KNOWLEDGE REPRESENTATION MODELS IN ARTIFICIAL INTELLIGENCE

Akmaljon Yuldashev Valijon
Namangan State Technical University, ass. Teacher
akmaljonyuldashev7201@gmail.com
90 372 72 01

Abstract: This article discusses models for representing knowledge in artificial intelligence, offering new perspectives, logical inferences, knowledge representation languages, and domains of reasoning. Overall, it emphasizes the need to take a different view when forming a knowledge base. It argues that results can be inferred using networked models, which can further advance intelligent systems. Evaluating events and states in real-world processes by considering every detail helps one approach situations correctly, meeting the demands of the time, and thus forms an important foundation in human life.

Keywords: Knowledge, subject, object, discussion area, expertise area, mathematical logic, knowledge representation language, structured models, unstructured models, formal models.

Annotatsiya: Ushbu maqolada sun'iy intellektda bilimlarni ifodalash modellari haqida malumotlar, yangi istiqbollar, mantiqiy xulosalar, bilimlarni ifodalash tillari va fikrlash sohalari taklif etilgan. Umuman olganda, u bilim bazasini shakllantirishda boshqacha nuqtai nazarga ega bo'lish zarurligini ta'kidlangan. Unda natijalarni tarmoq modellari yordamida chiqarish mumkinligi, bu esa aqlli tizimlarni yanada rivojlantirishi mumkinligi ta'kidlanadi. Haqiqiy dunyodagi jarayonlardagi voqealar va holatlarni har bir tafsilotni hisobga olgan holda baholash vaziyatlarga to'g'ri yondashishga, zamon talablariga javob berishga yordam beradi va shu tariqa inson hayotida muhim poydevor yaratadi.

Kalit so'zlar: Bilim, sub'ekt, obyekt, muhokama sohasi, ekspertiza sohasi, matematik mantiq, bilimlarni ifodalash tili, strukturaviy modellar, strukturasiz modellar, rasmiy modellar.

Аннотация: В данной статье рассматриваются модели представления знаний в искусственном интеллекте, предлагаются новые перспективы, логические выводы, языки представления знаний и области рассуждений. В целом, подчеркивается необходимость иного подхода при формировании базы знаний. Утверждается, что результаты могут быть получены с помощью сетевых моделей, что может способствовать дальнейшему развитию интеллектуальных систем. Оценка событий и состояний в реальных процессах с учетом каждой детали помогает правильно подходить к ситуациям, отвечая

требованиям времени, и, таким образом, формирует важную основу в жизни человека.

Ключевые слова: Знание, предмет, объект, область обсуждения, область экспертизы, математическая логика, язык представления знаний, структурированные модели, неструктурированные модели, формальные модели.

Representation is an operation that records a concept in the form of a figure, text, language, or formal structure. The theory of knowledge studies the relationship between the subject (the learner) and the object. In an objective sense, knowledge is what we have learned as a result of study [1–3].

Knowledge representation is the formalization of true propositions by means of figures, writings, and languages [1–3]. We are primarily interested in formalizations that can be perceived (understood) by computers. When representing knowledge in computer memory, questions arise about building languages and formalizations i.e., how to enter our notions into a computer and process them through speech and images, using natural language (such as English or German), formal languages, algebra or logic, propositional calculus, etc. The result of formalization should be a set of instructions that forms a part of a programming language.

There are many formal systems for knowledge representation, and they are commonly called knowledge representation models or languages (Figure 1).

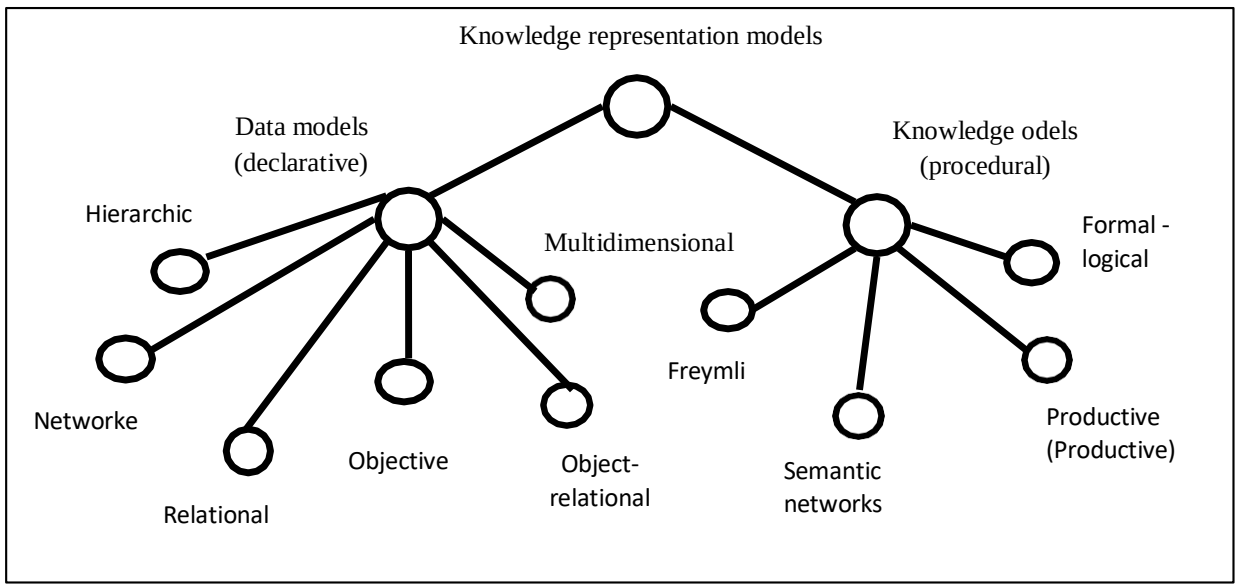

Figure 1. Knowledge representation models.

Among knowledge representation languages, we can distinguish models of structured and unstructured data [1–3]. Both classes of models are built on sign systems (formal languages). They differ in:

1) how the formalized knowledge is stored;

2) the usage of formalized knowledge or the specification of the intelligent system; and

3) the technology of formalization.

The formalization of knowledge about unstructured data proceeds in two stages [1]:

1) Formalization using natural-language sign systems (for example, generating texts in various genres);

2) Indexing texts and building rubrics (sections) and dictionaries. As models of unstructured data, formal languages for indexing are considered.

To store structured data (declarative knowledge) in a database, hierarchical, network, relational, object-oriented, object–relational, and multidimensional models are often used. To represent procedural knowledge, formal-logical models, production models, frame models, and semantic networks are used.

Intelligent systems (IS) in a certain sense model a person’s intellectual activity, in particular the logic of reasoning. In a simplified form, our system of logical reasoning can be described as deriving 'logically correct' conclusions from one or more premises (assumed true). For this, both the premises and the conclusions must be expressed in a language that adequately reflects the subject domain-in everyday life this is natural language, in mathematics it is a formal language of formulas, and so on. The existence of a language first requires an alphabet (vocabulary), which denotes the sets of basic concepts (elements). Second, using the alphabet and a set of syntactic rules, expressions can be constructed [1,4–6].

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