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Research Paper

The Development of Personality 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 Fingerprint Fingerprint Personality Solution. However, it is difficult to organize the knowledge of Fingerprint solution since it is a complex domain. Knowledge acquisition also a part of the problem because there is an only little number of Fingerprint certified trainer that expert in Fingerprint solution. The other circumstances are an Fingerprint 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 Fingerprint 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 Fingerprint via Farid Poniman. In this take a look at, Fingerprint 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 Fingerprint 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. 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. Based totally on the standards, METHONTOLOGY had been observed as the most suitable method to develop an ontology. This paper aim to analyze the improvement steps counseled in METHONTOLOGY. Discover problems associated with the METHONTOLOGY technique, OWL-DL, and Protégé-OWL additionally discussed later. Next section offers a brief overview of METHONTOLOGY, OWL-DL, and Protégé-OWL. Then describes the entire ontology development existence cycle of Fingerprint ontology. In addition discussion lessons found out from this venture. Eventually, Section 5 summaries from the examine and indicates future.

2. Fingerprint Ontology Development Background

2.1. Methontology

METHONTOLOGY history began with 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 easy to use. Furthermore, Protégé-OWL supports many plug-ins such as OntovizTab with graphical views. Although the development of Protégé-OWL has been traditionally driven with the aid of biomedical applications [8], the system is area independent. Although Protégé-OWL has been known in biomedical applications [8], this system could be used with any other domains.

3. METHONTOLOGY Development Life-Cycle

There are three phases in MENTHONTOLOGY. Each process contains specific activities. The three broad processes are a Predevelopment process (Scheduling and Specification), the Development process (Conceptualization, Formalization) and Postdevelopment process (Validation) . The figure 1 below shows the step in developing ontology using METHONTOLOGY approach.

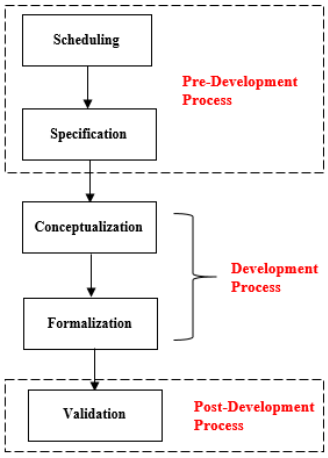


Fig. 1: METHONTOLOGY development process life-cycle

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 STIIFn 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

The first step in this method is to plan the main tasks for the Fingerprint ontology development. This is to identify the important tasks (organize, time arrangement and resources). OWL-DL is chosen as an ontology language and Protégé-OWL as the tool.

3.2.1. Structuring Knowledge

In this stage, the data were arranged according to intermediate representations (IRs). The IRs such as 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 Fingerprint 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 Fingerprint 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 Fingerprint 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 2 show the hierarchy of Fingerprint ontology.

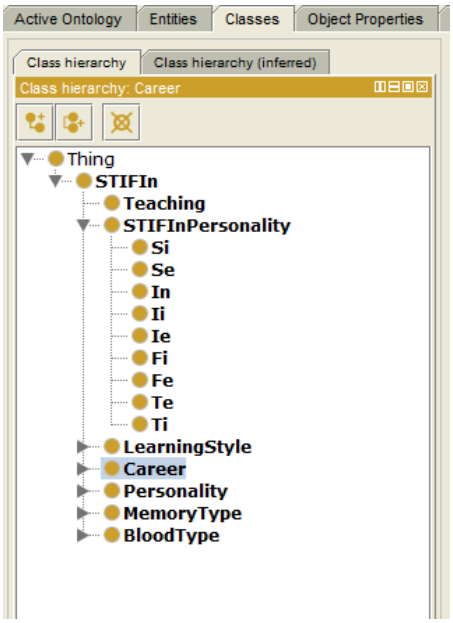


Fig. 2: Hierarchy of Fingerprint Ontology

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.

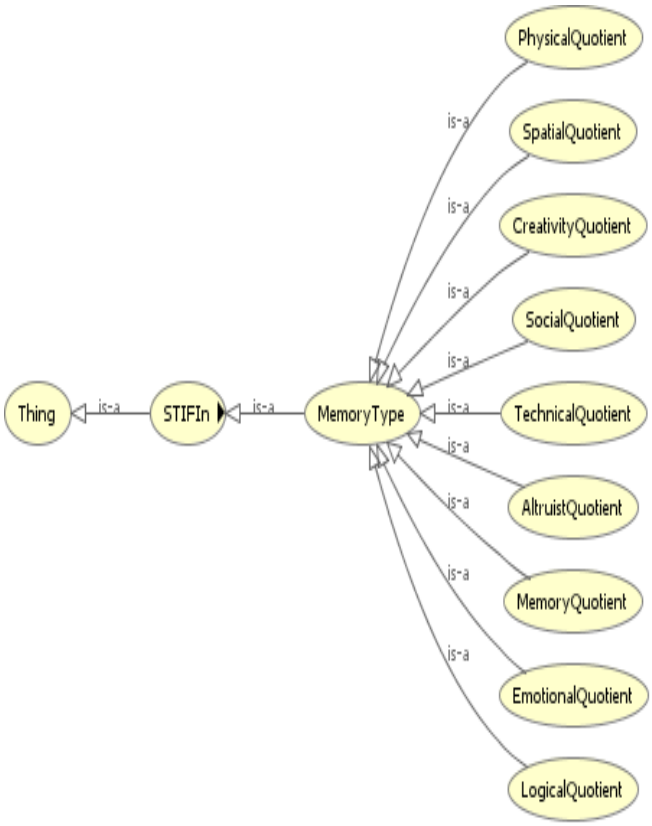
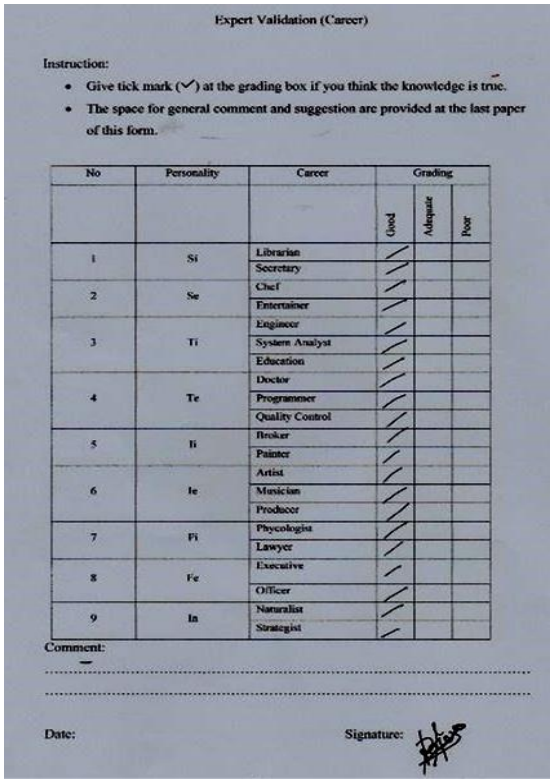


Fig. 3: The Memory Type Module in Protege

3.3. Post-Development Process

The process must be validated before they are used or reused. There are three types of evaluation; verification, validation, and assessment [3]. 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 consistency. Then, expert checked the completeness. Finally, expert will fill the form regarding the knowledge insight in developing Fingerprint 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	Adequate	Poor
1	Si	Librarian	✓		
		Secretary	✓		
2	Se	Chef	✓		
		Entertainer	✓		
3	Ti	Engineer	✓		
		System Analyst	✓		
		Education	✓		
4	Te	Doctor	✓		
		Programmer	✓		
		Quality Control	✓		
5	Ii	Broker	✓		
		Painter	✓		
		Artist	✓		
6	Ie	Musician	✓		
		Producer	✓		
7	Fi	Phycologist	✓		
		Lawyer	✓		
8	Fe	Executive	✓		
		Officer	✓		
9	In	Naturalist	✓		
		Strategist	✓		

Comment:

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Date: Signature:

Fig. 4: Example of expert validation checklist

4. Conclusion

There are numerous contributions on this research. First, although this method has been used in many development, we used it in our Fingerpirnt research. Fingerprint 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. This research is believed could be useful in many areas such as health and medicine.

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