attention, remain physically grounded, and access deeper states of relaxation.

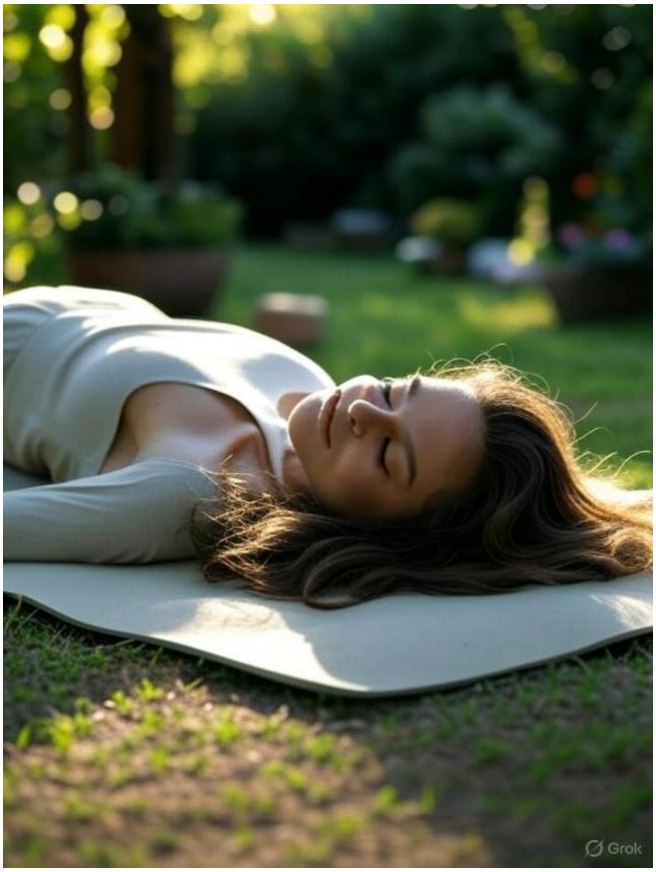

Fig. 1. Imagined use of the mat

II. Autoethnographic Reflexivity and Integrated Practice

Both authors are dedicated yoga practitioners, and one is a certified meditation teacher based in the UK and India. With years of experience in both practising and teaching yoga and meditation, we have developed a deep understanding of the subtle needs that arise during guided meditation practices such as Yoga Nidra.

This envisioned prototype emerges from our lived experience and meditation practice, sensing where attention drifts, how the body responds, and what kinds of support can enhance inward focus without distraction. As practitioners, we have seen how even small physical discomforts, wavering thoughts or a lack of grounding can interfere with deep meditative states.

With the availability of advanced, compact sensors and embedded technologies, it is now possible to design a mat that responds intelligently to the practitioner's physiological state. Our goal is to blend yogic tradition with thoughtful technology to make Yoga Nidra more accessible, immersive, and restorative for all levels of practitioners.

The combination of heat stimulation and biofeedback is proposed to provide meditators the ability to stay relaxed and internally focused, reduce mind-wandering, and deepen their sense of embodiment. Based on somaesthetic design principles, this mat can serve as a supportive tool for both novice and experienced practitioners, offering a more immersive and adaptive Yoga Nidra experience. In this paper, we discuss the design and potential applications of the mat for therapeutic, wellness, and stress-reduction contexts.

III. Related Work

In recent years, there has been growing interest in the design of technology-supported meditation and relaxation systems that support mindfulness practices. Research in HCI has explored how digital tools can scaffold meditative experiences by facilitating bodily awareness, reducing stress, and enhancing emotional regulation [4]. Systems such as Inner Garden [2] demonstrate the value of ambient feedback and affective interfaces in promoting introspection and mental well-being. These studies lay the groundwork for integrating technological affordances into traditional contemplative practices. The integration of bodily awareness technologies into meditative and introspective practices is an emerging area within this work. Designing for multisensory engagement, combining audio, touch, temperature, and physiological sensing, has proven effective in creating immersive and adaptive meditation systems through narrative structure (guided audio) with physical cues (heat, haptics, biofeedback) [1]. This body of work provides a valuable foundation for designing interactive systems, such as a Yoga Nidra mat, that support inner focus, grounding, and relaxation.

Prior work in the area emphasises the use of thermal feedback for grounding and focus [1]; therefore, thermal sensation has emerged as a design material in somatic technology. In a recent study, Ezer et al. designed a somaesthetic wearable that delivers targeted warmth during meditation. Their findings revealed that warmth helps the meditator using the wearable to draw attention inward, provides emotional comfort and motivates the practitioners to remain present, thus enhancing the overall introspective experience [5]. Notably, participants described the warmth as feeling internally generated, reinforcing the potential of thermal cues in enhancing the inward orientation required in Yoga Nidra.

In meditative or therapeutic settings, targeted heat can gently anchor attention in the body and reduce cognitive load, thus enhancing inward focus. The use of heat in your prototype aligns with this research, suggesting its potential to balance somatic awareness and mental stillness. Dublin and Zuckerman explored the use of targeted heat in a walking meditation mat. Their study compared visual signifiers and heat-based cues and found that while visual cues often distracted participants and pulled their focus outward, heat was more consistently associated with grounding, calmness, and somatic reflection [6].

These works highlight the value of integrating targeted heat into meditative technologies. Spatially distributed heat, such as that delivered through a mat, can effectively guide the user's attention across the body in a sequence [1] that mirrors guided body scan practices like those used in Yoga Nidra.

Thus, meditation practices scaffolded through technology use offer self-exploration, ways of placing the wavering mind's attention back to the body. People have reported feeling motivated to continue the practice, where the mat acts like a guide, provides a comforting feeling of intimacy, association of touch, soothes muscle tension and is perceived as therapeutic [5].

We want to explore sensor-based feedback in a Yoga Nidra context, where awareness of the body's subtle responses is integral. We embrace the tension of technology use for mindfulness and meditation purposes for self-exploration of feelings and emotions, through generic multiple interpretations of the technologically induced feedback, which can be emotional regulation, grounded, therapeutic, calming, etc.

The literature supports the integration of biofeedback, heat-based tactile cues, and guided narration as complementary modalities in meditation technology. These elements, when used thoughtfully, can facilitate deep relaxation, internal focus, and self-awareness, which are core to Yoga Nidra practice. The proposed prototype builds on this growing body of work by bridging traditional meditative practices with embodied, adaptive interaction design.

IV. Proposed/Imagined Prototype

Creating a first prototype of a Yoga Nidra mat that supports guided narration, targeted heat, and breath/pulse monitoring can be approached using off-the-shelf, low modality components and modular design principles. We propose to use relevant material, like fabrics and other soft materials already found in yoga and meditation practices, to integrate a calming, user-friendly form factor.

The mat would integrate guided narration (audio playback), gentle heat feedback (targeted warmth to specific body areas) and basic physiological sensing (breath and/or heart rate).

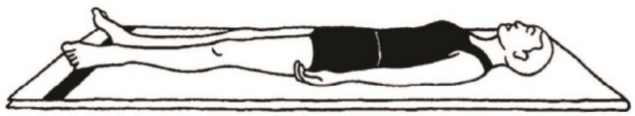

Fig. 2. Traditional Yoga Nidra Practice, World Yoga Forum

A. Tools & Materials Required

- The details of the imagined or existing prototype should be Arduino Nano
- MOSFET driver circuit (for heating control)
- Polyimide heater pads (5V, 1-3W each)
- DS18B20 or NTC thermistors

- Stretch sensor (Adafruit or homemade fabric band)
- DFPlayer Mini or ESP32 audio board + mini speaker
- Basic sewing kit or textile adhesive
- USB power bank or 5V supply

B. Components and their roles

TABLE I. PROTOTYPE DETAILS

Prototype Components		
Feature	***Component***	***Role***
Heat	Polyimide pads + MOSFETs	Body awareness & grounding
Breath/Pulse Sensor	Stretch band / Optical sensor	Biofeedback & personalization
Audio	Bluetooth speaker	Guided narration
Controller	Arduino	Coordination & logic
Mat Material	Foam + soft cover	Comfort & insulation

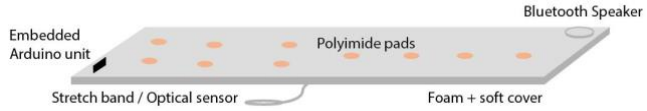

Fig. 3. Visual display of different components on the mat

Fig. 4. An envisioned prototype of the Yoga Nidra mat

V. RESPONSIBLE INNOVATION

In building the Yoga Nidra mat, we are committed to responsible innovation by integrating sustainability and openness into every layer of its design. We will prioritise the use of natural, breathable fibres and sustainable materials to ensure both user comfort and environmental responsibility. The mat's components, like the heat modules, sensors, and control units, will be designed to be modular, allowing for easy repair, replacement, or upgrade without creating unnecessary waste. We are looking to use a platform like LilyPad or FLORA for seamless textile integration later on. By using open-source software, we invite transparency, community-driven improvement, and adaptability across diverse use cases. This approach reflects our belief that wellness technologies should not only support personal wellbeing but also align with broader values of ecological care, ethical design, and shared innovation.

VI. AUTHOR BIOS

Simran Chopra has a disciplinary background in Design, and industrial experience in graphic, UX and design research in India. Her PhD from Northumbria University was a transdisciplinary approach to Sustainable HCI, focusing on practices of Participatory Visioning in grassroots communities. Her work focuses on More-than-Human, Critical Design, prototyping and discourse of technology use in everyday life through art, design, and social action.

Anupam Mediratta has a background in engineering, and he holds a Master's and a Bachelor's in Computer Science, focusing on AI. He is the founder of multiple technology startups in India and besides being a computer programmer, he is also a practitioner of Meditation, Yoga and Yoga Nidra. He is also a certified teacher in Kriya Yoga and has been teaching in small groups both in-person and online.

VII. ACKNOWLEDGEMENTS

The life-like images are generated using LLMs like Grok, ChatGPT.

VIII. REFERNCES

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