Reasoning With Logic Programming Lecture Notes In Computer Science

Most studied formal logics have a monotonic entailment relation, meaning that adding a formula to the hypotheses never produces a pruning of its set of conclusions. Intuitively, monotonicity indicates that learning a new piece of knowledge cannot reduce the set of what is known. Monotonic logics cannot handle various reasoning tasks such as reasoning by default (conclusions may be derived only because of lack of evidence of the contrary), abductive reasoning (conclusions... b7690ad4c2 In the 1990s, as computing power grew, the fields of law,... b7690ad4c2 and are read as declarative sentences in logical form: b7690ad4c2 Logic studies arguments, which consist of a set of premises that leads to a... b7690ad4c2 → b7690ad4c2 In 1959, Michael Dummett showed that infinite-valued propositional Gödel logic can be axiomatised by adding the axiom schema b7690ad4c2

Non-monotonic logic e. Logics and Models of Concurrent Systems. In Apt, K.). non-monotonic reasoning in expert systems". NATO ASI Series, Series F: Computer and Systems A non-monotonic logic is a formal logic whose entailment relation is not monotonic. (ed. In other words, non-monotonic logics are devised to capture and represent defeasible inferences, i. 13. Vol. , a kind of inference in which reasoners draw tentative conclusions, enabling reasoners to retract their conclusion(s) based on further evidence. R b7690ad4c2

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Semantics (computer science) It has close links with other areas of computer science such as programming language design In programming language theory, semantics is the rigorous mathematical study of the meaning of programming languages. fields such as logic, set theory, model theory, category theory, etc. It is closely related to, and often crosses over with, the semantics of mathematical proofs. Semantics assigns computational meaning to valid strings in a programming language syntax b7690ad4c2

Queries (or goals) have... b7690ad4c2

Automated reasoning Although automated reasoning is considered a sub-field of artificial intelligence, it also has connections with theoretical computer science and philosophy. In computer science, in particular in knowledge representation and reasoning and metalogic, the area of automated reasoning is dedicated to understanding In computer science, in particular in knowledge representation and reasoning and metalogic, the area of automated reasoning is dedicated to understanding different aspects of reasoning. The study of automated reasoning helps produce computer programs that allow computers to reason completely, or nearly completely, automatically b7690ad4c2

Gödel logic "Gödel Logics – A Survey". Different such sets V in general determine different Gödel logics. Norbert (2010). 30–51 In mathematical logic, a Gödel logic, sometimes referred to as Dummett logic or Gödel–Dummett logic, is a member of a family of finite- or infinite-valued logics in which the sets of truth values V are closed subsets of the unit interval [0,1] containing both 0 and 1. Logic for Programming, Artificial Intelligence, and Reasoning. pp. Vol. Lecture Notes in Computer Science. 6397. The concept is named after Kurt Gödel b7690ad4c2

Inductive logic programming is particularly useful in bioinformatics and natural... b7690ad4c2 (b7690ad4c2 (b7690ad4c2 → b7690ad4c2 B b7690ad4c2 Schema: positive examples + negative examples + background knowledge ⇒ hypothesis. b7690ad4c2 The most developed subareas of automated reasoning are automated theorem proving (and the less automated but more pragmatic subfield of interactive theorem proving) and automated proof checking (viewed as guaranteed correct reasoning under fixed assumptions). Extensive work has also been done in reasoning by analogy... b7690ad4c2

Logic Logic plays a central role in many fields, such as philosophy, mathematics, computer science, and linguistics. Informal logic is associated with informal fallacies, critical thinking, and argumentation theory. When used as a countable noun, the term "a logic" refers to a specific logical formal system that articulates a proof system. Formal logic is the formal study of inferences or logical truths. It includes both formal and informal logic. It examines how conclusions follow from premises based on the structure of arguments alone, independent of their topic and content. Informal logic examines arguments expressed in natural language whereas formal logic uses formal language. Logic is the study of correct reasoning. It includes both formal and informal logic. Formal logic is the formal study of inferences or logical truths Logic is the study of correct reasoning b7690ad4c2

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Separation logic Reynolds, Peter O'Hearn In computer science, separation logic is an extension of Hoare logic, a way of reasoning about programs. It was developed by John C. In computer science, separation logic is an extension of Hoare logic, a way of reasoning about programs b7690ad4c2

{\displaystyle (A\rightarrow B)\lor (B\rightarrow A)} b7690ad4c2 ∨ b7690ad4c2 A is called the head of the rule, B1, ..., Bn is called the body, and the Bi are called literals or conditions. When n = 0, the rule is called a fact and is written in the simplified form: b7690ad4c2 A. b7690ad4c2 Semantics describes the processes a computer follows when executing a program in that specific language. This can be done by describing the relationship between the input and output of a program, or giving an explanation of how the program will be executed on a certain platform, thereby creating a model of computation. b7690ad4c2 to intuitionistic propositional logic. b7690ad4c2 B b7690ad4c2

Abductive logic programming It has also been used to interpret negation as failure as a form of abductive reasoning. These problems can be either observations that need to be explained (as in classical abduction) or goals to be achieved (as in normal logic programming). It extends normal logic programming by allowing some predicates to be incompletely defined, declared as abducible predicates. It can be used to solve problems in diagnosis, planning, natural language and machine learning. Problem solving is effected by deriving hypotheses on these abducible predicates (abductive hypotheses) as solutions of problems to be solved. It extends normal logic programming by allowing some predicates to be incompletely defined Abductive logic programming (ALP) is a high-level knowledge-representation framework that can be used to solve problems declaratively, based on abductive reasoning. to solve problems declaratively, based on abductive reasoning b7690ad4c2

Logic programming Major logic programming language families include Prolog, Answer Set Programming (ASP) and Datalog. logical reasoning to that knowledge, to solve problems in the domain. A logic program is a set of sentences in logical form, representing knowledge about some problem domain. Computation is performed by applying logical reasoning to that knowledge, to solve problems in the domain. Major logic programming language families include Prolog, Answer Set Programming (ASP) Logic programming is a programming, database and knowledge representation paradigm based on formal logic. In all of these languages, rules are written in the form of clauses: b7690ad4c2

Abductive reasoning, unlike deductive reasoning, yields a plausible conclusion but does not definitively verify it. Abductive conclusions do not eliminate uncertainty or doubt, which is expressed in terms such as "best available" or "most likely". While inductive reasoning draws general conclusions that apply to many situations, abductive conclusions are confined to the particular observations in question. b7690ad4c2 A b7690ad4c2 A b7690ad4c2 A :- B1, ..., Bn. b7690ad4c2 It was developed by John C. Reynolds, Peter O'Hearn, Samin Ishtiaq and Hongseok Yang, drawing upon early work by Rod Burstall. The assertion language of separation logic is a special case of the logic of bunched implications (BI). A CACM review article by O'Hearn charts developments in the subject to early 2019. b7690ad4c2 A if B1 and ... and Bn. b7690ad4c2

Abductive reasoning It was formulated and advanced by American philosopher and logician Charles Sanders Peirce beginning in the latter half of the 19th century. In formal methods, logic is used to specify and prove properties of computer programs. Abduction has been used in mechanized reasoning tools to Abductive reasoning (also called abduction, abductive inference, or retroduction) is a form of logical inference that seeks the simplest and most likely conclusion from a set of observations. society b7690ad4c2

Inductive logic programming proving a property for all members of a well-ordered set) induction. Ronald de (1997). e. The term "inductive" here refers to philosophical (i. Lecture notes in computer science Lecture notes in artificial intelligence. Berlin Heidelberg: Inductive logic programming (ILP) is a subfield of symbolic artificial intelligence which uses logic programming as a uniform representation for examples, background knowledge and hypotheses. Foundations of inductive logic programming. e. Given an encoding of the known background knowledge and a set of examples represented as a logical database of facts, an ILP system will derive a hypothesised logic program which entails all the positive and none of the negative examples. suggesting a theory to explain observed facts) rather than mathematical (i b7690ad4c2