# Preface

*If you understand how the universe operates,*
*you control it, in a way.*
Stephen Hawking, My Brief History

*Pervasive computing* describes ICT (information and communication technology) systems that seamlessly enable information and services to be made available everywhere. Other terms, used with approximately the same meaning as pervasive computing, are *Ubiquitous Computing, Internet of Things* (*IoT*)*, calm computing, ambient intelligence, physical computing, smart spaces,* and *smart environments.*

You can write about pervasive computing in a million different ways. This book tells the story from a *systems engineering* perspective and focuses on smart systems that use pattern recognition to discover their context. My wish is to make you, the reader, feel confident that not only you *understand* how these systems operate, but you *can* also *build* such systems. While reading the book, you will realize, on the one hand, how simple the underlying principles are, and on the other hand, how difficult it is to implement them in practice. Learning how to ride a bicycle is also difficult. And yet, Dutch children learn this skill very early, usually before they reach four. What you have to do as a parent is to run along—over and over—and keep them in balance, until they suddenly get the trick and boost forwards, leaving you behind, out of breath, yet relieved. This book is a guide for exactly this period—of desperately running behind the bicycle. After that, I believe that imagination and talent will drive you toward building the most incredible systems.

This book is crafted around the lecture notes developed for the course *Pervasive Computing*, taught to computer science (CS) freshmen at the Vrije University in Amsterdam. Upon completion of this course, successful students will be able to:

- Design a realistic smart system with the potential to benefit human lives. The system acquires and processes data from video, audio, acceleration, or EEG sensors and uses pattern recognition to take decisions that affect the environment accordingly.

- Build a simplified version of the real system and program a software agent to control it.
- Work together in a team, collaboratively identifying not only the technical but also the safety or ethical issues with their designs, and then sharing their challenges and discoveries through reports, presentations, and in-class demonstrations.

Although mainly targeted for computer science undergraduate students, I believe this book will be interesting and readable for anyone wondering what happens behind the scenes of these fascinating systems. After reading it, the ones who dream of building their own system should feel one step closer to their goal.

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Being able to teach and shape your own material is a blessing, and nobody understands this better than my parents. Thank you, *dragii mei*, for your

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