



Aladdin's Lamp: Understanding New from Old

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Rationale I



Why study the real physical controls?

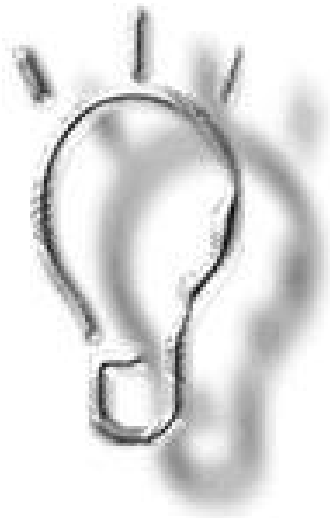
>> to understand the features of **physical interactions & physical-logical mapping** that make them comprehensible and natural

>> the **naturalness** is called **fluidity** [Dix et. al], and is related to both **natural affordances** [Gibson] and **culturally informed affordances** [Gaver & Norman]

>> most explicit design exhibits **strong affordances**, which inform users how to manipulate the devices

>> but there is **more** to this!

Rationale II

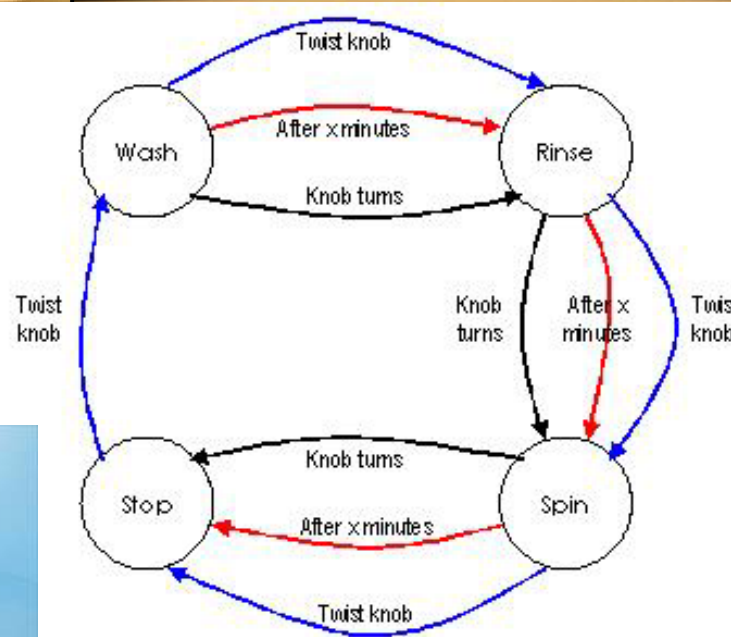


>> there are additional aspects of devices that exploit their physical form to inform users' interaction with the **logical function** they control: **inverse actions, compliant interaction, exposed state** and **hidden state**

>> this study and incipient set of physical-logical design principles compliment other work in **tangible interfaces** and **augmented reality**

>> Shneiderman's **direct manipulation principles**, are effectively about trying to harness the naturalness of physical interactions in the digital domain

Compliant Interaction



+ the rotary knob exhibits **symmetry** of machine–system interaction

+ the user sets the program by turning the dial, but, the system also turns the dial itself as the program advances

+ expert users can easily learn how to fine tune the device, and thus **intervene** in the programme as they wish

Inverse Actions



+ in many of the physical devices' controls, the inverse effects, like the dial, exploit **natural physical inverse actions**

+ this is especially important if the user does not have a perfect knowledge of the **physical-logical mapping**

+ the **visibility** of the physical effect appearance plays an important role which helps to bridge the **gulf of evaluation**



Conclusions

>> in the real world we have physical devices with an Immediate physical effect

>> in direct manipulation we have logical device and logical effects



>> in this study, tangible and some ubiquitous computing we have **physical devices** and **logical effects**

All exploit our innate abilities to live and act in the physical world!

ends