

A Web Based Approach towards the Automated Generation of ER-Diagram

Amol Khaire¹, Pramod B. Mali²

^{1,2}Department of Computer Engineering STES'S, Smt. Kashibai Navale College of Engineering Vadgaon BK, Savitribai Phule Pune University, Pune India

Abstract: *Diagrams plays an important role in the software development process. Drawing the diagram manually is the time consuming task so there are many tools to draw and modify the diagram. From all the diagrams ER (Entity Relationship) Diagram plays an important role in the software development process in Computer Engineering. There are many tools to draw Entity Relationship Diagram manually. Entity Relationship Diagram is the important step in the software Engineering. This topic will describe the existing tools and presents a Web Application to generate the Entity Relationship Diagram automatically. This Web Application will allow us to generate Entity Relationship Diagram automatically by form filling method which will take the Entity, Attribute and Relationship as an input and gives the Entity Relationship Diagram as output automatically.*

Keywords: Entity Relationship Diagram, Web Application, Software Engineering, Software Development Process, Form Filling Method

1. Introduction

Diagrams are an important step in the Software Engineering. There are many Diagrams like block diagrams, organizational chart for displaying the organizational structure, network diagram of an organization, Pie Chart, Flow Chart, ER-Diagram etc. But out of all these Diagrams ER-Diagram is very important in software development process. In today's business world, databases are of almost significance, as they characterize data of an organization and entity relationship modeling is by far the most common way to state the analytical result of an early stage in the creation of the new database [1]. In this paper we are going to see the difference between the ER-Diagram generating tools which is manual process, also require the lots of knowledge about tool and a web Application that we are going to develop. Currently there are various tools and software are available to draw the diagram. These tools are not liable for automatic generation of ER-diagram (Entity Relationship diagram). These tools provide the platform for the user to represent the ER-diagram using various symbols. Currently using tools for creation of ER-diagram are Edraw [7], DIA [8] etc. These tools are producing the Entity Relationship Diagram manually. That implies it require drag and drop the objects which are required to draw the Entity Relationship diagram. It should be noted that there are many representations of ER-Diagram for the same problem statement. We also plan to implement the web Application in the three steps

Step1:-Taking the input from the user i.e. Entity, Attribute and Relationships

Step2:-Providing input to a web form, which is generating the ER-Diagram automatically

Step3:-Generate and Store the ER-Diagram.

As DIA [7] and Edraw [8] is a manual tool to generate ER-Diagram. As [1] has not more focus on ER-diagram, [2] has not Clear idea about the how to generate ER-diagram automatically, [3] have the difficult process for generating ER-diagram automatically, So we are developing the Web application which is generating the Entity Relationship

Diagram automatically by taking the input as Entity, Attributes and Relationships (between the Entities) from an user. As this process is automatic this is very useful for the user.

2. Literature Survey

In [1] ADG (Auto-Diagram generator) tool is used to generate the Flow Chart, Block Diagram and Entity Relationship Diagram by form filling and text selection method. Form filling method used in [1] is one of the best approaches for a novice user to specify the diagram requirements. The diagram generator and editor is the main component of this tool. In [2] DeZign tool is used for generation of a diagram. DeZign tool generates the Extended Entity Relationship Diagram and this is using the form filling method as like the ADG [1] (auto diagram generator) tool. DeZign use the three modules to generate the Diagram. DeZign tool uses a Simple English statement as input and gives the Entity Relationship Diagram as an output. [3] Explains about an ABCM (Association based conceptual model) and how the ABCM uses a context-Adaptive approach to generate the Entity Relationship diagram. Before generating the ER diagram a graphical tool called Association based conceptual model is used to find an association between a two or more objects described in the business descriptions. The ABCM is able to manage a three or more objects as well as two ones in a breath.

In [5] an AER (Articulated Entity Relationship) is generated from the Entity-Relationship diagram. The AER is an extension to the ER-diagram. In the AER, diagram is generated automatically but the ER-diagram is taken manually. In [6] for generating the Entity-Relationship diagram natural language processing is used. Heuristic approach [6] is used for generating the Entity Relationship diagram. The semantic Heuristics will be used to determine the Entity, Attribute and Relationships from a database specification. Heuristics are a better approach, but the Diagram generation process is complicated due to this. In [6] syntactic Heuristics are implemented in the ER-converter. In

[4] diagram generation algorithms are given. Building block diagrams, graphical objects, diagram resizing and diagram editing algorithms are described in [4]. But, the process used in [4] is manual.

Table1 shows the comparison between the different tools like ADG, ABCS and DeZign. Table1 also shows how these tools are better to generate the Entity relationship diagram.

Currently there are many tools exist for the generation of an ER-diagram (entity relationship diagram). These tools are DIA [7], Edraw [8] etc. DIA tool is used to generate the diagrams like flow chart, block diagram, ER-Diagram etc. But, before drawing the diagram we have to first install that tool on our machine. We must have knowledge about the DIA tool. In DIA process for drawing diagrams is manual. So, diagram generation process in DIA is time consuming. Edraw is a tool as like DIA. Edraw tool also uses the manual process to draw the diagram.

Table 1: Comparison between Automated Tools

Tool Name	Survey Details	Findings
ADG Tool[1]	This explains about Automating diagram process and for atomization they use ADG tool and uses the form filling method.	Tool explains about atomization of all type of diagram and not more focus on ER-diagram.
DeZign Tool[2]	This explains about automating diagram process and use DeZign tool to generate the Entity Relationship Diagram.	Clear idea about the how to generate ER-diagram automatically is not explain.
ABCS(Association-Based Conceptual Based Systems) Tool[3]	For ER-diagram generation process uses ABCS(Association-Based Conceptual Based Systems).This uses the Context Adaptive approach to generate the ER- Diagram	Difficult process for generating ER-diagram automatically.

3. System Architecture

System architecture shows how we are developing the web Application to generate the Automated Entity Relationship Diagram. Figure1 shows a System Architecture for generating the Entity Relationship Diagram automatically. As the architecture is a web based so, we have to develop a web application. Due to this reason user must need an internet with them to open a web page on the web to generate the Diagram automatically.

In Automated ER-Diagram Generation we have the web page which will take the Entity, Attribute, Relationships as input and giving the ER-Diagram as output. A Proposed design for an automated ER-Diagram is divided into the 3 modules
 Module1: Extracting Entity, Attribute & Relationships
 Module2: Generating ER-Diagram automatically
 Module3: Placing ER-Diagram into a file

In the module 1 we are extracting the Entity, Attribute & Relationships from file which is provided as input by user for generating the ER-Diagram. As our project is a web based so we have to develop a web page which will generate the ER-Diagram automatically. We have to provide the input as an Entity, Attribute, Relationships (relationships between an entities) .As all this process is on the web so after providing the input this information is sent to the server. As soon as this information is coming to a server so the server has to save this information in the database. This information will be provided in the next module to generate the output.

In module 2 we are providing Entity, Attribute & Relationships as input to this module and generating the ER-Diagram automatically. The information which is saved by the server is fetched from a database and used to generate the ER-Diagram. In generating the ER-Diagram automatically we are going to develop the webpage and in module 3 we are taking the ER-Diagram which is generated by the Module 2 and this Diagram is saved into the format which a user is comfortable. After saving a file in this format the file is either stored on the server or provided to the user.

So, for this entire process user need an internet to generate ER-Diagram automatically and the user has to provide the all information to generate the ER-Diagram Then ER-Diagram is generated automatically.

Figure 1 shows the proposed design diagram which takes the input as an Entity, Attribute & Relationships. Input can be provided directly from the user or provided as a file. Then this input information is provided in the web page which generates ER-Diagram automatically.

Figure1 shows this basic system architecture to generate the ER-Diagram.

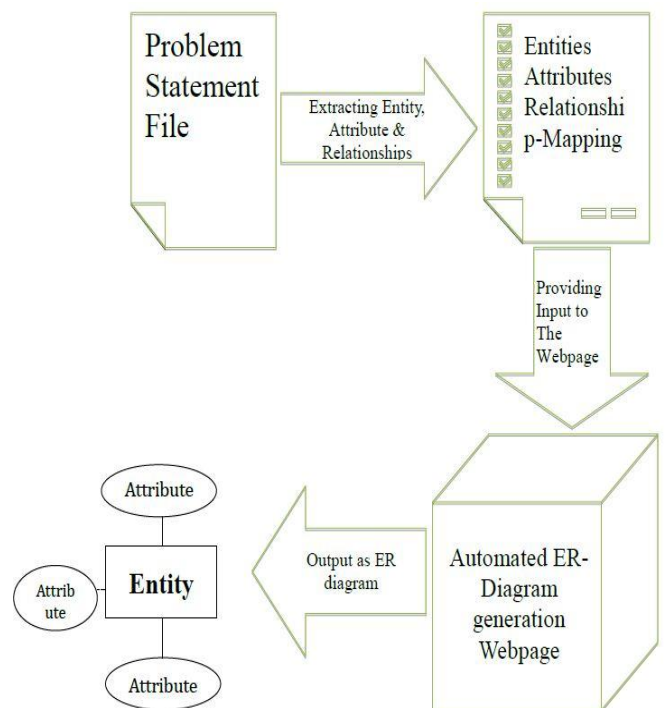


Figure 1: System Architecture

Arrows in the diagram show the input and output to and from the web page. Initially the user, providing the input files which contain the Entity, Attribute, and Relationship. And these inputs are provided to the webpage and these web pages will give the output as the ER-Diagram as shown in the Diagram. As compared to the previous tools these Web Application is the better approach to generate diagrams and also as these are available on the web so it is easy to use for the user.

4. Conclusion

A Web Application of Automated generation of ER-Diagram provides a way to generate Automated ER-diagrams, which makes it usable for a wide range of users. Automated ER-Diagram generating Web Application is user friendly and rather than drag and drop approach it uses an automated approach to generate the diagram. A user has not required more knowledge to generate the diagram. As compared to other tools our Web Application project is very useful and the best way to draw ER-Diagram.

Web Based approach towards Automated ER-Diagram generation can be extended to generate the Extended Entity Relationship Diagram (EED) automatically by providing input as an attribute, entity etc. In future we can also extend this for generating the all the UML diagrams like Use case diagram, Data Flow diagram, Class Diagram etc.

References

- [1] Tabinda Sarwar, Uzma Arif, Wajiha Habib, Samna Zehra, "Automating The Diagram Generation Process", International Journal of Scientific and Engineering Research Volume 2, Issue 7, July-2011
- [2] Dr. Muhammad Shahbaz, Dr. Syed Ahsan, ammad Shaheen, Rao Muhammad Adeel Nawab, Syed Athar Masood, University of Engineering & Technology Lahore, Punjab Pakistan, "Automatic Generation of Extended ER Diagram Using Natural Language Processing", Journal of American Science, 2011.
- [3] Sangwon Lee, Namgyu Kim and Songchun Moon, Department of Management Engineering, Korea Advanced Institute of Science and Technology, Seoul130-722, Korea, "Context Adaptive Approach for Automated Entity Relationship Modeling", journal of information science and engineering 26, 2229-2247 (2010).
- [4] Tabinda Sarwar, Uzma Arif, Wajiha Habib Samana Zehra, "An Efficient and Simplest Algorithm for Generating Diagrams", International Journal of Scientific & Engineering Research Volume 2, Issue 7, July-2011,ISSN 2229-5518
- [5] P. S. Dhabe, Dr. M. S. Patwardhan, Asavari A. Deshpande, M. L. Dhore, B.V. Barbadekar and H. K. Abhyankar, Department of Computer Engineering, Vishwakarma Institute of Technology, Pune-411037, Maharashtra State, India, "Articulated Entity Relationship Diagram for Complete Automation of Relational Database Normalization", International

- Journal of Database Management System, Volume 2, Num 2
- [6] N. Omar, P. Hanna and P. Mc Kevitt, "Semantic Analysis in the Automation of ER Modelling through Natural Language Processing"
 - [7] Edraw Max <http://www.edrawsoft.com/download-edrawmax.php>
 - [8] Dia <http://www.diahome.org>