Chapter 5

Characteristics of Machines and Frugal Air-Conditioners

Part one of this book (chapters 1-4) laid the groundwork for understanding how humans and machines interact, what kind of problems emerge, and how it is possible to understand and identify some of these problems. We have seen how time delays may confuse users. We have seen how the underlying structure of machines, where the same event can lead to several outcomes, produces errors. I introduced the concept of abstraction and we have discussed examples (e.g., the diagram of the London Underground) that highlight the use and benefits of this concept for interface design. The basic concept of non-determinism was introduced and we have come to see its problematic implication (e.g., in the digital watch) for interface design. Hopefully, you began to intuitively feel and realize that there is a very fine balance between simplification of the interface (by abstracting-out superfluous information) and over-simplification of interface to the point that it becomes non-deterministic. This is a key issue for interface design, and we will expand on it in later chapters. But most of all, chapters 1-4 gave us a foundation to organize the way we describe user-machine interaction (by using a machine model, user model, and composite model) and, given what we already know about abstraction and non-deterministic structures, identify potential design problems.

In part two of this book, we will use all that we have learned so far to describe and discuss many principles that govern efficient (as well as problematic) human-machine interaction. We will focus our attention on consumer electronics and identify the kind of user-interface design problems embedded in many “everyday” devices. But before we move on, we need to discuss three important characteristics of machines that will help us to better understand automated devices and user interaction with them.
Concurrency

Remember the climate control system from chapter 3? You can see it in figure 5.1(a), and all its 20 separate configurations and transitions in figure 5.1(b). It is really a rather simple system; we only had five modes and four fan settings, but look at the muddle of bubbles and transition lines in the figure. The mess, which arises from the multitude of configurations needed to describe the system, hinders our ability to understand the machine, let alone evaluate user interaction with it.