

Preface

Recent years have seen the development of two significant trends, namely: the adoption of some Traditional Chinese Medicine Practices into mainstream Allopathic Western Medicine; and the advent of the Internet and broadband networks leading to an increased interest in the use of Telemedicine to deliver medical services.

In this book, we see the convergence of these two trends leading to a semantically based TCM Telemedicine system that utilizes an ontology to provide sharable knowledge in the TCM realm to achieve this.

The underpinning research required the development of a three-layer architecture and an Ontology of the TCM knowledge.

As TCM knowledge like all medical knowledge is not frozen in time it was important to develop an approach that would allow evolution of the Ontology when new evidence became available.

In order for the system to be practically grounded it was important to work with an industry partner PuraPharm Group/HerbMiners Informatics Limited. This partnership was initiated through Prof. Allan Wong and the Chairman of PuraPharm Group Mr. Abraham Chan. This led to the system being utilized in more than 20 Mobile Clinics in Hong Kong and 300 Hospitals in China.

In order for these different deployments of the system to be coherent with the main Onto-core it was necessary for us to develop an Ontology-Driven Software System Generation approach.

The organization of the book reflects these issues. We briefly discuss the organization of the book to assist the reader.

Thus Chap. 1 sets out the motivation and significance of the work described in the book. It identifies the main research issues and then provides an overview of the solutions developed in the book.

Chapter 2 gives an explanation of the background knowledge of Traditional Chinese Medicine (TCM) necessary to understand the work of this book, including the evolution of TCM over 3,000 years. It outlines the theoretical framework underlying TCM. It also gives an overview of the diagnostic and treatment approaches employed in TCM. An important issue it highlights is the adoption of TCM treatments in Western Allopathic medicine and the adoption of some western approaches to diagnosis to supplement TCM approaches. It emphasizes the need for a compendium of sharable knowledge in TCM.

Chapter 3 explores the use of the ontology paradigm to capture the semantics and its use as a mechanism for representing Sharable knowledge across a broad community. It also explores techniques for acquiring and conceptual representation of this knowledge. It next examines different approaches to realization of these ontologies in a machine understandable form.

Chapter 4 explores the issues for developing a sharable representation of the TCM knowledge and develops the architecture of the proposed approach.

We utilize an ontology for doing this. Ontologies in general are discussed in Chap. 3. Their use for representing TCM knowledge is discussed in Chap. 4. Thus a TCM Ontology is developed in Chap. 4.

This three-layer architecture for TCM and cross-layer logical transitivity are explained fully in Chap. 4.

We give an overview of this Automatic System Generation Approach in Sect. 1.5 and give a full exposition of it in Chap. 5.

As is the case in Western Allopathic Medicine, in Traditional Chinese Medicine knowledge is constantly being generated as a result of new insights arising from research, clinical practice, experience and observation by TCM practitioners. In order to cater for this growing and evolving knowledge in the field we need mechanisms for evolving the consensus certified knowledge, represented in the TCM Ontology, in a semi-automatic fashion. In Chap. 6, we discuss the framework for such ontology evolution for the TCM Ontology using Mining and a systematic process for updating the Ontology.

In Chap. 7, we describe a model of the Network Infrastructure for delivery of the TCM over the Telemedicine System over the Internet. We carry out a performance analysis of the Telemedicine System based on this model.

Lastly, in Chap. 8, we provide a recapitulation of the work described in this book, summarizing what has been achieved. This is followed by a discussion of the future directions that this research on semantically based TCM Telemedicine can take.

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