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APPLICATION OF ONTOLOGIES FOR 3D MODELLING

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Ontologies are sets of explanations and rules expected to be justifiable and processable by the two people and PCs. Ontologies comprise the establishment of the semantic web across various areas and applications. Each metaphysics can comprise of various sorts of articulations that can either characterize ideas or portray realities identified with objects. Expressed articulations (T-Box) depict conceptualization-classes and properties, which can be utilized to determine plans of substance – portray what are the potential requirements on and relations between various sorts of substance components, without indicating specific components. Insistence enunciations (A-Box) delineate utilize content segments (moreover called individuals), which are events of classes. Content parts are depicted using properties with explicit characteristics allocated. In 3D displaying, ontologies included T-Box proclamations (in short T-Box ontologies) are plans of 3D scenes or scene components. For example, a T-Box ontology indicates a class of virtual gallery displays with various classes of antiques, for example, statues, stamps and coins as well as could be expected spatial properties of the ancient rarities they are set on stands. When all is said in done, such a pattern can be satisfied by various 3D scenes. Ontologies included A-Box explanations (in short A-Box ontologies) portray specific 3D scenes or scene components. For example, an A-Box cosmology portrays a specific virtual historical center display (individual) with antiques (others) that fulfill the conditions given in the T-Box ontology – have a place with the specific classes and are set on stands, which is depicted by fitting estimations of properties.

Ontologies are utilized in two unique manners in PC designs to depict content metadata and to speak to the substance. The ontologies used to depict content metadata (e.g., subject, creator and creation date), can be considered as innovative metadata plans (T-Box ontologies) and metadata portrayals (ABox ontologies), which have been broadly utilized specifically for 3D content comment and recovery. The ontologies used to speak to 3D content (e.g., shapes, surfaces and changes) can be considered as cutting edge encoding designs (T-Box ontologies) and 3D model or scene depictions (A-Box ontologies). In the two cases-metadata portrayal and substance, portrayal the fundamental bit of leeway of ontologies over commonplace metadata and 3D groups is the proper semantics, which empowers derivation of certain information. Nevertheless, just ontology based substance portrayal is the immediate reason for demonstrating of 3D content. A cosmology of 3D content is a T-Box ontology indicating classes and properties that empower 3D content portrayal at specific degrees of deliberation. A-Box ontologies that are occasions of 3D content ontologies are metaphysics based 3D content portrayals of 3D models and 3D scenes. In the rest of the piece of the paper, the word semantic methods determined utilizing ontologies.

The essential semantic web strategy for building ontologies for various kinds of substance is the Resource Description Framework (RDF). RDF is an information model, which empowers formation of proclamations on assets. Every announcement is a triple included: a subject (asset depicted by the announcement), a predicate (property of the subject) and an article (the estimation of the property portraying the subject). RDF presents essential ideas for depicting assets, for example, information types, compartments and records. RDF-based portrayals can be installed in site pages utilizing RDFa. The RDF Schema (RDFS) and the Web Ontology Language (OWL) are semantic web benchmarks dependent on RDF. These norms improve the expressiveness of RDF by giving extra ideas, for example, chains of command of classes and properties, requirements, property limitations and procedure on sets. The Semantic Web Rule Language (SWRL) and the Rule Markup Language (RuleML) expand OWL with rules. Another standard language utilized concerning 3D displaying is the Access-Limited Logic. Though an announcement portrays a reality, a standard depicts ramifications between the realities remembered for the ascendant (body) and the realities remembered for the relative (head). For example, if an individual is of the particle class (body), create a circle to speak to it (head) in a ontology for synthetic mixes.

Demonstration of 3D modelling content that based on ontologies is performed regarding the semantics of 3D content components, their classes and properties, which are indicated in 3D content ontologies. Regularly, the aftereffect of ontology based displaying is last 3D content encoded in a 3D organization or language (e.g., VRML, X3D, JavaScript) reasonable to 3D programs (e.g., Cortona, BS Contact or a web program). Ontology based demonstrating underscores the detail of the attractive presentational impacts to be accomplished rather than the solid succession of directions that must be performed to accomplish these impacts. Thus, ontology that is based on modelling can be viewed as a particular sort of decisive displaying.

Ontology-based modeling of 3D content can be regarded as a process encompassing the following four activities: semantic reflection, semantic selection, semantic configuration and semantic transformation of 3D content. Semantic reflection and semantic transformation are the activities in which 3D content changes the format of representation—from a format readable to 3D browsers to an ontology and vice versa. These activities are necessary because 3D content ontologies are not the native format understandable to the available 3D browsers. In turn, semantic selection and semantic configuration are the activities in which 3D content is modified using the concepts specified in the 3D content ontology used. Some approaches enable only single modeling activities, whereas other approaches enable several modeling activities combined into content creation pipeline. Furthermore, in some approaches, all activities are based on semantic web ontologies, whereas in other approaches some activities are not based on ontologies. The particular activities are described below along with an example of modeling a virtual museum exhibition. In description of the activities, 3D scenes and elements, represented using ontologies and 3D formats are called semantic and syntactic, respectively.

Modelling steps

1) *Reflection*

In semantic reflection, semantic substance components comparing to syntactic components communicated in a 3D position are made (e.g., shapes materials and activities). The syntactic components might be acquired from various sources and encoded in various configurations and dialects (e.g., VRML, X3D, MPEG-4). The made semantic components are portions of a metaphysics based portrayal and they are regularly parameterized to empower the further semantic design. For instance, a few works have been dedicated to reflecting various pieces of human body and indoor scenes. On the off chance that semantic reflection is trailed by the other demonstrating exercises, semantic components are encoded utilizing a typical semantic web system to save cross-similarity in the further design and change. Semantic components may speak to various highlights of 3D content, for example, geometry, structure, space, appearance, liveliness and conduct at various degrees of deliberation. Overall, semantic components can adjust, broaden and assemble the importance of their model syntactic components, e.g., a household item mirrors many cross sections; various types of wood reflect various surfaces and sparkle. Semantic components, which are partners to the models, are made and encoded utilizing a semantic web standard, OWL. The semantic components regard further use cases controlled by historical center guardians, who will utilize the ontology for demonstrating virtual gallery shows. For example, the chamber and the container are consolidated into the stool, while the sensors and the interpolator are joined into the curio activity. Both idea—the stool and the liveliness—are intended to be reasonable to historical center keepers. The consequence of the reflection is a lot of autonomous semantic components and properties that can additionally consolidated into 3D scenes.

2) *Selection*

In semantic selection, semantic components are picked for consideration in the objective substance portrayal. Semantic determination demonstrates a subset of every single semantic component that are accessible in an archive. Determination is performed utilizing ideas at the deliberation level that have been resolved during reflection. The level might be either explicit to 3D content—its geometry, structure, space, appearance, movement and conduct, or explicit to an application or area (for example production line reenactment and inside plan). Semantic choice normally goes before semantic setup in the demonstrating procedure. In the semantic determination in the virtual historical center model, relics (with the exception of the seal), stools and the storage facility, which will be additionally joined into the demonstrated 3D scene, are picked. The components despite everything have no properties doled out and they are in no relations.

3) *Configuration.*

In semantic plan, semantic properties of picked parts are set with values, and the segments are joined into a metaphysics based depiction that is a sound 3D scene. Plan is performed at the level of consideration that has been used in the past activities. This may be express to 3D content, unequivocal to an application or space, or wrap them two. In the semantic game plan in the virtual display corridor model, statues are shown as made of wood and glass, exuberance is applied to the glossy statue, and all the picked antiquated rarities are put on stools. The result of the arrangement is a cosmology based 3D scene included parts with properties and relations.

4) *Transformation*

Designed ontology based 3D scenes are encoded specifically 3D content organizations or dialects. Accordingly, semantic change can be viewed as a reverse semantic. In any case, as opposed to reflection, change delivers a sound substance portrayal that comprise of substance components with properties set, which empowers its introduction. Change is regularly performed without the utilization of semantic web ontologies. In such cases, change is not a piece of semantic demonstrating; nevertheless, it is irrefutably a piece of a more extensive displaying process.

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УМНОЖЕНИЕ МНОГОЧЛЕНОВ В СРЕДЕ ЯЗЫКА ПРОГРАММИРОВАНИЯ PYTHON

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Аннотация:

Цель статьи заключается в рассмотрении алгоритма умножения многочленов. Полученный в статье код, разработанный на базе программирования языка Python, несколько упрощает решение подобных задач. В статье также рассмотрены основные правила и понятия об умножении многочленов.

Abstract:

The purpose of the article is to consider the polynomial multiplication algorithm. The code obtained in the article, developed on the basis of programming the Python language, somewhat simplifies the solution of such problems. The article also discusses the basic rules and concepts of multiplication of polynomials.

Ключевые слова:

многочлен; умножение многочленов; переменные; Питон

Keywords:

polynomial; polynomial multiplication; variables; Python