【Grant-in-Aid for Scientific Research(S)】

Integrated Science and Innovative Science (Comprehensive fields)

Title of Project : World-Wide Sustainable Language Service Infrastructure Based on Multi-Agent Model

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Research Area : Comprehensive fields
Keyword : Web intelligence

【Purpose and Background of the Research】

Language barrier is a typical problem for communication and collaboration among people from different countries. We have been operating the Language Grid, a service-oriented multilingual infrastructure, which has accumulated and coordinated language resources as Web services since 2007. Currently, the Language Grid has 144 member organizations from 17 countries, and more than 140 registered services which are classified into over 20 types such as translators, dictionaries, parallel texts, and so on. The concept of the Language Grid, shifting from language resources to language services, has been shared among major language resource research groups all over the world.

This project aims to create a sustainable language service infrastructure by (1) incentive design for service providers. Since operation centers are working independently, (2) institutional design for the federated operation is needed when they collaborative with each other. We apply the results of the incentive design and institutional design to the stakeholders (service providers, service users, service infrastructure operators), which we regard here as autonomous agents in a multi-agent system. (3) We will design the language service ontology to achieve a world-wide language service infrastructure, collaborating with universities and research institutes in Europe and the United States.

【Research Methods】

In this project, our approach is to execute two research processes in parallel. In “laboratory”, we execute controlled experiments for verifying novel ideas with scientific process. In “field”, we test our technologies in the real world. Problems observed in “field” are solved in “laboratory” with theoretical studies and contributions of “laboratory” are feedback to the “field”.

We take this approach in both incentive design and institutional design. In “field”, we use the Language Grid currently in operation, and collaborate with corporates to provide sustainable infrastructures. In “laboratory”, we use the Amazon Mechanical Turk (AMT) for the controlled experiments, and build multi-agent simulation environments as well. Our research contributions will be presented in the language resource community, services computing community and multi-agent systems community.

【Expected Research Achievements and Scientific Significance】

This project is related to two research areas, services computing and multi-agent systems. The main focus in services computing community has been the implementation of Web service technology. However we will focus more on the upper layers such as reliability of services and incentive design. In the multi-agent community, we will contribute to the research of collaborative evaluation and self-organization by evaluation in the real world.

【Publications Relevant to the Project】

- Toru Ishida Ed. The Language Grid: Service -Oriented Collective Intelligence for Language Resource Interoperability. Springer, 2011.
- Toru Ishida , Yohei Murakami. Institutional Design for Service-Oriented Collective Intelligence. IEICE Transactions on Information and Systems, Vol.J93-D, No.6, pp.675-682, 2010. (in Japanese)
- Toru Ishida, Yohei Murakami, Rieko Inaba, Donghui Lin, Masahiro Tanaka. The Language Grid: Service-Oriented Multi-Language Infrastructure. IEICE Transactions on Information and Systems, Vol.J95-D, No.1, pp.2-10, 2012. (in Japanese)

【Term of Project】 FY2012-2016

【Budget Allocation】 167,600 Thousand Yen

【Homepage Address and Other Contact Information】

http://langrid.org/