Organic User Interfaces: Requirements for Flexible Displays

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In this presentation, I will be giving an overview of the work performed in Organic User Interfaces over the past decade at the Human Media Lab. Organic User Interfaces (OUI) are user interfaces with non-flat displays that may actively or passively change shape [1]. OUI was inspired by advances in flexible display technology leading to screens that can be shaped around objects. The purpose of Organic User Interfaces is to allow computing interfaces to become more embedded in the real world, with affordances of real world objects. For example, by taking bend affordances from flexible objects such as newspapers and magazines, OUIs can help users navigate information with less mental load, by bending displays up or down to page forward or back. Applications of OUIs in rigid objects lead to a new category of "Computational Things" that are fully 3D physical objects, with skins of pixels [2]. The possibilities of applications of such smart objects are endless, however, it can be challenging to envelop non-developable objects with flexible displays. The development of stretchable and 3D printable displays is critical to allow easier application of flexible displays around objects that are not cylindrical by nature. The goal of these interfaces is to put the interface directly on the object, providing a kind of visual/haptic synergy that is common in the real world. In 3D shaped interactions with real objects, passive haptics that help users determine the purpose and state of the interface eyes-free, come for free. For example, drinking water out of a bottle is easily performed eyes-free because users can feel the weight of the water, in relationship to the shape of the bottle. By contrast, most of our computer interactions always require eyes on the screen. The car is an excellent example of why this is important: users need to keep their eyes on the data (the road in this case), yet feel the state of the machine leading to minimal cognitive load in controlling the car. Similarly, the body of a violin visually displays the current pitch, haptically resonates the fingers with that pitch, and sounds that pitch as well, allowing the musician to focus on the expressive qualities of the tone. Computational things make possible the inclusion of passive and active haptic shape interactions, allowing us to create more synergetic interfaces in which all the senses are resonating with the same percept, greatly reducing the cognitive load of interacting with computers.

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References

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