

Casting Defect Analysis

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[Casting Processes and Modelling of Metallic Materials](#), Sep 22 2021 This book, [Casting Processes and Modelling of Metallic Materials](#), explores the various casting and modelling activities related to metallic alloy systems. The book provides results of research work conducted by experts from all over the globe to add to the research community in the era of the casting process and modelling. The book was edited by two experts in the field of materials science and modelling, Dr. Abdallah and Dr. Aldoumani, whom both have several publications in peer-reviewed journals, worldwide conferences, and scientific books. The book introduces the casting processes and then discusses the various issues and possible solutions. Over the past years, various models have been proposed and utilized to predict the performance of castings. Some of these models proved to be accurate whereas others failed to predict the casting performance. The strength of any predictive tool depends on the employment of physically meaningful parameters that replicate the real-life conditions. This has been illustrated

in the current book with such predictive models and finite element (FE) modelling to illustrate the behaviour of castings in real-life conditions.

Casting Defects Handbook Aug 10 2020

Technologies for Sustainable Development Feb 02 2020 This volume contains a selection of papers presented at the 7th Nirma University International Conference on Engineering 'NUiCONE 2019'. This conference followed the successful organization of four national conferences and six international conferences in previous years. The main theme of the conference was "Technologies for Sustainable Development", which is in line with the "SUSTAINABLE DEVELOPMENT GOAL" established by the United Nations. The conference was organized with many inter-disciplinary technical themes encompassing a broad range of disciplines and enabling researchers, academicians and practitioners to choose between ideas and themes. Besides, NUiCONE-2019 has also presented an exciting new set of events to engage practicing engineers, technologists and technopreneurs from industry through special knowledge sharing sessions involving applied technical papers based on case-study applications, white-papers, panel discussions, innovations and technology products. This proceedings will definitely provide a platform to proliferate new findings among researchers. Advances in Transportation Engineering Emerging Trends in Water Resources and Environmental Engineering Construction Technology and Management Concrete and Structural Engineering Futuristic Power System Control of Power Electronics Converters, Drives and E-mobility Advanced Electrical Machines and Smart Apparatus Chemical Process Development and Design Technologies and Green Environment Sustainable Manufacturing Processes Design and Analysis of Machine and Mechanism Energy Conservation and Management Advances in Networking Technologies Machine Intelligence / Computational Intelligence Autonomic Computing Control and Automation Electronic Communications Electronics Circuits and System Design Signal Processing

METAL CASTING Oct 24 2021 This book presents a scientific approach to metal casting design and analysis supported by software tools. Unlike other books in metal casting focused only on the process know-how, this book uncovers the know-why as well. Besides serving the needs of students of mechanical, production and metallurgical engineering, this book is equally meant to benefit practicing engineers involved or interested in casting development, including product designers, toolmakers, foundry engineers, supply chain managers, engineering consultants, researchers, and software developers. The theory discussed in the book is applicable to all types of castings: ferrous and non-ferrous, produced in sand and metal moulds. By gaining a better understanding of the theory and logic involved through creating, analysing and optimizing virtual castings, the readers will learn how to: Design process-friendly cast products, leading to shorter development time Manufacture assured quality castings, leading to fewer rejections and 'surprises' Manage material and energy utilization, leading to higher yield and lower costs.

Casting Design and Performance May 31 2022

Handbook of Production of Ductile Iron Aug 22 2021 "Handbook of Production of Ductile Iron through Case Studies & Practical Tips." This Handbook is for reference for the Practicing Foundry Engineers and workers to solve their troubleshooting during Production of Ductile Iron Castings as per global specifications. This Handbook is giving Case Studies and Practical Tips during five main stages 1. Selection of raw materials 2. Melting of metal in Induction Furnace to give good metallurgical quality of metal. 3. Magnesium Treatment Processes 4. Actual Magnesium Treatment- Mechanism of Nodule formation 5. Inoculation Processes- Purpose of this stage. 6. Concept of Hardenability and various Heat Treatments given to Ductile Iron 7. Compacted Graphite Cast Iron 8. Metallographic Analysis 9. Casting Defect Analysis through case studies. 10. More than 100 Tables. Please note that each chapter contains number of actual case studies solved by the author and Questions & Answers.

Stainless Steel Castings Jan 27 2022

Precision Forming Technology of Large Superalloy Castings for Aircraft Engines Mar 17 2021 This book describes systematically the theory and technology of the precision forming of large, complex and thin-walled superalloy castings for aircraft engines, covering all the important basic aspects of the manufacturing process, including process design, wax pattern, ceramic molds, casting and solidification, heat treatment, repair casting and dimension precision

control. The correlation of casting defects, structural characteristics and performance of castings is revealed through a range of tests. It also discusses the latest technologies and advances in this field – such as imaging the solidification process by means of synchrotron radiography, 3D computerized tomography and reconstruction of microporosity defects, analysis and diagnosis of error sources for dimension over-tolerance and adjusted pressure casting technology – which are of particular interest. Providing essential insights, the book offers a valuable guide to the design and manufacture of superalloy casting parts for aircraft engines.

Advances in Mechanical Processing and Design Jul 29 2019 This book presents selected proceedings of the International Conference on Advances in Mechanical Processing and Design (ICAMPD 2019). The contents highlight latest research in next-generation mechanical systems design, thermal and fluid systems design, materials and smart manufacturing processes, and industrial engineering. Some of the topics covered include smart materials, materials processing and applications, smart machinery and machine design, system dynamics and simulation, biomimetics, energy systems, micro- and nano-scale transport, automotive engineering, advance material characterization and testing, and green and sustainable manufacturing. Given the scope of the contents, this book can be of interest to students, researchers as well as industry professionals.

High Integrity Die Casting Processes Oct 31 2019 "It's about time that a practicing engineer with casting and academic experience has written a book that provides answers to questions about squeeze casting and semi-solid molding/forming that many engineers and students of casting need answered." —Joseph C. Benedyk, PhD, Consultant and retired technical director, Alcoa High Integrity Die Casting Processes provides a comprehensive look at the concepts behind advanced die casting technologies, including vacuum die casting, squeeze casting, and several variants of semi-solid metalworking. Practical applications for these processes are illustrated in numerous case studies. This single-source reference tool presents the latest material in five sections: Basic concepts of die casting and molten metal flow High integrity die casting processes with case studies Product design considerations Controlling quality and avoiding defects Future advances under development Key coverage includes a survey of liquid metal flow, strategies to overcome the limitations of conventional die casting, and potential defects unique to high integrity die casting processes. Also featured are methods for minimizing porosity, reducing cost by design, practical applied statistical process control techniques, designing for manufacturability, and containment methods for potential processing defects. Several chapters present detailed real-world examples illustrating the broad range of applications possible using high integrity die casting processes. Included with this book is a CD-ROM containing PowerPoint(r) presentations for each chapter. These presentations can be used for training purposes in conjunction with numerous study questions designed to practically apply the content of the book to real-world situations. Selected PowerPoint(r) slides can be used to support engineering proposals, marketing presentations, or customer education seminars. High Integrity Die Casting Processes is a valuable reference for both component producers and component users alike. Process engineers, tool designers, manufacturing engineers, production managers, and machine operators will acquire a better understanding of these advanced die casting processes to optimize manufacturing and improve product quality. Component designers, product engineers, purchasing agents, buyers, supplier quality engineers, and project managers will gain insight into these processes and develop superior products by design.

Data-Driven Optimization of Manufacturing Processes Aug 02 2022 All machining process are dependent on a number of inherent process parameters. It is of the utmost importance to find suitable combinations to all the process parameters so that the desired output response is optimized. While doing so may be nearly impossible or too expensive by carrying out experiments at all possible combinations, it may be done quickly and efficiently by using computational intelligence techniques. Due to the versatile nature of computational intelligence techniques, they can be used at different phases of the machining process design and optimization process. While powerful machine-learning methods like gene expression programming (GEP), artificial neural network (ANN), support vector regression (SVM), and more can be used at an early phase of the design and optimization process to act as predictive models for the actual experiments, other metaheuristics-based methods like cuckoo search, ant colony optimization, particle swarm optimization, and others can be used to optimize these predictive models to find the optimal process parameter combination. These machining and optimization processes are the future of manufacturing. Data-

Driven Optimization of Manufacturing Processes contains the latest research on the application of state-of-the-art computational intelligence techniques from both predictive modeling and optimization viewpoint in both soft computing approaches and machining processes. The chapters provide solutions applicable to machining or manufacturing process problems and for optimizing the problems involved in other areas of mechanical, civil, and electrical engineering, making it a valuable reference tool. This book is addressed to engineers, scientists, practitioners, stakeholders, researchers, academicians, and students interested in the potential of recently developed powerful computational intelligence techniques towards improving the performance of machining processes.

Comprehensive Materials Processing Apr 17 2021 *Comprehensive Materials Processing* provides students and professionals with a one-stop resource consolidating and enhancing the literature of the materials processing and manufacturing universe. It provides authoritative analysis of all processes, technologies, and techniques for converting industrial materials from a raw state into finished parts or products. Assisting scientists and engineers in the selection, design, and use of materials, whether in the lab or in industry, it matches the adaptive complexity of emergent materials and processing technologies. Extensive traditional article-level academic discussion of core theories and applications is supplemented by applied case studies and advanced multimedia features. Coverage encompasses the general categories of solidification, powder, deposition, and deformation processing, and includes discussion on plant and tool design, analysis and characterization of processing techniques, high-temperatures studies, and the influence of process scale on component characteristics and behavior. Authored and reviewed by world-class academic and industrial specialists in each subject field Practical tools such as integrated case studies, user-defined process schemata, and multimedia modeling and functionality Maximizes research efficiency by collating the most important and established information in one place with integrated applets linking to relevant outside sources

International Atlas of Casting Defects Nov 05 2022

Advances in Interdisciplinary Research in Engineering and Business Management Jul 21 2021 The volume contains latest research on software reliability assessment, testing, quality management, inventory management, mathematical modeling, analysis using soft computing techniques and management analytics. It links researcher and practitioner perspectives from different branches of engineering and management, and from around the world for a bird's eye view on the topics. The interdisciplinarity of engineering and management research is widely recognized and considered to be the most appropriate and significant in the fast changing dynamics of today's times. With insights from the volume, companies looking to drive decision making are provided actionable insight on each level and for every role using key indicators, to generate mobile-enabled scorecards, time-series based analysis using charts, and dashboards. At the same time, the book provides scholars with a platform to derive maximum utility in the area by subscribing to the idea of managing business through performance and business analytics.

Advanced High-Strength Steels Feb 13 2021 Examines the types, microstructures and attributes of AHSS Also reviews the current and future applications, the benefits, trends and environmental and sustainability issues.

Handbook of Materials Failure Analysis with Case Studies from the Aerospace and Automotive Industries Mar 05 2020 *Handbook of Materials Failure Analysis: With Case Studies from the Aerospace and Automotive Industries* provides a thorough understanding of the reasons materials fail in certain situations, covering important scenarios, including material defects, mechanical failure as a result of improper design, corrosion, surface fracture, and other environmental causes. The book begins with a general overview of materials failure analysis and its importance, and then logically proceeds from a discussion of the failure analysis process, types of failure analysis, and specific tools and techniques, to chapters on analysis of materials failure from various causes. Later chapters feature a selection of newer examples of failure analysis cases in such strategic industrial sectors as aerospace, oil & gas, and chemicals. Covers the most common types of materials failure, analysis, and possible solutions Provides the most up-to-date and balanced coverage of failure analysis, combining foundational knowledge, current research on the latest developments, and innovations in the field Ideal accompaniment for those interested in materials forensic investigation, failure of materials, static failure analysis, dynamic failure analysis, fatigue life prediction, rotorcraft, failure prediction, fatigue crack

propagation, bevel pinion failure, gasketless flange, thermal barrier coatings Presents compelling new case studies from key industries to demonstrate concepts Highlights the role of site conditions, operating conditions at the time of failure, history of equipment and its operation, corrosion product sampling, metallurgical and electrochemical factors, and morphology of failure

The Mechanisms of Metallurgical Failure May 07 2020 Metallurgy of Fracture: The Mechanics of Metal Failure looks at the origin of metal defects, their related mechanisms of failure, and the modification of casting procedures to eliminate these defects, clearly connecting the strength and durability of metals with their fabrication process. The book starts with a focus on the fracture of liquids, looking at topics such as homogeneous and heterogeneous nucleation, entrainment processes in bifilms and bubbles, furling and unfurling, ingot casting, continuous casting, and more. From there it discusses fracture of liquid and solid state, focusing on topics such as externally and internally initiated tearing. The book then concludes with a section discussing fracture of solid metals covering concepts such as ductility and brittleness, dislocation mechanisms, the relationship between the microstructure and properties of metals, corrosion, hydrogen embrittlement, and more. Improved approaches to fabrication and casting processes that will help eliminate these defects are provided throughout. Looks at how the fracture of metals originates in the liquid-state due to poor casting practices Offers improved casting techniques to reduce liquid-state borne fracture Draws attention to the parallels between fracture initiation in the liquid and solid states Covers spall tests and how to improve material quality by hot isostatic pressing

ICCAP 2021 Apr 29 2022 This proceeding constitutes the thoroughly refereed proceedings of the 1st International Conference on Combinatorial and Optimization, ICCAP 2021, December 7-8, 2021. This event was organized by the group of Professors in Chennai. The Conference aims to provide the opportunities for informal conversations, have proven to be of great interest to other scientists and analysts employing these mathematical sciences in their professional work in business, industry, and government. The Conference continues to promote better understanding of the roles of modern applied mathematics, combinatorics, and computer science to acquaint the investigator in each of these areas with the various techniques and algorithms which are available to assist in his or her research. We selected 257 papers were carefully reviewed and selected from 741 submissions. The presentations covered multiple research fields like Computer Science, Artificial Intelligence, internet technology, smart health care etc., brought the discussion on how to shape optimization methods around human and social needs.

Innovation, Communication and Engineering Jun 27 2019 This volume represents the proceedings of the 2013 International Conference on Innovation, Communication and Engineering (ICICE 2013). This conference was organized by the China University of Petroleum (Huadong/East China) and the Taiwanese Institute of Knowledge Innovation, and was held in Qingdao, Shandong, P.R. China, October 26 - November 1, 2013. The conference received 653 submitted papers from 10 countries, of which 214 papers were selected by the committees to be presented at ICICE 2013. The conference provided a unified communication platform for researchers in a wide range of fields from information technology, communication science, and applied mathematics, to computer science, advanced material science, design and engineering. This volume enables interdisciplinary collaboration between science and engineering technologists in academia and industry as well as networking internationally. Consists of a book of abstracts (260 pp.) and a USB flash card with full papers (912 pp.).

Metal Casting: Principles And Practice Jan 03 2020 In This Book, The Topics/Syllabus Adequately Cover Metal Casting Subject In The Courses Of Mechanical, Production And Metallurgy Branches For B.E., B.Tech. As Well As Production And Industrial Metallurgy For M.Tech. With His Direct Experience In Metal Casting Industry And Teaching Academics The Author Attempts To Bridge The Gap Existing Between Essential Theory In Books And Vital Practical Applications In Industry. It Contains All The Molding Processes Normally Used With Details Of Ingredient Testing, Different Stages Of Casting Production Essential Theory Of Gating And Riser, As Well As Finishing, Inspection And Quality Control. Over 80 Line Sketches Facilitate Easy Understanding. Information Given Through Over 20 Tables Help Easy Comprehension, Comparison And Remembrance. Exhaustive Examples Of Specific Components Normally Made By Casting Process Help To Build Confidence When Entering Industry. Over 200 Technical Books And Research Papers Upto

May 1996 Are Referred. Examples Of Working Computer Programs Given, Form The Basis For Modern Practice-Oriented Projects In Final Year.For Practising Engineers, Managers And Entrepreneurs, This Book Provides Useful Theory And Practical Aspects On Foundry Management. Exhaustive Treatment Of Critical Gating & Rising With Many Industry Examples, Practical Solutions To Melting Problems, Casting Defects Analysis Through Cause-Effect Diagrams Will Be Very Useful. Essential Information. On Energy Conservation And Environmental Pollution Control Is Also Given In The Last Chapter.

Analysis of Casting Defects Jul 01 2022

Directional Solidification of Steel Castings Jul 09 2020 Directional Solidification of Steel Castings summarizes the results of a large number of investigations, mostly scientific in character, on the directional solidification of steel castings. The influence of design on the technical possibilities of producing casting in the foundry is examined. Diagrams, simple basic rules, and formulae are provided, along with many practical examples. This book is comprised of 16 chapters and begins with an introduction to the technical and psychological aspects of steel casting before turning to a discussion of the influence of shape and dimensions on the time it takes for castings to solidify. The thermal gradient, feeder heads, and cavities in steel castings are then considered. In particular, the effect of the thermal gradient on solidification and feeding range are examined. Methods for increasing the thermal gradient in the casting are described, including the use of mold heating pads, breaker cores or Washburn cores; external cooling (iron chills); cooling fins; internal chills; and exothermic pads. Cavities in steel castings which are commonly mistaken for true shrinkage cavities are also analyzed. This monograph is particularly suitable for foundry managers, foremen, technicians, casting designers, and students.

Advanced Engineering Optimization Through Intelligent Techniques Jun 07 2020 This book comprises select peer-reviewed papers presented at the International Conference on Advanced Engineering Optimization Through Intelligent Techniques (AEOTIT) 2018. The book combines contributions from academics and industry professionals, and covers advanced optimization techniques across all major engineering disciplines like mechanical, manufacturing, civil, automobile, electrical, chemical, computer and electronics engineering. Different optimization techniques and algorithms such as genetic algorithm (GA), differential evolution (DE), simulated annealing (SA), particle swarm optimization (PSO), artificial bee colony (ABC) algorithm, artificial immune algorithm (AIA), teaching-learning-based optimization (TLBO) algorithm and many other latest meta-heuristic techniques and their applications are discussed. This book will serve as a valuable reference for students, researchers and practitioners and help them in solving a wide range of optimization problems.

Quality and Reliability Engineering: Recent Trends and Future Directions Dec 14 2020 International conference supported by Indian Statistical Institute, held at Bangalore, 20-22 December, 2011; selected papers.

Metallurgy of Failure Analysis Jan 15 2021 Complete Investigative Toolkit for Metal Failure-Design or Process Whether the problem is corrosion on the working surfaces of valuable or life-essential machinery, breakdowns in linchpin equipment, or life-threatening faults in air- or spacecraft, the causes must be found so that future disasters may be prevented. Metallurgy of Failure Analysis puts the tools for finding the answers in your hands. A complete guide to all types of metal failure, both design and process, it features: coverage of faults due to casting, forging, welding, machining, and heat treatment; analysis of the concepts and mechanisms of fatigue, stress corrosion, hydrogen embrittlement, and more; remedial measure for corrosion, overload, fatigue, and wear; investigative procedures including destructive, nondestructive, and fractographic analysis.

Science and Technology of Casting Processes Oct 04 2022 This book deals with various science and technology factors that need careful consideration in producing a casting. It consists of 11 chapters contributed by experts in their respective fields. The topics include simulation of continuous casting process, control of solidification of continuous castings, influence of mold flux in continuous casting, segregation in strip casting of steel, developments in shell and solid investment mold processes, innovative pressure control during filling of sand molds, fracture toughness specifically of castings, permanent molding of cast iron, wear resistant castings and improvement of accuracy in estimating graphite nodularity in ductile iron castings.

Casting defects handbook : Aluminium and Aluminium alloys Dec 26 2021

Proceedings of the National Conference on Investment Casting Feb 25 2022 Contributed papers presented at the conference held at Central Mechanical Engineering Research Institute, Durgapur.

Shape Casting Sep 03 2022 This book contains a collection of papers on the science, engineering, and technology of shape casting, with contributions from researchers worldwide. Among the topics that are addressed are the structure-property-performance relationships, modeling of casting processes, and the effect of casting defects on the mechanical properties of cast alloys.

Analysis of Casting Defects Mar 29 2022 This book helps foundrymen eliminate or minimize inherent casting problems, improve casting quality and reduce cleaning and finishing costs.

Shape Casting Nov 24 2021 This book contains a collection of papers on the science, engineering, and technology of shape casting, with contributions from researchers worldwide. Among the topics that are addressed are the structure-property-performance relationships, modeling of casting processes, and the effect of casting defects on the mechanical properties of cast alloys.

CFD Modeling and Simulation in Materials Processing Dec 02 2019 Proceedings of a symposium sponsored by Association for Iron and Steel Technology and the Process Technology and Modeling Committee of the Extraction and Processing Division and the Solidification Committee of the Materials Processing and Manufacturing Division of TMS (The Minerals, Metals & Materials Society) Held during the TMS 2012 Annual Meeting & Exhibition Orlando, Florida, USA, March 11-15, 2012

Modeling for Casting and Solidification Processing May 19 2021 This text seeks to provide a comprehensive technical foundation and practical examples for casting process modelling technology. It highlights fundamental theory for solidification and useful applications for industrial production. It also details shape and ingot castings, semi-solid metalworking, and spray forming.

Principles of Metal Casting Oct 12 2020

Effect of Geometry on Quality of Casting in Gravity Casting Process Nov 12 2020 As in any Casting process, Gravity die casting process has a significant rejection due to defective casting process. There are many factors which affects these defects in the component. One of the main reasons is the improper design of the component itself. If the component geometry is properly studied and analyzed, it can effectively reduce the defects arising in the casting of a component. Design For Manufacturability (DFM) during the component design stage eliminates the need for tool correction and re-tooling at the later stage of product life cycle which will indirectly increase the cost of the end product. The main objective of this research work is to study the geometry of the Gravity Casting Part, understand the defect pattern using Non destructive testing and thermal analysis and relate the geometry parameters to the induced defect in the casting. The idea is also to prepare a set of recommendation as a tool for Design for Manufacturability for Gravity Casting Process.

Foundry Technology Jun 19 2021 Introduction; Liquid Metals and the Gating of Castings; Solidification 1 -- Crystallization and the development of cast structure; Solidification 2 -- the Feeding of Castings; The Moulding Material -- Properties, Preparation and Testing; Defects in Castings; Quality Assessment and Control; Casting Design; Production Techniques 1 -- the Manufacture of Sand Castings; Mould Production; Melting and Casting; Finishing Operations; Production Techniques 2 -- Shell, Investment and Die Casting Techniques; Production Techniques 3 -- Further Casting techniques; Environmental Protection, Health and Safety; Appendix; Index.

Industry 4.0 and Advanced Manufacturing Apr 05 2020 This book presents selected papers from the 1st International Conference on Industry 4.0 and Advanced Manufacturing held at the Indian Institute of Science, Bangalore and includes deliberations from stakeholders in manufacturing and Industry 4.0 on the nature, needs, challenges, opportunities, problems, and solutions in these transformational areas. Special emphasis is placed on exploring avenues for creating a vision of, and enablers for, sustainable, affordable, and human-centric Industry 4.0. The book showcases cutting edge practice, research, and

educational innovation in this crucial and rapidly evolving area. This book will be useful to researchers in academia and industry, and will also be useful to policymakers involved in creating ecosystems for implementation of Industry 4.0.

Advances in Materials Research Sep 30 2019 This book comprises select peer-reviewed proceedings of the International Conference on Advances in Materials Research (ICAMR 2019). The contents cover latest research in materials and their applications relevant to composites, metals, alloys, polymers, energy and phase change. The indigenous properties of materials including mechanical, electrical, thermal, optical, chemical and biological functions are discussed. The book also elaborates the properties and performance enhancement and/or deterioration in order of the modifications in atomic particles and structure. This book will be useful for both students and professionals interested in the development and applications of advanced materials.

Advances in Material Sciences and Engineering Aug 29 2019 This book presents selected papers from the 4th International Conference on Mechanical, Manufacturing and Plant Engineering (ICMMPE 2018), which was held in Melaka, Malaysia from the 14th to the 15th of November 2018. The proceedings discuss genuine problems concerning joining technologies that are at the heart of various manufacturing sectors. In addition, they present the outcomes of experimental and numerical works addressing current problems in soldering, arc welding and solid-state joining technologies.

Ambient Communications and Computer Systems Sep 10 2020 This book includes high-quality, peer-reviewed papers from the International Conference on Recent Advancement in Computer, Communication and Computational Sciences (RACCCS-2018), held at Aryabhata College of Engineering & Research Center, Ajmer, India on August 10–11, 2018, presenting the latest developments and technical solutions in computational sciences. Networking and communication are the backbone of data science, data- and knowledge engineering, which have a wide scope for implementation in engineering sciences. This book offers insights that reflect the advances in these fields from upcoming researchers and leading academicians across the globe. Covering a variety of topics, such as intelligent hardware and software design, advanced communications, intelligent computing technologies, advanced software engineering, the web and informatics, and intelligent image processing, it helps those in the computer industry and academia use the advances in next-generation communication and computational technology to shape real-world applications.

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