

FOREWORD

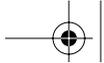
Radio frequency identification (RFID) is the first important technology of the twenty-first century. That's an awesome responsibility. The first important technology of the twentieth century, radio, had a profound impact: Its descendents included television, computers, and even air travel. Big, fundamental technologies do that—they are the first steps onto a new continent of possibility. What follows are decades of exploration and discovery, much of it entirely unexpected and initially unbelievable.

RFID is important because it enables machines to perceive. Machine perception is common in science fiction, where sentient robots walk and talk as a matter of course, but it is rare and primitive in everyday life. Airport faucets struggle to sense people impatiently waiting to wash their hands, bar code scanners frequently fail to beep, and home burglar alarms have trouble distinguishing between pets and intruders. During the next few decades, RFID will help change all that: It will usher in a new wave of computing in which devices can effectively sense and interpret the world around them.

RFID, as its name suggests, is the means of identification. Later, related technologies will piggyback on RFID infrastructure to provide data about things like temperature, pressure, and wear. Warehouses will sense whether they are low on stock or overstocked; airports will find and route luggage automatically; cars will know whether their tires are about to blow; homes will know if lights are left on, doors are unlocked, or windows are open. Because of RFID, we are entering what Paul Saffo has called "The Sensor Age." In the nineteenth century, machines could do; in the twentieth century, they could think; in the twenty-first century, they will perceive.

For some, this is a Utopian vision. For others, it sounds like hell. As usual, the reality will be somewhere in between. To dispense with Utopia first: One thing is certain about the future—it won't ever be perfect. RFID will not cure war, end hunger, or eliminate all waste. But it may help sustain our world, increase our standard of living, raise the efficiency of our economy, and enhance the quality of our lives. At its very best, it may improve healthcare by making





pharmaceutical distribution more efficient and accurate; it may lead to more recycling by providing automatic sorting of garbage; and by improving the efficiency of government and business alike, it could contribute to lower prices and, maybe, reduced taxes. These are real benefits, of real value both to individual lives and to the human race as a whole. And this is just what we see today; there will be other benefits too, as yet unimagined. The technologies of the twentieth century—television, radio, computing, and so on—brought comparable advantages. Major technologies often start out as luxuries, indulgences, or conveniences and then, because they reshape society, become essential.

On the other side of the debate are those who think RFID means instant doom. Another certainty is that the world will not end in our lifetime. (Noam Chomsky jokes that this is the safest prediction to make because if you are wrong, no one will be around to notice.) All new technologies merit diligence. RFID is no different. Its risks must be measured, and where appropriate, we should be cautious. But not all risks are equal, and some must be dismissed to improve the debate.

First, RFID is not the work of the Devil. The Devil, by all accounts, is a supernatural being with inhuman powers: He doesn't need RFID. Second, RFID is not part of a plot by evil corporate interests intent on spying on everyone. A corporation, in contrast to the Devil, is a group of human beings with human powers, not evil villains who conspire against their customers. The people who work at corporations are interested in RFID because they think it will help them build a better business, not because they are secretly out to get us. Third, RFID is not about to give rise to a whole new class of totalitarianism. While dictators and oppressors *are* out to get us—or at least some of us—they have regrettably managed very well over the centuries without RFID. Dictators will use whatever they can to work their evil, but whether or not they succeed in the future probably has little to do with new technology.

Once these dramatic exaggerations are excluded, we are left with some important, serious, and reasonable questions. How can we know when and how RFID is being used? How can we make sure it is not misused? How can we exercise choice over how it affects us personally? How do we ensure that it is safe?

This book is an important contribution to the ongoing effort to find the answers. My friend and colleague, Sanjay Sarma, says, "Writing is the highest form of thought." It follows that reading allows us to hold other people's thoughts up to the light for closer examination. We can test their logic, measure their assumptions, and check their sources. Written argument has a vulnerability that is not found in sound bites, speeches, or journalism where it is too easy to gloss and gild and misrepresent. A written idea is a naked idea.





I do not agree with everything that is written here, but I welcome every word. RFID is too important for there to be no public debate or for a debate that is badly informed, sensationalized, or manipulated. It is an inevitable technology, and its impact will be felt for generations. We are at the start of a new century, the beginning of our adventure in machine perception, and the dawning of the Sensor Age. Now is the perfect time to wonder.

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