

Preface

INTRODUCTION

Information Systems and Software Development is a very dynamic, grooming, and important research area of today's technology. It provides the finest and the fastest way for solving the typical problems. Designing, developing, implementing, and functioning a system involves a wide range of disciplines and many application-specific constraints. To make sense of and take full advantage of these systems, an excellent approach is needed, as software development plays a major role for successfully run of information systems and also a good segment of researchers are focusing on this area. Although this field is mature in many aspects, the main issue with this technology is related to its concrete link between software development and information systems, as it is a highly important factor as all functional requirements are based on it. Researchers have suggested so many different ways for the best use of information systems and software developments. But it still need to be consider more, for getting more accurate and precise results by applying new trends and techniques including merging the concepts of both.

This book aims to provide a comprehensive reference for Information Systems and Software Developments by covering all important topics including introduction, information systems and software development life cycle, systems and software processes, functional and non-functional requirements, managing software development and software quality, metrics and technology. In addition *Software Development Techniques for Constructive Information Systems Design* will focus on research and experience that could contribute to the improvement of information systems and software development practices. The book's scope includes methods, techniques, and technology to better engineer software and manage its development. It is divided into two sections and with each section, extends the growing literature on the emerging technologies and innovations would be covered in the field of Software development techniques and Information System Design. Thus, it would not only serve as a reference for information systems and software development area, but it would also become a reference for new innovations in Software Development and Information System Development.

This book contains 23 excellent chapters authored by a group of internationally experienced professionals and researchers in the field of software engineering, information system, and system analysis and design. Contributors also include industry experienced and younger authors, creating a value-added constellation of dynamic authors. Concerning the environments from which the contributions are presented, the chapters came from academia, research institutions, and industry.

ORGANIZATION OF BOOK

This book is designed to cover a wide range of topics in the field of software engineering and information systems. It includes two sections that provide a comprehensive reference for software engineering and information systems by covering all important topics, including an introduction, Introduction and Overview of Information Systems and Software Development, information systems and software development life cycle, systems and software processes, functional and non-functional requirements, diagrams and representations, managing software development, software quality, metrics and technology, Structural (non functional) Testing, Ethics Privacy and Information Security, Data and Knowledge management and Project Planning. Each chapter is designed to be as a stand-alone as possible; the reader can focus on the interested topics only. The chapters are described briefly as follows.

Section 1: Software Development Methodologies and Techniques

Chapter 1 describes the requirements for e-selection technology to be of practical use for any company. Chapter focuses on different e- techniques, and identified related e- hiring issues. The chapter further provides a conclusion to focus e-techniques web-based technologies and stated that web-based technologies should primarily support the core day-to-day work activities rather than be user-friendly or provide additional functionality.

Chapter 2 focuses on the conceptual database design evolution, by introducing concepts which are common to both information systems and software engineering researches. An optimization algorithm of partitioning, based on the decomposition of objects and on the inheritance of attributes, is proposed and extended. The extended algorithm, which defines a formal constructive mapping from conceptual to logical database models, aims to show how some updates reflecting modifications occurring in the real life can affect the conceptual database design.

Chapter 3 presents a survey on the most relevant software development practices that are used nowadays to build software products for the web, with security built in. It starts by presenting three of the most relevant Secure Software Development Lifecycles, which are complete solutions that can be adopted by development companies: the CLASP, the Microsoft Secure Development Lifecycle and the Software Security Touchpoints. This chapter also discusses other relevant initiatives that can be integrated into existing development practices, which can be used to build and maintain safer software products: the OpenSAMM, the BSIMM, the SAFECode and the Securosis.

Chapter 4 describes suitable quality practices which could not only support development of a good quality Software product but also linked up well with the strategic needs of the organizational business. It focuses industry requirements for quality practices of software development, then presented a framework which links Information System's development process improvement with strategic needs of an organization. It also covers the process improvement plan and use of different software development methodologies in multimodal process improvement scenarios.

Chapter 5 Project management is a key activity to manage project's objectives, timeline, cost, roles of the participants and other challenges like estimating, planning, scheduling, budget monitoring, resource

management, and documentation. This chapter briefs about issues related to project management and provides knowledge about different software that can be used in project management and diagramming to overcome project management issues.

Chapter 6 focuses the emerging role of Cloud computing and its impact on software development methodologies. It briefs about the trend of cloud computing and new responsibilities which are linked with software development methodologies with respect to this new change of cloud computing environment from client server architecture.

Chapter 7 provides knowledge of the features and purposes of information. It also discusses the role of information system for developing a new system using System Development Life Cycle (SDLC). It also analyzed the concept of information quality to make a new system uses the different phases of SDLC.

Chapter 8 author propose a “Cybernetic Planning Framework” (CPF), which combines the diversity of educational theories and practices, yielding in a common basis for their inclusion. Chapter focuses on Second Life’s qualitative characteristics that can utilize to construct a “teaching-organizational” framework, which is essential for planning effective and meaningful distance learning courses. This gain averred a “cybernetic model,” in which enhanced pedagogical authorities and principles of Contemporary Learning Theories that previous studies carried out in Second Life.

Chapter 9 describes about Information Systems its complexity and importance. As the Information Systems are to be using the most advanced development tools and methodology, it must be simple for the users to understand, comprehend and use they should be capable of performing all the functions necessary to perform a tasks efficiently.

Chapter 10 describes Agile Interactive Software Development Process Models for Crowd Source Projects, which are very flexible in considering previous project parameters assume somewhat stable team and project structures. Author investigate all traditional project characteristics, elaborate on all those elements that should be modified to fit the open competition agile structure. Author use several case studies to demonstrate management issues related to managing software projects in open competitions.

Chapter 11 discusses ‘Software Engineering life cycle, history and software architecture’ as well as foundation of Information Engineering and Information System. It describes the software lifecycle phases and how to make effective use of various technical methods by applying effective technical and other efficient methods at the right time. This chapter shows Information Engineering Life Cycle’ and discuss the ‘key phrases’ for Information Engineering as well as Information System.

Section 2: Advanced Topics in Software Engineering

Chapter 12 author introduce a novel model-driven perspective on secure software engineering, which integrates seamlessly software security analysis with traditional software development activities. A systematic security engineering process that starts in the early stages of the software development process and spans the entire software lifecycle is presented. Fundamental software security concepts and analysis techniques are also introduced, and several illustrative examples are presented, with focus on security requirements and risk analysis.

Chapter 13 explains the major objectives of a security policy, with focus on how applications that can protect data at all access points can be developed. Access control models and their known issues are discussed. From a security policy prospective, the security design principles and modeling using the UML are also discussed. In addition, an informal discussion on potential software security metrics

that can be used for security measurement and finally, a discussion on security testing involving the use of metrics, are discussed.

Chapter 14 a comparative analysis has been presented for sequence analysis and comparative analysis best approaches has been reported along with some notions about tools, techniques, methodologies and algorithms used for sequence analysis. The overall objective is to highlight the significance of underlying problems and existing solutions for analysis. Best approximation can only be achieved by comparing and identifying the optimal pathway for destination. It is commonly observed that one computational solution can't be guaranteed as an optimal solution for sequence NP hard problems, different and diverse solutions can lead to more significant result.

Chapter 15 Enterprise systems development approaches can be classified into development-centric and procurement centric approaches. Based on the component-based system development methodology (CBSD), chapter proposed a procurement-centric framework to develop enterprise content management (ECM) system. Adopting CBSD to develop ECM system avoids the drawbacks of the development-centric approaches, and remedies the ECM field lacks where there is no system development method that helps in selecting and implementing the ECM system. A case study is applied to validate the proposed framework.

Chapter 16 A fault tree analysis (FTA) is presented as a qualitative method for studying the state of the WT as a system considering to its different sub-systems. The quantitative analysis of the FTA is done by Binary Diagram Decision (BDD). The size of the BDD generated by the transformation from FTA to BDD will depend of the ordering of the FTA events. This chapter describes the the top-down-left-right, the level and the “and” methods for listing the events. Finally, a classification of the events is done based on their importance measures. The importance measures has been calculated by the Birnbaum, Critically and Structural heuristic methods. A comparative analysis is done and the main results are presented.

Chapter 17 describes about Semantic approach, Semantic web applications which promises to make the content on World Wide Web machine understandable thus enabling creation of an agent based web where automated programs can accomplish a variety of tasks that involve interpretation of the content and are not possible with existing web technologies. Chapter also gives a brief introduction to the semantic web and components common to all semantic web applications.

Chapter 18 describes knowledge management, the methodological formulation of strategies and practices which are deployed by the businesses and organization identify, define, develop and utilize the Tacit and Explicit information within the organization for better use of developing and marketing new products and ideas.

Chapter 19 briefed about an access control to multi level security documents. How organizations around the globe intend to apply security levels over their confidential documents to protect from unauthorized use. Some numbered access control approaches have been proposed with this study, and also chapter presents an overview of a robust software engineering approach for access control to multi-level security documents. The access control system incorporates stages including data refinement, text comprehension, understanding of multi-stage protection and application levels.

Chapter 20 presents evolution of information security, current impetus towards boundary less enterprises, federated identities, the contemporary standards, need for federal governments to be involved in information security, ethics and privacy concerns. With such a gamut of influencing forces, information security needs to be inbuilt with SDLC as a natural process rather than as an afterthought. chapter also covers information security trends in relation to cloud, mobile devices, bring your own device. Convergence of information security with risk management and business process continuity.

Chapter 21 two important trends are discussed in modern software engineering (SE) regarding the utilization of Knowledge Management (KM) and information retrieval (IR). Chapter also introduces the fundamental concepts of KM theory, practice and mainly describes the aspects of knowledge management that are valuable to software development organizations and how can a KM system for such an organization be implemented. Chapter further describes how information retrieval (IR) can play a vital role in SE.

Chapter 22 discusses the ethical issue of transparency. Transparency is being considered an indispensable ingredient in social accountability and necessary for preserving and guaranteeing ethical and fair processes. Chapter describes importance of transparency issues and challenges faced to implement transparency in software systems for distributed work groups.

Chapter 23 Semantic web was proposed to make the content machine-understandable by developing ontologies to capture domain knowledge and annotating content with this domain knowledge. Author is focusing the Semantic web role for several domains in general and specially about ontologies. This chapter discusses how ontologies can be used in various stages of system development life cycle. Ontologies can be used to support requirements engineering phase in identifying and fixing inconsistent, incomplete and ambiguous requirement. They can also be used to model the requirements and assist in requirements management and validation. During software design and development stages, ontologies can help software engineers in finding suitable components, managing documentation of APIs and coding support. Ontologies can help in system integration and evolution process by aligning various databases with the help of ontologies capturing knowledge about database schema and aligning them with concepts in ontology.

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