A Design Approach for Tangible User Interfaces

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Abstract

This paper proposes a mechanism to design Tangible User Interface (TUI) based on Alexander's (1964) design approach i.e. achieving fitness between the form and its context. Adapted to the design of TUIs, the fitness-of-use mechanism now takes into consideration the potential conflicts between the hardware of the artifact (electro-mechanical components) and the form of the user's control (Physical-ergonomics). The design problem is a search for an effortless co-existence (fitness-of-use) between these two aspects. Tangible interface design differs from traditional graphical interface design as unsolved conflicts between hardware and ergonomics can deeply affect the desired interaction. Here we propose a mechanism (in the form of eight questions) that support the design by defining the boundaries of the task, orienting the hardware (electro-mechanics) and ergonomics of the design space for various sub-tasks and finally fitting the different components of the hardware and physical-ergonomics of the artefact to provide a component level fitness which will delineate the final tangible interfaces. We further evaluate the effectiveness and efficiency of our approach by quantitative user evaluation

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