

Feel The Flow

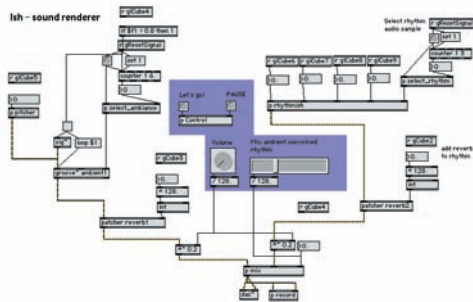
Tangible Interaction Design from a Software Engineering Perspective

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People often choose to work with a product despite it being difficult to use, because it is challenging, seductive, playful, surprising, memorable or rewarding, resulting in enjoyment of the experience. However, current digital products often neglect these aspects, because engagement and beauty are lacking. They do not address the physical and emotional skills of the user. A large number of tiny buttons does not exploit our physical skills, and the uniformity of designs together with the absence of tangibility makes it hard to express our emotions.

We believe designers should pursue beauty, exploration and experiences instead of efficiency and productivity. Unfortunately, the existing design models and theories that support the designer to create aesthetic interactions are predominately suitable for designing 'static' and mechanical products. Therefore, we need to develop a theoretical framework for a new generation of adaptive products. We strongly believe this is a multi disciplinary effort, involving interaction designers, product designers, electrical engineers, psychologists and software engineers. We published extensively on these views (see the above web link for downloadable papers).

During the process of designing interaction in tangible products, we think it is important to iterate often from design to product. The prototype of a product should be fully functional so that the interaction experience can be established when involving user input and product feedback. We also avoid lots of software and hardware development and stay away from relatively complex technology. In this way we aim to keep the development cycle as short as possible.

In this workshop we demonstrate a software development model, the data flow model, as an effective method for designing tangible interaction honoring the statements above. The model beautifully matches the logical flow of information from the sensory input of user actions to the actuators providing the required feedback. In the data flow model functionality is represented as connected set of modules. Each module performs a task. For instance, the task can be generating random numbers or positioning the playback head of a DVD player. A module can receive data that control the operation of its specific task. A module can also send data as the result of its

specific task. Writing a data flow program is done by defining the required modules and connecting them. Thus a path is created for the flow of data from a module that performs sensory input through a module that performs e.g. signal processing to a module that performs feedback.

Tools that facilitate software development - the data flow way - typically have some of the following features: a visual programming environment, a rich set of building blocks and a portal (API) to traditional programming methods e.g. C, C++ and Java. A visual programming environment typically provides a modular and high abstraction level way for programming applications. The development cycle in a visual programming environment takes only one step. There is no distinction between a running program and a program this is being edited. Application of a data flow approach in this context has multiple beneficiary aspects: short development cycles, immediate testing and easily adaptable mapping of actions to functionality.

In the workshop we illustrate the application of the data flow software development model to ISH (Image and Sound handling). ISH is an interactive multimedia installation to explore the salient aspects of aesthetic interactions. What makes human-product interaction engaging, intimate, challenging, seductive, playful, surprising, memorable, rewarding, ...? ISH consists of several tangible products, a projection screen and an audio system. Interacting with these tangible products allows the user to alter the projected images and music, thus altering the entire atmosphere. Every product has its own character with respect to feed-forward, feedback, time-delay, temptation, clarity, etc.

To "run" ISH we use data flow tools from the field of musical performance and new media art. These programs have required characteristics and easily interface with sensors through MIDI. Digitally oriented musicians have been blessed for years with software that enables them to control in real time a multitude of parameters in their composition. The market targeting the needs of digitally oriented musicians is well established and broad. We can transpose their "pattern" of work to our field, the field of tangible interaction. And consequently use products that have undergone years of testing and improvement.