

Design of Management Structure Measuring Integrated Monitoring System Based on Linked Open Data

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ABSTRACT

In this paper, we analyze the operations and/or status of our structure which builds the management structure measuring integrated monitoring system based on linked open data in a short term or long term bases. We have applied a novel analyzing method of linked open data to expect what movements can be occurred in the structure, and we improve the monitoring system using an integrated design to solve the drawbacks of conventional types of monitoring. And collecting data through cloud and their reliability can be proved by evaluation of soundness of data amount and their confidence.

I. Introduction

Linked Open Data(LOD) recognizes data on Web by their independent URIs, and we finally expect Web connecting concepts in the world by assigning link information of each URI [1]. It plays an important role of connecting or linking between domain data of the same quality and domain data of different quality, which has not been connected with each other among our maintenance and management data of constructional structures like bridges and tunnels etc. Conventional monitoring systems currently operating for maintenance and/or management of structures were developed in various methods following their purposes or requirements of users or hosts. Therefore, it has been so difficult to develop a sort of integrated monitoring system because there is no standard code or integrated system regulations [2].

On the other hand, the area of maintenance structures measuring is so progressive that these novel maintenance data set can be accumulated year after year. Especially the scale of relationship between data is dramatically increasing because area of linked open data for structures measuring and maintenance becomes variety and their ontologies are also complicated [3]. According to these environmental variations, needs of maintenance quality control, confidence of data management, and tool development are continuously increasing these days.

II. Design of Integrated Monitoring System Using Intelligent Information Management

Conventional system of structure measuring and management has a lot of defects in its maintenance or upgrade process. It is not easy to change or upgrade a part of hardware or analysis algorithm in conventional monitoring system. Moreover, it strictly depends on the support of original developer in any simple maintenance process because it is so difficult to analyze the inner organization of the monitoring program.

We propose and design a new style integrated maintenance, management and measuring monitoring system based on linked open data. This new system generates knowledge out of interlinked data using this intelligent information management concept. Fig.1 shows a kind of life cycle of linked open data.

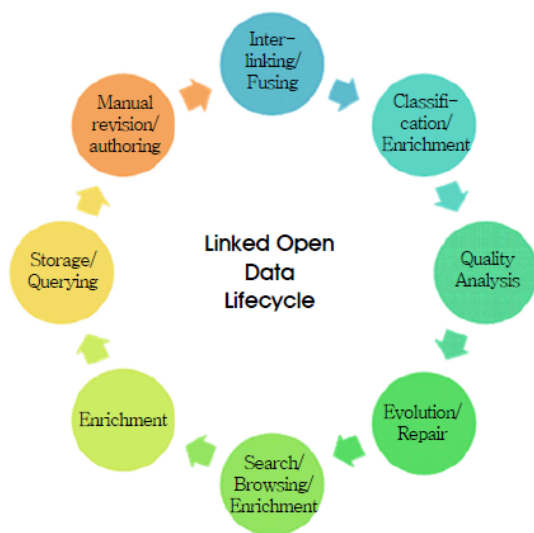


Fig.1 Life Cycle of Linked Open Data

Throughout this technology development, we try to solve following problems in the life cycle of linked open data by activating the inter-relationships between semantic Web data;

- Storage : Obtaining the data storing space of the concept RDF(resource description framework) with the performance of RDBMS(relational database management system)
- Authoring : Tools of authoring for users who have semantic WIKI, Wysiwyg editing, and social semantic cooperation technologies.
- Interlinking : Technology of automated link generation and management supporting consistency and data combining
- Classification : Technology of linkage and integration with high level ontology for searching and retrieval of linked data
- Quality : Technology of quality improvement for Web data by disclosing the source, scope, and structure
- Evolution/Repair : Automated recovery technology solving problems from dynamic Web data and their characteristics
- Search/Browsing/Exploration : Searching and browsing technologies of visualized linked open data for users

To solve these problems in the conventional linked open system, we have been trying to develop commercialized tools, test-beds, algorithms, and

advanced standards when we design the integrated monitoring system for structure maintenance and management based on linked open data. In addition, combining open data set with semantic technology, we submit usefulness of linked open data obtaining some application services based on searching such as 'Active Hiring'.

III. Concluding Remarks

In the area of structure maintenance, management and measuring system, new data set has been accumulated year after year to be continuously advanced. Especially the scale of inter-relationship between data is rapidly increasing because area of structure maintenance and management that linked open data occupied has been various and their ontology has been complicated. In this environment, needs of consistency, quality control, and tools development for structure measuring and maintenance are increasing.

We have applied a novel analysis method of linked open data throughout probability and statistics techniques to expect any small moving of structures in a short-term or a long-term basis. We would apply the results of this processing to the integrated monitoring system for structure maintenance, management, and measuring. We expect that our new scheme can solve some drawbacks of conventional system by collecting data from cloud basis, amount and quality control of data, and evaluation of soundness.

References

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