Journal of Computational Intelligence in Bioinformatics.
ISSN: 0973-385X Volume 4 Number 1 (2011) pp. 111—118

http://www.ripublication.com/jcib.htm

Design & Development of Software for Medicinal Plant Database

Partha Pratim Kalita[1], Robin Das[1], Dhrubajyoti Das[1], Subrata Sinha[1] and Bijoy Neog[2]

[1]Center for Bioinformatics Studies, Dibrugarh University, India
[2]Department of Life Sciences, Dibrugarh University, India
E-mail: parthakalita2010@indiatimes.com

Abstract

The present study deals with the design of relational database for socio-economic documentation of medicinal plant species against some well known disease found in Upper Brahmaputra Valley. The Relational Database Management system is expected to help in evaluating, monitoring and predicting the status of key species and their ecosystem; and to adapt new conservation management practices.

The designing phase for the information system was guided by certain theories and techniques which involve extensive survey and case observation on the experimental material and their surrounding environment. For the development of the web based database different platform were used in this database system. First the database was built by using DBMS software, SQL SERVER 7.0 as back end and Visual Basic 6.0 as front end. All the species information and related data were arranged in a systemic manner in the database and software is constructed to access the database efficiently.

Keywords: Medicinal Plant Database, Medicinal Plant Software, Upper Brahmaputra Valley Medicinal Plants.

Introduction

The present study deals with the design of relational database for socio- economic documentation of medicinal plant species against some well known disease found in Upper Brahmaputra Valley. The Relational Database Management system is expected to help in evaluating, monitoring and predicting the status of key species and their ecosystem; and to adapt new conservation management practices.

Assam is known for its extensive forest areas and availability of rich medicinal plant besides other valuable forest products. As per information available from the

State Forest Department, the total area under forests in Assam was 26,781.91 Sq.km. at the end of March, 2003, out of which 15,492.329 Sq. Km. was under Reserved Forests and 2,860.942 Sq. Km. under Protected Forest Area. Thus, the Forests areas constitute about 34.14 % of the total geographical area of Assam[1].With the passage of time, the people of this area have developed a great deal of knowledge on the use of plants and plant products in curing various ailments. They have a deep belief in their native folklore medicine for remedies and they rely exclusively on their own herbal cure.

So a database is required to store those valuable records and a basic software is constructed to access those valuable records, so we have used SQL7.0 Server for creating a database for Medicinal plants. The database design process is divided into few steps mentioned below.

The information gathered in the requirements analysis step is used to develop a higher-level description of the data to de stored in the database, along with the constraints known to hold over this data. This step is often carried out using the ER model. The ER model is one of several high-level, or semantic, data models used in database design. The goal is to create a simple description of the data that closely matches how user and developers think of the data. At the same time, the initial design must be sufficiently precise to enable a straightforward translational into a data model supported by a commercial database system, which, in practice, means the relational model.[2]

Materials and Method

Materials

To design the database we used SQL 7.0 SERVER, a RDBMS package which follows Standard Query Language specification .It helps us to design and maintain a database. Visual Basic 6.0 used as front end. VB is an Integrated Development Environment in which one can develop, run, test and debug applications[3]. It is known as RAD, Rapid Application Development. For connectivity, we have used ADO, which is a Microsoft Technology for Database connectivity. SQLOLEDB is used as Provider.

Method

The database design starts from identifying entities and relationship among entities followed by designing ER Diagram, then mapping ER Model to the physical database. For designing the software, Classic Life Cycle[4] Model of SDLC is followed. In the design phase we have constructed the DFD and accordingly the software is constructed.

About Entity Relationship

We have used SQL 7.0 for creating a database. The database design process is divided into few steps mentioned below:

The entity-relationship (ER) data model allows us to describe the data involved in a real-world enterprise in terms of objects and their relationships and is widely used to develop an initial database design. The ER model is important primarily for its role in

database design. It provides useful concepts that allow us to move from an informal description of what users want from their database to a more detailed and precise, description that can be implemented in DBMS. The ER diagram is an approximate description of the data, constructed through a subjective evaluation of the information collected during requirements analysis.[4]

To design a database which conforms to an E-R diagram can be represented by a set of tables. For each entity-entity relationship there is a unique table which is assigned the name of corresponding entity set. These relationships may exist as One-to-Many, One-to-One and Many-to-Many where primary key of one entity moves to the other entity and becomes the foreign key of that entity or both the primary keys of the entities go to the relationship and form the foreign key as found in One-to-One and Many-to-Many relationships. An entity usually has an attribute whose values are distinct for each individual entity in the collection and is known as key attribute.

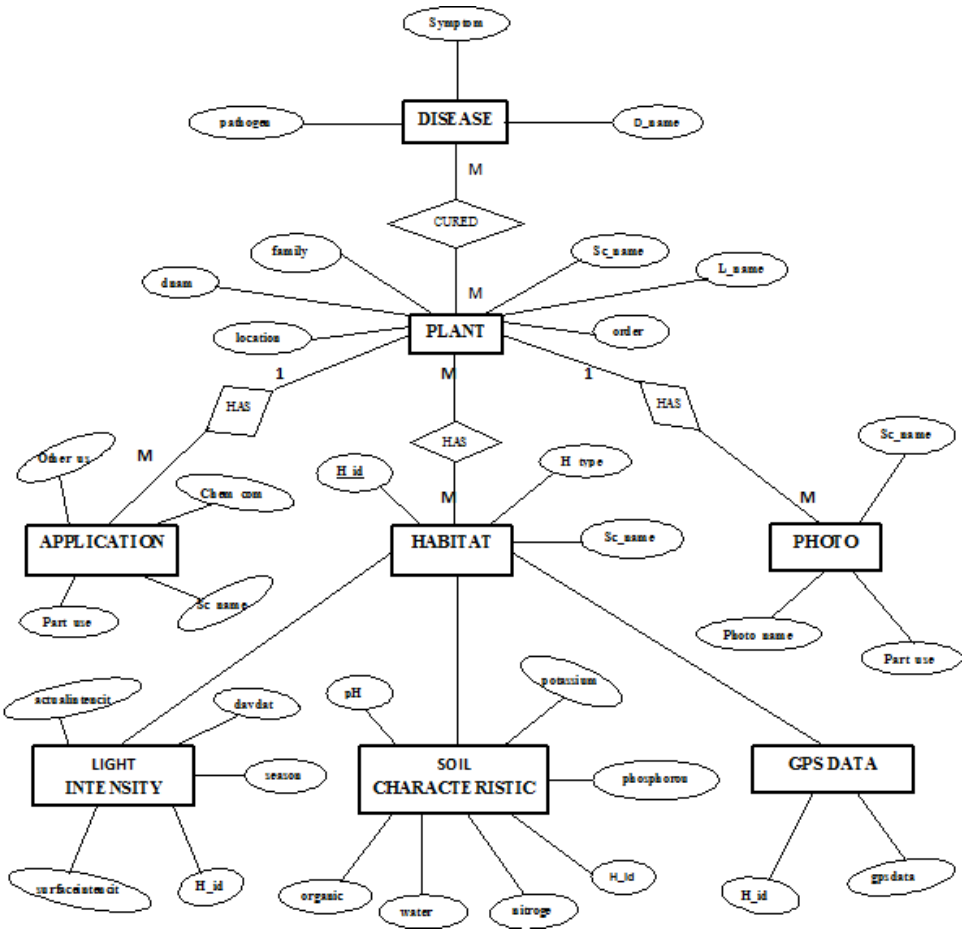


Figure 1: Showing the E-R model of the database.

In the above E-R diagram, we have an entity name PLANT with attribute Sc_name. We specify Sc_name as primary key because it is unique.

Mapping of Binary 1:N relationship Types:-For each regular binary 1:N relation type R, identify the relation S that represents the participating entity type at N-side relationship type. Include as foreign key in S the primary key of the relation T that represents the other entity type participating in R; we do this because each entity instance on the N-side is related to most one entity instance on the 1-side of the relationship type.

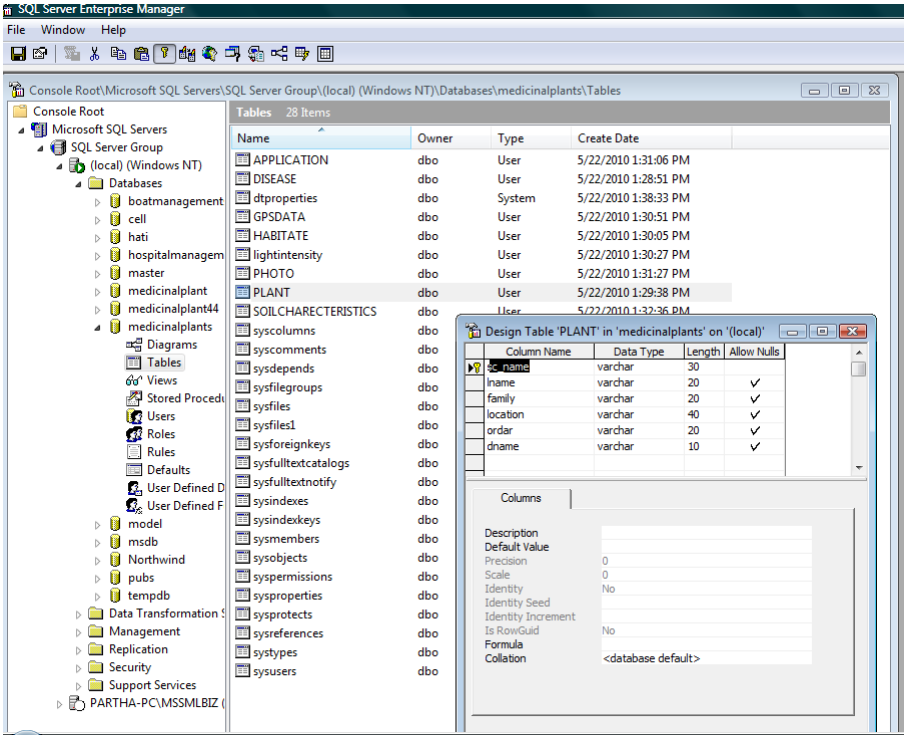


Figure 2: A snapshot of Enterprise Manager while creating schema of the database.

Mapping of Binary M:N Relationship Types: For each M:N relationship type R, create a new relation S to represent R. Include as foreign key attribute in S the primary keys of the relation that represents the participating entity types; their combination will from the primary key of S.

To design the database SQL Server 7.0 Enterprise Manager is used. The detailed process may not include for length constraint of the paper. A snapshot of enterprise Manager while creating schema of the medicinal plant database is shown in the Fig 2.

Result

The result of our work is the database created using SQL 7.0 as well as the software product which will be used to efficiently access the data and maintain the database .The schema of the database which is generated from SQL7.0 Manager is shown below:

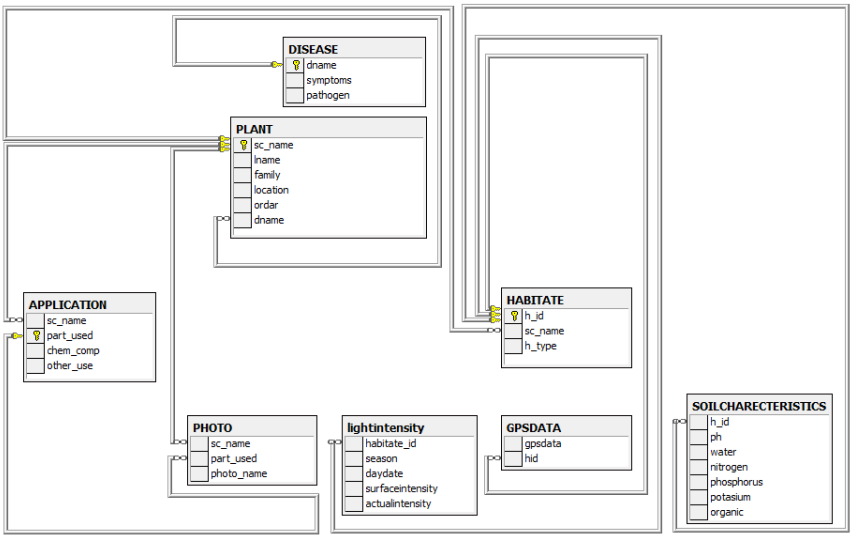


Figure 3: Proposed schema.

After designing the database we have drawn the DFD (Data Flow Diagram) for the Vitamin Information System. DFD shows the flow of data from one process to another process. The DFD shown is the blueprint of the software design.[5]

The first context diagram or 0 level DFD has been drawn context diagram is nothing but the bird's view of overall software operation which shows the interaction between the external entity and the main system.

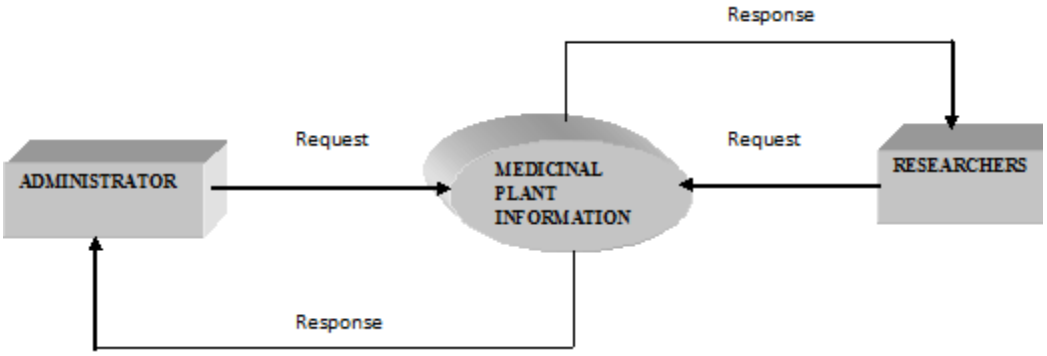


Figure 4: Zero Level DFD(Context Diagram).

The overall working of the software can be represented with a Dataflow Diagram which has the following process:

In level one DFD we have nine processes as described below-

Process 1.0: Disease process

This process is responsible for save, delete and update of disease records.

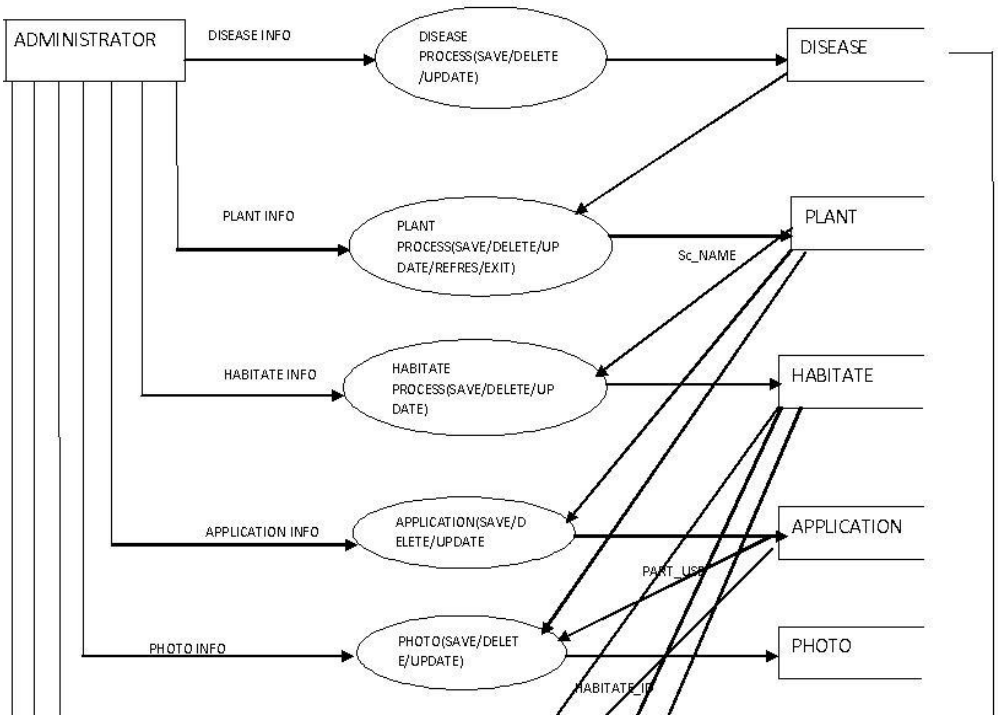
Process 2.0: Plant process
This process is responsible for save, delete and update of plants type. The administrator will chooses a Plant and enters scientific name, local name, family, location, order of a plant and it will be stored in the plant table.

Process 3.0: Habitat process
This process is depends on plant table where the habitat information of a particular plant can be stored. It is also responsible for save , delete and update of data.

Process 4.0: Application Process
This process depends on the plant table where the lists of plants names are stored. The administrator will choose a plant name and enters part used, chemical composition and other uses as a whole the record is stored in the application table. This process is responsible for save, delete, update of application.

Process 5.0: Soil Characteristics Process
This process is dependent on the habitat table. The administrator will choose the habitat of a plant and will enter pH, water and also organic and inorganic components of that place and the record will stored in the Soil Characteristics table.

Process 6.0: GPS data process
This process depends on the habitat table. The administrator will enter the geographical location of that particular plant and it will be stored in the GPS data table.



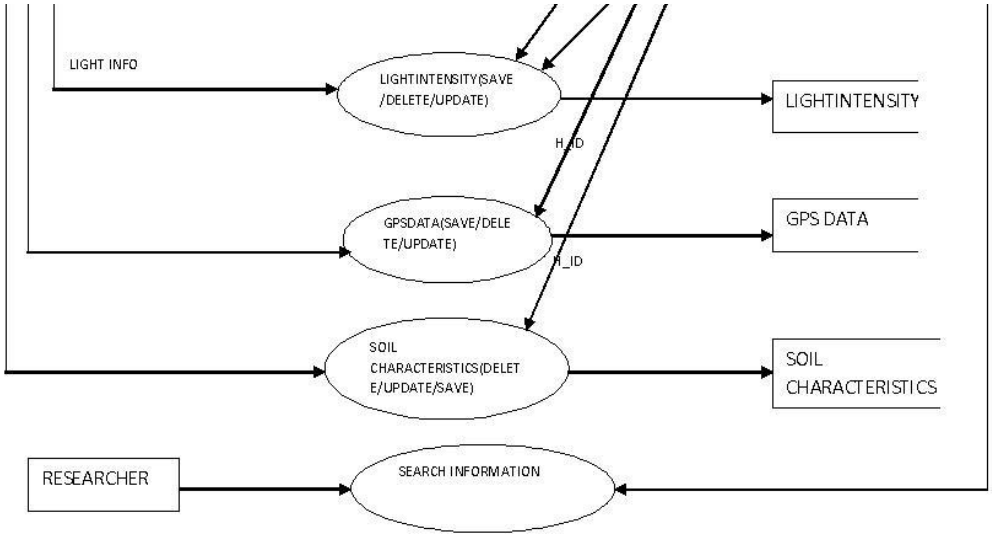


Figure 5: Level 1 DFD for Medicinal Plant Information System.

Process 7.0: Light intensity Process

This process is also dependent on habitat table .The administrator will choose the habitat of the particular plant and will enter the whole requirements which will be stored in the light intensity table.

Process 8.0: Photo Process

This process depends on the Plant table as well as the application table. The administrator will choose a Plant name and will load the photos of various parts used of that plant which will be stored in the Photo table. It is also concerned with saving, deleting, updating the photos.

Process 9.0: Researchers Process

The 9.0 is a search process. The researchers will get the whole informations of Medicinal Plants through search.

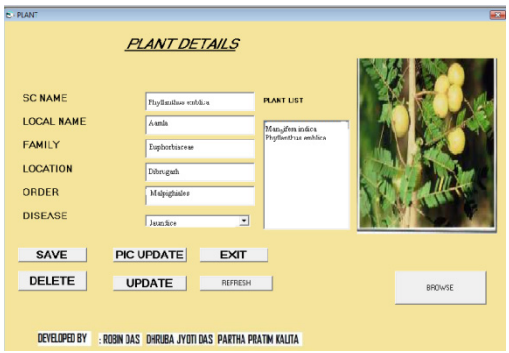


Figure 6: Snapshot of the software.

After designing DFD we have constructed the software as per DFD .The Software created to access the Medicinal plant database has many graphical user interfaces . The snapshot of one of those interfaces is given below:

Discussion

The designed software is a standalone desktop based application, which runs on windows environment only. The software gives details about all relevant information about medicinal plant. The system designed can be used for educational purposes. As the system runs on only in Windows environment so we are planning to make a web based version of the designed software using Java Applets. That will give our application a platform neutrality with out changing any design issue of the database. In the present work we have only concentrated on the relational aspect of the database and the construction of the database. The further incorporation of data can be done through the software interfaces. Also we are incorporating more information and features in our database and software respectively. As a whole we can say that the software which is a standalone version can be helpful to students, researchers and educators of the same field.

Acknowledgement

We acknowledge all the entire fraternity of Centre for Bioinformatics Studies as a whole and also to the Department of Life Sciences of Dibrugarh University.

References

[1] WWW.Economic Survey assam 2003-2004.mht
[2] Elmasri R, Navathe S.B Fundamentals of Database Systems 5th edition. Pearson Education, Mcgraw-hill. pp 228-231.
[3] Petroutsos, E., Mastering Visual Basic 6, Willey India Edition, pp 5, 134-136.
[4] Ramakrishnan, R. Gehrke J., Database Management Systems 3nd edition, Mcgraw-Hill, 2003. pp 25-26
[5] Pressman R.S, Software Engineering- A Practitioners Approach, Mcgraw-Hill 6th Edition, 2005, pp 79-80, 226-229.