


# Visualization and Mapping of Knowledge and Science Landscapes in Expert Systems With Applications Journal: A 30 Years' Bibliometric Analysis

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## Abstract

The *Expert Systems With Applications* (ESWA) is a leading journal in the fields of computer science and engineering. Motivated by its outstanding performance, this paper seeks to develop a comprehensive overview of research activities in ESWA since its inception in 1990. In this regard, bibliometric techniques have been utilized to characterize the status quo, dynamics, and development trends of research patterns in ESWA. In doing so, the work used Scopus database as a source of data required. A data visualization software, visualization of similarities (VOS) viewer, was used to map the bibliographic material. The Scopus database yielded 12,254 documents published in ESWA from 105 countries with an average of 408 documents/year. The most productive country was Taiwan (2,069 documents; 17.0%). National Cheng Kung University, Taiwan, was the most productive institution (219 documents; 1.8%). The major topics which will continue to be active include genetic algorithms, data mining, neural networks, support vector machines, classification and machine learning, feature selection, particle swarm optimization, fuzzy logic, and clustering. The outcomes underline the significant growth of ESWA through time. The vitality of topics addressed in ESWA to solve real-world problems boosts the progress and advancements of knowledge in this journal.

## Keywords

artificial intelligence, expert systems, visualization maps, bibliometric indicators, content analysis

## Introduction

The expert systems as reliable decision-making systems have a great potential in solving many problems that mostly entail a human expert. These systems are computational applications utilizing convenient logical reasoning with an intention of providing a subject-matter expertise to non-experts in a particular field (Roy et al., 2015). As a part of applied artificial intelligence, the expert systems have been developed in the mid of 1960s by the artificial intelligence community. The knowledge in expert systems are transferred from human experts to computers, stored and called upon by users for a particular advice (Shu-Hsien, 2005). The building of any expert system is based primarily on a deep knowledge of a specific subject area that can be acquired from specialties and experts in the subject area. The research in expert systems can be considered as one of the most flourishing areas of current research activities within artificial intelligence field (Wagner, 2017). Many applications of expert systems have been developed covering a vast range of complex problems domains (i.e., accounting, financial services, manufacturing, medicine, etc.) (Wagner, 2017). In association

with the evolution of expert systems, many scientific journals have been emerged on this topic to report the developments and advancements in this regard.

The expert systems science and application community is increasing exponentially. This is evident by the large amount and high-quality research works on this topic. Many well-respected and influential journals are active in publishing relevant research. The *Expert Systems With Applications* (ESWA) journal published by Elsevier is one of the most prominent journals which are devoted to reporting the new research findings in the domain of expert systems and their applications. The scope of ESWA journal covers topics in relation to designing, development, testing, implementation, and/or management of expert and intelligent models and also

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# Expert Systems Journal

**Noura Metawa, Mohamed  
Elhoseny, Aboul Ella Hassanien, M.  
Kabir Hassan**

## **Expert Systems Journal:**

**Expert Systems** Petrică Vizureanu, 2010-01-01 Expert systems represent a branch of artificial intelligence aiming to take the experience of human specialists and transfer it to a computer system The knowledge is stored in the computer which by an execution system inference engine is reasoning and derives specific conclusions for the problem The purpose of expert systems is to help and support user s reasoning but not by replacing human judgement In fact expert systems offer to the inexperienced user a solution when human experts are not available This book has 18 chapters and explains that the expert systems are products of artificial intelligence branch of computer science that seeks to develop intelligent programs What is remarkable for expert systems is the applicability area and solving of different issues in many fields of architecture archeology commerce trade education medicine to engineering systems production of goods and control diagnosis problems in many industrial branches

Expert Systems and Related Topics Marlene A. Palmer, 1990-01-01 This comprehensive reference to all areas of expert systems and applications plus advanced related topics lets you spend your time reading expert systems literature rather than searching for it It gives you a source of historical perspectives and outlooks on the future of the field Whether you are a manager a developer or an end user or researcher Expert Systems and Related Topics Selected Bibliography Guide to Information Sources puts all the sources of expert systems literature at your fingertips

**Managing Expert Systems** Efraim Turban, Jay Liebowitz, 1992-01-01 Managing Expert Systems explores the trends in expert systems development and implementation As top authorities in the field of ES Turban and Liebowitz examine the factors that contribute to the development of a successful expert system

**Expert Systems Technology and Its Implication for Archives** Avra Michelson, 1991 *Proceedings of Third International Conference on Sustainable Expert Systems* Subarna Shakya, Valentina Emilia Balas, Wang Haoxiang, 2023-02-22 This book features high quality research papers presented at the 3rd International Conference on Sustainable Expert Systems ICSES 2022 held in Nepal during September 9 10 2022 The book focuses on the research information related to artificial intelligence sustainability and expert systems applied in almost all the areas of industries government sectors and educational institutions worldwide The main thrust of the book is to publish the conference papers that deal with the design implementation development testing and management of intelligent and sustainable expert systems and also to provide both theoretical and practical guidelines for the deployment of these systems

**Expert Systems and Geographic Information Systems for Impact Assessment** Agustin Rodriguez-Bachiller, John Glasson, 2004-08-12 Impact Assessment is becoming part and parcel of an increasing number of development proposals in the UK and Europe As the practice of Impact Assessment develops it becomes more standardized and good practice starts to be defined However the quality of Impact Assessment is still far from satisfactory Expert Systems and GIS for Impact Assessment

**Topics in Expert System Design** C. Tasso, G. Guida, 2014-06-28 Expert Systems are so far the most promising achievement of artificial intelligence research Decision making planning design control supervision

and diagnosis are areas where they are showing great potential However the establishment of expert system technology and its actual industrial impact are still limited by the lack of a sound general and reliable design and construction methodology This book has a dual purpose to offer concrete guidelines and tools to the designers of expert systems and to promote basic and applied research on methodologies and tools It is a coordinated collection of papers from researchers in the USA and Europe examining important and emerging topics methodological advances and practical experience obtained in specific applications Each paper includes a survey introduction and a comprehensive bibliography is provided Database and Expert Systems Applications Roland R. Wagner,1996-08-28 Content Description Includes bibliographical references and index

**Systematic Introduction to Expert Systems** Frank Puppe,2012-12-06 At present one of the main obstacles to a broader application of expert systems is the lack of a theory to tell us which problem solving methods are available for a given problem class Such a theory could lead to significant progress in the following central aims of the expert system technique Evaluating the technical feasibility of expert system projects This depends on whether there is a suitable problem solving method and if possible a corresponding tool for the given problem class Simplifying knowledge acquisition and maintenance The problem solving methods provide direct assistance as interpretation models in knowledge acquisition Also they make possible the development of problem specific expert system tools with graphical knowledge acquisition components which can be used even by experts without programming experience Making use of expert systems as a knowledge medium The structured knowledge in expert systems can be used not only for problem solving but also for knowledge communication and tutorial purposes With such a theory in mind this book provides a systematic introduction to expert systems It describes the basic knowledge representations and the present situation with regard to the identification realization and integration of problem solving methods for the main problem classes of expert systems classification diagnostics construction and simulation

**Database and Expert Systems Applications** Kim V. Andersen,John Debenham,Roland Wagner,2005-08-11 DEXA 2005 the 16th International Conference on Database and Expert Systems Applications was held at the Copenhagen Business School Copenhagen Denmark from August 22 to 26 2005 The success of the DEXA series has partly been due to the way in which it has kept abreast of recent developments by spawning specialized workshops and conferences each with its own proceedings In 2005 the DEXA programme was co located with the 7th International Conference on Data Warehousing and Knowledge Discovery DaWaK 2005 the 6th International Conference on Electronic Commerce and Web Technologies EC Web 2005 the 4th International Conference on Electronic Government EGOV 2005 the 2nd International Conference on Trust Privacy and Security in Digital Business TrustBus 2005 the 2nd International Conference on Industrial Applications of Holonic and Multi agent Systems HoloMAS 2005 as well as 19 specialized workshops These proceedings are the result of a considerable amount of hard work Beginning with the preparation of submitted papers the papers went through the reviewing process This process was supported by online discussion between the reviewers to determine the final conference

program The authors of accepted papers revised their manuscripts to produce this fine collection DEXA 2005 received 390 submissions and from those the Program Committee selected the 92 papers in these proceedings This year the reviewing process generated more than 1000 referee reports The hard work of the authors the referees and the Program Committee is gratefully acknowledged

**Expert Systems and Decision Support in Medicine** Otto Rienhoff, Ursula Piccolo, Berthold Schneider, 2012-12-06 The 33rd Annual Meeting of the German Association for Medical Documentation Informatics and Statistics was combined with a Special Topic Conference of the European Federation for Medical Informatics and takes place at Hannover F R of Germany from September 26 to 29 1988 It was planned and initilly prepared by the late Prof P L Reichertz who headed the Hannover institute from 1969 to 1987 To commemorate his contribution to the development of medicine the conference was devoted to him Peter Reichertz Memorial Conference on Expert Systems and Decision Support in Medicine Since computers in the early Fifties were first applied to support medical reasoning various phases of euphoria and resiation have followed Every new methodology which became technically possible was and will be applied to the old questlon of how to diagnose diseases more reliably Artificial Intelligence is just one new approach to the old challenge Over the years some authors have been very optimistic and put forward opinions which motivated the common press to coin the phrase Dr med computer Papers printed under this heading rebuffed the majority of physiCians for many years Today we know that medical decision making is a most complex human performance And 30 years of research on decision support have given us only limited insight into the underlying processes Most of the principal methodological questions were already asked very early on

Expert Systems in Reference Services Christine Roysdon, Howard D. White, 2019-12-06 This book first published in 1989 introduces readers to expert systems applications in many areas of library and information science and presents design and implementation issues encountered by librarians who have developed early systems to address the library reference function Systems for ready reference online database access and enhancement of subject searching in online catalogues are all explored Theoretical issues related to expert systems are balanced with descriptions of actual systems currently operating or under development Reference librarians interested in computing and automation library managers and administrators as well as teachers and students in library schools will be fascinated by this account of how expert systems are helping to make the expertise of the reference librarian available in a more consistent and timely fashion and reduce the burden of repetitive predictable questions for the professional

**Handbook of Expert Systems Applications in Manufacturing Structures and rules** A. Mital, S. Anand, 2013-03-08 This book is aimed at both researchers and practitioners and provides a collection of expert systems in manufacturing and production engineering along with their knowledge base and rules We believe that inclusion of the knowledge base and associated rules is essential if practitioners are to derive full benefit from these expert systems This unique book is the result of our belief and the efforts of our distinguished colleagues who subscribe to this philosophy A total of 15 different expert systems are included in this book

These expert systems are preceded by an introductory chapter written by Kuo Preface XVII Mital and Anand The expert system rules are included on a floppy disk in ASCII and can be easily accessed These rules and the description of the expert system s structure should assist the users in customizing these systems Overall the expert systems included in this volume cover a fairly wide variety of manufacturing and production engineering topics Expert Systems and Intelligent

Computer-aided Instruction Educational Technology Magazine Staff,1991 **Fuzzy Expert Systems for Disease**

**Diagnosis** Kumar, A.V. Senthil,2014-11-30 The development of fuzzy expert systems has provided new opportunities for problem solving amidst uncertainties The medical field in particular has benefitted tremendously from advancing fuzzy system technologies Fuzzy Expert Systems for Disease Diagnosis highlights the latest research and developments in fuzzy rule based methods used in the detection of medical complications and illness Offering emerging solutions and practical applications this timely publication is designed for use by researchers academicians and students as well as practitioners in the medical field The Application of Expert Systems in Libraries and Information Centres Anne Morris,2011-09-12 No

detailed description available for The Application of Expert Systems in Libraries and Information Centres **Database and Expert Systems Applications** Mohamed Ibrahim,Josef Küng,Norman Revell,2003-05-15 The Database and Expert Systems Applications DEXA conferences have established themselves as a platform for bringing together researchers and practitioners from various backgrounds and all regions of the world to exchange ideas experiences and opinions in a friendly and stimulating environment The papers presented at the conference represent recent developments in the field and important steps towards shaping the future of applied computer science and information systems DEXA covers a broad field all aspects of databases knowledge based systems knowledge management web based systems information systems related technologies and their applications Once again there were a good number of submissions out of 183 papers that were submitted the program committee selected 92 to be presented In the first year of this new millennium DEXA has come back to the United Kingdom following events in Vienna Berlin Valencia Prague Athens London Zurich Toulouse Vienna and Florence The past decade has seen several revolutionary developments one of which was the explosion of Internet related applications in the areas covered by DEXA developments in which DEXA has played a role and in which DEXA will continue to play a role in its second decade starting with this conference **Database and Expert Systems Applications** Heinrich

C. Mayr,Jiri Lazansky,Gerald Quirchmayr,Pavel Vogel,2003-06-29 th DEXA 2001 the 12 International Conference on Database and Expert Systems Applications was held on September 3 5 2001 at the Technical University of Munich Germany The rapidly growing spectrum of database applications has led to the establishment of more specialized discussion platforms DaWaK conference EC Web conference and DEXA workshop which were all held in parallel with the DEXA conference in Munich In your hands are the results of much effort beginning with the preparation of the submitted papers The papers then passed through the reviewing process and the accepted papers were revised to final versions by their authors and arranged

with the conference program All this culminated in the conference itself A total of 175 papers were submitted to this conference and I would like to thank all the authors They are the real base of the conference The program committee and the supporting reviewers produced altogether 497 referee reports on average of 2.84 reports per paper and selected 93 papers for presentation Comparing the weight or more precisely the number of papers devoted to particular topics at several recent DEXA conferences an increase can be recognized in the areas of XMS databases active databases and multi and hypermedia efforts The space devoted to the more classical topics such as information retrieval distribution and Web aspects and transaction indexing and query aspects has remained more or less unchanged Some decrease is visible for object orientation

Research and Development in Expert Systems V British Computer Society. Specialist Group on Expert Systems. Technical Conference, 1989-02-09 Contains papers presented at Expert Systems 88 the eighth annual conference of the British Computer Society Specialist Group on Expert Systems held in Brighton in December 1988 Covers many aspects of current work in particular theoretical topics practical techniques and real applications of expert systems a wide spectrum of commercial and industrial interest The theme of the 1988 conference was integrating with mainstream software development No index Annotation copyrighted by Book News Inc Portland OR

### **Expert Systems in Finance** Noura Metawa, Mohamed

Elhoseny, Aboul Ella Hassanien, M. Kabir Hassan, 2019-05-10 Throughout the industry financial institutions seek to eliminate cumbersome authentication methods such as PINs passwords and security questions as these antiquated tactics prove increasingly weak Thus many organizations now aim to implement emerging technologies in an effort to validate identities with greater certainty The near instantaneous nature of online banking purchases transactions and payments puts tremendous pressure on banks to secure their operations and procedures In order to reduce the risk of human error in financial domains expert systems are seen to offer a great advantage in big data environments Besides their efficiency in quantitative analysis such as profitability banking management and strategic financial planning expert systems have successfully treated qualitative issues including financial analysis investment advisories and knowledge based decision support systems Due to the increase in financial applications size complexity and number of components it is no longer practical to anticipate and model all possible interactions and data processing in these applications using the traditional data processing model The emergence of new research areas is clear evidence of the rise of new demands and requirements of modern real life applications to be more intelligent This book provides an exhaustive review of the roles of expert systems within the financial sector with particular reference to big data environments In addition it offers a collection of high quality research that addresses broad challenges in both theoretical and application aspects of intelligent and expert systems in finance The book serves to aid the continued efforts of the application of intelligent systems that respond to the problem of big data processing in a smart banking and financial environment

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