
Preface

Bioinformatics as a discipline has come of age and there are now numerous databases and tools that are widely used by researchers in the biomedical field. New developments in both areas, computing and biology/medicine, however, pose new challenges. In particular, the next generation world wide web is expected to be one of the key information technology advancements of this decade, while Translational Science and Systems Biology are recognised as key fields in today's medical and life sciences.

The successful development of future bioinformatics and medical informatics applications will depend heavily on an appropriately formalised representation of domain knowledge, and as described by Robert Stevens in the foreword, one such key domain knowledge is that of anatomy.

There exists a substantial body of work on anatomy ontologies, ranging from the more philosophical considerations of mereology to state of the art 3D visualisations and descriptions of anatomy for human and model organisms. The corresponding literature, however, is scattered across a large number of scientific conference proceedings, journals and books for various target audiences, such as computer scientists, bioinformaticians, biologists, medics and philosophers. This book provides a timely, unique and first of its kind collection of papers about anatomy ontologies. It is interdisciplinary in its approach, bringing together the relevant expertise from computing as well as biomedical studies, and covers the more theoretic as well as the applied aspects of the field. Whilst taking account of important work in the past, it also covers the latest developments in the field of anatomy ontologies.

The book is primarily aimed at readers who will be involved in developing the next generation of IT applications in the areas of Life Sciences, Bio-Medical Sciences and/or Health Care. Specifically, the book is relevant to: 1) those who will further develop anatomy ontologies, 2) those who will use them (annotators and scientists wanting to query the relevant databases), and 3) informatics staff involved in the actual development of relevant software applications. The goal is to provide the

reader with a comprehensive understanding of the foundations of anatomical ontologies and the state of the art in terms of existing tools and applications that are using or planning to use these ontologies.

There are four major parts to the book. The first focuses on existing anatomy ontologies for human, model organisms and plants, complemented by a chapter on disease ontologies. Part II describes systems and tools dealing with linking anatomy ontologies with each other and other on-line resources, such as the biomedical literature. Anatomy in the context of spatio-temporal biomedical atlases is discussed in part III. A number of modelling principles are presented in part IV, which also concludes the book with a chapter on recent efforts to develop a common anatomy reference ontology (CARO).

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*Albert Burger
Duncan Davidson
Richard Baldock*

Anatomy Ontologies for Bioinformatics

Principles and Practice

Burger, A.; Davidson, D.; Baldock, R. (Eds.)

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