

Preface

Localization and tracking are key functionalities in ubiquitous computing systems and techniques. Most applications in pervasive computing inherently rely on location information, e.g. to make the gathered measurements geographically meaningful. Also, location information can be used to support fundamental network layer services such as clustering, topology control and routing, among others.

In the past few years, the integration of miniaturized GPS receivers in ubiquitous computing devices has greatly improved localization and tracking in outdoor environments providing sufficient accuracy for many applications. Despite these advances, reducing GPS shadows and improving accuracy still require intense R&D effort. However, today the most relevant research topics in localization and tracking focus on indoor and GPS-denied environments. A very high variety of localization approaches, sensors and techniques have been developed. However, none of the proposed schemes is ideal—all have pros and cons—and the selection of the method for a given problem highly depends on the specific requirements and constraints of the application and scenario.

This book briefly summarizes the current state of the art in localization and tracking in ubiquitous computing systems. It is focused on cluster-based schemes, which is probably the most widely adopted architecture. This book analyzes the existing techniques for measurement integration, node inclusion/exclusion in/from the cluster and cluster head selection.

Although significant advances have been performed in the past, many issues still remain open for current and future research. We hope that this book may be helpful to contribute to provide a broader perspective of the localization and tracking problems and may spark new innovative ideas.

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