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Extraction Rules-Based Relational Data Mining for Power Project Management Ontology

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Introduction

This paper builds power ontology based on relational database. At present, the construction of power ontology is still manually constructed by experts in the field of power. Manual construction of ontology is not only very cumbersome but also inefficient and incomplete. The data used in this paper comes from the relational data of power projects. The data is characterized by neat structure, clear relationship and distinct structural characteristics. Therefore, this paper proposes to automatically extract ontology from relational databases. Under the guidance of the extraction rules proposed in this paper, it will be more convenient to construct the required ontology.

Result and discussion

	Class	Data property	Object property	Axiom	Accuracy
RDB2OWL	9	24	5	10	87.2
OntoEdit	10	29	10	9	89.2
Our Algorithm	13	41	23	16	92.36

Compared with the open source tool RDB2OWL and other methods, the number of classes, attributes and axioms in the ontology model extracted is also more, and the semantic information is richer.

Methods

Transformation rule 1: The table in the power project database is converted into a class in the body, and the table name is the class name of the body:

$$s \in S \Rightarrow c = concept(s); c \in :: Class \qquad (1)$$

Transformation rule 2: The various attributes in the table in the power project database are converted into the Datatype Property of the body. The attribute name of the table is the data attribute name of the body, and the domain of the data attribute is the corresponding relationship. The class in the ontology and the Range are the data type corresponding to the attribute in the table. which is:

$$s \in S, u \in attr(s) \Rightarrow$$
$$a = \Pr oN(u); a :: Data\Pr operty; \qquad (2)$$
$$concept(s) = Domain(a); type(u) = Range(a)$$

Conclusion

This paper presents a new method of automatic ontology extraction based on power project database. This paper analyzes the primary key and attribute of the table in the relational database, and extracts the corresponding data examples to build the power project management ontology. It can solve the problem of high cost and low efficiency of power system management of power projects.