

Visualization flexible Encoding System Design for Sheet Metal

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Abstract: Under the guidance of files in XML format description for specifications in sheet metal, scalable coding rules are used for encoding in application. Then, based on event response and Windows GUI, a user-friendly human-computer interaction interface is designed to realize dynamic computer aided encoding system, which can work with composite cursor positioning, code hint track display, view actions in response, code validation and user input constraint checking. Code structure is designed for variable length of code bits; it can be adjusted easily and quickly, then dynamic analysis of rules is realized and a GUI interface can run interactively. Code as a string stored in database, sqlite is used for storage. Through parsing of the string, two kinds of queries based on code bit are realized using technique of quick-positioning. Set operations and multiple filters are used to achieve compound queries in technical support for sheet metal manufacturing enterprise information standardization.

Keywords: visualization, encoding, XML, sheet metal

Introduction

Encoding is a technical for identification of information object; classification and metadata are used for describing the tabular layouts of article characteristics^[1]. Common ERP, PDM software provides the tools for encoding, which tend to use serial code which can be recognized by computer but cannot be identified by personal, suitable for high level information enterprises, serial code mean nothing but a identification, has no more information about object. Today, highly flexible and plenty of information is produced in this society, mass production has characteristic of fast-changing, tend to manually manage code. Code rules determination cause two problems^[2]: 1, classification of professional makes coding rules difficult to modify, only professionals can enact practical encoding rules; 2 abstract the code so that only professionals can understand the intended

meaning of code strings, hinder the management of standardization of information personnel for encoding, not for beginner. Computer-assisted coding system avoids these problems by encoding rules in a computer after the software identifies the particular format of files, distribute and update, under the software-aided instruction coding, efficient and less error-prone. According to sheet metal engineering applied in production, this paper build sheet metal Visual encoding system.

1 Encoding rules of sheet metal

Study on rules of encoding point out that information classification is subject to scientific quality, system performance, scalability, compatibility and applicability of principles^[3]. Result of sheet metal encoding rules is a string has length of 15, specification as shown in Table 1.

Table 1 sheet metal coding rule

code segment	design information										technology				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	material					function		structure			technology				
item	varieties	Broad categories	Marks	status	specification	rough sort	subclass	Typical	Whole	configuration	Heat Treatment	surface treatment	batch	process requirement	forming method

Seen from coding standard, except for the first 6 to 7 level code segment is outside^[4], the rest of you using faceted classification, the overall use of hybrid classification methods. Based on this analysis, the logic state diagram between each code segment^[5].

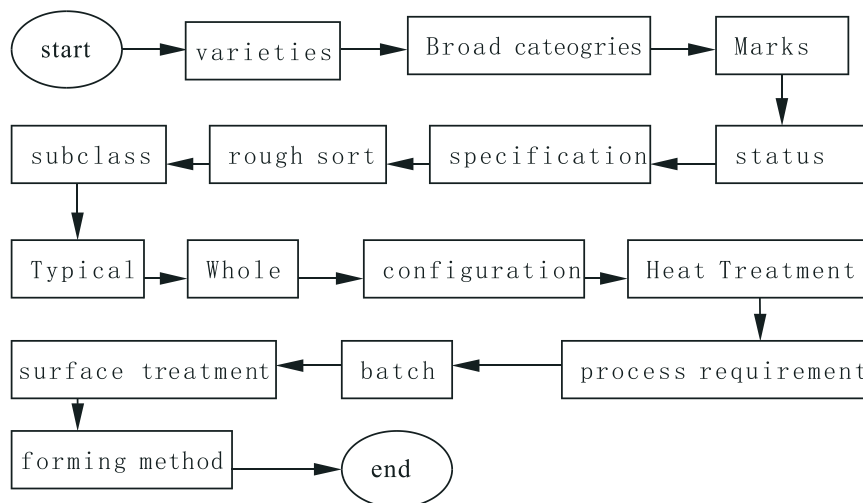


Fig 1 code segment logic status graph

this article uses the knowledge of the rules stored in XML format, the advantages of using XML files as described encoding rules that:

1 XML format files better scalability, ease of management node encoding rules, but also facilitate the expansion of a new type of encoding rules;

1 XML file readable, easy to manually check for errors, computer processing is also convenient;

1 XML files for easy network transmission network to facilitate the production version of the coding rules parser, able to adapt to B/S structure of the program

2 Visual coding module design

Functional Design

1. Timely response to keyboard input and mouse events. When the user enters a specific encoding, not necessarily the order must be entered by the coding rules, may enter a code bits, and then enter the other code bits of code bits so often locate and switch keyboard for entering information and the adjacent character code toggle bit, but the mouse is used to switch any code bits

2. Encoding process prompts. During the

encoding process , navigate to the code segment , you need three kinds of dynamic prompts . Represent 1) the meaning of the code segment should give the user prompt 2) the code segments for all values of meaning should be prompt. These tips can save the user manual to find the time it takes to encode 3) cursor prompt. Users enter a location to highlight

3. Code integrity testing and code storage. In order to facilitate and coordinate other software, copy it to the clipboard operations to provide the encoded completed. To check the code before storage uniqueness of the code.

4. User input record . When setting the value of the specific character of certain key bits of the code segment message bits , the value of information , occupying the length , type of code bits in accordance with the sequence encoding node arrangement and display contrast

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Interface Design

Good GUI interfaces play a beneficial use of personnel efficiency, the module for users to use when encoding and storage , there is high demand for man-machine interfaces , software interface must be simple, prompt and complete input smooth, content clear features , ease of non-professionals quickly achieve specific encoding. This module is a graphical interface is divided into five regions:

1. coding result display area . Just above the screen when displaying multiple boxes represent the length and location of the encoded characters, the user has input characters are displayed inside the box , the box is high brightness green cursor , the keyboard left, right key location , users can also in the region with a mouse click box to locate the input position cursor at the top of the code length , arranged location hints , tips

carry the meaning of the code segment below . The bottom of the drawing area use the programming operation, combined with user input events (keyboard input, mouse) , message tracking code bits display dynamically updates the user input to achieve the encoding process visualization , visualization .

2. Tips region coding segments. In the middle of the interface used to prompt the region coding section lists all of the characters can be entered and the corresponding meanings, different types of encoding nodes may have different prompts , the user can double-click the mouse in the region prompted the line to achieve the corresponding character input .

3. Coding results area . In the middle of the right side of the interface for storing coded result, when the user has finished encoding, the resulting code can be copied to the clipboard or into a database .The results prompted the region -by-bit encoding. In the bottom of the interface for the user to enter each store , as well as the specific meaning of the meaning of user input codes each code segment , representing high brightness line is input code bits . You can locate the area of the selected row input cursor.

4. Command button operation area. In the bottom of the interface used to implement open encoded files , clear code, locate the input cursor operation.

3 Coding database query module design

After a period of time to implement coding , coding database to store a large amount of encoded information , then the user will be encoded for the actual needs of the library all inquiries to identify a set of data items of interest by screening operation.

Functional Design

1. Code storage capabilities. Reasonable code with the code entered by the user, often to query, modify, and delete operations, make sure your code is reliable storage, but also to guarantee uniqueness of the code. Code bits positioning. Since the result is stored as a string encoding , all code bits specific information has been lost , check a code bits of information is very inconvenient place only after positioning of the code ,

the encoded string can be separated and re- display the corresponding code into a new independent string

2. Query methods. Coding result is a string, the string usually operate only " search " , which can not meet the project needs, the need to convert the code bits of information to form after screening a collection or numeric characters only meet the actual requirements

3. Multiple or complex queries. Queries often involve multiple query code bits and complex , a single query or query for a single bit of code can not meet the project needs .Coding management . When the results meet the user needs to get coding , you need to encode the results of the operation, such as modifying Remarks delete coding , coding to maintain the accuracy of the database and the uniqueness of the code

3 Code library storage

1. Expression code entered by the user into a string. When the user has finished coding , in order to facilitate the process, the Western unity deal , the code to convert Unicode strings are stored ; advantage of this approach is that the result is stored as a single string , small footprint, simple operation, easy to expand , the disadvantage code bits of information are lost, you need to specify the encoding rules before re- use analytic 2. Code is stored in the database . Sqlite database using embedded open source database , with a small , fast , and other advantages , supports standard SQL database manipulation language all basic grammar, managing databases, tables create, modify and delete records were achieved using SQL syntax . Create the following database table structure

table2 structure of database

name	Data type	explain
code	text	The text type, is used to store the code
memo	text	The text type, used to store the notes
ID	PRIMARY KEY	Automatic growth integer, is used to record insertion order, ordering

Below is a table structure to create an SQL statement

"create table cs (code text, memo text,ID INTEGER PRIMARY KEY)"

4 Query Design

Since coding stored as a string, the string is the meaning of each code bit different, it is not by conventional database query language, the only way is designing specific query string for code bit.

1. Positioning the query code bits . By the start bit and the query length to achieve , can be achieved in this way to locate any single bit of code , when the set of code bits , coding region of the query results automatically record setting string is divided according to the independent displays the contents of the code segment

2. Set the query. When the code bits to determine the need to set the query to determine whether the record meets the requirements of the code bits, according to project requirements, design the two

kinds of query: 1 , a collection of discrimination law . The code bits in accordance with the string data type, to determine whether the code bits in a string collection. 2, compare discrimination law. The code bits in accordance with a string or numeric data type, to determine whether the code points in the specified range.

3. Filter design. The current record set denoted A, match the query records denoted as B, then filter results can be designed as B or AB, through multiple filters , you can get the ultimate collection of records

5 Conclusion

Based on the analysis of sheet metal encoding specification, design specification into the code structure design, content design code segment in two parts, the use of XML file formats to achieve scalable coding standards describe the logic states of expression

with the structure of the information section. Avoid the user to program the workload and create, test coding standards process, to maximize the realization of the sheet metal flexible coding system. Facilitate programmers and coders mutual enterprise division of labor, produce higher quality code, standardization of manufacturing companies providing information technology support.

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钣金可视化柔性编码系统设计

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摘要：在钣金编码规范的指导下，以XML格式文件实现可扩充的编码规则描述。然后，基于事件响应和GUI绘图技术设计出界面友好的人机交互接口，实现复合光标定位、代码提示跟踪显示、多视图操作响应、用户输入约束、代码有效性检查等功能。设计码位长度内容可变、码位结构可调整的柔性编码规则，并进行动态解析运行。代码以字符串存储到Sqlite数据库，通过对代码字符串解析，提出快速码位定位技术并实现2种基于码位的查询。利用集合运算和多次筛选实现复合查询，为钣金制造企业信息标准化提供技术支持。

关键词：可视化；编码；钣金；XML

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