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# Data Vows: Reimagining Ritual through eTextile Practice

## **Abstract**

Data Vows is a series of biometric sensing garments for near future commitment ceremonies. It imagines a world where these rituals are no longer sworn by words, but unlocked by displaying and exchanging our most sacred physical information: our heartbeat. In order to be wed, partners must trade heartbeat data to cement their devotion. When one partner is in close enough proximity, a custom crafted corset and a handmade kerchief illuminate to the rhythm of their combined heartbeats. This initial series is an exploration into wearable technology and e-textiles as ritual objects and design probes to critique embedded power structures within societal systems. Speculative design methods formed the framework, with traditions, textiles, modes of communication, and personal data as the components.

## **Author Keywords**

eTextiles; wearable technology; ritual; personal data; speculative design

## **ACM Classification Keywords**

H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

## **Introduction**

This paper examines wearable technology and eTextile practice as tools for critiquing power structures within personal, societal, and cultural rituals through material objects. By redesigning these objects, I posit that there is an opportunity to recontextualize them within new narratives of empowerment. For this initial exploration, I chose to focus on gender as the power structure and wedding ceremonies as the ritual.

### *eTextile Practice*

Etextiles have a relatively short, but rich history of scholarship around technological self-efficacy [1] and the impact of personalization on individuals and collectives who do not consider themselves fluent in the technology that drives their world [2]. As a hybrid practice that permits practitioners to fluidly draw from various fields of electronics, fiber arts, craft and more, eTextiles defies the boundaries that constrain the self-described technologically illiterate - many of whom are women - from creatively expressing themselves with or changing their world through technology. Indeed, I believe there is a reclamation of power in this practice that has historically been denied the female gender. It subverts sociotechnical identities ascribed to women and infuses feminine values into the highly masculine field of technology [3]. Since so much of these gender power dynamics emerge and are reinforced by ritual and ceremony, eTextiles becomes a potent space to craft new meaning and disrupt institutionalized contexts.

### *Weddings: Ritual Objects & Acts*

Weddings as ritual tend to amplify firmly rooted ideas of gender roles and associated antiquated notions of expected behavior and motivations (it is necessary to

emphasize that I am focusing on cisgendered, heterosexual relationships for this specific project). Shared values, beliefs, and histories define traditional and emergent rituals throughout the event. This garment attempts to question the cultural constructions that govern traditional western wedding ceremonies through its most visible material manifestation: the wedding dress. If the wedding dress is the central symbolic object, wedding vows are the central symbolic act. Historically, the purpose of weddings signified the exchange of property through shared verbal or written agreements. Language acts as the interface that binds these sacred pacts. Given a society where unbalanced power structures are woven into social and cultural constructs through language, what alternative communication exists to cement two consenting, equal partners? What information would they transmit? What visual cues or feedback would signal the exchange?

### *Personal Data and the Heart*

Personal data collection tools and objects to measure our biometric data are pervasive. They resonate deeply with our ubiquitous need to better understand the invisible systems at play in our bodies and their impact on our identity, lives, and relationships. Yet displaying that data in visible manifestations has yet to reach widespread adoption. It is sacred to us. It conveys a secret life and has the power to betray or empower us, connect or alienate us. The human heart also has a deep psychological and cultural significance in communicating our experience of love. It is our heart that breaks, sings, pours out, is stolen, etc. Symbolically, love emanates from this specific location on the body, if not biologically accurate. However, an individual's heart rate is a unique marker of their

identity. It is for this symbolic and functional reason I chose heart rate as the ritual mechanic.

### **Methodology**

Working under heavy influence of Margaret Atwood, Simone de Beauvoir, and Donna Haraway, this feminist trinity guided many of the design principles informing the dress' evolution, along with speculative design frameworks established by Anthony Dunne and Fiona Raby. I examined various iterations of traditional and non-traditional wedding rituals across various cultures. I chose to focus on western traditions since it is embedded in my own history and to avoid inadvertently appropriating or (worse) misinterpreting other cultural histories.

I used the following inquiries to generate vignettes of possible futures that would inform the design: How would cyborgs commit to each other? If meaning is problematic when steeped in semantics unrecognizable to machines, what alternative rituals would they employ? If words lost all meaning in a dystopian, post panoptic world, how do you trust the utterings spoken by your partner? What staying power does tradition have? What conditions are necessary for traditions and rituals to change? From these explorations, I developed short narratives and illustrations to inform the aesthetics and interaction of the dress and kerchief.

### **Design**

For the dress design, I chose a traditional approach of a corset and skirt. I sought to juxtapose the familiarity of a western style wedding dress with the unfamiliar interaction of the embedded circuitry to subvert expectations associate with the wedding dress.

I constructed three different prototypes of the corset utilizing different techniques to achieve the functional and aesthetic goals of the garment. My primary design goal was a symbolic alignment between circuit design and speculative narrative. Secondary goals included an aesthetic focus on light, embroidery techniques, and LED behavior across different states of interaction. I chose light as the output to ensure visibility to the community present at the ceremony. The garment consisted of two layers: a bottom corset housing the circuit and a top refined corset to diffuse the LEDs. On one side of the garment, three signal lines run parallel to each other to control the three colors of LEDs. The three LEDs signify each partner and the third entity they create together. A ground trace cuts across the garment on the opposite side as a stabilizing asymmetrical force. For me, this design symbolizes an act of unity and recognition of balanced power, both literally and metaphorically.

### **Prototypes and Materials**

All prototypes were constructed with the Adafruit Flora microcontroller, Polar One Heart Rate sensor and receiver, surface mount LEDs, and Karl Grimm silver conductive thread or LessEMF copper taffeta fabric (see figure 1).



**Figure 1:** Corset prototypes



**Figure 3:** Wedding corset

The first proof of concept prototype employed Karl Grimm conductive thread and five light patches positioned across the top of the garment.

For the second prototype (and garment used for the actual wedding, see figure 3), I designed a custom circuit in Illustrator then vinyl cut the traces out of copper fabric. Five LED patches were arranged in a similar layout. This material choice was not ideal for the design as I had to isolate multiple areas to avoid shorting the circuit. In doing so, the areas of the polyester copper taffeta melted and lost conductivity thereby decreasing most of the dress's functionality.



**Figure 5:** Handkerchief



**Figure 4:** Corset embroidery

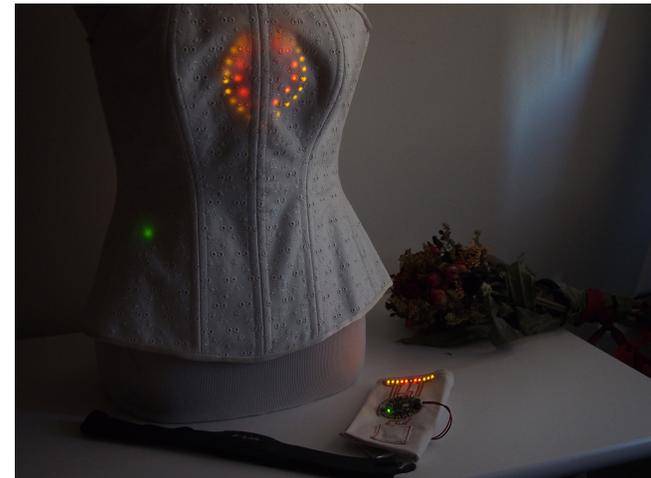
For the third and final prototype, I returned to the conductive thread for the traces and designed a new circuit layout based on feedback from wedding participants. This version eliminated the five LED patches in favor of three concentric circles at the center

of the corset. This iteration reinforced the symbolism discussed above and allowed more aesthetic agency in the embroidery design (see figure 4).

The handkerchief was much more subtle, with a single row of LEDs across the top and diffused by folded over piece of fabric (see figure 5).

### **Interaction**

Both partners wear a Polar One Heart Rate sensor that wirelessly transmits their heart rates to a receiver sewn into the corset and handkerchief (see figure 6). The receiver is connected to an Adafruit Flora microcontroller that displays the speed of their heartbeat: as their heart rate increases, the fading speed of the LEDs increase. As a behavior, fading has the potential to transition from a calming to excited state rapidly and seamlessly.



**Figure 6:** Data Vows corset and handkerchief

The transmitter and the receiver are proximity-based, meaning they only communicate within a 3-4 foot range. When partners are outside of each other's proximity, the LEDs enter a slow fading state from one color to the next (see figure 7). The receivers do not have unique addresses, meaning a cannot be paired to know which transmitter is attached to which receiver and vice versa. When partners stand near each other, the receivers intercept both signals. They display the averaged data of both signals on the garments. Without language and with equitable consent through forward movement, two heartbeats are stitched into one.



**Figure 7:** Fading LED behavior

### **Future Work**

Rituals play a central role in human's ability to create meaning, whether individual or collective. The combination of technology and craft, familiar and unexpected, real and speculative affords a space to reimagine rituals that reject unbalanced power

structures in favor of new narratives. As a garment and ritual object, Data Vows represents one example of such a narrative. Based on this initial inquiry, I plan to further develop this research by crafting eTextile objects focused on rituals of intimacy.

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