## Contents

List of Figures and Table  xi  

Preface  xvii  

**Chapter 1 Digital Libraries in Context**  
1.1 Treasures from the World’s Great Libraries  1  
1.2 The Rise of Digital Libraries  4  
1.3 The Traditional Library  8  
1.4 Libraries and Information Media in Historical Context  9  
1.5 Digital Libraries as a Global Resource  14  
1.6 Digital Library Definitions  16  
1.7 Why Digital Libraries?  21  

**Chapter 2 Digital Libraries: Users and Services**  
2.1 User Access to Digital Libraries  25  
2.2 Digital Libraries in Various Institutional Environments  29  
  2.2.1 Museums  29  
  2.2.2 National libraries  30  
  2.2.3 Public libraries and institutions  32  
  2.2.4 Research establishments  33  
  2.2.5 Teaching and learning establishments  34  
2.3 Personalized Digital Libraries  36  
2.4 Digital Reference Services  37  
2.5 Information Literacy  39  
2.6 Barriers to User Access  40  
  2.6.1 Visual or other physical impairment affecting access  40  
  2.6.2 No appropriate technology  42  
  2.6.3 ICT illiteracy  43  
  2.6.4 Language barrier  44
Chapter 3 Digital Information Sources 49
  3.1 Introduction 49
  3.2 Full-Text Materials 51
    3.2.1 Scholarly ejournals 51
    3.2.2 Open access, eprint collections and open archives 52
    3.2.3 Ebooks 55
    3.2.4 Electronic newspapers 58
    3.2.5 Theses and dissertations 59
    3.2.6 Archives 59
  3.3 Metadata Sources 61
    3.3.1 The catalogue 61
    3.3.2 Abstracting and indexing databases 63
    3.3.3 Indexes to archives 64
  3.4 Multimedia Material 65
  3.5 Websites and Quality Issues 67
  3.6 Suppliers of Some Digital Information Sources 69
    3.6.1 Scholarly ejournals 69
    3.6.2 Open access, eprint collections and open archives 71
    3.6.3 Ebooks 73
    3.6.4 Abstracting and indexing databases 74
  3.7 Creating Digitized Sources 75

Chapter 4 Standards and Interoperability 85
  4.1 Introduction 85
  4.2 Standards 85
  4.3 Interoperability 86
  4.4 Metadata 88
    4.4.1 MARC 91
    4.4.2 Dublin Core 92
    4.4.3 The International Standard Archival Description (General) 95
    4.4.4 Encoded Archival Description (EAD) 95
    4.4.5 Text Encoding Initiative (TEI) 95
    4.4.6 Resource Description Framework (RDF) 96
    4.4.7 Metadata Encoding and Transmission Standard (METS) 96
    4.4.8 CIMI XML 97
  4.5 Presentation Standards 97
    4.5.1 Character encoding 97
    4.5.2 Formats 100
    4.5.3 Markup languages 101
  4.6 Digital Object Locators 102
  4.7 Protocols 103
    4.7.1 Z39.50 103
    4.7.2 Open Archives Initiative-Protocol for Metadata Harvesting 105
  4.8 Continuity and Change 105

Chapter 5 Organizing Access to Digital Information Sources 109
  5.1 Introduction 109
  5.2 Software Developed from Library Management Systems 111
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.2.1 EnCompass from Endeavor</td>
<td>112</td>
</tr>
<tr>
<td>5.2.2 Metalib and DigiTool from Ex Libris</td>
<td>113</td>
</tr>
<tr>
<td>5.2.3 Hyperion and Ilink from Sirsi</td>
<td>114</td>
</tr>
<tr>
<td>5.2.4 Millennium from Innovative Interfaces</td>
<td>115</td>
</tr>
<tr>
<td>5.3 Software Developed from Document/Information/=</td>
<td>115</td>
</tr>
<tr>
<td>Museum Management Systems</td>
<td></td>
</tr>
<tr>
<td>5.3.1 CAIRS</td>
<td>116</td>
</tr>
<tr>
<td>5.3.2 CALM</td>
<td>116</td>
</tr>
<tr>
<td>5.3.3 Inmagic</td>
<td>118</td>
</tr>
<tr>
<td>5.3.4 KE EMu</td>
<td>120</td>
</tr>
<tr>
<td>5.3.5 Content management software</td>
<td>120</td>
</tr>
<tr>
<td>5.4 Open Source Software for Digital Library Development</td>
<td>121</td>
</tr>
<tr>
<td>5.4.1 CERN Document Server software</td>
<td>123</td>
</tr>
<tr>
<td>5.4.2 DSpace</td>
<td>123</td>
</tr>
<tr>
<td>5.4.3 EPrints Archive Software</td>
<td>123</td>
</tr>
<tr>
<td>5.4.4 Greenstone</td>
<td>124</td>
</tr>
<tr>
<td>5.5 Digital Library Architecture</td>
<td>125</td>
</tr>
<tr>
<td>Chapter 6 Interface Design</td>
<td>129</td>
</tr>
<tr>
<td>6.1 Introduction</td>
<td>129</td>
</tr>
<tr>
<td>6.2 Interface Design Principles: An Overview</td>
<td>130</td>
</tr>
<tr>
<td>6.3 Interface Design Rules</td>
<td>131</td>
</tr>
<tr>
<td>6.4 Interfaces for Digital Libraries</td>
<td>132</td>
</tr>
<tr>
<td>6.4.1 Content overview</td>
<td>133</td>
</tr>
<tr>
<td>6.4.2 Searching and browsing</td>
<td>133</td>
</tr>
<tr>
<td>6.4.3 Display of retrieved information</td>
<td>134</td>
</tr>
<tr>
<td>6.4.4 Personalization</td>
<td>135</td>
</tr>
<tr>
<td>6.4.5 Help</td>
<td>140</td>
</tr>
<tr>
<td>6.5 Interface Developments</td>
<td>141</td>
</tr>
<tr>
<td>6.6 Interfaces for Specific User Communities</td>
<td>143</td>
</tr>
<tr>
<td>6.6.1 Interfaces for young users</td>
<td>144</td>
</tr>
<tr>
<td>6.6.2 Interfaces for users with visual handicaps</td>
<td>144</td>
</tr>
<tr>
<td>6.7 Languages and Interface Design</td>
<td>147</td>
</tr>
<tr>
<td>6.8 Cultures and Interface Design</td>
<td>153</td>
</tr>
<tr>
<td>6.9 Interface Evaluation</td>
<td>158</td>
</tr>
<tr>
<td>Chapter 7 Searching and Browsing</td>
<td>163</td>
</tr>
<tr>
<td>7.1 Libraries and Information Seeking</td>
<td>163</td>
</tr>
<tr>
<td>7.2 Searching</td>
<td>163</td>
</tr>
<tr>
<td>7.3 Browsing</td>
<td>171</td>
</tr>
<tr>
<td>7.4 Information Display</td>
<td>172</td>
</tr>
<tr>
<td>7.5 Searching Multilingual Collections</td>
<td>174</td>
</tr>
<tr>
<td>7.5.1 Machine translation</td>
<td>177</td>
</tr>
<tr>
<td>7.5.2 Cross-language information retrieval</td>
<td>178</td>
</tr>
<tr>
<td>7.6 Searching Visual and Sound Sources</td>
<td>180</td>
</tr>
<tr>
<td>7.6.1 Automatic indexing of non-text material</td>
<td>182</td>
</tr>
<tr>
<td>7.6.2 Automatic image indexing</td>
<td>182</td>
</tr>
</tbody>
</table>
7.6.3 Automatic indexing of audio content 185
7.7 User Feedback on Searching and Browsing 185

Chapter 8 Practical Issues 189
8.1 The Management of Change 189
8.2 Users’ Needs 190
8.3 Planning 193
8.4 Requirement Specification 193
8.5 Selection 195
8.6 Installation 196
8.6.1 Health and safety issues 196
8.6.2 Training 196
8.6.3 Documentation and help 197
8.6.4 Authentication, authorization and access 198
8.6.5 Security issues 199
8.7 Running 199
8.8 Evaluation 201
8.9 Consortia 202
8.9.1 Regional consortia 202
8.9.2 National consortia 202
8.9.3 Multinational consortia 204
8.10 Intellectual Property Rights 204
8.11 Preservation Issues 209
8.12 Staffing 213
8.13 Principles for Digital Library Development 215
8.14 Further Sources of Information 216

Chapter 9 Case Studies 221
9.1 Introduction 221
9.2 Open Library, Open University, UK 221
9.2.1 Background to the institution 221
9.2.2 Background to the library 222
9.2.3 Digital library implementation and use 222
9.3 Biblioteca Mario Rostoni, Università Carlo Cattaneo, Italy 226
9.3.1 Background to the institution 226
9.3.2 Background to the library 227
9.3.3 Digital library implementation and use 227
9.4 University of Moratuwa Library, Sri Lanka 231
9.4.1 Background to the institution 231
9.4.2 Background to the library 231
9.4.3 Digital library implementation and use 232
9.5 Vidyanidhi Digital Library, University of Mysore, India 236
9.5.1 Background to the institution 236
9.5.2 Background to the Vidyanidhi Digital Library Project 236
9.5.3 Vidyanidhi Digital Library and E-Scholarship Portal 236
9.6 ELibraryHub and Digital Library, National Library Board, Singapore 240
9.6.1 Background to the institution 240
9.6.2 ELibraryHub and the Digital Library 241
9.7 The International Children's Digital Library, University of Maryland, US 244
  9.7.1 Background to the institution 244
  9.7.2 Background to the ICDL 245
  9.7.3 ICDL implementation and use 245
9.8 Archives, McGill University, Montreal, Canada 251
  9.8.1 Background to the institution 251
  9.8.2 Background to the Archives 251
  9.8.3 Implementation and use of the digitized collections 252
9.9 National Library of Wales, Aberystwyth, UK 258
  9.9.1 Background to the institution 258
  9.9.2 Background to digital library development 259
  9.9.3 Implementation and use of the digitized collections 260

List of Acronyms 265

Index 270