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Modeling a Digitalized Indexing Structure for a Departmental Library Using HTML

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Abstract

Every existing library possesses a catalogue, which is a guiding document for every user of the library who does not intend to waste time in identifying the actual location of a resource in a section of the library. A catalogue serves as a collection of the library's blueprints, i.e. the various sections and the system of arrangement in the library. These catalogues in most libraries have become an old pile of cards, which is of little or no help to a library user in terms of resource location. Nowadays, card catalogues are being replaced with digital catalogues. A library viewed as a network of different sections can have its catalogue modeled using a web language (HyperText Mark-up language, or HTML). The use of such a model affords the community, which the library serves, with the advantage of better awareness. This work highlights the essentials of digital cataloguing and enumerates the steps involved in the conversion of an existing card catalogue to its digital equivalence.

Keywords: *HyperText Mark-up Language, catalogue, library, coding, tables, tags, elements, attribute.*

Introduction

Discussing the essentials of digital cataloguing without understanding what a catalogue is all about is incomplete. A library catalogue is an index to the library collection that enables a user to find materials of interest (Halsey *et al*. 2006). Searching through a library in a quest to locate a content of choice can be a Herculean task, especially when the visitor is not well adapted to the system of classification of the content of said library. With catalogues, library users can determine whether a library owns the materials they need by searching through catalogue records. In many cases, the information of the items provided on the record will enable the users to make a decision whether the items listed suit their needs.

This work is a case study of the Library of the Department of Electrical and Electronics Engineering, Federal University of Technology, Minna, Niger State, Nigeria. The processes involved in the execution of this work include data collection, data classification, structural modeling, shelf organization and coding.

Overview of HyperText Mark-up Language

Designed by the British scientist, Sir Tim Berners-Lee, in Switzerland during the 1980s, the HyperText Mark-up Language (HTML) is a formatting system for displaying on a computer monitor text, graphics, and audio retrieved over the Internet using a browser (Encyclopedia Britannica 2012). Each retrieval unit is known as a 'web page' and such pages frequently contain hypertext links that allow related pages to be retrieved. HTML is the mark-up language for encoding web pages.

The HTML document itself is a text file with an .htm or .html filename extension. It forms the source code of a web page. When viewed with a web page editor (Microsoft FrontPage, Microsoft Notepad, or Adobe Dreamweaver), the document is a series of tags and elements that specify how the web page is

to be displayed. It provides a means of creating structured documents by denoting structural semantics for text such as headings, paragraphs, lists, links, quotes and other items. The HTML mark-up consists of two key components, including (McFarland 2007):

- Elements (and their attributes); and
- Document type declaration.

Elements

The HTML documents are composed entirely of HTML elements that, in their most general form, have three components: a pair of tags, 'start tag' and 'end tag'; some attributes within the start tag; and finally, any textual and graphical content between the start and end tags, perhaps including other nested elements. The HTML element is everything between and including the start and end tags. Each tag is enclosed in angle brackets.

The general form of an HTML element is: `<tag attribute1 = "value1" attribute2 = "value2">` *content* `</tag>`. Some HTML elements are defined as empty elements and take the form `<tag attribute1 = "value1" attribute2 = "value2" />`. Empty elements may enclose no content. The name of an HTML element is the name used in the tags. The end tag's name is preceded by a slash character '/' and in empty elements the slash appears just before the closing />.

Document Type Declaration

The HTML documents are required to start with a Document Type Declaration tag `<!doctype…>` . This tag defines for the browser the version of HTML with which the document was created. For example: `<! DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"…>` document type declaration signifies that the HTML document version XHTML 1.0 Transitional was used. Other document types include XHTML 1.0 Strict, XHTML 1.0 Mobile, XHTML 4.01 Transitional, and XHTML 4.01 Strict.

The aims of this work were to design a digital indexing model for a library for easy assessment of the library content, and to develop a system of classification (similar to that used for the Library of Congress, Washington, DC, USA) for content identification and location on the shelf.

Conversion Methodology

Data Collection

The first stage of the work carried out for the conversion process was data collection. The card catalogue in use consisted of the following lists:

- List of the available textbooks in the library with the names of the authors;
- List of projects/theses completed by students in the last decade (2001-2010); and
- List of journals and magazines.

These lists were verified to ensure that all materials listed on the text of the resource catalogue were available in the library. The verification process involved taking a new stock of present library resources and having the new stock matched with those in the available catalogue. All available resource titles were put in soft form for easy incorporation into to the new digital catalogue.

Data Classification

The collected texts and projects/theses were classified according to the major options in Electrical Engineering namely:

- Power Systems and Machines;
- Communication Engineering;
- Electronics; and
- Computer Engineering.

The predefined naming system of the Library of Congress was modified to generate a suitable naming system. The subclasses of the 'technology class' in the Library of Congress identified as TK were modified to cover all aspects of electrical engineering. During the modification, the subclass Power Systems and Machines was assigned the subclass name TK-PM, Communication Engineering was assigned TK-CmE, Electronics was assigned TK-EE and Computer Engineering was assigned TK-CE. The major criterion for classification of texts is the content of each text.

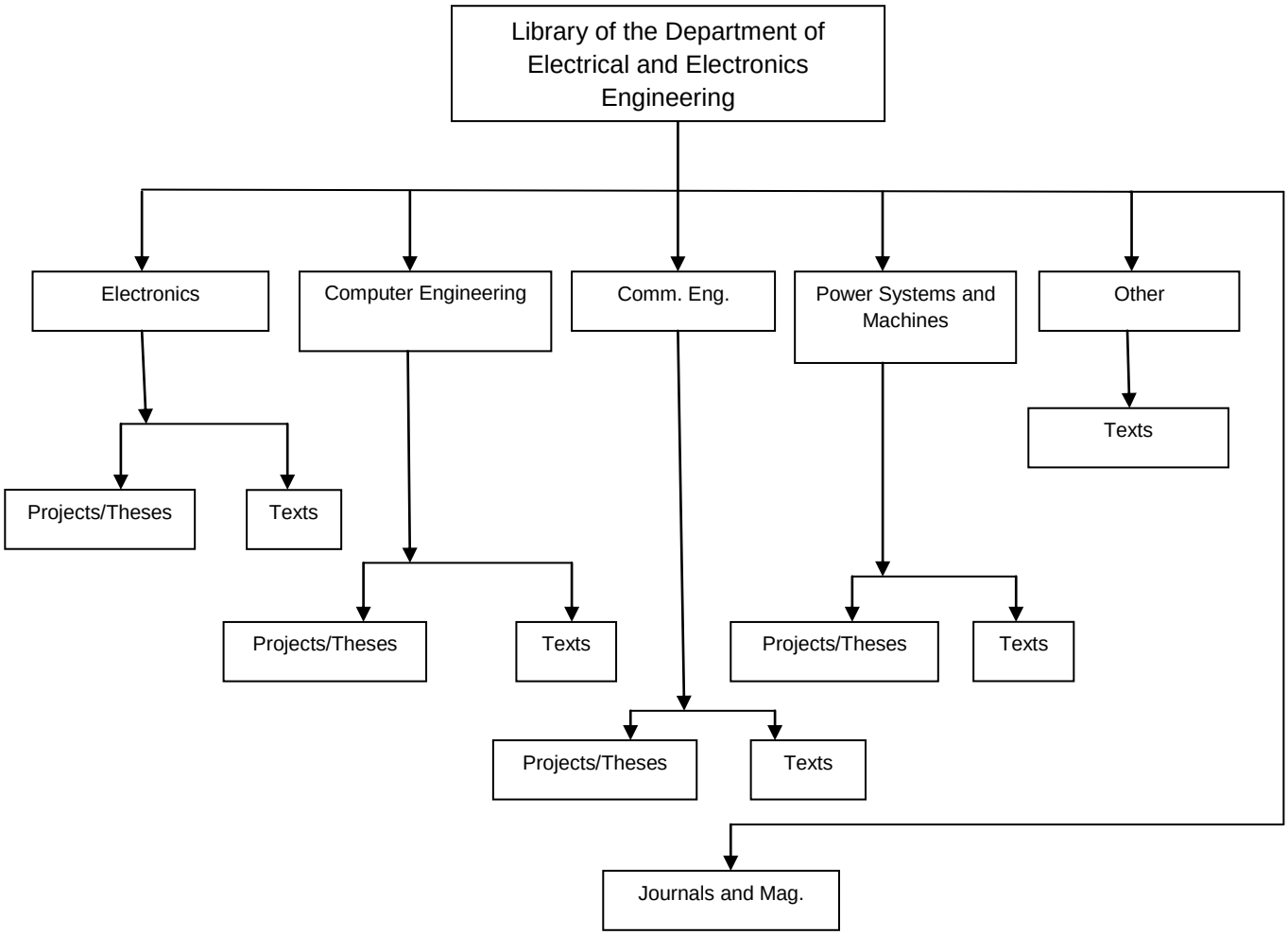

Fig. 1. Structural model of design.

Structural Modeling

The structural modeling results in a block diagram for the design. The design model is as shown in Fig. 1.

Shelf Organization

The shelves available in the library were organized in three sections:

- The Textbooks section;
- The past Projects/Theses section; and
- The Journals and Magazines section.

Each section was further subdivided according to the mode of classification used for the resources in the section (Harter 1997).

The textbook section was divided into five subsections according to the classification used, viz. Power Systems and Machines, Communication Engineering, Electronics, Computer Engineering and Other texts. Call numbers were assigned to every text available.

Only Projects/Theses titles completed from 2001 to 2010 were collected and as such, this section was divided into ten subsections, viz. 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, and 2010. The Projects/Theses were assigned call numbers generated according to the years the Projects/Theses were completed.

The Journals and Magazines section was divided into five subsections according to the year of publication of each journal or magazine: publications earlier than 2000, publications from 2001-2003, publications from 2004-2006, publications from 2007-2009 and publications from 2010 till the present day. Call numbers were not attached to the journals.

Coding

Sharing a small amount of information with other users requires a web page while large amounts of information require a web site. A web site is a collection of web pages

and related files and folders stored on a server. The concept of a web site was used in this work so as to enable a number of different users to access the information they seek in the library simultaneously. The HTML (HyperText Mark-up Language) being the bedrock of web site design is the language used for the coding process.

Coding Requirements

The requirements for the coding process include (Aptech 2012, Microsoft Windows 7 2009):

- Computer running Windows XP, Windows Vista or Windows 7 (preferably Windows Vista or Windows 7), or Mac OS;
- Installed Adobe Dreamweaver application software used as the command editor; and
- Any of the listed installed browser application software (Internet Explorer, Mozilla Firefox, Opera, Safari, or Google Chrome).

Any software development requires going through some phases. These phases include the design phase and the development phase (Aptech 2012).

Design Phase

The design phase in which the design went through involved the following considerations:

***Objectives Definition*:** The objectives of the application were clearly defined. Its main purpose is to provide a broader means of awareness of the resources available in the library for its user community. It also helps alleviate the stress of going through the contents in search of a particular resource.

***Audience*:** The identification of the target audience was very important. Academic sites should have a different look and feel from the entertainment sites.

***Storyboarding*:** A storyboard is a description of the layout, contents, sequence and operation of the site. This defines the conceptual design of the site. The following information was provided for each page:

- Title describing the document;
- The main heading;
- Subheadings (where necessary);
- Purpose of the page;
- Description of contents;
- Images to be used; and
- Description about the links.

***Information Organization*:** This defines the navigation scheme for the site. The three basic steps in information organization were:

- Division of the information into logical units;
- Creation of a hierarchy of important and general topics; and
- Use of the hierarchy to structure relationships among units of information.

Development Phase

In the development phase, two important factors were kept in mind as follows:

- The layout of the page; and
- Navigation around the site.

***Layout and Content Development*:** The basic rule here is unity and variety. This means that everything should fit together as a unit (Candela *et al*. 2007), but at the same time there is enough variety to keep it interesting. Consistency created the unique identity of the site. Colours, fonts, column layout, and other design elements were kept consistent throughout every section of the site.

***Navigation around the Site*:** Every site should have a simple navigation scheme no matter how attractive the site is. This ensures that users do not lose their way in the course of navigation. The basic principles in designing a navigation scheme involve:

- Specifying the contents of the site;
- Creating a navigation scheme that helps users to go to the required section, quickly; and
- Providing means to search for additional information.

The hierarchical navigation layout is the most common layout that is used in web site design. The home page has links to several other pages. The user can select a link and 'jump' to the required page. Each page has a link to the home page. The navigation layout for this design is as shown in Fig. 2.

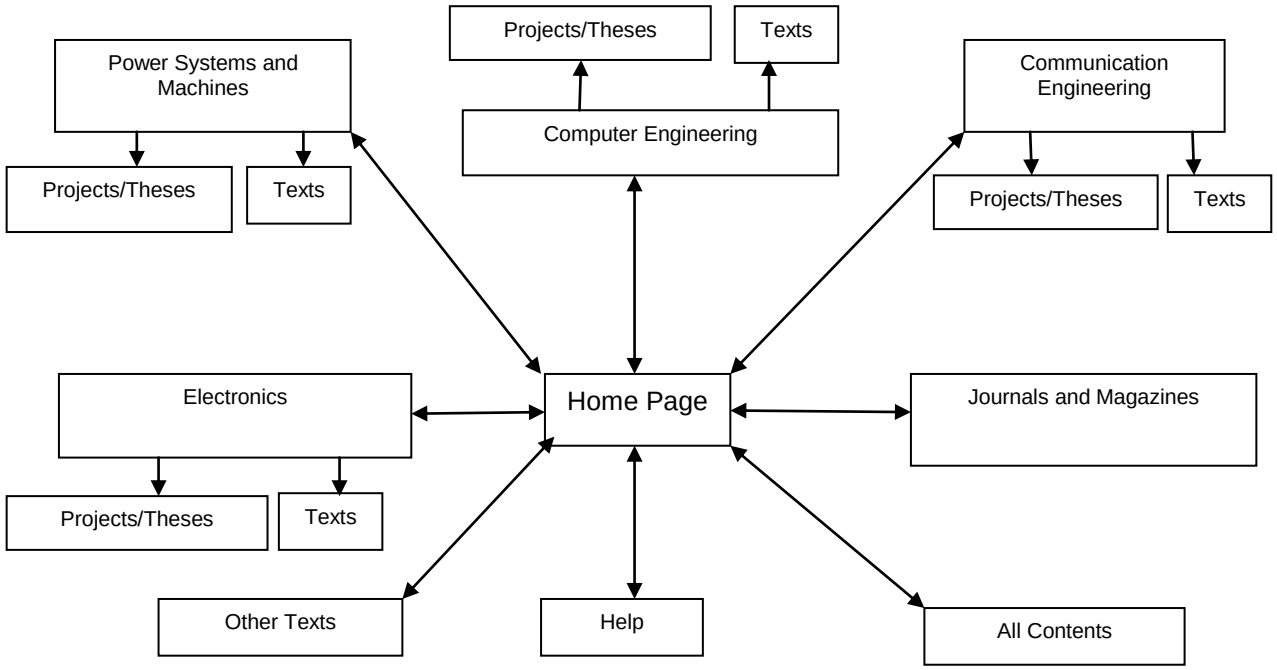

Fig. 2. Hierarchical navigation layout.

Structure of an HTML Document

An HTML document has three basic sections (Aptech 2012):

***The HTML section*:** Every HTML document must begin with an opening HTML tag `<html>` and end with a closing HTML tag `</html>`. The HTML tags tell the browser that the content between these two tags is an HTML document.

***The Header Section*:** The header section begins with a <head > tag and is closed with a `</head>` tag. This section contains the title that is displayed in the navigation bar of the web page. The title itself is enclosed within the title tag, which begins with a `<title>` tag and is closed with a `</title>` tag.

***The Body Section*:** This comes after the head section. It contains the text, images, and links that are displayed on the page. The body section begins with a `<body>` tag and ends with a `</body>` tag.

Block level elements are elements that appear in the body section. Many block level elements exist in HTML, but for the purpose of this work only a few are used. They include: image element, table element, font element, and link element. Each of these block level elements has its attribute and values as illustrated below:

```
<element attribute = "value">.
```

All the elements mentioned above have their closing tags </element> except the image element which opens and closes within the same braces:

```
<img attribute ="value"/>.
```

Creating Tables

The table element was most frequently used since the design involves data display. Its use helps to group related data into lists. The `<table>` tag is used to create a table in the HTML document. The attributes of the table element apply to the table itself. The basic unit of a table is a cell and is defined with the `<td>` tag. A horizontal group of cells makes a row and a table row is defined using the `<tr>` tag. The position of the data within each cell was specified using the align attribute. The alignment was either left, right, centre, or justify. Apart from positioning the content of the table cells, the size and position of the table on the screen was adjustable. The width and height attributes of the table tag fix the area of the table on the screen while the align attribute aligns the table on the screen accordingly.

Developmental Results

Design Output

The resultant self-explanatory design output is shown in Figs. 3-19.

Fig. 3. Library home page (HTML document).

Fig. 4. Power Systems and Machines page (HTML document).

Fig. 5. Power Systems and Machines past Projects/Theses page (HTML document).

Fig. 6. Power Systems and Machines texts page (HTML document).

Fig. 7. Communication Engineering page (HTML document).

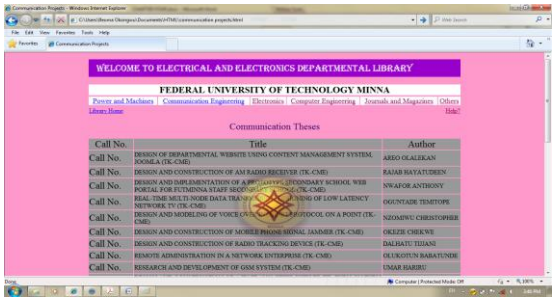

Fig. 8. Communication Engineering past Projects/Theses page (HTML document).

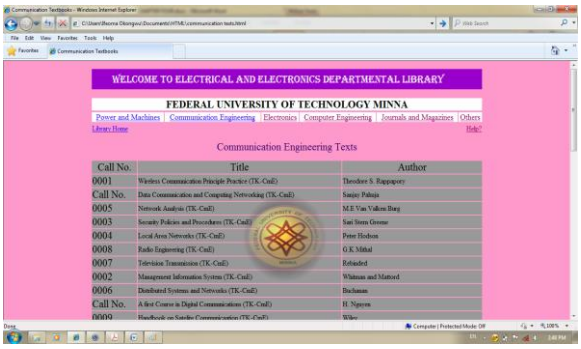

Fig. 9. Communication Engineering texts page (HTML document).

Fig. 10. Electronics page (HTML document).

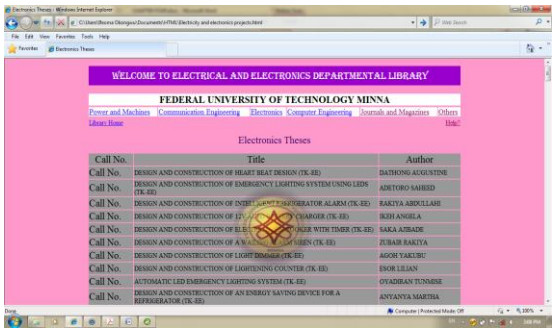

Fig. 11. Electronics past Projects/Theses page (HTML document).

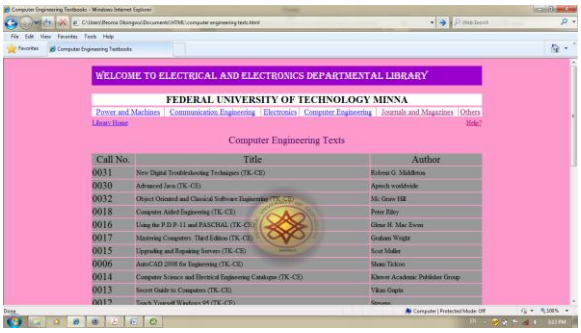

Fig. 15. Computer Engineering texts page (HTML document).

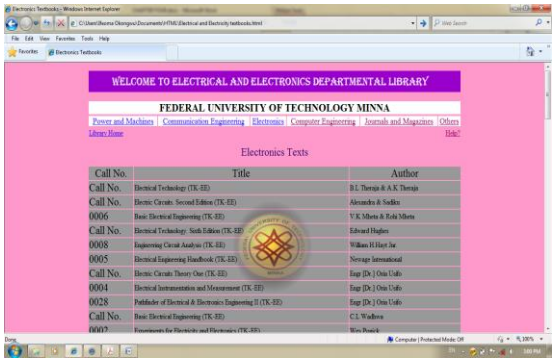

Fig. 12. Electronics texts page (HTML document).

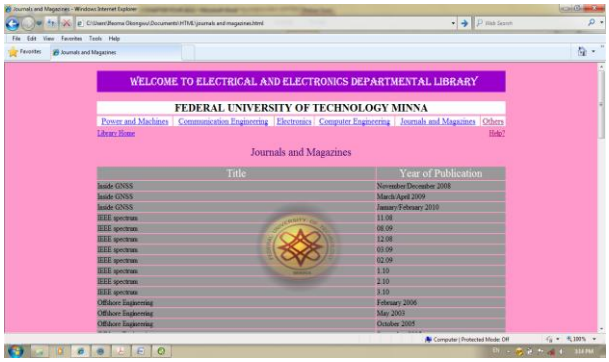

Fig. 16. Journals and Magazines page (HTML document).

Fig. 13. Computer Engineering page (HTML document).

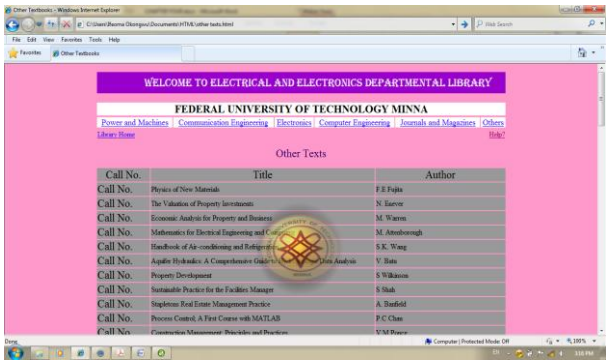

Fig. 17. Other texts page (HTML document).

Fig. 14. Computer Engineering past Projects/Theses page (HTML document).

Fig. 18. All texts page (HTML document).

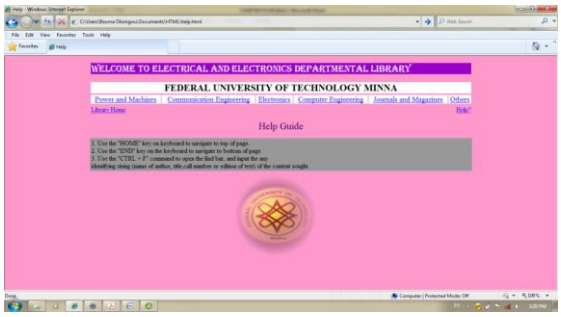

Fig. 19. Help page (HTML document).

Conclusion

The aims of this work were to design a digital indexing model for a library for easy assessment of the library content, and to develop a system of classification (similar to that used for the Library of Congress) for content identification and location on the shelf. As the result shows, these objectives were met and hence the design met the proposed goal.

Recommendations

The following recommendations should be taken into consideration for the future development of the digital catalogue:

- This catalogue should be updated each time new materials are received (The update is through the design window in Dreamweaver).

- This catalogue should be made an integral part of the school's web site so as to enable wider awareness to library resources in the department.

- This model catalogue is best implemented for libraries of small size (with less than 2,500 collections) equivalent to the Library of the Department of Electrical and Electronics Engineering, Federal University of Technology, Minna, Niger State, Nigeria, used for the case study in this work. It is not very suitable for libraries with larger capacity than was specified above since the conversion of an analog catalogue into a digital form becomes more tedious and expensive.

- As an improvement on this model for use in large libraries, a comprehensive redundant database structure should be created and linked with the model to keep the records safe and away from damages (corruption).

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