International Journal of Engineering Research in Computer Science and Engineering (IJERCSE) Vol 3, Issue 4, April 2016

Table Complexity Measurement of Database Systems

[1] Rachna Kumari, [2]Jayant Kr Joyti, [3]Nivedita.
[1][2][3] Master's Scholar, Dept. of Computer Sc. & Engineering
Birla Institute of Technology
Mesra, India
[1]rachnait20@gmail.com, [2] Jayant.ggu@gmail.com, [3]nivepriya09@gmail.com

Abstract: **Software complexity and effort estimation is an essential part of software plan organization. Developing and choosing relevant quality software application. It is essential that the software can be classify according to their use for every important quality individual using definition and validated metrics. Already, various methods has been proposed for database quality measurement. In our paper a method is proposed to measure the complexity of small Table of database system and categorize the complexity into three different category- simple, average and complex on the basis of given ranges. Our method is based on Table Complexity Determining Factors. The complexity of each table is computed and categorize according to the given ranges.**

Index Terms— **Weight measures, complexity factor, Category ranges, table complexity determining factor**

I. INTRODUCTION

Most of the organizations today use Information Communication Technologies (ICT) to execute each accountability. ICT can be implemented on an underlying, like the global file repository. On the other side, ICT can be implemented as an Information System (IS) which depends on method organization of the objective realism. IS cannot prevail without even one of this resources. Fabrication of an information system is a complex process which needs methodological approach. The extent of time utilized on designing and development of all the elements of an IS alter the all IS. IS with a larger number and more distinct business Activities are more composite than those which carry out a less amount of activities. Various types of Information systems have different types of complexity. In the IS development process, Complexity is crucial for assess needed resources (people, time, money, equipment) [1]. Development of more relevant software utilization is essential. Mostly, all proposed metrics are focused on software applications program, omit data-relevant quality. This eliminated data-related quality keep demonstrate as databases have newly developed, just an inferior model along with lesser addition to quality measurement of the whole organization. Nowadays, databases were proposed in almost all important Information System are enhancing their necessary crux [2]. Database is a unit of basic data software which plays a vital role as compared to other form of database. At real model, and implementation level of database [3]. The most important thing is the quality software products, and clearly databases, are assess for each compatible aspect, by choosing validated and universally secure metrics. These metrics can helps to the developer, to choose the most suitable database, among definition identical to different schemata. To do this, following Objectives were identified which are as follows Review the existing database metrics and their theory based.

II. MOTIVATION

The observation from the various analyst that the extent of software application perform significant role among all other product assets such as cohesion, coupling and complexity. Handling of the major quality of data in the database is essential. Nowadays, we know that as the size of data is increase the complexity is also increase, so if the large number of data existing in database, however data not simply increase the extent of database but also increases the cost and difficulty of database system and consume more time in terms of relationship between various constraints. With growing size and complexity it is becoming more difficult to expect the cost and effort development of database item. The achievement of software application is rest on the successful plan and development of database system. The size estimation of database component is basically depends on the relation in a relational system and also on the total number of tuples in every relations.

III. MEASUREMENT OF DATABASE SIZE AND COMPLEXITY METRICS

The RDBMS is a combination of different tables having some features. The complexity of RDBMS rely on the specified factors-

1) Total Number of different table and attributes of the tables.
2) Total Number of primary keys.
3) Total Number of foreign keys.
4) Total Number of attributes having constraints.
5) Total Number of attributes without having constraints.

The existence of object integrity constraints like primary keys and referential integrity like foreign keys advocates the item number. Trigger is a standard PL/SQL slab present in record and performs indirectly when trigger follows. Triggers occur when UPDATE, INSERT and DELETE statement perform against database table. View schema and trigger can be fire before and after an event occurs. However, when the number of trigger increases the database size also increases the number of LOC (lines of code) which is necessary for their application. Similarly, the more number of table as more the relation exists and it increases the size and complexity of the database. According to their level of complexity, we are assigning some weight measures to the different constraints, shown in Table 1.

Table 1: Weight Measure for TCDF

Attributes	Weight Measure
#PK	1.00
#FK	0.75
#AHC	0.50
#AWHC	0.25

Where, #PK indicates number of primary keys, #FK indicates foreign keys, #AHC indicates attributes having constraints and #AWHC indicates attributes without having constraints
According to given mass measure on different attributes on above table, the resulting the total weight of table is calculated for each table object relation.

IV. TABLE COMPLEXITY DETERMINING FACTORS

A database item can be categorize into three ways that is simple, average and complex which helps to determine the complexity of each item in database. The complexity of a table is to be determined by the number of table complexity determining factor such as primary keys, foreign keys, attributes having constraint keys and attributes not having constraints keys etc. Each TCDF is given as a stationary weight (W_i). Conferring to the TCDF the grouping of table item is calculated by means of Total Weight of Table (TWT) expending subsequent method:

$$TWT = \sum_{i=1}^{4} N_{fi} * W_i$$

Here, TWT stands for Total Weight of the Tables, N_{fi} stands for the number of determining factor given by the users and W_i is the equivalent weight of the TCDF.

According to the given ranges, (shown in the Table 2) the complexity is categorize into simple, average and complex [6].

Table 2: TCDF Category ranges

Table Complexity Determining Factor (TCDF) Classification

Category	Simple	Average	Complex
Ranges of TWT	1.25- 2.75	2.76– 5.75	5.76+

A Table item is used to supply information in the method of tuples and records. The major TCDFs which affect the classification of the table include total number of primary keys, total number of foreign keys, total number of attributes having constraints and total number of attributes without having constraints. As we see in the given below table 3 that the larger the number of tuples and records in the table larger will be the complexity. So in given table we measure the total weight of the database table using our proposed method TWT and categorize the complexity of the table according to the given ranges in (Table 2).

Table 3: TCDF Classification Table

S.No	#PK	#FK	#AHC	#AWHC	TWT	Category
Table-1	1	1	5	14	7.75	Complex

Table-2	1	0	2	1	2.00	Simple
Table-3	1	3	6	8	8.75	Complex
Table-4	1	0	5	6	4.75	Average
Table-5	2	2	5	0	6.00	Complex
Table-6	1	0	3	9	4.50	Average
Table-7	1	0	2	0	1.75	Simple
Table-8	1	1	3	0	3.25	Average
Table-9	1	0	2	2	1.80	Simple
Table-10	2	2	0	0	4.50	Average
Table-11	1	2	1	1	7.50	Complex
Table-12	1	0	1	1	1.50	Simple
Table-13	2	2	0	0	4.50	Average

V. CONCLUSION

It is necessary that the software product and database are calculated for all relevant methods using authorized or broadly known as metrics. Nowadays, database becomes more complex. Various types of Information systems have various types of complexity Fabrication of an information system is a complex process which needs methodological approach. The extent of time utilized on designing and development of all the elements of an IS alter the all IS. IS with a larger number and more distinct business activities are more composite than those which carry out a less amount of activities. For this reason we have taken different methods that evaluated complexity that disturbs the reliability of the relational database, object relational database schematics by our paper a method is proposed to measure the complexity of small Table of database system. The method was built using the database constraints. The constraints were categories according to their total complexity determining factors. We used our method to evaluate complexity of small table. We analyze the complexity and categorize it into three different categories that are simple, average and complex.

In future we want to modify this method and use it to measure the large database project and also use to measure the complexity of ER diagram.

REFERENCES

[1] Marin Kaluza, Mirjana Rajkamari “Croatia Functional Correlation of FP and DC Methods” Croatian OperationalResearch Review (CRORR), Vol. 4, 2013

[2] Mario Piattini, Coral Calero, Marcela Genero "Table Oriented Metrics for Relational Databases", software quality journal, 9, 79-97, 2001.

[3] Samaresh Mishra1, Krushna Chandra Tripathy & Manoj Kumar Mishra "Effort Estimation Based on Complexity and Size of Relational Database System" International Journal of Computer Science & Communication Vol. 1, No. 2, July-December 2010, pp. 419-422.

[4] Mario Piattini, Coral Calero, Houari Sahraoui , Hakim Lounis "An Empirical study with object-relational database metrics", ECOOP 2000, Cannes,13june.

[5] CoraI Calero, Mario Piattini, Marcela Genero “Database Complexity Metrics”.

[6] Bushra Jamil, Asma Batool "Software Metric Analyser for Relational Database Systems", ICIET, 2010 international conference.

[7] Elmasri, R. and Navathe, S. (2006). *Fundamentals of Database Systems*.Thirdedition. Addison-Wesley. Massachussets

[8]https://www3.ntu.edu.sg/home/ehchua/programming/sql/SampleDatabases.html