nLITEn: A Wearables Toolkit for Enabling Creativity in Fashion Technology Design

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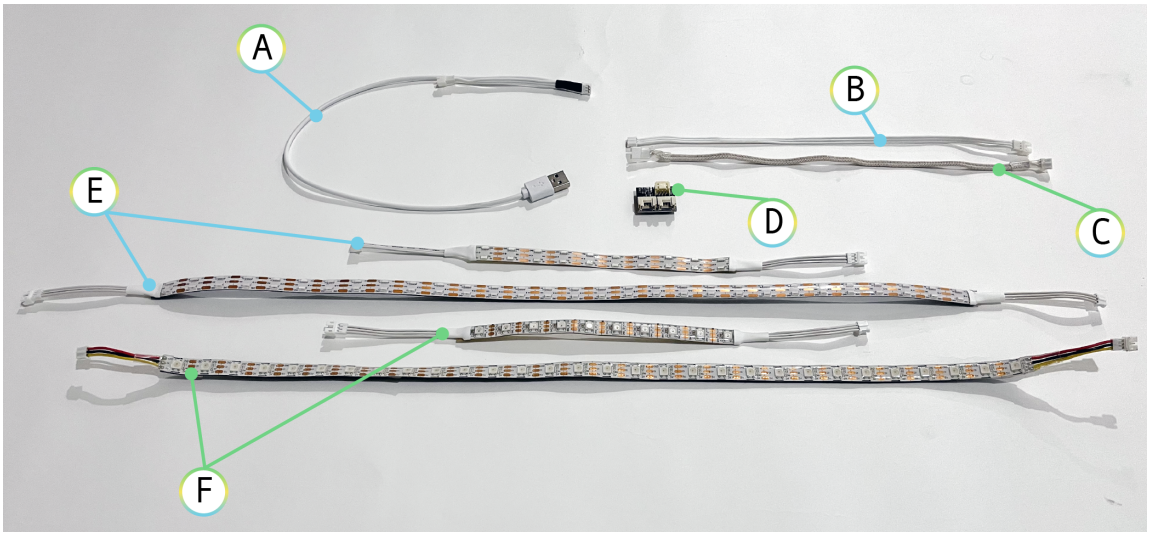

Fig. 1. The hardware components in the nLITEn Toolkit: A. Power Injector, B. quick connection Extender Cables, C. quick connection Stretchy Extender Cables, D. custom designed nLITEn Controller pre-installed with the Bekonix OS, E. Dual Edge Emitting 10 LED strips (top) and 30 LED strips (bottom), F. Forward Emitting 10 LED strips (top) and 30 LED strips (bottom).

Additional Key Words and Phrases: fashion technology, efashion, wearables toolkit, wearables, toolkit evaluation

1 ABSTRACT

Fashion is an aesthetic form of human expression, allowing us to express and communicate ideas about our identity, links to cultural and global trends and social and economic change [4]. Essentially, Fashion tells a story of who we are, allowing designers and wearers to express opinions and positions. Fashion technology is a recent evolution in the fashion industry and encourages more dynamic expressions for fashion. However, integrating technology into fashion is difficult and time-consuming, especially for fashion designers without prior knowledge of technology.

A large number of hobbyist-grade kits are now available and used by people to create wearable technologies (Adafruit Flora, LilyPad, Micro:bit), which are a combination of basic electronics hardware and software. While each of these kits contributes to wearables design and innovation, most rely in some form on coding and basic understanding of circuitry. From our experience of over nine years of fashion-tech design and show production, fashion designers often struggle or are discouraged by the technological burden when designing fashion-tech. Even experienced fashion-tech

designers have to contribute a significant amount of time integrating and implementing technology, sacrificing creative exploration with physical technology.

Newer kits address this by black-boxing, or hiding, certain aspects of the electronics. For instance, MakerWear [1] employs this approach, which allowed children to create sensor-driven accessories (e.g. gloves, shoes). Mannequette [3] provides a tangible mini-mannequin that can be used for communication, creative expression and experimentation. Our work aims to build on these efforts to create a toolkit that is targeted towards full-form garments.

We present the nLITEn toolkit, designed to lower barriers to technology and enable creativity in fashion-tech designers during their design process. nLITEn partnered with Bekonix was created by designers for designers. The toolkit comprises durable, quick connecting components and a small custom-designed board installed with the Bekonix OS (Figure 1). The toolkit components paired with the Bekonix software (Figure 2) allow designers to create fashion-tech garments without prior knowledge of soldering, circuitry or programming. With nLITEn, designers can explore the effects of the technology in their garments instead of losing time in creativity learning or implementing technology.

Ledo et al. [2] state that toolkits present users with methods that afford a path of least resistance. In this work, the authors provide a synthesis of evaluation techniques on toolkits in HCI research, identifying four major strategies to evaluate toolkits (demonstration, usage, performance, heuristics). Of particular importance is the Usage evaluation strategy, which ensures that toolkits are conceptually clear, easy to use, and valuable to the audience. Our work will employ this technique to evaluate the nLITEn toolkit, particularly the “Observation” and “Take-Home Studies” tactics outlined by the authors. We plan to deploy our toolkits to designers and interview them to elicit qualitative feedback. We also plan to conduct workshops for an observational study to evaluate the ease of use, how quickly users can move into creative exploration and design and sources of difficulties using the toolkit.

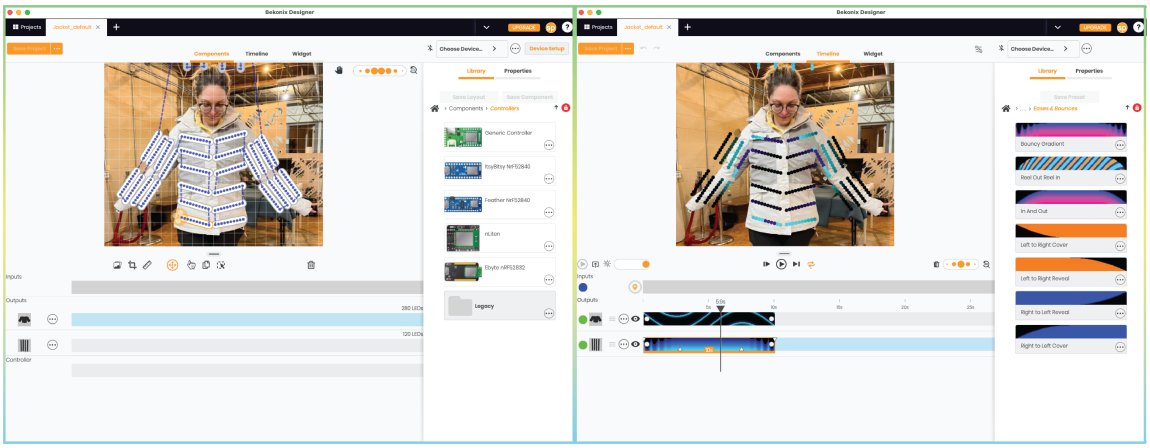

Fig. 2. Bekonix Designer Software. Components page (left) for drawing hardware design and the Timeline page (right) for adding and customizing effects for the design.

REFERENCES

[1] Majeed Kazemitabaar, Jason McPeak, Alexander Jiao, Liang He, Thomas Outing, and Jon E. Froehlich. 2017. MakerWear: A Tangible Approach to Interactive Wearable Creation for Children. In *Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems* (Denver, Colorado, USA) *(CHI '17)*. Association for Computing Machinery, New York, NY, USA, 133–145. https://doi.org/10.1145/3025453.3025887

[2] David Ledo, Steven Houben, Jo Vermeulen, Nicolai Marquardt, Lora Oehlberg, and Saul Greenberg. 2018. Evaluation Strategies for HCI Toolkit Research. In *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems* (Montreal QC, Canada) *(CHI '18)*. Association for Computing Machinery, New York, NY, USA, 1–17. https://doi.org/10.1145/3173574.3173610

[3] Teddy Seyed and Anthony Tang. 2019. Mannequette: Understanding and Enabling Collaboration and Creativity on Avant-Garde Fashion-Tech Runways. In *Proceedings of the 2019 on Designing Interactive Systems Conference* (San Diego, CA, USA) *(DIS '19)*. Association for Computing Machinery, New York, NY, USA, 317–329. https://doi.org/10.1145/3322276.3322305

[4] Manuel Martinez Toran, Alicia Bonillo, and Emilio Espi. 2017. Future Trends about Fashion and Technology: A Forward. *Current Trends Fashion Technology Textile Engineering* 2, 2 (2017), 555–582. https://doi.org/10.19080/CTFTTE.2018.02.555582