THE FABRIC OF DIGITAL LIFE: BUILDING AN INTERNET ARCHIVE FOR EMBODIED TECHNOLOGY

Andrew Iliadis
Temple University

Isabel Pedersen
Ontario Tech University

Research on wearables, quantified self, and the self-tracking movement has grown in recent years (Nafus, 2016; Neff and Nafus, 2016; Pedersen, 2013; Young, 2012), leading to novel insights about our intimate relationships with emerging forms of tactile, embodied computing. Researchers have discovered valuable applications for wearables in diverse domains of activity, from libraries and archives (Bruno, 2015) to theater and performance (Kozel, 2008), and fashion (Ryan, 2014). Wearable technologies have also risen in popularity among businesses and publics—Vandrico's wearable devices database, powered by Deloitte, currently lists over 455 devices from 314 companies and a Google Ngram Viewer search for the term "wearables" shows use of the word skyrocketing in popularity since the 1990s.

While wearables have quickly become a highly visible form of embodied technology, wearables often act as misnomers that incorrectly identify alternative embeddable technologies (items like prosthetics) and their myriad processes or exclude non-traditional forms of wearables such as ingestibles and implantables (Iliadis and Pedersen, 2016). Embodied technologies are body-centered and body-oriented technologies that provide mechanisms for control to improve areas of life, activity, and production, from health and fitness to security and labor. For example, prison monitoring ankle bracelets are wearables even though they are rarely framed as such and items like smart pills are emerging as ingestible forms of computing. Building on previous research on embodied forms of technology and technological knowledge (Ahmad and Lee, 2016; Boer et al., 2015; Bucksbarg and Carter, 2012; Mainzer, 2012; Riva, 2008; Rosenberger, 2012; Sorensen and Levold, 1992; Watson, 2013), we use the term embodied technology to refer to types of embodied computing, including wearables, ingestibles, implantables, and embeddables that are used to augment aspects of life.

We developed the Fabric of Digital Life (FABRIC) to track the development of embodied technologies and to create a space for realizing narratives around technological progress and society. FABRIC is asking: how can we help the public understand and track these embodied technologies as they grow in importance? FABRIC is an online digital archive for storing media related to embodied technologies—things like patents, news releases, instructional videos, and art. The archive allows users to track, catalog, and view artifacts related to human-computer interaction platforms, designs, and ideas, including images, videos, texts, websites, and datasets that document emerging trends. Curated sub-collections are hosted on the archive that relate to a variety of themes, including ethics, surveillance, and vulnerable populations. The underlying motivation is to provide a tool for illustrating the diverse, shared origins of embodied technology platforms, separate from profit-driven inventors and companies. A secondary motivation was to provide a space for thinking about social issues and embodied technologies. The archive allows users to browse keywords ("smart watch" for example) and through a customized metadata scheme users can collect and catalogue embodied technologies and the discourse that surrounds them. Currently, our hope is that researchers who have interests in embodied technologies will begin to use the archive, add to it, and help build the specially curated collections that are inside to highlight the various ways that embodied technologies stand to impact society and culture.

Inventions do not emerge statically, supplied solely with the inventor's intent; they emerge within a vast context of overlapping texts that circulate with multiple motives. The archive attempts to capture, annotate, and build a searchable collection of media about embodied technology while being cognizant of the rhetorical motives that inform them. The archive preserves the discourse(s) surrounding embodied technology by cataloguing the materials related to objects along several phases of their existence: from the first time an idea is proposed in fiction, capturing the cultural imaginary, to an inventor's proposal to make an object a reality, through to the object's emergence in the market. FABRIC calls for a recasting of invention as a rhetorical process by investigating the discourses that mediate the framing of our understanding of embodied technology. To illuminate the processes by which this takes place, the archive plots the rhetorical connections that exist between the collected artifacts. For example, the persuasive tactics used by Google to convince the public to embrace GoogleGlass over a smartphone is illuminated through the cataloguing of the social media, promotional events, and YouTube videos Google employed to do so. In this way, the archive serves as a digital repository of the rhetorical processes that drive the emergence, evolution, and adoption of embodied technologies.
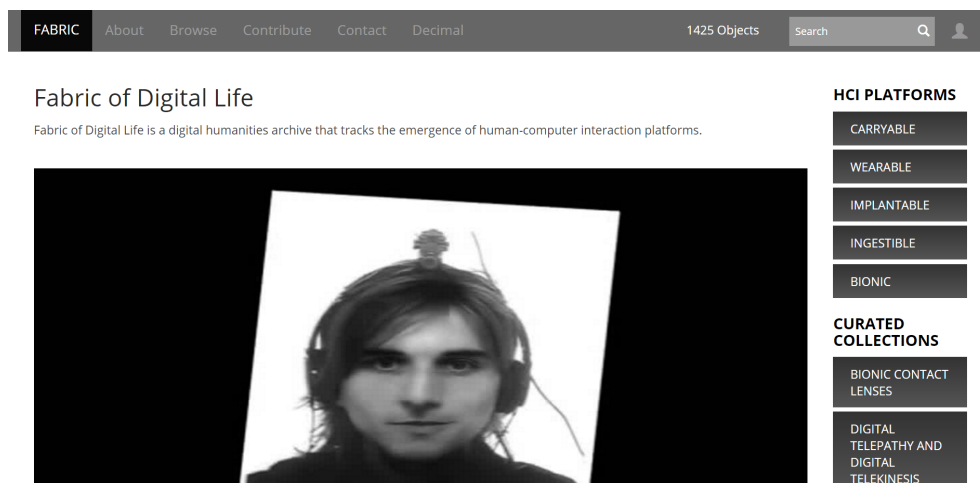
Figure 1 Fabric of Digital Life

The front page (Figure 1) contains access to FABRIC's browse and search features, a contribution page where users can make recommendations for new additions to the archive, a contact page, and links to some of the curated material that FABRIC houses. Currently the archive holds just over 1450 artifacts; corporate and research videos, mostly describing scientific breakthroughs and promotions of emerging tech, proliferate. Clips from feature films, which underscore primarily speculative, fictional portrayals of futuristic technologies, hold a close second in terms of volume. These serve to demonstrate the inclusion of fictional concepts in contemporary understandings of technology. Journal and magazine articles are also catalogued with prominence for their descriptions of emerging embodied technologies. There are also entries in art, audio lectures, corporate papers, drawings, fashion, government publications, interactive installations, songs, performance art, commercials, websites, and a wide variety of YouTube clips. The project is committed to growing these collections.

One exemplary case study in FABRIC that demonstrates the future potential of the project focuses on exoskeletons. Digital artefacts and digital representations of artefacts referencing exoskeletons are catalogued as they appear across multiple mediums. In this instance, the archive serves as a repository of the evolution of rhetoric as it pertains to the invention from the first announcement of its imaginings, through to its ultimate market proliferation. As the archive tracks the evolution of an artefact by cataloguing its various digital representations, we may better understand the influence that a past narrative has played in the motivation and adoption of future inventions. Working toward this as a primary objective, the archive logs metadata in relation to each artefact. The metadata is used to describe each resource, plot rhetorical connections, and allow for ease in retrieval. One such collected attribute is the persuasive intent of an artefact.

Figure 2 Timeline

FABRIC is organized using CollectiveAccess (CA) infrastructure. CA software is used for describing objects and allows users to build archives per required specifications. CA runs on any web browser and is integrated with library standards including Dublin Core. The software is customizable through a backend interface or custom programming. Plugins are used to create timelines (Figure 2). Our intention was to build FABRIC with software that is easy-to-use for front end users while providing programming support for back end content management. The main browsing keywords on the FABRIC home page include wearables, implantables, ingestibles, and bionic devices. Users can browse the archive using our further customized metadata categories. The main, upper-level categories paired with the platform categories in FABRIC are discursive type, persuasive type, media type, collections, films, locations on the body, augments, people/companies/related, entities, technologies, marketing, and keywords.

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