Normalization in Conceptual Phase of RDBMS Using AER (Articulated Entity Relationship) Diagram

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EXTENDED ABSTRACT
The ER model enjoys widespread popularity as a tool for conceptual database design, and received many extensions and variations, which are generally termed as Enhanced-ER (EER) model. In this paper we make use of Articulated Entity Relationship (AER) diagram to accommodate the Functional Dependency (FD) information as its part for complete automation of normalization with an additional advantage that any modifications (addition, deletion or updation of attributes) made to the AER diagram will automatically be reflected in its FD information. Normalization, which makes up the core of the design theory for relational databases, is also considered an important technique to improve the quality of ER schema. Normalization is the process of grouping attributes into refined structures. The normal forms and the process of normalization have been studied by many researchers, since Codd initiated the subject. First Normal Form (1NF), Second Normal Form (2NF), and Third Normal Form (3NF) were the only forms originally proposed by Codd, and they are the normal forms supported by commercial case tools. The higher form of normalization such as BCNF (Boyce/Codd Normal Form), the Fourth Normal Form (4NF), the Fifth Normal Form (5NF), DKNF (Domain/Key Normal Form) and the Sixth Normal Form (6NF) are academically important but are not widely implemented yet. The objective of normalization is to organize data into stable structures, and thereby minimize update anomalies and maximize data accessibility. Although normalization is generally regarded as the rule for the structure of relational database design, there are still times when database designers may turn to denormalizing a database in order to enhance performance and ease of use. Even though normalization results in many benefits, there is at least one major drawback – poor system performance. ERD which is the end product of conceptual data modeling phase of database life cycle is first transformed into relational database design during logical phase and then normalized. Normalization utilizes association among attributes within an entity table to accomplish its objective. Since an ERD also utilizes association among attributes as a basis to identify entity type structure, it is possible to apply normalization principles during the conceptual data modeling phase. This paper also suggests inclusion of normalization techniques before logical design phase. Here, we first present a framework for describing ER schema. Then normal forms are defined and a complete set of transformations to achieve these normal forms is suggested. We discuss few of the limitations of AER model and how to overcome these limitations. Finally, we discuss how the theory may be applied and give an outlook on future research.

CONCLUSION

- Normalization being done in conceptual design phase can avoid lot of issues that can be raised if it is being done in logical design phase.
- If any Entity has atomic candidate key and have no two attributes that are transitively dependent on each other is always in Boyce Codd Normal Form (BCNF).
- AER diagram can normalize a relation that has functional dependency but not multi valued dependency.

FUTURE SCOPE
AER diagram can be extended to normalize a relation that has multi valued dependency.

REFERENCES