Evidence Based Software Engineering And Systematic Reviews Chapman Hallcrc Innovations In Software Engineering And Software Development Series

In the decade since the idea of adapting the evidence-based paradigm for software engineering was first proposed, it has become a major tool of empirical software engineering. Evidence-Based Software Engineering and Systematic Reviews provides a clear introduction to the use of an evidence-based model for software engineering research and practice.

This Expert Guide gives you the techniques and technologies in software engineering to optimally design and implement your embedded system. Written by experts with a solutions focus, this encyclopedic reference gives you an indispensable aid to tackling the day-to-day problems when using software engineering methods to develop your embedded systems. With this book you will learn: The principles of good architecture for an embedded system Design practices to help make your embedded project successful Details on principles that are often part of embedded systems, including digital signal processing, safety-critical principles, and development processes Techniques for setting up a performance engineering strategy for your embedded system How to develop user interfaces for embedded systems Strategies for testing and deploying your embedded system, and ensuring quality development processes Practical techniques for optimizing embedded software for performance, memory, and power Advanced guidelines for developing multicore software for embedded systems How to develop embedded software for networking, storage, and automotive segments How to manage the embedded development process Includes contributions from: Frank Schirrmeister, Shelly Gretlein, Bruce Douglass, Erich Stygler, Gary Stringham, Jean Labrosse, Jim Trudeau, Mike Brogioni, Mark Pitchford, Catalin Dan Udma, Markus Levy, Pete Wilson, Whit Waldo, Inga Harris, XinXin Yang, Srinivasas Addepalli, Andrew McKay, Mark Kraebling and Robert Oshana. Road map of key problems/issues and references to their solution in the text Review of core methods in the context of how to apply them Examples demonstrating timeless implementation details Short and to- the- point case studies show how key ideas can be implemented, the rationale for choices made, and design guidelines and trade-offs Although software engineering can trace its beginnings to a NATO conference in 1968, it cannot be said to have become an empirical science until the 1970s with the advent of the work of Prof. Victor Robert Basili of the University of Maryland. In addition to the need to engineer software was the need to understand software. Much like other sciences, such as physics, chemistry, and biology, software engineering needed a discipline of observation, theory formation, experimentation, and feedback. By applying the scientific method to the software engineering domain, Basili developed concepts like the Goal-Question-Metric method, the Quality-Improvement-Paradigm, and the Experience Factory to help bring a sense of order to the ad hoc developments so prevalent in the software engineering field. On the occasion of Basili’s 65th birthday, we present this book containing reprints of 20 papers that defined much of his work. We divided the 20 papers into 6 sections, each describing a different facet of his work, and asked several individuals to write an introduction to each section. Instead of describing the scope of this book in this preface, we decided to let one of his papers, the keynote paper he gave at the International Conference on Software Engineering in 1996 in Berlin, to lead off this book. He, better than we, can best describe his views on what is perimetal software engineering.

This book provides guidelines for practicing design science in the fields of information systems and software engineering research. A design process usually iterates over two activities: first designing an artifact that improves something for stakeholders and subsequently empirically investigating the performance of that artifact in its context. This “validation in context” is a key feature of the book - since an artifact is designed for a context, it should also be validated in this context. The book is divided into five parts. Part I discusses the fundamental nature of design science and its artifacts, as well as related design research questions and goals. Part II deals with the design cycle, i.e. the creation, design and validation of artifacts based on requirements and stakeholder goals. To elaborate this further, Part III presents the role of conceptual frameworks and theories in design science. Part IV continues with the empirical cycle to investigate artifacts in context, and presents the different elements of research problem analysis, research setup and data analysis. Finally, Part V deals with the practical application of the empirical cycle by presenting in detail various research methods, including observational case studies, case-based and sample-based experiments and technical action research. These main sections are complemented by two generic checklists, one for the design cycle and one for the empirical cycle. The book is written for students as well as academic and industrial researchers in software engineering or information systems. It provides guidelines on how to effectively structure research goals, how to analyze research problems concerning design goals and knowledge questions, how to validate artifact designs and how to empirically investigate artifacts in context – and finally how to present the results of the design cycle as a whole.

Component-Based Software Engineering (CBSE) is the way to produce software fast. This book presents the concepts in CBSE. While detailing both the advantages and the limitations of CBSE, it covers every aspect of component engineering, from software engineering practices to the design of software component infrastructure, technologies, and system.

This book presents contemporary empirical methods in software engineering related to the plurality of research methodologies, human factors, data collection and processing, aggregation and synthesis of evidence, and impact of software engineering research. The individual chapters discuss methods that impact the current evolution of empirical software engineering and form the backbone of future research. Following an introductory chapter that outlines the background of and developments in empirical software engineering over the last 50 years and provides an overview of the subsequent contributions, the remainder of the book is divided into four parts: Study Strategies (including e.g. guidelines for surveys or design science); Data Collection, Production, and Analysis (highlighting approaches from e.g. data science, biometric measurement, and simulation-based studies); Knowledge Acquisition and Aggregation (highlighting literature research, threats to validity, and evidence aggregation); and Knowledge Transfer (discussing open science and knowledge transfer with industry). Empirical methods like experimentation have become a powerful means of advancing the field of software engineering by providing scientific evidence on software development, operation, and maintenance, but also by supporting practitioners in their decision-making and learning processes. Thus the book is equally suitable for academics aiming to expand the field and for industrial researchers and practitioners looking for novel ways to check the validity of their assumptions and experiences. Chapter 17 is available open access under a Creative Commons Attribution 4.0 International License via link.springer.com.

Software Engineering for Science provides an in-depth collection of peer-reviewed chapters that describe experiences with applying software engineering practices to the development of scientific software. It provides a better understanding of how software engineering is and should be practiced, and which software engineering practices are effective for scientific software. The book starts with a detailed overview of the Scientific Software Lifecycle, and a general overview of the scientific software development process. It highlights key issues commonly arising during scientific software development, as well as solutions to these problems. The second part of the book provides examples of the use of testing in scientific software development, including key issues and challenges. The chapters then describe solutions and case studies addressing key issues in scientific software development efforts. The final part of the book provides examples of applying software engineering techniques to scientific software, including not only computational modeling, but also software for data management and analysis. The authors describe their experiences and lessons learned from developing complex scientific software in different domains. About the Editors Jeffrey Carver is an Associate Professor in the Department of Computer Science at the University of Alabama. He is one of the primary organizers of the workshop series on Software Engineering for Science (http://www.SE4Science.org/workshops). Neil P. Chue Hong is Director of the Software Sustainability Institute at the University of Edinburgh. His research interests include barriers and incentives in
research software ecosystems and the role of software as a research object. George K. Thiruvathukal is Professor of Computer Science at Loyola University Chicago and Visiting Faculty at Argonne National Laboratory. His current research is focused on software metrics in open source mathematical and scientific software.

Perspectives on Data Science for Software Engineering presents the best practices of seasoned data miners in software engineering. The idea for this book was created during the 2014 conference at Dagstuhl, an invitation-only gathering of leading computer scientists who meet to identify and discuss cutting-edge informatics topics. At the 2014 conference, the concept of how to transfer the knowledge of experts from seasoned software engineers and data scientists to newcomers in the field highlighted many discussions. While there are many books covering data mining and software engineering basics, they present only the fundamentals and lack the perspective that comes from real-world experience. This book offers unique insights into the wisdom of the community's leaders gathered to share hard-won lessons from the trenches. Ideas are presented in digestible chapters designed to be applicable across many domains. Topics included cover data collection, data sharing, data mining, and how to utilize these techniques in successful software projects. Newcomers to software engineering data science will learn the tips and tricks of the trade, while more experienced data scientists will benefit from war stories that show what traps to avoid. Presents the wisdom of community experts, derived from a summit on software analytics Provides contributed chapters that share discrete ideas and technique from the trenches Covers topics of concern, including mining security and social data, data visualization, and cloud-based data Presented in clear chapters designed to be applicable across many domains

Software Engineering: Architecture-driven Software Development is the first comprehensive guide to the underlying skills embodied in the IEEE's Software Engineering Body of Knowledge (SWEBOK) standard. Standards expert Richard Schmidt explains the traditional software engineering practices recognized for developing projects for government or corporate systems. Software engineering education often lacks standardization, with many institutions focusing on implementation rather than design as it impacts product architecture. Many graduates join the workforce with incomplete skills, leading to software projects that either fail outright or run woefully over budget and behind schedule. Additionally, software engineers need to understand system engineering and architecture—the hardware and peripherals their programs will run on. This issue will only grow in importance as more programs leverage parallel computing, requiring an understanding of the parallel capabilities of processors and hardware. This book gives both software developers and system engineers key insights into how their skillsets support and complement each other. With a focus on these key knowledge areas, Software Engineering offers a set of best practices that can be applied to any industry or domain involved in developing software products. A thorough, integrated compilation on the engineering of software products, addressing the majority of the standard knowledge areas and topics Offers best practices focused on those key skills common to many industries and domains that develop software Learn how software engineering relates to systems engineering for better communication with other engineering professionals within a project environment

This is the most authoritative archive of Barry Boehm's contributions to software engineering. Featuring 42 reprinted articles, along with an introduction and chapter summaries to provide context, it serves as a "how-to" reference manual for software engineering best practices. It provides expert access to Boehm's landmark work on product development and management processes. The book concludes with an insightful look to the future by Dr. Boehm.

Writing and running software is now as much a part of science as telescopes and test tubes, but most researchers are never taught how to do either well. As a result, it takes them longer to accomplish simple tasks than it should, and it is harder for them to share their work with others than it needs to be. This book introduces the concepts, tools, and skills that researchers need to get more done in less time and with less pain. Based on the practical experiences of its authors, who collectively have spent several decades teaching software skills to scientists, it covers everything graduate-level researchers need to automate their workflows, collaborate with colleagues, ensure that their results are trustworthy, and publish what they have built so that others can build on it. The book assumes only a basic knowledge of Python as a starting point, and shows readers how it, the Unix shell, Git, Make, and related tools can give them more time to focus on the research they actually want to do. Research Software Engineering with Python can be used as the main text in a one-semester course or for self-guided study. A running example shows how to organize a small research project step by step, over a hundred exercises give readers a chance to practice these skills themselves, while a glossary defining over two hundred terms will help readers find their way through the terminology. All of the material can be re-used under a Creative Commons license, and all royalties from sales of the book will be donated to The Carpentries, an organization that teaches foundational coding and data science skills to researchers worldwide.

This book addresses active research (AR), one of the main research methodologies used for academia-industry research collaborations. It elaborates on the right research activities and how to distinguish them from non-significant ones. Further, it details how to glean lessons from the research results, no matter whether they are positive or negative. Lastly, it shows how companies can evolve and build talents while expanding their product portfolio. The book's structure is based on that of AR projects; it sequentially covers and discusses each phase of the project. Each chapter shares new insights into AR and provides the reader with a better understanding of how to apply it. In addition, each chapter includes a number of practical use cases or examples. Taken together, the chapters cover the entire software lifecycle: from problem diagnosis to project (or action) planning and execution, to documenting and disseminating results, including validity assessments for AR studies. The goal of this book is to help everyone interested in industry-academia collaborations to conduct joint research. It is for students of software engineering who need to learn about how to set up an evaluation, how to run a project, and how to document the results. It is for all academics who aren't afraid to step out of their comfort zone and enter industry. It is for industrial researchers who know that they want to do more than just develop software blindly. And finally, it is for stakeholders who want to learn how to manage industrial research projects and how to set up guidelines for their own role and expectations.

Get the most out of this foundational reference and improve the productivity of your software teams. This open access book collects the wisdom of the 2017 "Dagstuhl" seminar on productivity in software engineering, a meeting of community leaders, who came together with the goal of rethinking traditional definitions and measures of productivity. The results of their work, Rethinking Productivity in Software Engineering, includes chapters covering definitions and core concepts related to productivity, guidelines for measuring productivity in specific contexts, best practices and pitfalls, and theories and open questions on productivity. You'll benefit from the many short chapters, each offering a focused discussion on one aspect of productivity in software engineering. Readers in many fields and industries will benefit from their collected work. Developers wanting to improve their personal productivity, will learn effective strategies for overcoming common issues that interfere with progress. Organizations thinking about building internal programs for measuring productivity of programmers and teams will learn best practices from industry and researchers in measuring productivity. And researchers can leverage the conceptual frameworks and rich body of literature in the book to effectively pursue new research directions. What You'll Learn: review the definitions and dimensions of software productivity. See how time management is having the opposite of the intended effect. Develop valuable dashboards Understand the impact of sensors on productivity. Avoid software development waste. Work with human-centered methods to measure productivity. Look at the intersection of neuroscience and productivity. Manage interruptions and context-switching. Who Book Is For: Industry developers and those responsible for seminar-style courses that include a segment on software developer productivity. Chapters are written for a generalist audience, without excessive use of technical terminology.

Empirical research has now become an essential component of software engineering yet software practitioners and researchers often lack an understanding of how the empirical procedures and practices are applied in the field. Empirical Research in Software Engineering: Concepts,
Analysis, and Applications shows how to implement empirical research processes, procedures, and practices in software engineering. Written by a leading researcher in empirical software engineering, the book describes the necessary steps to perform replicated and empirical research. It explains how to plan and design experiments, conduct systematic reviews and case studies, and analyze the results produced by the empirical studies. The book balances empirical research concepts with exercises, examples, and real-life case studies, making it suitable for a course on empirical software engineering. The author discusses the process of developing predictive models, such as defect prediction and change prediction, on data collected from source code repositories. She also covers the application of machine learning techniques in empirical software engineering, includes guidelines for publishing and reporting results, and presents popular software tools for carrying out empirical studies.

Data Science for Software Engineering: Sharing Data and Models presents guidance and procedures for reusing data and models between projects to produce results that are useful and relevant. Starting with a background section of practical lessons and warnings for beginning data scientists for software engineering, this edited volume proceeds to identify critical questions of contemporary software engineering related to data and models. Learn how to adapt data from other organizations to local problems, mine privatized data, prune spurious information, simplify complex results, how to update models for new platforms, and more. Chapters share largely applicable experimental results discussed with the blend of practitioner focused domain expertise, with commentary that highlights the methods that are most useful, and applicable to the widest range of projects. Each chapter is written by a prominent expert and offers a state-of-the-art solution to an identified problem facing data scientists in software engineering. Throughout, the editors share best practices collected from their experience training software engineering students and practitioners to master data science, and highlight the methods that are most useful, and applicable to the widest range of projects. Shares the specific experience of leading researchers and techniques developed to handle data problems in the realm of software engineering. Explains how to start a project of data science for software engineering as well as how to identify and avoid likely pitfalls. Provides a wide range of useful qualitative and quantitative principles ranging from very simple to cutting edge research. Addresses current challenges with software engineering data such as lack of local data, access issues due to data privacy, increasing data quality via cleaning of spurious chunks in data. The software profession has a problem, widely recognized but which nobody seems willing to do anything about; a variant of the well known "telephone game," where some trivial rumor is repeated from one person to the next until it has become distorted beyond recognition and blown up out of all proportion. Unfortunately, the objects of this telephone game are generally considered cornerstone truths of the discipline, to the point that their acceptance now seems to hinder further progress. This book takes a look at some of these "ground truths" the so-called 10x variation in productivity between developers; the "software crisis"; the cost-of-change curve; the "cone of uncertainty"; and more. It assesses the real weight of the evidence behind these ideas - and confronts the scary prospect of moving the state of the art forward in a discipline that has had the ground kicked from under it. Like other sciences and engineering disciplines, software engineering requires a cycle of model building, experimentation, and learning. Exploratory techniques are valuable tools for all software professionals who are involved in evaluating and choosing between different methods, techniques, languages, and tools. The purpose of Experimentation in Software Engineering is to introduce students, teachers, researchers, and practitioners to empirical studies in software engineering, using controlled experiments. The introduction to experimentation is provided through a process perspective, and the focus is on the steps that we have to go through to perform an experiment. The book is divided into three parts. The first part provides a background of theories and methods used in experimentation. Part II then devotes one chapter to each of the five experiment steps: scoping, planning, execution, analysis, and result presentation. Part III completes the presentation with two examples. Assignments and statistical material are provided in appendixes. Overall the book provides indispensable information regarding empirical studies in particular for experiments, but also for case studies, systematic literature reviews, and surveys. It is a revision of the authors' book, which was published in 2000. In addition, substantial new material, e.g. concerning systematic literature reviews and case study research, is introduced. The book is self-contained and it is suitable as a course book in undergraduate or graduate studies where the need for empirical studies in software engineering is stressed. Exercises and assignments are included to combine the more theoretical material with practical aspects. Researchers will also benefit from the book, learning more about how to conduct empirical studies, and likewise practitioners may use it as a "cookbook" when evaluating new methods or techniques before implementing them in their organization. Users increasingly demand more from their software than ever before—more features, fewer errors, faster runtimes. To deliver the best quality products possible, software engineers are constantly in the process of employing novel tools in developing the latest software applications. Progressions and Innovations in Model-Driven Software Engineering investigates the most recent and relevant research on model-driven engineering. Within its pages, researchers and professionals in the field of software development, as well as academics and students of computer science, will find an up-to-date discussion of scientific literature on the topic, identifying opportunities and advantages, and complexities and challenges, inherent in the future of software engineering. As software R&D investment increases, the benefits from short feedback cycles using technologies such as continuous deployment, experimentation-based development, and multidisciplinary teams require a fundamentally different strategy and process. This book will cover the three overall challenges that companies are grappling with: speed, data and ecosystems. Speed deals with shortening the cycle time in R&D. Data deals with increasing the use of and benefit from the massive amounts of data that companies collect. Ecosystems address the transition of companies from being internally focused to being ecosystem oriented by analyzing what the company is uniquely good at and where it adds value. Over the past ten years since the idea of adapting the evidence-based paradigm was first proposed for software engineering, it has become a major tool of empirical software engineering, influencing primary studies, as well as motivating secondary studies. This book promulgates an understanding of empirical software engineering practices and knowledge, including how to use such knowledge effectively. It provides guidance upon how to conduct secondary studies in software engineering—replacing the existing 2004 and 2007 technical reports. Many claims are made about how certain tools, technologies, and practices improve software development. But which claims are verifiable, and which are merely wishful thinking? In this book, leading thinkers such as Steve McConnell, Barry Boehm, and Barbara Kitchenham offer essays that uncover the truth and unmask myths commonly held among the software development community. Their insights may surprise you. Are some programmers really ten times more productive than others? Does writing tests first help you develop better code faster? Can code metrics predict the number of bugs in a piece of software? Do design patterns actually make better software? What effect does personality have on pair programming? What matters more: how far apart people are geographically, or how far apart they are in the org chart? Contributors include: Jorge Aranda Tom Ball Victor R. Basili Andrew Begel Christian Bird Barry Boehm Marcelo Cataldo Steven Clarke Jason Cohen Robert DeLine Madeline Diep Hakan Ergodmus Michael Godfrey Mark Guzdial Jo E. Hannay Ahmed E. Hassan Israel Herзаам Kim Sebastian Herzig Cory Kapser Barbara Kitchenham Andrew Ko Lucas Layman Steve McConnell Tim Menzies Gail Murphy Nachi Nagappan Thomas J.

A groundbreaking book in this field, Software Engineering Foundations: A Software Science Perspective integrates the latest research, methodologies, and their applications into a unified theoretical framework. Based on the author's 30 years of experience, it examines a wide range of underlying theories from philosophy, cognitive informatics, denot

This book constitutes the thoroughly refereed post-proceedings of the International Dagstuhl-Seminar on Empirical Software Engineering, held in Dagstuhl Castle, Germany in June 2006. The 54 revised full papers in this state-of-the-art survey are organized in topical sections on the empirical paradigm, measurement and model building, technology transfer and education, as well as roadmapping.

"This book provides integrated chapters on software engineering and enterprise systems focusing on parts integrating requirements engineering, software engineering, process and frameworks, productivity technologies, and enterprise systems"--Provided by publisher.

Developing projects outside of a classroom setting can be intimidating for students and is not always a seamless process. Real-World Software Projects for Computer Science and Engineering Students is a quick, easy source for tackling such issues. Filling a critical gap in the research literature, the book: Is ideal for academic project supervisors. Helps researchers conduct interdisciplinary research. Guides computer science students on undertaking and implementing research-based projects This book explains how to develop highly complex, industry-specific projects touching on real-world complexities of software developments. It shows how to develop projects for students who have not yet had the chance to gain real-world experience, providing opportunity to become familiar with the skills needed to implement projects using standard development methodologies. The book is also a great source for teachers of undergraduate students in software engineering and computer science as it can help students prepare for the risk and uncertainty that is typical of software development in industrial settings.

Today, software engineers need to know not only how to program effectively but also how to develop proper engineering practices to make their codebase sustainable and healthy. This book emphasizes this difference between programming and software engineering. How can software engineers manage a living codebase that evolves and responds to changing requirements and demands over the length of its life? Based on their experience at Google, software engineers Titus Winters and Hyrum Wright, along with technical writer Tom Manshreck, present a candid and insightful look at how some of the world's leading practitioners construct and maintain software. This book covers Google's unique engineering culture, processes, and tools and how these aspects contribute to the effectiveness of an engineering organization. You'll explore three fundamental principles that software organizations should keep in mind when designing, architecting, writing, and maintaining code: How time affects the sustainability of software and how to make your code resilient over time How scale affects the viability of software practices within an engineering organization What trade-offs a typical engineer needs to make when evaluating design and development decisions "This book explores different applications in V & V that spawn many areas of software development -including real time applications- where V & V techniques are required, providing in all cases examples of the applications"--Provided by publisher.

Evidence-Based Software Engineering and Systematic Reviews

The nearly 60 essays in this book--always easily digestible, often profound, and never too serious--take up large themes and important questions, never shying away from controversy. (Computer Books)

As the software industry continues to evolve, professionals are continually searching for practices that can assist with the various problems and challenges in information technology (IT). Agile development has become a popular method of research in recent years due to its focus on adapting to change. There are many factors that play into this process, so success is no guarantee. However, combining agile development with other software engineering practices could lead to a high rate of success in problems that arise during the maintenance and development of computing technologies.

Software Engineering for Agile Application Development is a collection of innovative research and development with other software engineering practices could lead to a high rate of success in problems that arise during the maintenance and development of computing technologies.

The presented materials combine theories from current empirical research results as well as practical experiences from real projects that provide insights into incorporating agile qualities into the architecture of the software so that the product adapts to changes and is easy to maintain. While highlighting topics including continuous integration, configuration management, and business modeling, this book is ideally designed for software engineers, software developers, engineers, project managers, IT specialists, data scientists, computer science professionals, researchers, students, and academicians.

Although there are countless books on statistics, few are dedicated to the application of statistical methods to software engineering. Simple Statistical Methods for Software Engineering: Data and Patterns fills that void. Instead of delving into overly complex statistics, the book details simpler solutions that are just as effective and connect with the intuition of problem solvers. Sharing valuable insights into software engineering problems and solutions, the book not only explains the required statistical methods, but also provides many examples, review questions, and case studies that provide the understanding required to apply those methods to real-world problems. After reading this book, practitioners will possess the confidence and understanding to solve day-to-day problems in quality, measurement, performance, and benchmarking. By following the examples and case studies, students will be better prepared to achieve seamless transition from academic study to industry practices. Includes boxed stories, case studies, and illustrations that demonstrate the nuances behind proper application Supplies historical anecdotes and traces statistical methods to inventors and gurus Applies basic statistical laws in their simplest forms to resolve engineering problems Provides simple techniques for addressing the issues software engineers face The book starts off by reviewing the essential facts about data. Next, it supplies a detailed review and summary of metrics, including development, maintenance, test, and agile metrics. The third section covers the fundamental laws of probability and statistics and the final section presents special data patterns in the form of tailed mathematical distributions. In addition to selecting simpler and more flexible tools, the authors have also simplified several standard techniques to provide you with the set of intellectual tools all software engineers and managers require.

This book focuses on a specialized branch of the vast domain of software engineering: component-based software engineering (CBSE). Component-Based Software Engineering: Methods and Metrics enhances the basic understanding of components by defining categories, characteristics, repository, interaction, complexity, and composition. It divides the research domain of CBSE into three major sub-domains: (1) reusability issues, (2) interaction and integration issues, and (3) testing and reliability issues. This book covers the state-of-the-art literature survey of at least 20 years in the domain of reusability, interaction and integration complexities, and testing and reliability issues of component-based software engineering. The aim of this book is not only to review and analyze the previous works conducted by eminent researchers, academicians, and organizations in the context of CBSE, but also suggests innovative, efficient, and better solutions. A rigorous and critical survey of traditional and advanced paradigms of software engineering is provided in the book. Features: In-interactions and Out-
Interactions both are covered to assess the complexity. In the context of CBSE both white-box and black-box testing methods and their metrics are described. This work covers reliability estimation using reusability which is an innovative method. Case studies and real-life software examples are used to explore the problems and their solutions. Students, research scholars, software developers, and software designers or individuals interested in software engineering, especially in component-based software engineering, can refer to this book to understand the concepts from scratch. These measures and metrics can be used to estimate the software before the actual coding commences.

Market_Desc: · Programmers· Software Engineers· Requirements Engineers· Software Quality Engineers Special Features: · Offers detailed coverage of software measures. Exposes students to quantitative methods of identifying important features of software products and processes· Complete Case Study. Through an air traffic control study, students can trace the application of methods and practices in each chapter· Problems. A broad range of problems and references follow each chapter· Glossary of technical terms and acronyms facilitate review of basic ideas· Example code given in C++ and Java· References to related web pages make it easier for students to expand horizons

About The Book: This book is the first comprehensive study of a quantitative approach to software engineering, outlining prescribed software design practices and measures necessary to assess software quality, cost, and reliability. It also introduces Computational Intelligence, which can be applied to the development of software systems.

Research and Evidence in Software Engineering: From Empirical Studies to Open Source Artifacts introduces advanced software engineering to software engineers, scientists, postdoctoral researchers, academicians, software consultants, management executives, doctoral students, and advanced level postgraduate computer science students. This book contains research articles addressing numerous software engineering research challenges associated with various software development-related activities, including programming, testing, measurements, human factors (social software engineering), specification, quality, program analysis, software project management, and more. It provides relevant theoretical frameworks, empirical research findings, and evaluated solutions addressing the research challenges associated with the above-mentioned software engineering activities. To foster collaboration among the software engineering research community, this book also reports datasets acquired systematically through scientific methods and related to various software engineering aspects that are valuable to the research community. These datasets will allow other researchers to use them in their research, thus improving the quality of overall research. The knowledge disseminated by the research studies contained in the book will hopefully motivate other researchers to further innovation in the way software development happens in real practice.

This book presents a significant advancement in the theory and practice of knowledge engineering, the discipline concerned with the development of intelligent agents that use knowledge and reasoning to perform problem solving and decision-making tasks. It covers the main stages in the development of a knowledge-based agent: understanding the application domain, modeling problem solving in that domain, developing the ontology, learning the reasoning rules, and testing the agent. The book focuses on a special class of agents: cognitive assistants for evidence-based reasoning that learn complex problem-solving expertise directly from human experts, support experts, and nonexperts in problem solving and decision making, and teach their problem-solving expertise to students. A powerful learning agent shell, Disciple-EBR, is included with the book, enabling students, practitioners, and researchers to develop cognitive assistants rapidly in a wide variety of domains that require evidence-based reasoning, including intelligence analysis, cybersecurity, law, forensics, medicine, and education.

"This book provides coverage of recent advances in the area of secure software engineering that address the various stages of the development process from requirements to design to testing to implementation"--Provided by publisher.

Evidence-Based Software Engineering and Systematic Reviews provides a clear introduction to the use of an evidence-based model for software engineering research and practice. It explains the roles of primary studies (experiments, surveys, case studies) as elements of an over-arching evidence model, rather than as disjointed elem

In this book, the authors highlight recent findings that hold the potential to improve software products or development processes; in addition, they help readers understand new concepts and technologies, and to see what it takes to migrate from old to new platforms. Some of the authors have spent most of their careers in industry, working at the frontiers of practice-based innovation, and are at the same time prominent researchers who have made significant academic contributions. Others work together with industry to test, in industrial settings, the methods they've developed in the lab. The choice of subject and authors represent the key elements of this book. Its respective chapters cover a wide range of topics, from cloud computing to agile development, applications of data science methods, re-engineering of aging applications into modern ones, and business and requirements engineering. Taken together, they offer a valuable asset for practitioners and researchers alike.

"This book provides analysis, characterization and refinement of software engineering data in terms of machine learning methods. It depicts applications of several machine learning approaches in software systems development and deployment, and the use of machine learning methods to establish predictive models for software quality while offering readers suggestions by proposing future work in this emerging research field"--Provided by publisher.

This book identifies challenges and opportunities in the development and implementation of software that contain significant statistical content. While emphasizing the relevance of using rigorous statistical and probabilistic techniques in software engineering contexts, it presents opportunities for further research in the statistical sciences and their applications to software engineering. It is intended to motivate and attract new researchers from statistics and the mathematical sciences to attack relevant and pressing problems in the software engineering setting. It describes the "big picture," as this approach provides the context in which statistical methods must be developed. The book's survey nature is directed at the mathematical sciences audience, but software engineers should also find the statistical emphasis refreshing and stimulating. It is hoped that the book will have the effect of seedling the field of statistical software engineering by its indication of opportunities where statistical thinking can help to increase understanding, productivity, and quality of software engineering. Authors also present detailed practical guidelines on the preparation, conduct, design and reporting of case studies of software engineering. This is the first software engineering specific book on the case study research method.

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