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Developing Microsoft Word 2007 Add-On Applications

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Abstract

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In 2007, Microsoft released a new version of MS Office that changed the file platform to a universal data format called Extensible Markup Language or XML. XML is meant to be simple, meaningful, and understood by all computer programs. Since Microsoft has moved its file format to XML, tremendous extendibility can be built by software professionals to link MS Office 2007 documents to data not held within the saved documents. This project tested the levels of interactive data between MS Word 2007 and several other XML data sources.

Introduction

According to John R. Rymer of Forrester Research Inc., "Microsoft's goal is to make Office a first-class component of a broad 'application platform.'" (1) In 2007, Microsoft will be releasing a new version of MS Office that will change the saved file platform to a universal data format called Extensible Markup Language or XML (2). This means that MS Office 2007 documents will not be compatible with previous versions of MS Office unless users remember to save the file in the old format. XML is meant to be simple, meaningful, and understood by all computer programs, for an example refer to the Appendix (3). With Microsoft moving its file format to XML, tremendous extendibility can be built by software professionals to link MS Office 2007 documents to data not held within the saved documents.

Microsoft claims that the XML file format will allow "rapid creation of documents from disparate data sources." (2) In simple terms, an XML formatted MS Word 2007 document, when opened, could link to up-to-the-second information stored anywhere in the world, and display the data within the document. This project tested three levels of interactive data between MS Word 2007 and:

1. MS Excel 2007,
2. MS Access 2003 database, and
3. Really Simple Syndication (RSS) feed popular with news sites to update news feeds.

The functionality for both applications 1 and 2 were provided in MS Word 2003 and earlier but was removed due to the limited use in previous versions (4). Since this was former functionality, it was a starting point for development of add-on applications that

previous MS Word users would be familiar with. The third application was chosen because of the tremendous flexibility of RSS feeds. Since RSS feeds are automatically updated by their publishers the feeds can be used in a business application to keep employees up to date on the latest business news. A company could publish its own RSS feed and keep employees up to date on company news or strategies.

Methodology

Development

The research project had three phases. The first phase was to program, using VB.NET, the three different interactive add-on applications for MS Word 2007. Application 1 had interaction between a MS Excel 2007 spread sheet and a MS Word 2007 document. The Excel file had sample names and addresses, and the add-on application took the names and addresses in MS Excel and brought them into a letter written using MS Word 2007. Application 2 performed similar to application 1 except connected a MS Word 2007 document to a MS Access 2003 database. Application 3 allowed users to link to a RSS feed and have the Word document display the latest news feed from a RSS source. I located a few developer resources to help me build add-on applications to MS Word 2007. I used my knowledge to extend upon this information to enhance MS Word 2007's functionality.

Testing

The second phase consisted of testing the add-on application's functionality. There were two measures in this usability testing. First, I tested the applications for correct functionality. Second, after functional verification, users were asked to interact with my applications and evaluate whether the add-ons met criteria for speed and whether the add-ons provided useful tools (5). Thirty-seven test users were obtained from both upper level and lower level computer science classes. The testers ranged from freshmen to senior status and gave feedback via questionnaires and by myself observing the users during the testing.

Evaluating

The third phase was to evaluate the observations and questionnaires and to look for trends and similarities in the test results. I looked to see if the applications met the criteria for speed and if the applications met the users' expectations for usefulness. For a screenshot of the evaluated applications refer to the Appendix.

Results

The first outcome of the project was the successful programming of the three applications. It took significant research and experimentations to gain an understanding of the new XML formatting of the MS Word documents. The XML pattern was more complex than I was used to and took time to link the relations between the multiple XML files built into each document.

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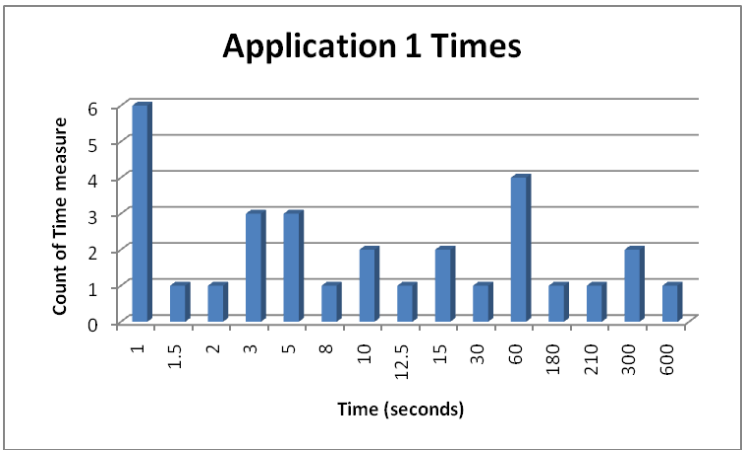
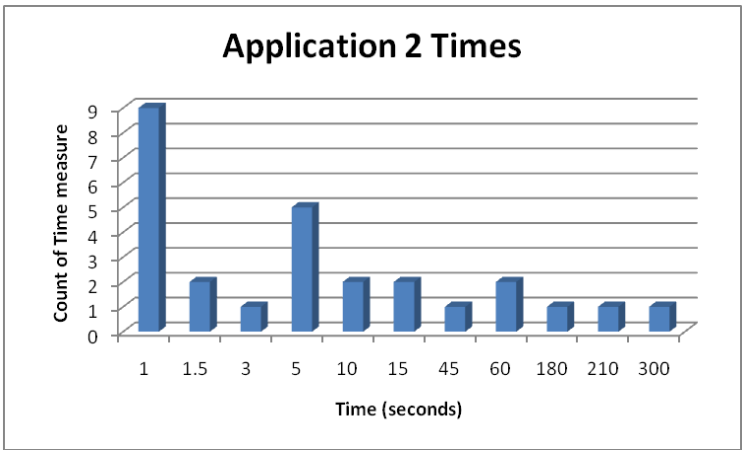
The second outcome of the project was the successful testing of the three applications. Application 1 was given a 4.375 rating out of 5 by the testers. The testing group said that the application was very simple to use and could be very useful in the real world. The testers also said that the application took on average sixty-five seconds to perform the operation of creating a letter with the address stored in an excel file. This time is not accurate since some users said the time took one to two seconds and some said the operation took minutes. The reason there is such a large range in times is because some testers interpreted the response time questions to include the time to open up MS Word, while other only recorded the time after the button click to create the letter to the time the letter popped up. Some suggested changes the testers responded with were selectable template letters, more fields (phone number, email address, etc.), and a wizard to create the template letter that is then used by the application.

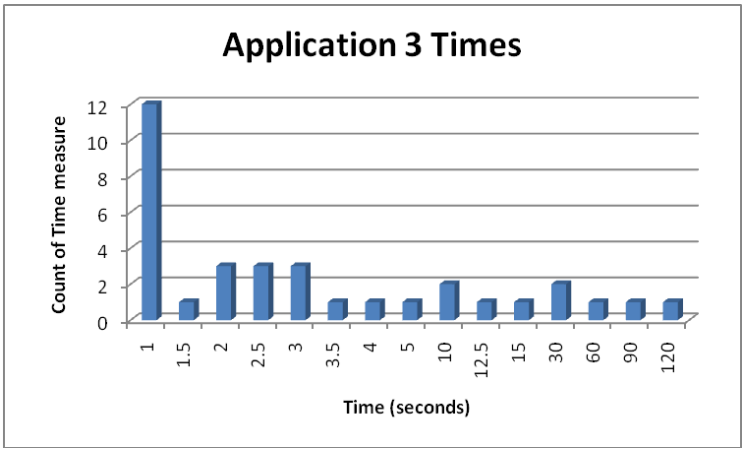


Application 2 was quite similar to Application 1 in the way it functioned and worked and had similar suggested improvements. The average rating testers gave application 2 was a 4.39 out of 5. The average time it took users to create a letter was twenty-one seconds. This time was significantly less then Application 1 because most of the testers went directly from Application 1 to Application 2, which meant a lot of the testers did not include the time it took MS Word to start up. Like Application 1 some users gave one to two seconds as the time it took to create the letter while others included the time it took to load the Access database.



The rating testers gave to Application 3, the application that loaded an RSS feed into the application, was 4.35 out of 5. Testers thought once again the application was very simple to use, and thought it would work very well to keep business up to date with the latest news. It took 10.6 seconds on average to create the RSS feed document. In this case, testers had all similar times and measured the time it took for the document to be created after the create button was pushed. The 10.6 second response time was excellent

because in a survey taken by the testers before testing the applications they said an updated information document should take 14.4 seconds on average to open. Some suggested improvements to this application included showing pictures that were built into the RSS feeds and providing an error message if the entered RSS feed URL was not correct.



Overall eighty-nine percent of my testers thought the applications would be useful in a real-world setting. This ranking was held up because most of the testers surveyed saw high potential for my applications in the business realm. Only sixty-six percent of the testers thought that the applications would be useful in a home setting.

Future Research

With my experience in building Microsoft add-on applications still in its early stages, future research would be to build and develop more complex applications that do more computations and manipulations within documents. I would also like to expand the add-ons to work with Excel, PowerPoint, Outlook, and other Microsoft Office 2007 applications.

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Personal Biography

Peter Sonnek is a senior majoring in management information systems. After graduating from Blue Earth Area High School in Blue Earth, MN, he furthered his studies by enrolling at Minnesota State University, Mankato in the fall of 2003. Since then he has received several academic-based scholarships including the Federated Insurance Scholarship, the Department of Computer and Information Sciences scholarship, and the College of Science, Engineering and Technology scholarship. He was also a Who's Who Among Students in American Universities nominee and was awarded a Minnesota State University, Mankato Foundation Research Grant for this project. Peter is also a Student Ambassador, helping with campus and community activities and also giving weekly tours for potential students. He served as the Student Ambassador President from 2005 to 2006. He has been involved in the Honors Program, many intramural sports, and is a YMCA Big Brother. He is currently completing his internship with General Mills, and will be graduating in the spring of 2007. After graduation he plans to continue working for General Mills as a full-time programmer analyst. His hobbies include playing sports, working out, electronics, home theater equipment, farming, family, and friends.

Faculty Advisors Biography

Dr. Ann Quade is a professor in the Department of Computer and Information Sciences at Minnesota State University, Mankato (MSU). She received her PhD from the University of Minnesota.

Throughout her career, she has published research in several areas related to computer science education including: attracting and retaining women in computer science; classroom models that promote undergraduate research; assessing the merits of student online notetaking; the syntax and semantics of learning object meta-data; and the development and assessment of active, project-based hybrid online courses.

Since becoming a MSU faculty member in 1984, Dr. Quade has represented her University through participation in: numerous national and international conferences; the Computing Research Association mentoring program; and the 2002 International Grace Hopper Celebration of Women in Computing Conference steering committee. In 1998, she presented both oral and written testimony before the U.S. House of Representatives, Committee on Science in support of H. R. 3007, The Advancement of Women in Science, Engineering, and Technology Development Act. She also works diligently to build partnerships between industry and education.

At MSU she has been recognized as a: Teaching Scholar; William Flies fellow; recipient of the Minnesota State Student Association Dr. Duane Orr teaching award; and six year member of the MSU Foundation Board of Directors.

Appendix A: XML

A-1 XML Example

XML has no rules beside having opening (<Label>) and closing (</Label>) tags around the data.

Example 1. A Person modeled in XML that includes descriptions of the name, age, and gender.

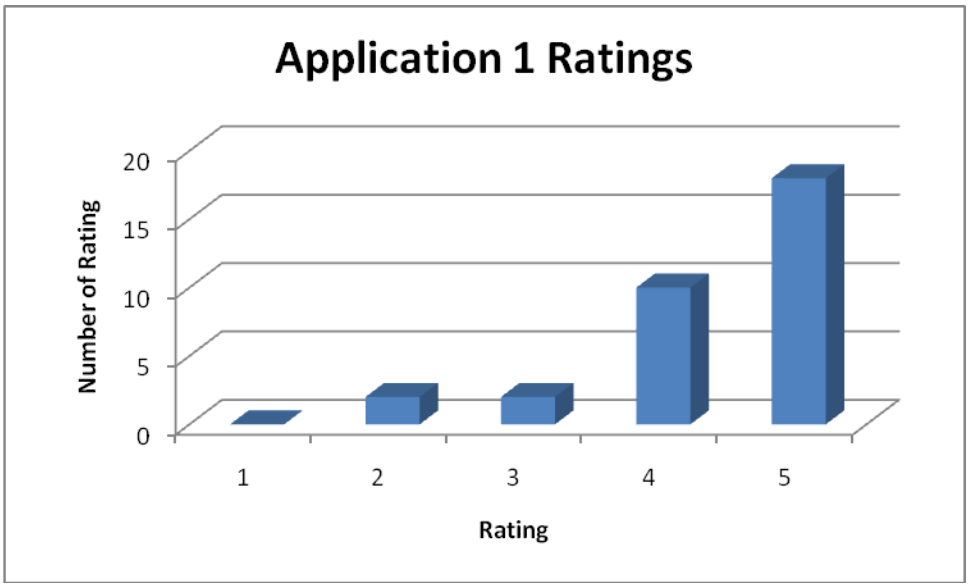
```
<Person>
        <Name>
                <First>Peter</First>
                <Last>Sonnek</Last>
        </Name>
        <Age>22</Age>
        <Gender>Male</Gender>
</Person>
```

Example 2. An address modeled in XML that includes the street address, city, state, and zip code.

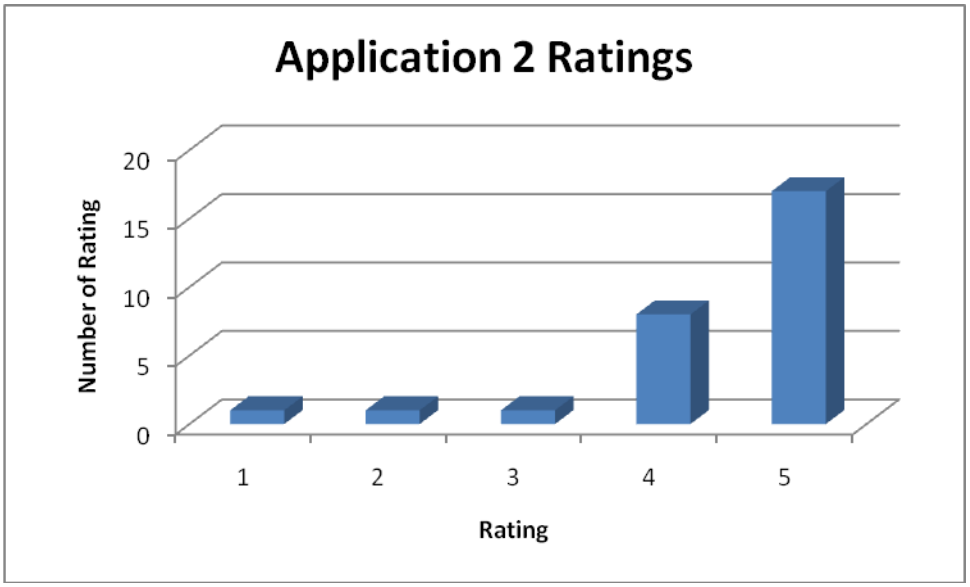
```
<Address>
        <Street_Address>124 Main Street</Street_Address>
        <City>Mankato</City>
        <State>MN</State>
        <ZipCode>56001</ZipCode>
</Address>
```

Appendix B: Project Results

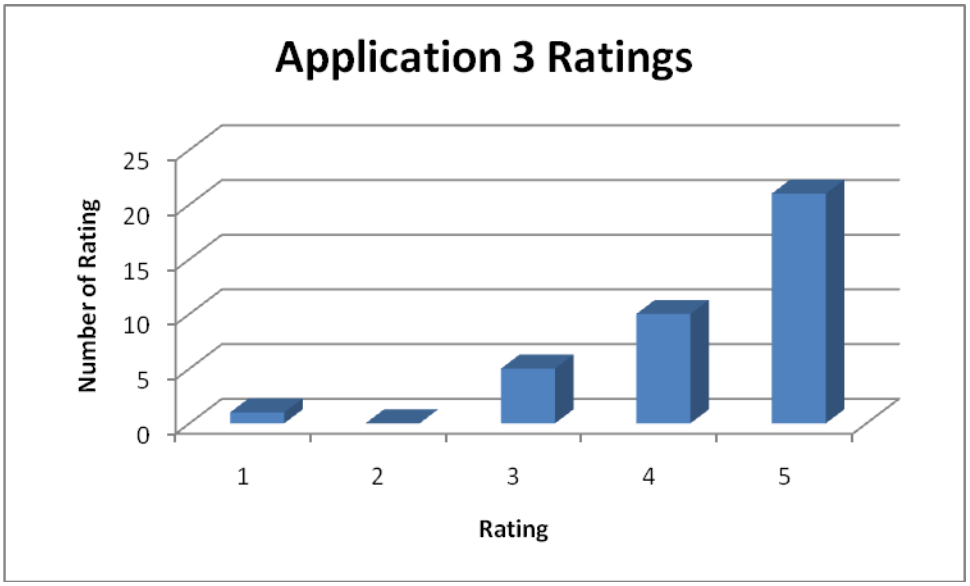
B-1 Application 1 Results



B-2 Application 2 Results



B-3 Application 3 Results



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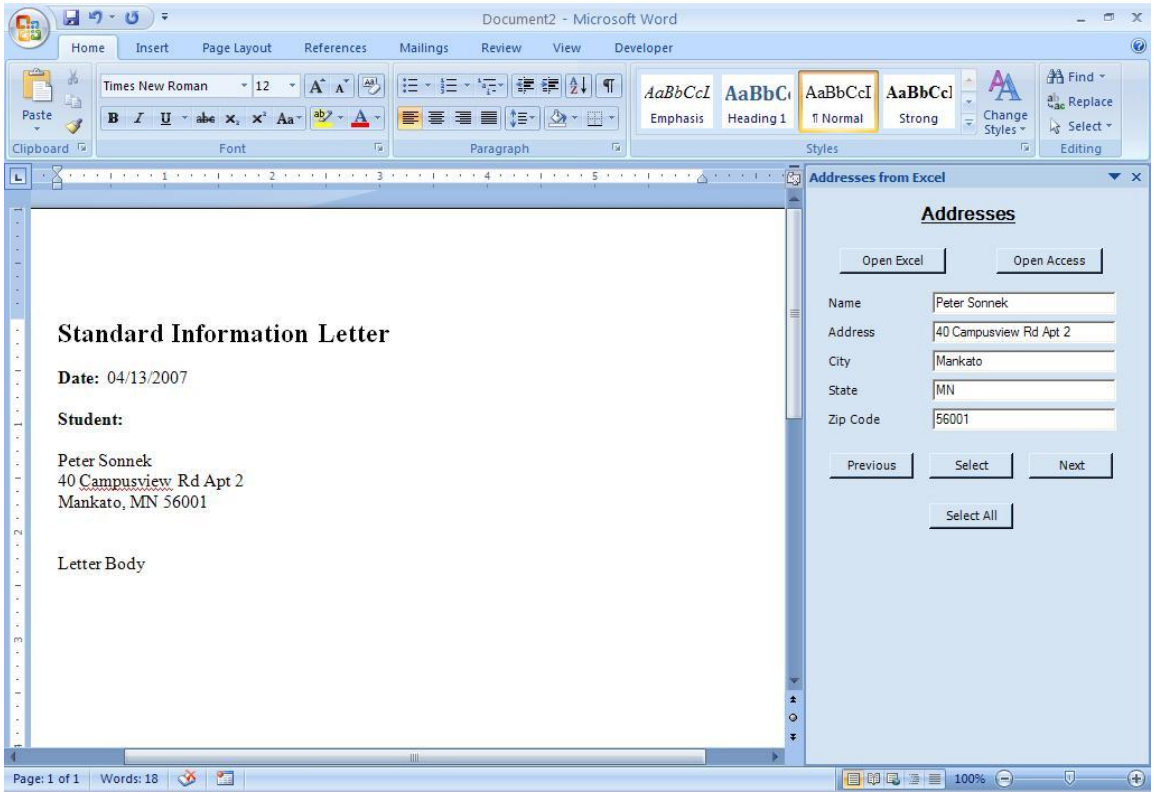
Appendix C: Application Screenshots

C-1 Applications 1 & 2 Screenshot



C-2 Application 3 Screenshot