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Research Infrastructures for Systematization and Application of Large-scale Knowledge Resources

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To function at optimal levels of efficiency, the 21st century, which is being described as the century of knowledge resources, will require the construction of sophisticated, accessible, large-scale knowledge resources in every domain of research, education and daily life. Knowledge in this context refers to the structured representation of observed content, and the application of the rules that underlie this representation to information interpretation, problem solving, and information creation. Another way of describing this concept is as the comprehensive, integrated form of information which has been verified as valid, for a specific topic, and which is therefore more significant than a mere collection of data or observations. Thus a knowledge resource is the large-scale accumulation of usable knowledge, combined with meta-knowledge, and it represents a much more sophisticated object than mere content. While various individual knowledge bases exist today, inconsistent development approaches, lack of communication among participating research organizations, and the high level of complexity inherent to the project mean that these knowledge bases are usually dfficult to manage, extend or utilize.

In order to resolve these growing problems, a five-year COE (Center of Excellence) sponsored program, the 'Framework for the Systematization and Application of Large-scale Knowledge Resources' was launched at the Tokyo Institute of Technology in 2003. Since then, those involved in the project have been conducting a wide range of interdisciplinary research, combining information and knowledge from the humanities with technology from the natural and information science fields, in order to establish a large scale framework for the systematization and application of large-scale knowledge resources in electronic mediums. Figure 1 illustrates the strategy of the COE program, with integrated hierarchies for building infrastructure for research and education, investigating systematization technology, building fundamental knowledge resources, and constructing knowledge resource applications. Large-scale systems for computation, information storage and retrieval have been installed as infrastructure to support research and education. For the systematization of large-scale knowledge resources,

statistical theories, graph theory, logic, ontology, and metadata techniques, as well as approaches to refining various traditional methods are being investigated. Various fundamental knowledge resources such as spoken language-resources, written-language resources, audio-visual resources and Web-based resources are being constructed in accordance with these technologies. On top of these fundamental knowledge resources, application oriented resources, including educational (e-learning) resources, classic literature, documents on historical sites, broad-casing resources and Web-knowledge resources are also being constructed.
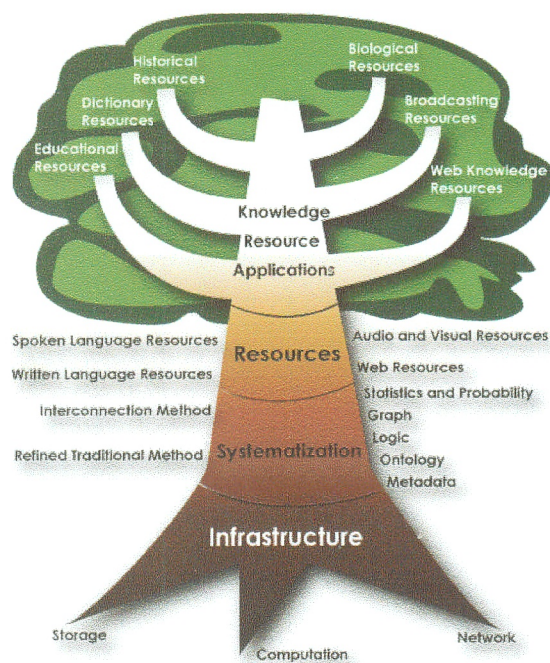

Fig. 1 - The strategy of the COE program.

Reference

[1] "Proceedings of the International Symposium on Large-scale Knowledge Resources (LKR 2006)", Tokyo, Japan, March 1-3, 2006.