Construction of Database Design- A Reverse Engineering Process

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Abstract—**Rapid Software Applications Development are getting more pervasive, and it is becoming increasingly necessary for Design Details of applications that run and are widespread. We introduce a novel approach for constructing the Entity Relation Model (E-R) and Class Diagram with minimal user intervention. The design overcomes technical challenges that involves E-R diagram by introducing an interface that only provokes user for the Code location and Database location that provides the user with Database design whose responsibility is to discover the need of the same. Then user can make further additions to the constructed. The .NET (pronounced dot net) Framework is one of the popular platform that runs extensively on Microsoft Windows. The .NET Framework has a large Library for base classes which provides Interface for the user (GUI), Access data, Database connectivity, etc. Hence through the language interoperability with the Microsoft SQL Server database, Database Design can be constructed.**

Keywords—**.Net, Rapid Miner, Microsoft SQL DB**

I. INTRODUCTION

The following section gives a detailed description of the system developed and also gives an overview of the existing systems, problems associated with it, goals and visions of the proposed system. It also specifies the system environment used in the development of the proposed system and also gives brief introduction about the various technologies used in the development of the system.

Requirement for ER Diagram: An ER model is an abstract way of describing a database. In the case of a relational database, which stores data in tables, some of the data in these tables point to data in other tables - for instance, your entry in the database could point to several entries for each of the phone numbers that are yours. The ER model would say that you are an entity, and each phone number is an entity, and the relationship between you and the phone numbers is 'has a phone number'. Diagrams created to design these entities and relationships are called entity–relationship diagrams or ER diagrams.

An entity may be defined as a thing which is recognized as being capable of an independent existence and which can be uniquely identified. When we speak of an entity, we normally speak of some aspect of the real world which can be distinguished from other aspects of the real world. Entity–relationship diagrams don't show single entities or single instances of relations. Rather, they show entity sets and relationship sets. Example: a particular *song* is an entity. The collection of all songs in a database is an entity set. The eaten relationship between a child and her lunch is a single relationship. The set of all such child-lunch relationships in a database is a relationship set. In other words, a relationship set corresponds to a relation in mathematics, while a relationship corresponds to a member of the relation.

II. PROJECT OBJECTIVE

Rapid Software Applications Development are getting more pervasive, and it is becoming increasingly necessary for Design Details of applications that run and are widespread. We introduce a novel approach for constructing the Entity Relation Model (E-R) with minimal user intervention. The design overcomes technical challenges that involve E-R diagram generation by introducing an interface that only provokes user for the Database location that provides the user with Database design whose responsibility is to discover the need of the same. The **.NET** (pronounced *dot net*) Framework is one of the popular platform that runs extensively on Widows. The .NET Framework has a large Library for base classes which provides Interface for the user, Access the data, Database connectivity, etc. Hence through the language interoperability with the Microsoft SQL Server database, Database Design can be constructed.

A. Scope: This Design construction provides the following features

- It produce a ready to use Design.
- Provide a technique that constructs the ER-Diagram dynamically.
- Not showing the construction process to the user.

B. Intended Audience: This system is useful to construct design for the Rapid Application Developed system and for Legacy Systems as well.

III. SYSTEM ANALYSIS

System Analysis is done in order to better understand the organization's requirements. Better understanding of the system's requirements leads to the development of a better system in turn. This process forms the basis of software development and validation. It gives us an idea about what is expected from the system and what the system expects for its performance. This chapter gives a brief discussion about the detailed study of the proposed system and the different functionalities involved in the system.

IV. SYSTEM DESCRIPTION

A. Existing System: The main problem with the Entity Relation-ship diagram is the constraints extraction to obtain the association cardinalities between the keys of database.

Here the keys refers the primary key and the foreign key. If the value of the primary key (A) refers to the value of the foreign key (B), One to One mapping cardinalities will be the outcome. If the same takes place in the reverse process as, the value of (A) refers to many values of (B), then the outcome will be one to many as mapping cardinalities.

B. Limitations
1) Failing to establish a standard structure.
2) No usage of the tool in construction/alteration of the Back-end.

V.PROPOSED SYSTEM

The system targets in construction of the ER and also providing options dynamically in adding the entities and the relationship between them from the same system location.

A. Features of Proposed System
Description: Extracts the Database and then the Database is divided into several tables and with their respective columns. The tables are ordered in queue for the construction process with their particular columns which are done one by one. The process is repeated to construct the complete design. Relationships are then matched between tables.

B. Response Sequences: The system as soon as it gets the Database, it starts executing the dynamic construction process of ERD.

C.Functional Requirements: The only functional requirement is that the user should specify about the location of the database.
The main function of the system is described as follows,
- Extracts the Database
- Database divided into several tables and with their respective columns
- The tables are ordered in queue for the construction process
- Then their particular columns are constructed one by one.
- The process is repeated to construct the complete design.
- Relationships are then matched between tables.
- Interface provided for the construction of the tables and their relationship.

D. Non-Functional Requirement
- **Platform Independent:** The system should function irrespective of any platform.
- **Scalability:** The system should process any number of bill sources across different customers.
- **Portable:** The template code should be portable such that it can be executed in any required configured systems.
- **Reusability:** The code should be generic so that it could be customized easily. Hence the code should be reusable in future.
- **Performance:** The system is expected to respond to user's actions quickly.

- **Security:** The usability and access privileges are expected to be maintained properly. Users with specified privileges alone can be allowed to access information from the system.
- **Accuracy:** The system is expected to provide the desired output.
- **Fast Retrieval:** The system should fetch and provide the output details faster and in efficient manner.
- **Easy Installation:** It should be an easy task for the end users to use the tool.

VI. SYSTEM DESIGN

It is a process that, software Requirements are converted into the representation of software. It is the place where quality is fostered. It identifies the software components, specifies relationships among components, defines program structure and provides a blue-print for implementation. The following chapter deals with the various design issues that guides the interface development of the application. Here the System design must have to support the comprehensive modelling of large and complex systems, resulting in precise, easy to understand and unambiguous specifications. The software engineers could have the ability to specify not only the model but also the behavioural part of the system which will come under development phase.

**A. Features:** The DBRE is divided into four major steps
Project preparation: The first step of DBRE is the preparation of system profiles for the DBRE project. Before starting the DBRE work, we have to collect and organize the complete description of all data assets in the database.
Data structure extraction: It mainly deals with the content of database to Non-covered attributes, properties such as uniqueness and hypothesis of the test such as foreign keys.
Timer: Periodic verification of the schema to detect changes in it by extracting, comparing and updating if any changes detected in the same.
Data structure conceptualization: Finally It converts the logical schema into conceptual schema, which is usually represented by Entity Relationship Diagram. Here the logical schema is extracted from the previous step.

Module Diagram
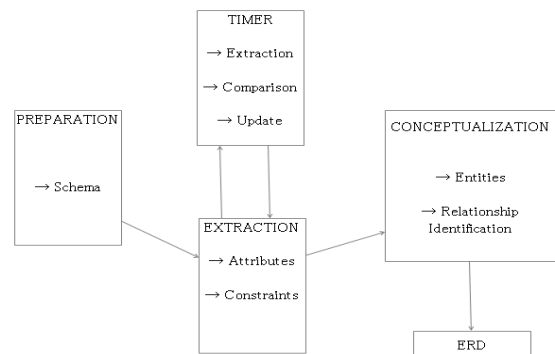
B. User Interfaces: User interface is used to provide communication between users and system. The user has to send the input query to the reputed database location. At the back end the server gets the input from the user using UI, It input which the server is retrieving is easy to understand. The user interface must be well-organized on screen and the parts should be communicated in better. Mainly it has to be user friendly to the user. Each and every task of a user interface should be mentioned clearly and users should use them correctly and thus it is maintained very easy.

In this system, users uses their application program via user interface program. When database access is required, the system establishes a connection to the database management system, once the connection is established; the client system can communicate with the construction phase. Then by using various coordinates and construction process, based on the specific tables and the number of columns, ERD constructed dynamically.

VII. SYSTEM IMPLEMENTATION

Implementation is the process of disciple a new or revised system design into an operational one. It is one of the most deadly stage in achieving a new successful system and in giving confidence on the system for the teams that it will work efficiently and effectively. In this phase, one can build the components either from scratch or by composition. Given the architecture document from the design phase and requirement document from the analysis phase, one can build exactly what has been requested.

Installation Procedure

MySQL

CREATE IDENTIFIED USER; GRANT ALL PRIVILEGES ON *.* WITH GRANT OPTION;

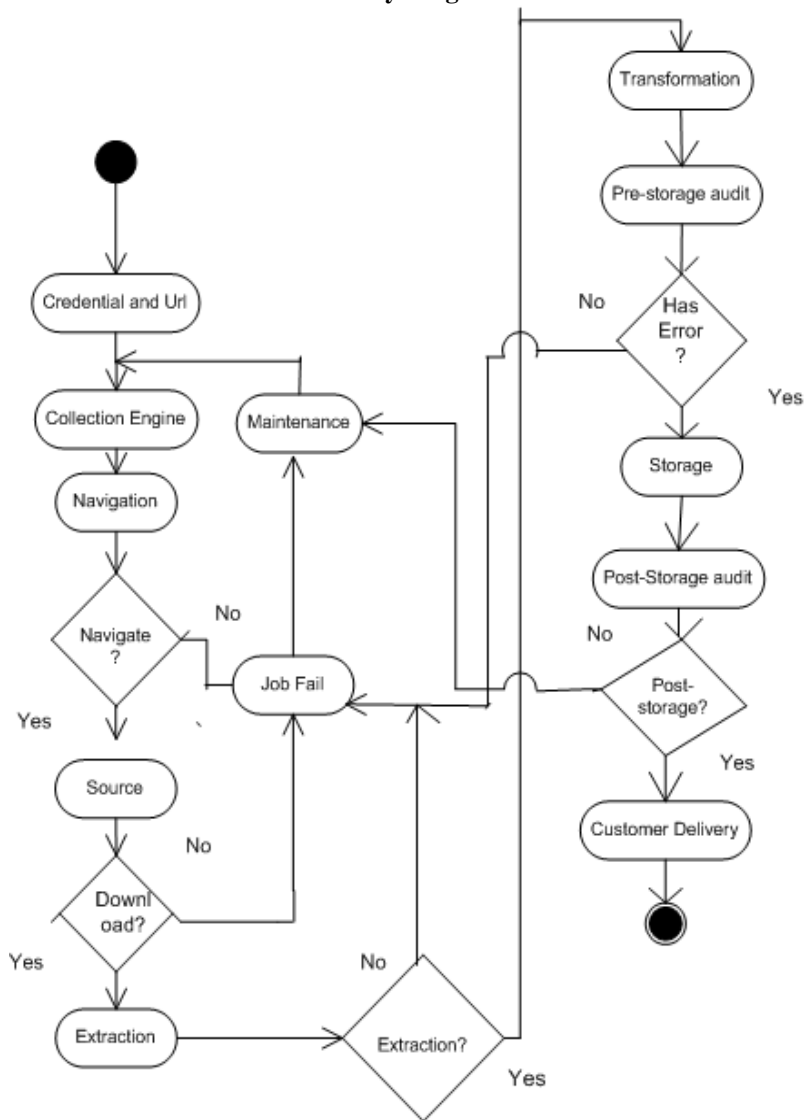Create databases.

Service mysql restart

Run

Tool

Run the setup file.

Install in the location required.

BEHAVIORAL DESIGN
Activity Diagram

VIII. CONCLUSION

Features of the Developed System

- User friendly
- Reusability
- Faster Access
- Efficient process automation
- Maintainability

Future Scope: Eyeing on extending extraction engine to handle more number of data sources. Strengthening implementation to make sure construction of ER is complete.

Enhance the system to avoid override completely. As a part of business development, targeting on the quick construction process and provide more dynamic approach. Integrating all the data stores into centralized data store which avoids losing data if we migrate the system to new platform in future.

As a future note, we will enhance the system in such a way that the user can not only retrieve ER and add tables dynamically, but also to edit the already existing tables and relationships and also to delete the same according to the requirement.

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