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Abstract

In this paper, we propose a new knowledge representation method using a unique triplet knowledge representations, namely "animation knowledge", "natural language knowledge", and "metadata", as well as a new sharing technique utilizing Web page search engines for knowledge use.

At the same time, we conducted systematization research on potential problem analysis that becomes an issue in prior evaluations (assessments), especially those in which future predictions become an especially important element, and propose a new knowledge acquisition method of extracting explicit knowledge from tacit knowledge. Up to date, there has been no precedent of systematization research on potential problem analysis in Japanese, and this study is the first ever to be conducted. The results of our research, which are detailed in this paper, are summarized as follows.

In Chapter 1, we lay out the aim and purpose of our study, explain the significance of motion picture knowledge, natural-language knowledge and potential problem analysis, and account on the background of our research and the structure of this paper.

In Chapter 2, we describe the technique of digital-archiving by way of utilizing the triplet knowledge representations, i.e. "animation knowledge", "natural language knowledge", and a "metadata". Traditional researches on knowledge creation define tacit knowledge as "knowledge of the experiential, physical and analog realm, which cannot be expressed in language even when it is known", and explicit knowledge as "digitally shareable knowledge, created by verbalizing and systemizing tacit knowledge". So called "mastery" is an example of tacit knowledge. Metadata is a set of keywords using IEEE-compliant learning object metadata LOM, and the structure ontology of LOM is consisted of RDF/RDFS expressions of LOM.

In Chapter 3, we introduce a new technique of the knowledge acquisition using a potential problem analysis system by the KT method, applying the aforementioned triplet knowledge representations. Furthermore, we assess the potential problem analysis system multifacetedly using Web technologies such as animation knowledge, natural language knowledge, bulletin boards and chat rooms etc. on the Web by multiple people and consider the usability of the knowledge acquisition technique which uses the potential problem analysis system.

In Chapter 4, we elaborate on Web page searches by natural language in which the LSI method is utilized as an example of knowledge utilization of the triplet knowledge representations explained in Chapter 2.

In Chapter 5, we conduct conformity feedback by the support vector machine (SVM) which uses "animation knowledge" by the aforementioned Web page search engine. Subsequently we compare the performance of the system with and without conducting conformity feedback, and evaluate the improvement of search accuracies.

In Chapter 6, we create the structure ontology of LOM using its RDF/RDFS expressions in order to realize an e-Learning supporting system which allows ambiguous searches using semantic Web technologies, and examine methods for improving the precision of Web page searches explained in Chapter 4.

Finally, we present an overall summary at Chapter 7, and review our future tasks.

In this paper, we have proposed the triplet knowledge representations, i.e. "animation knowledge", "natural language knowledge", and a "metadata", and introduced techniques to digital-archive such.

We utilized "animation knowledge" for this Web page search engine, newly conducted conformity feedback by the support vector machine (SVM), and evaluated the improvement of search accuracies. Furthermore, we tested a new e-Learning supporting system which can perform ambiguous searches using Semantic Web technologies in order to simultaneously conduct more advanced, semantic processings.

Moreover, we have proposed a technique for expressing explicit knowledge from tacit knowledge as a method of knowledge acquisition, and have developed Japan's first potential problem analysis system using the KT method.