

The Development of STIF in Ontology Based on The Methontology Approach

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Abstract. Complex domain occurs when a lot of knowledge overloads and knowledge trek phenomenon appeared with the raise of product complexity and the explosion of knowledge and information. The knowledge content of complex domain is difficult to organize. One of the complex domain is STIFIn Fingerprint Personality Solution. However, it is difficult to organize the knowledge of STIFIn solution since it is a complex domain. Knowledge acquisition also a part of the problem because there is an only little number of STIFIn certified trainer that expert in STIFIn solution. The other circumstances are an STIFIn solution also have the possibility to be extended in future. To solve the following problem, Structured Knowledge is used to structure the knowledge content that will be more effectively organize the content in order to enhance reusable and extendable of the knowledge model. Structured Knowledge contains a wealth information, it can effectively help to carry out the knowledge of the complex domain. There are many ways to express the structured knowledge, Ontology is one of them. In this paper will discuss the development of STIFIn Ontology based on METHONTOLOGY approach.

Keywords: Ontology, METHONTOLOGY, Complex Domain, Structured Knowledge.

1 Introduction

The personality is hypothesized to lead to ideas associated with the conduct [1]. In the different words, studying outer behaviors may be used to persona analysis seeing that conduct is the expression of persona. Human personality may effect on many social sports including instructional overall performance [2], getting to know approach preference [3] and academic motivation. With admiring to different research have located that personality to be associated with academic performance, the desire of electives, finishing university schooling, and desire of career [4-6].

There are numerous distinct schemes of in determining character types of personality. As an example, the learning fashion stock (LSI; Kolb, 1984), the big five frameworks (Costa and McCrae, 1992), and the MBTI (Myers, 1993), and STIFIn via Farid Poniman. In this take a look at, STIFIn Fingerprint test with the aid of Farid Poniman has been selected as a complicated area. While there are lots of overloads and knowledge trek phenomenon regarded with the rise of product complexity and the explosion of understanding and facts. The hassle in STIFIn Fingerprint check is the end result from the fingerprint test are complicated facts and information isn't in an understanding way. Any other trouble raised does no longer have enough knowledge in this subject, so it hard to locate a knowledge. Due to lack of understanding, the understanding desires to capture the knowledge and flip it into knowledge model.

Established understanding could be very popular in structuring the complex understanding. One in all a method to shape the information is Ontology. Ontologies at the moment are central to many packages which include semantic web provider, information management, digital commerce, and medical expertise gadget. An absolutely described and well-structured technique can reduce ontology development time and increase the rate of success for an assignment. But, there exist no mature information technique fro ontology development. METHONTOLOGY, though, has been adopted in several ontology developments because of its area independent characteristic.

On this study, standards that have considered for selecting an ontology development method have been the diploma of adaptability by way of non-specialists, the ranges of information of the technique, whether to aid iterative development responsibilities, pointers for formalization, the device helps, recommended techniques, and so on.

Based totally on the standards, METHONTOLOGY had been observed as the most suitable method to develop an ontology.

The goal of this study, primarily based on development enjoy, to analyze the ontology improvement lifestyles cycle counseled in METHONTOLOGY. Discover problems associated with the METHONTOLOGY technique, OWL-DL, and Protégé-OWL additionally discussed later.

This paper is prepared as follows. Phase 2 offers a brief overview of METHONTOLOGY, OWL-DL, and Protégé-OWL. Phase 3 describes the entire ontology development existence cycle of STIFIn ontology. Section 4 discussion lessons found out from this venture. Eventually, Section 5 summaries from the examine and indicates future.

2 STIFIn Ontology Development Background

2.1 METHONTOLOGY

METHONTOLOGY turned into in the beginning derived from the enjoy of developing Chemical Ontology at Polytechnic college of Madrid [7]. It became first delivered in 1999. Then, in 2004, it became accelerated and categorized into three vast strategies. Every technique contains unique activities: (1) the management manner consists of scheduling, manipulate and fine guarantee, (2) the improvement technique is split into specification, conceptualization, formalization, implementation, and upkeep, and (three) the aid technique consists of 5 activities, i.e., information acquisition, evaluation, documentation, configuration management, and integration. METHONTOLOGY adopts a few tips from the IEEE general for software program improvement (IEEE, 1996). In this paper, we mainly focus on the development process because that is the most important process in METHONTOLOGY.

2.2 OWL-DL

OWL is an ontology language for the Semantic Web, developed by W3C Web Ontology Working Group. OWL is classified into three sub-languages: OWL-Lite, OWL-DL, and OWL-Full. OWL-Lite is the syntactically simplest sub-language. OWL-DL is much more expressive than OWL-Lite and based on Description Logics (DL). DL is a decidable fragment of the first

order logic, and therefore, amenable to automated reasoning. OWL-Full is the most expressive sublanguage. However, because it is impossible to perform automated reasoning on OWL-Full sub-language, we selected OWL-DL as our ontology development language.

2.3 Protege-OWL

Although METHONTOLOGY recommends WebODE as a technological framework, we selected Protégé-OWL for the subsequent reasons. First, Protégé-OWL is more harmonized with OWL-DL than other tools. Second, it is platform- unbiased in order that builders can apply it to any platform. Third, due to the fact Protégé-OWL is a free and open ontology editor, this device has high accessibility as compared with different ontology development tools. Furthermore, Protégé-OWL supports diverse plug-ins. The most useful plug-in for our project is OntovizTab which shows an ontology with graphical perspectives. Although the development of Protégé-OWL has been traditionally driven with the aid of biomedical applications [8], the system is area independent. Although the development of Protégé-OWL has been historically driven by biomedical applications [8], the system is domain in dependent with any other domains

3 METHONTOLOGY Development Life-Cycle

METHONTOLOGY were divided into three broad processes. Each process contains specific activities. The three broad processes are a Pre-development process (Scheduling and Specification), the Development process (Conceptualization, Formalization) and Post-development process (Validation). . The figure 3.1 below shows the step in developing ontology using METHONTOLOGY approach.

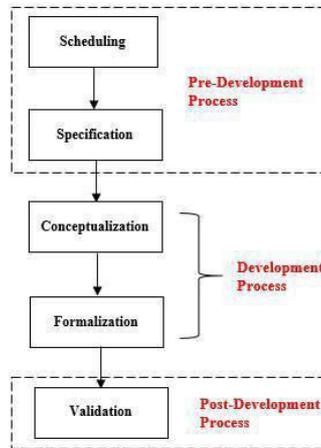


Figure 3.1 METHONTOLOGY development process life-cycle

3.1 Pre-Development Process: Scheduling and Specification

There are two phases involved in this stage which is scheduling and specification process. The aim for the scheduling activity is to identify the essential task, organize those tasks and to allocate time and resource. During planning stage also need to decide what tools want to use, what kind of language to use and the software for the development. This is a crucial stage where if the task not planning well, it will be caused to project delay and cost overrun. To avoid that from happening, during the pre-development process, scheduling stage must be done correctly and accurately.

Meanwhile, in the specification stage, the domain and the scope of ontology are identified, which include the purpose of the ontology, the intended users, and others. The goal of the specification phase is to produce either an informal, semi-formal or formal knowledge representation using a knowledge representation tools. Several activities had been carried out such as the search for existing knowledge ontology, domain analysis and knowledge acquisition in order to obtain an ontology specification document. The output for this activity is the concept mapping of STIFn knowledge using CMap tools. Cmap tools were used to described and recorded hundreds of concepts, their definitions, binary relationships between them in the form of theoretical axioms, and other contextual information about them.

3.2 Development Process

As recommended by METHONTOLOGY, we first performed a scheduling activity in order to plan the main tasks for the STIFIn ontology development. The objective of the scheduling activity is to identify the essential tasks, to organize those tasks, and to allocate time and resources (e.g., people, a development tool, an ontology language, etc.). We chose OWL-DL as an ontology language and Protégé-OWL as a development tool.

3.2.1 Conceptualization

The focus in this stage is to arrange and structure the knowledge acquired from the exterior illustration and implementation. The conceptualization stage starts with changing informal data into semi-formal specifications using a set of intermediate representations (IRs) primarily based on tabular and graph notations supplied by using

METHONTOLOGY. These IRs (i.e. concept, attributes, relations, axioms, and rules) are precious due to the fact they are easily understood by means of area expert and ontology developer

The strategy used to conceptualize STIFIn knowledge is the use of a manual strategy which is embedded inside the chosen texts. The conceptualization manner started out with the identification and recording of all phrases and principles of interest. There are five necessary concepts as the sub-ontologies underneath which other principles could be placed. These main principles included: 1) Personality, 2) Learning, 3) Career and 4) Teaching.

Next, other personality-related standards had been identified and placed under their associated categories. Cmap tools were used to described and recorded thousands of concepts, their definitions, binary relationships between them in the structure of theoretical axioms, and different contextual information about them. However, this preliminary thought mission underwent many variations as improved with conceptualization task.

3.2.2 Formalization of Conceptualization

IRS developed for STIFIn ontology during the conceptualization were finally formalized and implemented. Protégé-OWL were used to convert the formal model into an OWL-DL. This tool allows us to store the specified concepts in a class hierarchy and provides facilities for the description and definition of their properties, constraints, and their links with other concepts. The figure below shows the hierarchy of STIFIn ontology. Protégé-OWL supports graphical representation of a class hierarchy though OWLVIZ plug-in. This visualization function helps developers and users understand the structure of the ontology more easily than merely showing a text-based ontology structure. Figure 3.2 show the hierarchy of STIFIn ontology.

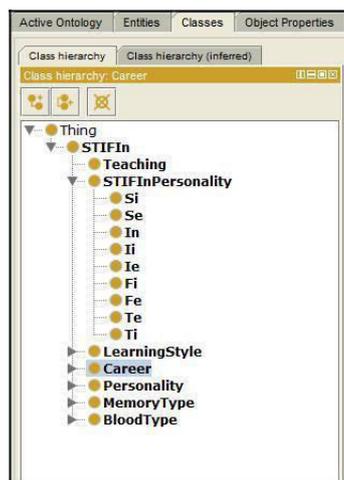


Fig 3.2 Hierarchy of STIFIn Ontology

The class hierarchy was developed and formalized by means of a combination of top-down and bottom-up classification strategies [8]. Using a top-down approach, it began with the creation and description of the seven specified general concepts or sub-ontologies. Each of these top-level concepts, then, integrated a few relevant middle-level concepts. Some of these middle-level concepts were defined via a top-down method. The classified concepts of the class hierarchy were then defined and described using the object properties. Object properties represent ontological relationships which link different classes (concepts) together. Furthermore, the tools allowed to add a comment, label, definition, and other metadata to concepts and axioms and restrict their application to certain contexts.

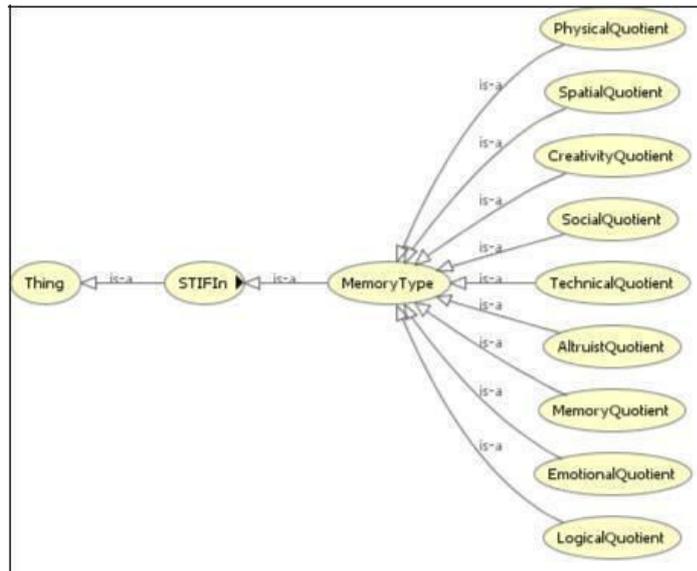


Fig 3.3 The Memory Type Module in Protege

3.3 Post-Development Process

The ontology should be validated before they are used or reused. Ontology evaluation has three types of evaluation which are ontology verification, ontology validation, and ontology assessment [3]. Ontology verification is to ensure whether the ontology is implemented correctly according to all the expected requirements. Meanwhile, ontology validation refers to whether the ontology concepts really represent the real world for which the ontology was created.

In order to ensure a workflow to be executed correctly, expert validation technique was used to validate the workflow ontology and knowledge. First, expert checked whether all individual concepts were consistent and ensured no contradictory concept could be inferred from other concept and axioms. Then, expert ascertained the classification hierarchy and disjoint knowledge to compute completeness. Finally, expert will fill the form regarding the knowledge insight in developing STIFIn ontology.

Expert Validation (Career)

Instruction:

- Give tick mark (✓) at the grading box if you think the knowledge is true.
- The space for general comment and suggestion are provided at the last paper of this form.

No	Personality	Career	Grading		
			Good	Medium	Poor
1	si	Librarian	✓		
		Secretary	✓		
2	Se	Chef	✓		
		Translator	✓		
3	Ti	Engineer	✓		
		System Analyst	✓		
4	Te	Education	✓		
		Doctor	✓		
5	ti	Programmer	✓		
		Quality Control	✓		
6	Is	Broker	✓		
		Painter	✓		
7	Fi	Artist	✓		
		Musician	✓		
8	Fa	Producer	✓		
		Psychologist	✓		
9	Is	Lawyer	✓		
		Executive	✓		
		Officer	✓		
		Nurse	✓		
		Strategist	✓		

Comment:
.....

Date: _____ Signature: 

Fig 3.4 Example of expert validation checklist

4 Discussion

In this section, we analyze METHONTOLOGY with a critical view based on our STIFIn ontology development experience in order to address some issues of METHONTOLOGY. We also discuss some problems of OWL DL and Protégé-OWL.

First of all, we present several drawbacks of the METHONTOLOGY approach. First, METHONTOLOGY does not provide specific guidelines for assigning individual developers to certain tasks. METHONTOLOGY consists of three different processes (i.e., management, development, support process). According to METHONTOLOGY, those processes are carried out simultaneously and each of them is performed by various developer groups (e.g., domain experts, ontology experts, etc). However, it does not explain how to allocate those groups to specific tasks, how to combine those tasks together once divided works are completed, and so on. Second, one of the important motivations to adopt METHONTOLOGY is that even a domain expert is supposed to build an ontology easily without help from ontology experts. However, according to our experience, that is not the case. Even though METHONTOLOGY could be fully understood by a domain expert, it is not easy to develop an ontology by

understood by a domain expert, it is not easy to develop an ontology by the domain expert alone without help from an ontology specialist. Third, METHONTOLOGY focuses heavily on conceptualization and this could be a problem. We found that the IRs developed during the conceptualization phase are sometimes not seamlessly codified into an ontology language. This can cause delays during the

formalization and implementation stages. Fourth, METHONTOLOGY does not provide sufficient explanations about methods and techniques applied in each stage, such as a detailed technique on how to extract concepts and methods on identifying relations among concepts.

5 Conclusion

METHONTOLOGY by actually developing an ontology for real-world use since we would like to analyze the ontology development methodology, the ontology development language, and the development tool. There are numerous contributions on this research. First, despite the fact that previous studies commonly focused on the usage of in preference to the analysis of METHONTOLOGY, for the primary time, we tried to research the method with a vital view with the intention to locate its strengths and weaknesses. Second, primarily based on an expansion of reviews, this take a look at discusses lessons found out from the development revel in and gives useful hints to practitioners who need to increase an ontology based on the METHONTOLOGY technique on their tasks. Our examine also offers a few insight to ontology technique researchers who want to accumulate a greater superior ontology development technique. STIFIn ontology may be reused by means of other character trits or similar domain names considering that it's far advanced based totally on standard principles usually used in the area.

However, there are some obstacles of the STIFIn project. First, even though METHONTOLOGY encouraged builders to use WebODE as a building tool, we had to adopt Protégé-OWL because WebODE was no longer available. Even though Protégé-OWL is available and one of the most broadly used ontology improvement tools, the adoption of Protégé-OWL as a substitute of WebODE would possibly influence our conclusion on the issues of METHONTOLOGY. Second, considering none of the preceding research tried to boost an ontology for the personality traits, the fine of two STIFIn ontology can't be in contrast and evaluated. In conclusion, this learn about provides several contributions to the ontology methodology and sensible implications in the ontology improvement research field. Therefore, we agree with that our find out about will promote further research on this area. In the future, a comparison between WebODE and Protégé-OWL ought to be made to examine their variations when adopting the METHONTOLOGY.

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