A Rule Based Language For Web Data Management

A self-contained tutorial on Z for working programmers discussing practical ways to apply formal methods in real projects, first published in 1997.

This book constitutes the proceedings of the 7th International Conference on Advances in Natural Language Processing held in Reykjavik, Iceland, in August 2010.

This book constitutes the refereed proceedings of the International RuleML Symposium, RuleML 2011-America, held in Fort Lauderdale, FL, USA, in November 2011 - collocated with the 22nd International Joint Conference on Artificial Intelligence, IJCAI 2011. It is the second of two RuleML events that take place in 2011. The first RuleML Symposium, RuleML 2011-Europe, has been held in Barcelona, Spain, in July 2011. The 12 full papers, 5 short papers and 5 invited track and position papers presented together with 3 keynote speeches were carefully reviewed and selected from numerous submissions. The accepted papers address a wide range of rules, semantic technology, and cross-industry standards, rules and automated reasoning, rule-based event processing and reaction rules, vocabularies, ontologies and business rules, cloud computing and rules, clinical semantics and rules.

This book constitutes the refereed proceedings of the 4th International Conference on COTS-Based Software Systems, ICCBSS 2005, held in Bilbao, Spain in February 2005. The 28 revised full papers presented together with summaries of panels,

workshops, tutorials, and posters were carefully reviewed and selected from numerous submissions. The papers are organized in topical sections on COTS at business, integration and interoperability, evaluation and requirements, safety and dependability, architecture and design, COTS management, and open source software.

How to prototype and develop an expert system. This practical guide to the tools and techniques used to build expert systems shows you how to choose the best method for the job at hand, saving you weeks of fact-finding and experimental work. Provides dozens of examples that can be applied to popular rule-based systems. Discusses user interface design, reviewing and system testing, multi-valued information, procedural control, and much more. Contains an appendix of sample knowledge bases.

This book constitutes the thoroughly refereed post-proceedings of the Third International Andrei Ershov Memorial Conference, PSI'99, held in Akademgorodok, Novosibirsk, Russia, in July 1999. The 44 revised papers presented together with five revised full invited papers were carefully reviewed and selected from a total of 73 submissions. The papers are organized in sections on algebraic specifications, partial evaluation and super compilation, specification with states, concurrency and parallelism, logic and processes, languages and software, database programming, object-oriented programming, constraint programming, model checking and program checking, and artificial intelligence.

This book includes 9 projects on building smart and practical AI-based systems. These

projects cover solutions to different domain-specific problems in healthcare, e-commerce and more. With this book, you will apply different machine learning and deep learning techniques and learn how to build your own intelligent applications for smart ...
Jess in Action first introduces rule programming concepts and teaches you the Jess language. Armed with this knowledge, you then progress through a series of fully-developed applications chosen to expose you to practical rule-based development. The book shows you how you can add power and intelligence to your Java software.
Rule-Based Programming is a broad presentation of the rule-based programming method with many example programs showing the strengths of the rule-based approach. The rule-based approach has been used extensively in the development of artificial intelligence systems, such as expert systems and machine learning. This rule-based programming technique has been applied in such diverse fields as medical diagnostic systems, insurance and banking systems, as well as automated design and configuration systems. Rule-based programming is also helpful in bridging the semantic gap between an application and a program, allowing domain specialists to understand programs and participate more closely in their development. Over sixty programs are presented and all programs are available from an ftp site. Many of these programs are presented in several versions allowing the reader to see how realistic programs are elaborated from `back of envelope' models. Metaprogramming is also presented as a technique for bridging the `semantic gap'. Rule-Based Programming will be of interest to programmers, systems analysts and other developers of expert systems as well as to researchers and practitioners in artificial intelligence, computer science professionals and

educators.

This book constitutes the refereed proceedings of the Third International Workshop on Rules and Rule Markup Languages for the Semantic Web, RuleML 2004, held in Hiroshima, Japan, in November 2004, together with ISWC 2004. The 11 revised full papers presented together with 2 invited papers and 5 tool presentation abstracts were carefully reviewed and selected from 25 submissions. Among the topics addressed are nonmonotonic rule systems, rule learning for feature extraction, logic reasoners for the Semantic Web, deductive RDF rule languages, description logic programs, defeasible description logics, conceptual logic programs, OWL inferencing, and Semantic Web reasoning.

In this thesis autonomous units are presented as a concept to model autonomous processes. Autonomous units form a community with a common environment, in which they act and which they transform. They are based on rules, the applications of which yield changes in the environment. They are also equipped with anindividual goal which they try to accomplish by applying their rules. A control condition enables autonomous units at any time and in any situation to select the rule that is actually applied from the set of all applicable rules. The formal semantics of a community as a whole and of each of its members is defined in two stages. In the sequential case only one unit can act at a time and the rule application of the involved units are interl eaved with each other. In order to illustrate the sequential case, the formal concept of Petri nets is modeled by a community of autonomous units. Here every transition of the Petrinet is realized as one autonomous unit.In the parallel case a number of actions take place in parallel at the same time. As an example, a colony of ants with a very simple foraging strategy is presented. In this case the parallel actions still occur in sequential order, so some

preliminary ideas of a third stage are given. In this concurrent semantics, the autonomous units may act independently withoutchronological relations between them, unless a causal relationship demands a certain order of actions.As further illustration, communities of autonomous units are applied to the domain of transport logistics. A transport network is modeled which consists of depots and their connections, unit loads, and trucks. The load units have to be transported from a source depot to a target depot by trucks. Here the trucks as well as the load units are modeled as autonomous units. How the unit loads will actually be transported by the trucks results from negotiations between all involved entities.Two case studies that have actually been implemented using the graph transformation tool grgen are presented in detail. The first case study deals with a model of the board game Ludo and the sequential process semantics of the corresponding community. The second case study deals with a model of a foraging ant colony and the parallel process semantics of the corresponding community. Some fundamental aspects of the semantics of rule-based systems in relation to the semantics of visual models are discussed, which form the conceptional background of this thesis. Since control conditions are an essential part of the modeling with autonomous units, their efficient handling is the mainchallenge regarding the creation of a software tool. So some seemingly simple control conditions are investigated with respect to implementation.

The ideas introduced in this book explore the relationships among rule based systems, machine learning and big data. Rule based systems are seen as a special type of expert systems, which can be built by using expert knowledge or learning from real data. The book focuses on the development and evaluation of rule based systems in terms of accuracy, efficiency and interpretability. In particular, a unified framework for building rule based systems,

which consists of the operations of rule generation, rule simplification and rule representation, is presented. Each of these operations is detailed using specific methods or techniques. In addition, this book also presents some ensemble learning frameworks for building ensemble rule based systems.

This dissertation, "A Rule-based Analysis System for Chinese Sentences" by ??, Bik, Lum, was obtained from The University of Hong Kong (Pokfulam, Hong Kong) and is being sold pursuant to Creative Commons: Attribution 3.0 Hong Kong License. The content of this dissertation has not been altered in any way. We have altered the formatting in order to facilitate the ease of printing and reading of the dissertation. All rights not granted by the above license are retained by the author. DOI: 10.5353/th_b3120876 Subjects: Chinese language - Data processing Rule-based programming Parsing (Computer grammar)

As we stand at the precipice of the twenty first century the ability to capture and transmit copious amounts of information is clearly a defining feature of the human race. In order to increase the value of this vast supply of information we must develop means for effectively processing it. Newly emerging disciplines such as Information Engineering and Soft Computing are being developed in order to provide the tools required. Conferences such as the International Conference on Information Processing and ManagementofUncertainty in Knowledge-based Systems (IPMU) are being held to provide forums in which researchers can discuss the latest developments. The recent IPMU conference held at La Sorbonne in Paris brought together some of the world's leading experts in uncertainty and information fusion. In this volume we have included a selection ofpapers from this conference. What should be clear from looking at this volume is the number of different ways that are available for representing

uncertain information. This variety in representational frameworks is a manifestation of the different types of uncertainty that appear in the information available to the users. Perhaps, the representation with the longest history is probability theory. This representation is best at addressing the uncertainty associated with the occurrence of different values for similar variables. This uncertainty is often described as randomness. Rough sets can be seen as a type of uncertainty that can deal effectively with lack of specificity, it is a powerful tool for manipulating granular information.

New Zealand schools have experienced unprecedented change during the lastdecade. Radicalrestructuringoftheframeworksforbothcurriculumand qualificationsfollowedamovementtowards self-managementin 1989. The curriculum framework, consisting of seven essential learning areas, has been progressively introduced with completionnotexpecteduntil 2002. Thenew Qualifications Framework, based on unit standards, was launched in 1994. The introduction of unit standards signalled an emphatic movement towards the use of internal assessment for awarding qualifications at the seniorsecondaryschoollevel. Eachcoursehadunitstandardsdefined,which described the outcomes and the performance criteria that would be used to determine whether or not the standard had been achieved. Approximately five to eight standards would be used for each full year course and each standard had a number of credits associated with it. The plan, which has since been modified, was for these credits to contribute to a National Certificate of Educational Achievement, at years 12 and 13, and other, subject specific, National Certificates. Secondary schools were faced with the task of recording and reporting 1 unit standardresults to theNew Zealand Qualifications Authority . This, by itself, was not a major issue as the significant

suppliers of CSIS had modules availablewhichsatisfiedthis need.
Atthistimeamodelwasbeingpresented to school audiences demonstrating how the recording, reporting and evaluation ofassessment data, relating to the curriculumframework, could be relatively straight forward IF there was a common assessment ‘currency’ across the school. This model was converted into software form for demonstration purposes.
RuleML 2003 was the second international workshop on rules and rule markup languages for the Semantic Web, held in conjunction with the International Semantic Web Conference (ISWC). The aim of the RuleML workshop series is to stimulate research on all issues related to web rule languages and to provide an annual forum for presenting and discussing new research results. The Semantic Web is a major world-wide endeavor to advance the Web by enriching its multimedia document content with propositional information that can be processed by inference-enabled Web applications. Rules and rule markup languages, such as RuleML, will play an important role in the success of the Semantic Web. Rules will act as a means to draw inferences, to express
constraints,tospecifypoliciesforreactingtoevents,totransformdata,etc.Rule markup languages will allow us to enrich Web ontologies by adding de?nitions of derived concepts, to publish rules on the Web, to exchange rules between di?erent systems and tools, etc. RuleML 2003 built on the success of RuleML 2002, which was held in c- junction with ISWC 2002, Sardinia, Italy. The proceedings of RuleML 2002 can be found at http://www.ceur-ws.org/Vol-60/.
Special highlights of the RuleML 2003 workshop were the two invited pres-
tationsgivenbyPeterChenon“Rules,XML,andtheERModel”andbyHarold Boley on “Object-Oriented RuleML: User-Level Roles, URI-Grounded Clauses, and Order-Sorted Terms”. This

proceedings volume also contains an invited - per by Francois ? Bry and Sebastian Scha?ert on “An Entailment Relation for Reasoning on the Web”.

Software -- Programming Techniques.

This book constitutes the refereed proceedings of the 5th International Symposium on Rules, RuleML 2011 - Europe, held in Barcelona, Spain, in July 2011 - collocated with the 22nd International Joint Conference on Artificial Intelligence, IJCAI 2011. It is the first of two RuleML events that take place in 2011. The second RuleML Symposium - RuleML 2011 - America - will be held in Fort Lauderdale, FL, USA, in November 2011. The 18 revised full papers, 8 revised short papers and 3 invited track papers presented together with the abstracts of 2 keynote talks were carefully reviewed and selected from 58 submissions. The papers are organized in the following topical sections: rule-based distributed/multi-agent systems; rules, agents and norms; rule-based event processing and reaction rules; fuzzy rules and uncertainty; rules and the semantic Web; rule learning and extraction; rules and reasoning; and rule-based applications.

The Way of ZPractical Programming with Formal MethodsCambridge University Press

Thinking in terms of facts and rules is perhaps one of the most common ways of

approaching problem de?nition and problem solving both in everyday life and under more formal circumstances. The best known set of rules, the Ten Commandments have been accompanying us since the times of Moses; the Decalogue proved to be simple but powerful, concise and universal. It is logically consistent and complete. There are also many other attempts to impose rule-based regulations in almost all areas of life, including professional work, education, medical services, taxes, etc. Some most typical examples may include various codes (e.g. legal or tra?c code), regulations (especially military ones), and many systems of customary or informal rules. The universal nature of rule-based formulation of behavior or inference principles follows from the concept of rules being a simple and intuitive yet powerful concept of very high expressive power. Moreover, rules as such encode in fact functional aspects of behavior and can be used for modeling numerous phenomena.

The book presents logical foundations for rule-based systems. An attempt has been made to provide an in-depth discussion of logical and other aspects of such systems, including languages for knowledge representation, inference mechanisms, inference control, design and verification. The ultimate goal was to provide a deeper theoretical insight into the nature of rule-based systems and put together the most complete presentation including details so frequently skipped

in typical textbooks. The book may be useful to potentially wide audience, but it is aimed at providing specific knowledge for graduate, post-graduate and Ph.D. students, as well as knowledge engineers and research workers involved in the domain of AI. It also constitutes a summary of the Author's research and experience gathered through several years of his research work.

This book constitutes the refereed proceedings of the 9th International RuleML Symposium, RuleML 2015, held in Berlin, Germany, in August 2015. The 25 full papers, 4 short papers, 2 full keynote papers, 2 invited research track overview papers, 1 invited paper, 1 invited abstracts presented were carefully reviewed and selected from 63 submissions. The papers cover the following topics: general RuleML track; complex event processing track, existential rules and datalog+/- track; legal rules and reasoning track; rule learning track; industry track.

The 2008 International Symposium on Rule Interchange and Applications (RuleML th 2008), collocated in Orlando, Florida, with the 11 International Business Rules - rum, was the premier place to meet and to exchange ideas from all fields of rules te- nologies. The aim of RuleML 2008 was both to present new and interesting research results and to show successfully deployed rule-based applications. This annual sym- sium is the flagship event of the Rule

Markup and Modeling Initiative (RuleML). The RuleML Initiative (www.ruleml.org) is a non-profit umbrella organization of several technical groups organized by representatives from academia, industry and government working on rule technologies and applications. Its aim is to promote the study, research and application of rules in heterogeneous distributed environments such as the Web. RuleML maintains effective links with other major international societies and acts as intermediary between various ‘specialized’ rule vendors, appli- tions, industrial and academic research groups, as well as standardization efforts from, for example, W3C, OMG, and OASIS.

An ontology is a formal description of concepts and relationships that can exist for a community of human and/or machine agents. The notion of ontologies is crucial for the purpose of enabling knowledge sharing and reuse. The Handbook on Ontologies provides a comprehensive overview of the current status and future prospectives of the field of ontologies considering ontology languages, ontology engineering methods, example ontologies, infrastructures and technologies for ontologies, and how to bring this all into ontology-based infrastructures and applications that are among the best of their kind. The field of ontologies has tremendously developed and grown in the five years since the first edition of the "Handbook on Ontologies". Therefore, its revision includes 21

completely new chapters as well as a major re-working of 15 chapters transferred to this second edition.

"This book provides a comprehensive collection of state-of-the-art advancements in rule languages"--Provided by publisher.

This book is dedicated to intelligent systems of broad-spectrum application, such as personal and social biosafety or use of intelligent sensory micro-nanosystems such as "e-nose", "e-tongue" and "e-eye". In addition to that, effective acquiring information, knowledge management and improved knowledge transfer in any media, as well as modeling its information content using meta-and hyper heuristics and semantic reasoning all benefit from the systems covered in this book. Intelligent systems can also be applied in education and generating the intelligent distributed eLearning architecture, as well as in a large number of technical fields, such as industrial design, manufacturing and utilization, e.g., in precision agriculture, cartography, electric power distribution systems, intelligent building management systems, drilling operations etc. Furthermore, decision making using fuzzy logic models, computational recognition of comprehension uncertainty and the joint synthesis of goals and means of intelligent behavior biosystems, as well as diagnostic and human support in the healthcare environment have also been made easier.

RuleML 2005 was the ?rst international conference on rules and rule markup languages for the Semantic Web, held in conjunction with the International Semantic Web C-

ference (ISWC) at Galway, Ireland. With the success of the RuleML workshop series came the need for extended research and applications topics organized in a conference format. RuleML 2005 also accommodated the ?rst Workshop on OWL: Experiences and Directions. Rules are widely recognized to be a major part of the frontier of the Semantic Web, and critical to the early adoption and applications of knowledge-based techniques in- business, especially enterprise integration and B2B e-commerce. This includes kno- edge representation (KR) theory and algorithms; markup languages based on such KR; engines, translators, and other tools; relationships to standardization efforts; and, not least, applications. Interest and activity in the area of rules for the Semantic Web has grown rapidly over the last ?ve years. The RuleML 2005 Conference was aimed to be this year's premiere scienti?c conference on the topic. It continued in topic, leadership, and collaboration with the previous series of three highly successful annual inter- tional workshops (RuleML 2004, RuleML 2003 and RuleML 2002). The theme for RuleML 2005 was rule languages for reactive and proactive rules, complex event p- cessing, and event-driven rules, to support the emergence of Semantic Web applications. Special highlights of the RuleML 2005 conference included the keynote address by Sir Tim Berners- Lee, Director of W3C. This book constitutes the refereed proceedings of the 10th International RuleML Symposium, RuleML 2016, held in New York, NY, USA during July 2016. The 19 full papers, 1 short paper, 2 keynote abstracts, 2 invited tutorial papers, 1 invited standard

paper, presented were carefully reviewed and selected from 36 submissions. RuleML is a leading conference aiming to build bridges between academia and industry in the field of rules and its applications, especially as part of the semantic technology stack. It is devoted to rule-based programming and rule-based systems including production rule systems, logic programming rule engines, and business rule engines and business rule management systems, Semantic Web rule languages and rule standards and technologies, and research on inference rules, transformation rules, decision rules, and ECA rules.

The best informal de?nition of the Semantic Web is maybe found in the May 2001Scienti?cAmericanarticle“TheSemanticWeb”(Berners-Leeetal.),which says“TheSemanticWebisanextensionofthecurrentWebinwhichinformation is given well-de?ned meaning, better enabling computers and people to work in cooperation. ” People who work on the Semantic Web quite often base their work on the famous “semantic web tower”, a product of Tim Berners-Lee’s inspiring drawing on whiteboards. The lowest level is the level of character representation (Unicode) and the identi?cation of resources on the Web (URIs). The highest level concerns the problem of trusting information on the Web. Somewhere in the middle of the tower is the logic level. It addresses the problem of represe- ing information on the Web in a way so that inference rules can derive implicit information from explicitly stated information. The workshop “Principles and Practices of Semantic Web Reasoning” (PPSWR 2004)

addressed problems on this level. It took place in September 2004 as a satellite event of the 20th Int- national Conference on Logic Programming (ICLP) in St. Malo, France. After PPSWR 2003 in Mumbai, India, it was the second workshop in this series. This book contains the articles presented at the workshop.

This book constitutes the proceedings of the 12th International Symposium on NASA Formal Methods, NFM 2020, held in Moffett Field, CA, USA, in May 2020.* The 20 full and 5 short papers presented in this volume were carefully reviewed and selected from 62 submissions. The papers are organized in the following topical sections: learning and formal synthesis; formal methods for DNNs; high assurance systems; requirement specification and testing; validation and solvers; solvers and program analysis; verification and times systems; autonomy and other applications; and hybrid and cyber-physical systems. *The conference was held virtually due to the COVID-19 pandemic. The chapter “Verifying a Solver for Linear Mixed Integer Arithmetic in Isabelle/HOL” is available open access under a Creative Commons Attribution 4.0 International License via link.springer.com.

Annotation. This book constitutes the refereed proceedings of the 4th InternationalConference on Web Reasoning and Rule Systems, RR 2010, held inBrixen-Bressanone, Italy, in September 2010. The 9 revised full papers, 6 revised short papers, and 4 poster paperspresented together with 1 PhD paper, 2 system descriptions and 3 invitedpapers were carefully reviewed and selected from 41

submissions. Thepapers address all current topics in Web reasoning, Web-based knowledge, and rule systems such as representation techniques; rules andontologies; reasoning languages; efficiency and benchmarking, ; ontologylanguages; querying and optimization; reasoning with uncertainty, underinconsistency, and with constraints; rule languages and systems; ruleinterchange formats and markup languages; scalability; approximatereasoning; statistical methods and symbolic reasoning; as well assemantic Web services modeling and applications.

Leverage the power of machine learning and deep learning to extract information from text data About This Book Implement Machine Learning and Deep Learning techniques for efficient natural language processing Get started with NLTK and implement NLP in your applications with ease Understand and interpret human languages with the power of text analysis via Python Who This Book Is For This book is intended for Python developers who wish to start with natural language processing and want to make their applications smarter by implementing NLP in them. What You Will Learn Focus on Python programming paradigms, which are used to develop NLP applications Understand corpus analysis and different types of data attribute. Learn NLP using Python libraries such as NLTK, Polyglot, SpaCy, Standford CoreNLP and so on Learn about Features Extraction and Feature selection as part of Features Engineering. Explore the advantages of vectorization in Deep Learning. Get a better understanding of the architecture of a rule-based system. Optimize and fine-tune Supervised and

Unsupervised Machine Learning algorithms for NLP problems. Identify Deep Learning techniques for Natural Language Processing and Natural Language Generation problems. In Detail This book starts off by laying the foundation for Natural Language Processing and why Python is one of the best options to build an NLP-based expert system with advantages such as Community support, availability of frameworks and so on. Later it gives you a better understanding of available free forms of corpus and different types of dataset. After this, you will know how to choose a dataset for natural language processing applications and find the right NLP techniques to process sentences in datasets and understand their structure. You will also learn how to tokenize different parts of sentences and ways to analyze them. During the course of the book, you will explore the semantic as well as syntactic analysis of text. You will understand how to solve various ambiguities in processing human language and will come across various scenarios while performing text analysis. You will learn the very basics of getting the environment ready for natural language processing, move on to the initial setup, and then quickly understand sentences and language parts. You will learn the power of Machine Learning and Deep Learning to extract information from text data. By the end of the book, you will have a clear understanding of natural language processing and will have worked on multiple examples that implement NLP in the real world. Style and approach This book teaches the readers various aspects of natural language Processing using NLTK. It takes the reader from the basic to advance level in

a smooth way.

Artificial intelligence, or AI, is largely an experimental science--at least as much progress has been made by building and analyzing programs as by examining theoretical questions. MYCIN is one of several well-know programs that embody some intelligence and provide data on the extent to which intelligent behavior can be programmed. As with other AI programs, its development was slow and not always in a forward direction. The book shares the results of nearly a decade of work, the experiments performed, and present a coherent picture of the work. It presents a critical analysis of several pieces of related research, performed by a large number of scientists. The whole field of AI will benefit from detailed, retrospective examinations of experiments, for this is the way the scientific foundations of the field will gradually be defined. This is the reason this analysis of the MCYIN experiments is being offered to readers.

This book constitutes the refereed proceedings of the 12th International Symposium on Practical Aspects of Declarative Languages, PADL 2010, held in Madrid, Spain, in January 2010, colocated with POPL 2010, the Symposium on Principles of Programming Languages. The 22 revised full papers presented together with 2 invited talks were carefully reviewed and selected from 58 submissions. The volume features original work emphasizing novel applications and implementation techniques for all forms of clarative concepts, including functions, relations, logic, and constraints. The papers address all current aspects of declarative programming; they are organized in topical sections on non-monotonic reasoning - answer set programming, types, parallelism and distribution, code quality assurance, domain specific languages, programming aids, constraints, and tabling - agents.

The leading edge of computer science research is notoriously ?ckle. New trends come and go

with alarming and unfailing regularity. In such a rapidly changing ?eld, the fact that research interest in a subject lasts more than a year is worthy of note. The fact that, after ?ve years, interest not only remains, but actually continues to grow is highly unusual. As 1998 marked the ?fth birthday of the International Workshop on Agent Theories, Architectures, and Languages (ATAL), it seemed appropriate for the organizers of the original workshop to comment on this remarkable growth, and re ect on how the ?eld has developed and matured. The ?rst ATAL workshop was co-located with the Eleventh European Conference on Arti?cial Intelligence (ECAI-94), which was held in Amsterdam. The fact that we chose an AI conference to co-locate with is telling: at that time, we expected most researchers with an interest in agents to come from the AI community. The workshop, whichwasplannedoverthesummerof1993,attracted32submissions,andwasattended by 55 people.ATAL was the largest workshop at ECAI-94, and the clear enthusiasm on behalfofthecommunitymadethedecisiontoholdanotherATALworkshopsimple.The ATAL-94proceedingswereformallypublishedinJanuary1995underthetitleIntelligent Agents, and included an extensive review article, a glossary, a list of key agent systems, and — unusually for the proceedings of an academic workshop — a full subject index. Thehighscienti?candproductionvaluesembodiedbytheATAL-94proceedingsappear to have been recognized by the community, and resulted inATAL proceedings being the most successful sequence of books published in Springer-Verlag s Lecture Notes in Arti?cial Intelligence series.

The specification of a human-computer interface requires a language in which that interface is expressed. Such a language should have a number of properties: (1) It should not be so

syntactically complex that programming nonspecialists who must author dialogues have difficulty learning and using it. (2) It must be expressive and concise so that complicated interfaces can have a simple definition. (3) It ought to model human reasoning processes so that unnecessary formalisms and constructs are not required of the dialogue author. A number of types of languages are available for specifying dialogues, including procedural languages, and rule-based languages. This report describes an implementation of a rule-based language related to PROLOG for the specification of human-computer interfaces. It is based not upon von Neumann computer architectures but rather upon Post production systems or Markov algorithms, which are the foundations of computer science.

Abstract: "Current software development environments generally take one of two approaches. The integrated toolset approach provides an extensible set of utilities to the developer, and a common inter-tool communication and integration facility. However, it provides no guidance as to how the tools should be used. The process-based approach integrates a toolset with a process control engine so as to provide an environment that enacts a particular development process. Unfortunately, it is not always feasible to go to the process-based route; in the case where the existing tools are integrated with one another, the process engine integration mechanism may be in conflict with that of the integrated toolset. Process servers are an alternative means of integrating a process control engine with a toolset, which avoids this conflict by adapting the process control engine to use the toolset's existing integration mechanism. Many process-based environments are rule-based environments: Their process specification language is a rule language. Rules deal well with local constraints, but often interact counter-intuitively and make it difficult to express the global nature of a process. Higher-

level process languages are needed to describe global constraints effectively, but without losing the advantages of rules. We propose to integrate the two approaches in an environment centered around a rule-based process server, which is a process server with a rule-based control engine. We propose also to provide a framework for implementing declarative process modeling languages and for interfacing the interpreter to the target toolset. Although our process server is to be rule-based, we plan to support a broader, multi-paradigm notion of a process modeling language. These process modeling languages will include declarative global process specifications in addition to local rule-based constraints, but translated into a rule-based form, plus appropriate run-time support wrapping around the rule interpreter, for execution."