

Foreword

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The steady evolution of hardware, software and communications technology is rapidly transforming the PC- and dot.com world into the world of Ambient Intelligence (AmI). This next wave of information technology is fundamentally different in that it makes distributed wired and wireless computing and communication disappear to the background and puts users to the foreground. AmI adapts to people instead of the other way around. It will augment our consciousness, monitor our health and security, guide us through traffic etc. In short, its ultimate goal is to improve the quality of our life by a quiet, reliable and secure interaction with our social and material environment.

What makes AmI engineering so fascinating is that its design starts from studying person to world interactions that need to be implemented as an intelligent and autonomous interplay of virtually all necessary networked electronic intelligence on the globe. This is a new and exciting dimension for most electrical and software engineers and may attract more creative talent to engineering than pure technology does.

Development of the leading technology for AmI will only succeed if the engineering research community is prepared to join forces in order to make Mark Weiser's dream of 1991 come true. This will not be business as usual by just doubling transistor count or clock speed in a microprocessor or increasing the bandwidth of communication.

Indeed, this book shows clearly that progress in this next wave of information technology can only result from merging previously unconnected domains and techno-cultures to create the ultra-low power, low cost, always connected devices that autonomously and seamlessly adapt to social human behavior.

Hence, building ambient intelligent systems requires a team effort of sociologists, system architects, computer scientists, network and communication specialists, electrical and mechanical engineers as well as device physicists with an open mind for interdisciplinary dialogue. Progress will result from theme driven demonstrator experiments that identify the relevant challenging problems to be solved by the best, deeply specialized but open-minded, academics. This may require novel ways of organizing industrial and academic research.

So, more than ever before, we must bring system design oriented people together, join in acts of creativity and find ways how to organize system design methodology research crossing the discipline boundaries to solve the societal challenges stated above. The best way of developing the basic AmI technology is to bring the best engineers together in open, long term, team based AmI prototype projects with a clear goal to create innovation by merging their expertise.

In that respect this book is truly an eye-opener as it is the first one that relates the dream scenarios of Ambient Intelligence quantitatively to the technical challenges and requirements of the huge distributed and interoperable embedded systems needed to implement AmI systems in the real world. It provides a connection between AmI architects and the specialized engineers in the fields of computer architecture, software architecting, chip and sensor design. In addition, it shows partial practical experimental answers to the challenges and what can be learned from them for further research.

The editors succeeded marvelously to connect the previously unconnected. As such the reader of this book should carefully avoid just reading what belongs to his/her domain of expertise but rather read the book from A-Z because only then he/she will grasp the awareness that the added value comes from putting it all together into the context of the global AmI system rather than optimizing one single part of it.

Therefore this book is strongly recommended to a wide spectrum of engineers interested to embark in this rapidly emerging and fascinating technology. For engineering managers and educators it provides not only a great vision on the technical challenges ahead but it also shows the need to reflect on new organizational structures for theme and team based research necessary to make rapid progress in a domain that promises to be of great economical and societal impact.

Leuven, August 2003