

Design and implementation of *Enteromorpha Prolifra* reflectance spectra database system based on VC++ and Access

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Abstract—The *Enteromorpha* spectral characteristics is the basic foundation of remote sensing, which can provide an important foundation data for real-time remote sensing monitoring and early warning of *Enteromorpha* disasters. Through the combination of the VC programming language and the Access database software, application-oriented approach to systems development. In this paper, the functionality and interface of *Enteromorpha* reflectance spectra database system were designed, Access database E-R diagrams and data tables were analyzed, spectral data display and auxiliary information display functions to achieve results were detailedly introduced. Using this system can achieve sharing, information inquiry, visual analysis and management functions of mass spectral data *Enteromorpha* and attribute information.

Index Terms—VC++, Access, *Enteromorpha Prolifra*, reflectance spectra, database system.

I. INTRODUCTION

The *Enteromorpha* monitoring and early warning of its comprehensive management has become a hot research topic in the current. Currently, for *Enteromorpha* basic research, series of physiological functions *Enteromorpha* products more the activity of research studies [1-2], *Enteromorpha* disaster remote sensing monitoring and comprehensive management study is relatively small [3-4]. The spectral characteristics of *Enteromorpha* is *Enteromorpha* Remote Sensing, it is to provide the basis for of *Enteromorpha* remote sensing information processing, interpretation and classification. In the 1970s, NASA began to establish earth resources the spectroscopic information system (ERSIS) After the typical spectral database: JPL, USGS, ASTER and IGCP. Our country since the 1980s, started to build a spectral library of foreign matter in the feature spectral characteristics of the measurement and research related to rocks, minerals, soil, vegetation[5], but the weak *Enteromorpha* spectrum measurement and research.

II. SYSTEM DESIGN

A. System Function Design

The system is divided into two major functional blocks, including the system of application modules and the system

management module.

The system application modules that provide services for users of all functional modules, including a user logs on, the spectral data query, spectral graph drawing water environment elements of view, the concentration of chlorophyll view, as well as for the introduction document *Enteromorpha* View.

System management module is used to achieve for the management of the entire system, including system maintenance and update of the database system maintenance is the maintenance of the system performance as well as the modification of the system function code, database update include the spectral data, modify, and delete operations [6].

B. System Interface Design

The interface is the most immediate level of software to interact with the user interface is good or bad will determine the first impression of the software, a good interface is the most direct factor to attract users. Design scientific, standardized, beautiful interface, not only to give the user a pleasant feel the corresponding guide users quickly familiar with the operation of the software. Thus, the interface for the system, is a very important part. Interface design principles include: ease of use, normative, help option, rationality, aesthetics and coordination, the uniqueness.

III. DATABASE DESIGN

A. Spectral Database Design

Practical and more databases Oracle, Sybase, SQL Server, Access database, the database used in this study for the Access database. Compared with other databases, the Access database has its own characteristics: simple storage, ease of maintenance and management; Object-oriented; friendly interface, easy to operate; the Access supports ODBC.

Spectral library to establish the source data from the field or laboratory spectrometer measured fill input data the *Enteromorpha* wavelength reflectivity. Spectral data mainly various *Enteromorpha* wavelength reflectance data, you need three tables, one is stored spectral data, and the second is the water environment information, and the third is the chlorophyll concentration information.

B. E-R Diagram

E-R diagram contains three basic elements of the entity type, attributes, and contact. E-R role is more clearly

expressed directly to express the entity relationship. Fig.1 shows the E-R diagram of the database was built in the system table attributes and relations.

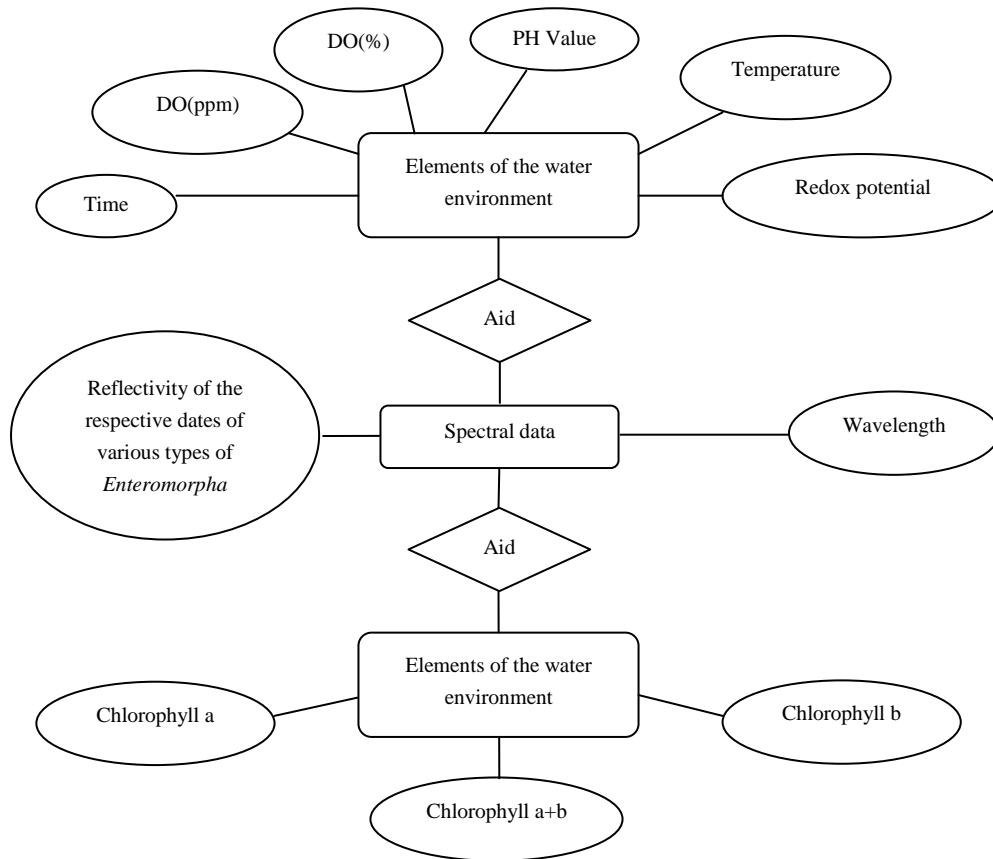


Fig.1 Database structure of the E-R diagram

C. Data Table

Obtained by the measured data, including the establishment of a database, the database *Enteromorpha* algae the body reflectance spectroscopy data obtained under three experimental conditions as well as the environment and attribute data. The data obtained under extreme environmental conditions here an example to introduce the construction of the database, *Enteromorpha* reflectance spectra database contains three data table, respectively, for the *Enteromorpha* spectral data table, water environment and the chlorophyll concentration table.

IV. SYSTEM IMPLEMENTATION

Enteromorpha reflectance spectra library system features include: display of spectral data, *Enteromorpha* spectral data graph drawing, such as the water environmental elements and chlorophyll concentration data show that *Enteromorpha* picture display. Auxiliary function of spectral data, water environmental elements, chlorophyll concentration data query, *Enteromorpha* introduced so on.

A. Display of SpectralData

Into the main system interface, the system will automatically display all types of *Enteromorpha* the spectral wavelength reflectivity daily, we can clearly see that these spectral data. As shown in Fig.2, the lower-left corner of the main system interface is displayed spectral data module, and these can be seen from the information in the open system.

B. Auxiliary Information Display

Information displayed by the system in addition to the spectral data, also shows the different types of *Enteromorpha* the date water environmental elements, chlorophyll concentration, and *Enteromorpha* picture display. Will be displayed in the bottom of the system, for example, continued to July 3 float tube *Enteromorpha* select the menu item "July 3 float tube *Enteromorpha* this day, such *Enteromorpha* various auxiliary data information (including the chlorophyll concentration and water environment elements), as compared *Enteromorpha* picture displayed in the upper right corner of the system, shown in

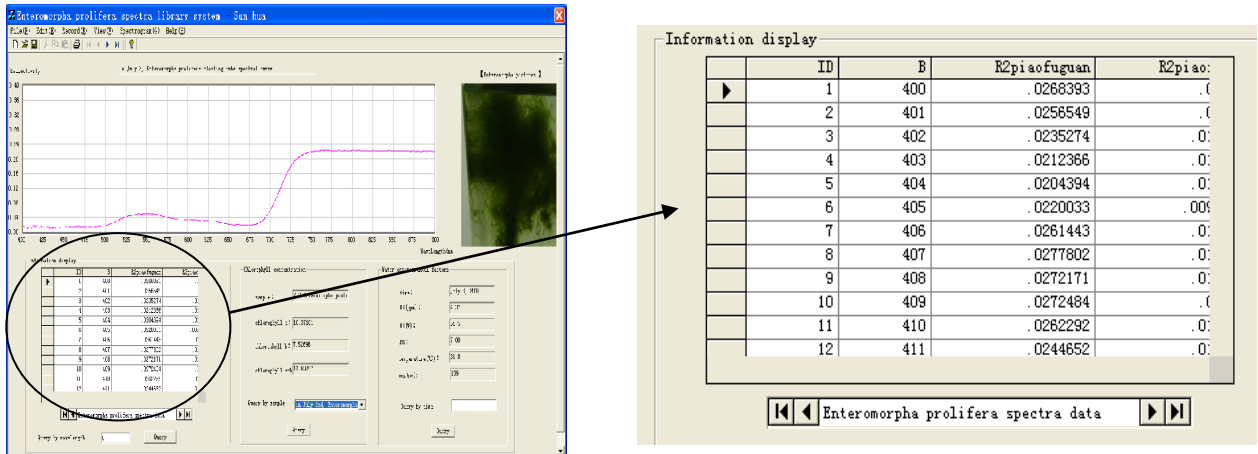


Fig.2 Information display of spectral

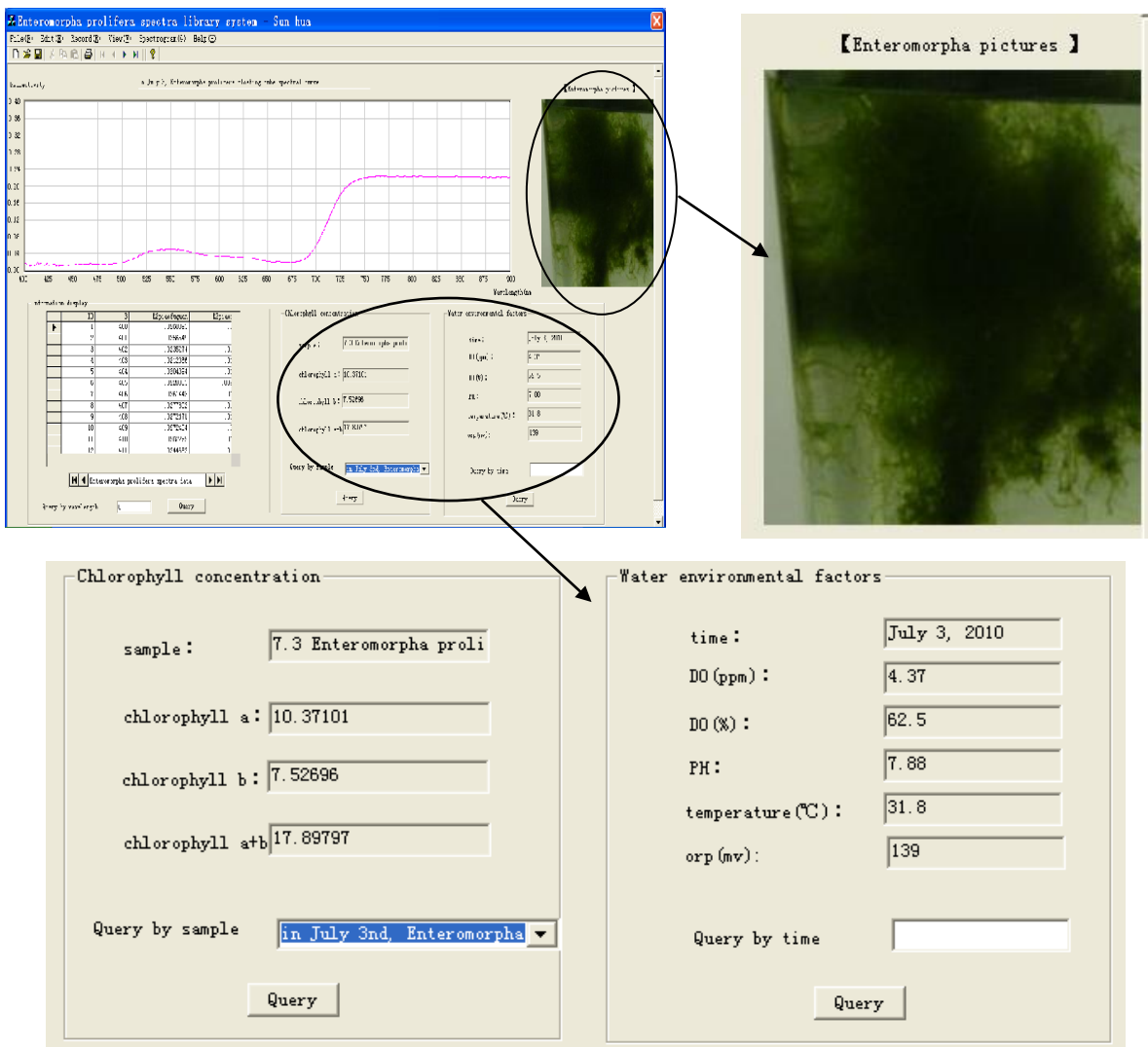


Fig.3 Auxiliary information display of *Enteromorpha* spectral

Fig.3. It is worth noting that the water environment information displayed data of the day, it does not exist *Enteromorpha* species of the points, that is, the same day the water environment information is the same as the chlorophyll concentration in addition to the date of exceptionally different *Enteromorpha* moss species difference.

V. CONCLUSION

Based on application-oriented system development methods, the use of combined the VC++ programming language and the Access database software, built the *Enteromorpha* spectral library system, the reflectance spectra of the different stages of growth of algae *Enteromorpha* storage, display and query capabilities, *Enteromorpha* The picture of the frond reflection spectra corresponding display function, principles and programs of the reflection spectra introduced function, algae *Enteromorpha* corresponding to water environmental parameters function. With the deepening of *Enteromorpha* spectral studies, the system has yet to be continuously improved.

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