A Proposal Preparation System to Assist Novice Researchers

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ABSTRACT

Proposals are never easy to write, as short deadlines and difficult to obtain information are challenges for even the most experienced professional. Those who have never written a proposal before, especially novice researchers are faced with the same challenges and more. They often spend time trying to figure out how to come up with the proposal, what to include, and how to organize it. Supporting novice researchers in their early research stages could be very helpful by providing insight of where to start and save time. The aim of this research is to offer a basic understanding to novice researchers on how to get started finding relevant literature, information that proposals typically contain, and how the process works. Thus, this paper introduces an ontology-based digital library and a proposal preparation system which assists novice researchers in writing their proposals based on data they collect while reviewing and reading the resources and documents. Its concern is to utilize semantic web technologies and ontology knowledge representation to define a flexible infrastructure with semantic relationships. Future work proposes a framework for developing a proposal preparation system to provide a draft version of proposals according to a provided outline by researchers.

Keywords: Proposal Preparation, Novice Researchers, Research Problem

1.0   INTRODUCTION

For most types of research, a researcher will need to produce a research proposal which is a written document of the concept, plan and schedule of the research work. Research begins with finding one topic to study, then reviewing the related literature and results in a written research proposal. After selecting a general topic, scholars usually list keywords to help them look up information related to the topic. Comprehensive search of relevant literature, reading everything on the topic, taking notes and organizing them based on the proposed outline are the most troublesome part of research but necessary for preparing the research proposal. Many novice researchers may face difficulties in this stage. Most students and beginning researchers do not fully understand what a research proposal means, nor do they understand its importance [1]. Therefore, they may prepare a poor research proposal which results in failing the project. On the other hand, a high quality proposal not only guarantees project success, but also expresses the student's potential as a researcher. Apart from the importance of research proposal, most students also suffer some difficulties when writing a proposal, problems that become more serious and common if the scholar is a novice researcher. Students may read many resources and take notes on each in order to gain good understanding on the topic, after which it is hard to organize and structure all the gathered information based on the outline, or they may fail to carefully and properly cite all references. A proposal preparation system will aid novice researchers have a draft version of their proposals based on the gathered information from reviewing materials and resources. This draft version is based on the student's proposed outline and helps by giving ideas on how to amend into their final proposal version.

Utilizing the advantages of information systems and having a proposal preparation system will help researchers overcome some of the difficulties possibly faced in early research stages.

2.0   RELATED WORK

Novice researchers need to get early result with minimal effort. Emergence of academic digital libraries is the answer to the needs of accessing and retrieving information through network environments. Appearance of academic digital libraries resulted in changes in learning and researching environment thus methods for research and education become more reliable and faster. For the first phase of the research which is preparing the research proposal, researchers need to find and review relevant literatures to the topics as well as find a problem. The actual process of reviewing the literature can be done by going to different libraries and searching through different resources such as books, journals and previous theses in the field, or by searching the internet and institutional repositories. At this stage, a digital library system which supports novice researchers find relevant literature, experts on the topic and related institutions will be of assistance.

There are some systems which have been developed in order to help researcher's access to the information easier and more efficient. Dspace [12] and Eprints [13] are two most common institutional repository systems which capture and preserve the academic output of a single or multiple university community. Moreover existing systems such as CAS (Computer Science AKTive Space) are portals that allow multiple ways to discover information and rich relations in computer science research [3]. ScholOnto is another ontology-based digital library server for researching documents and discourses [4]. E-Scholar Knowledge Inference Model (ESKIMso) demonstrates the roots of

ontological hypertext and scholarly inquiry to provide comprehensive research support [5]. SSNR (Support System for Novice Researcher) is a system which can be utilized by novice researchers to accelerate the research process by providing relevant literature, institutions, experts and trends in the specific research area [6].

Next after finding the relevant literatures, it is necessary for researchers to read and evaluate several resources to have a general idea of what they would like to expand on regarding the topic. This is where restricting the primary topic and finding a problem to write the research proposal come in. A research proposal is a detailed description of a proposed study designed to investigate a given problem [2]. A research proposal is intended to convince others that researchers have a worthwhile research project and they have the competence and work-plan to complete it. Broadly, the research proposal must address the following questions regardless of research area or methodology chosen: What does the researcher plan to accomplish? Why do they want to do it? How are they going to do it? [1]

To prepare the research proposal, researchers may bookmark favorite websites, print out, photocopy and take notes of relevant information for further study and reference. At this stage, it is time to make an outline, something every research proposal should have. All information gathered will be organized according to the outline. Throughout the duration of reviewing resources, certain parts might be found useful for specific portions of the outline. Researchers need to take notes to later synthesize, sort, and digest the information they have gathered. While organizing, they need to write down full bibliographical information related to the resource on their work sheet, or enter it in their notes for later retrieval and references to avoid committing plagiarism. They may devise their own method to organize notes such as marking in the file with different color ink or highlighting parts to identify the notes related to each outline section. Finally, the researcher needs to utilize the advantages of software such as MS Word in order to organize all the information gathered from different resources, a time demanding and difficult task for novices.

A variety of commercial tools exist, developed to support proposal preparation. However, they are mainly for preparing business proposals. An electronic proposal preparation system for selling computer equipment and copy machines, stores a variety of pictures and text segments from different products and environments in which the product may be used. The system generates queries to determine the customer's needs and interests and based on answers to these queries selects product pictures and text sections to fill in the proposal templates. The system prints the completed proposal and provides the user with a proposal which describes the product's features and benefits (Johnson 1997).

ProposalSmartz Desktop and Quosal are proposal generation applications designed to automate the business proposal preparation for products. They create proposals based on customer data and product information. ProposalSmartz appears as an add-on to the Microsoft Word toolbar after installation and facilitates creating proposals with ease [7]. Quosal allows users to prepare quotes and proposals which include customer data, product information and any additional information such as contract terms, options, product documentation, and delivers the quote or proposal as a Microsoft Word document, a PDF contained in an email, or as a custom Web site from Quosal's Order Porter feature [8].

An academic proposal preparation system to assist students in their early research stages of structuring and organizing their gathered information and putting it in a specified outline to produce a proposal draft version is the main aim of developing a PPS (proposal preparation system). The system will be based on semantic approaches to help students attain desired content, and not on stored templates.

3.0   METHODS

The process of providing an ontology-based digital library system to assist novice researcher consists of three steps:
- Step 1: Ontology Specification/Creation, Population (with Documents).
- Step 2: Relevant literature auto search based on research title.
- Step 3: Proposal framework creation (the goal of this paper).

KMSSA is a system which developed to provide Step 1 of the process by utilizing ontology as a framework for storing and accessing research literature to enable researchers to use required literature more easily. It allows real time flexible ontology management by providing full graphical representation and editing [12]. Fig. 1 represents a screenshot of the KMSSA ontology editing mode. Next is an automated search for related literature based on the research title. An integrated system called Support System for Novice Researcher (SSNR) was developed as a means to facilitate early research work and enhance the quality of search by the scholars. In this research semantic web technology is used. An ontology development tool will be chosen in order to construct the ontology and provide a semantic layer to enable the connection of different topics in the searched areas and their relations. Ontology is expressed as a formal representation of knowledge by a set of concepts within a domain and the relationship between these concepts. Ontology based systems assist novice researchers in the first phases of their research to find appropriate literature in their area of interest and to manage their study materials. SSNR consisted of five main modules namely 1) Relevant Literature, 2) Expert Detection, 3) Trend Detection, 4) Related Research Institution and 5) Related Online Resources or Databases. The result of the Relevant Literature module is the most related literature to the keyword based on the ACM Category and OntoGen's constructed ontology. Fig.2 shows screenshots of this module in the SSNR.

Step 3 is the focus of this paper and its aim is developing a system which helps novice researchers in their early research stages by creating a proposal framework. A number of ontology development tools currently exist. They will be compared and the most applicable one for this project will be used to extend the ontology used in step 2. Notable tools, among others, are Protégé, WebODE, OntoEdit, Oiled, OntoLingua [9], and OntoGen [10]. The information captured by scholars from a document during reviewing and reading is stored in a knowledge base and is given a

formal representation according to the outline specified by the researcher. The consequential knowledge base has the detail lists stated by instances of ontology classes, in a semantic environment. Thus, it will be possible to make some inferences about them.
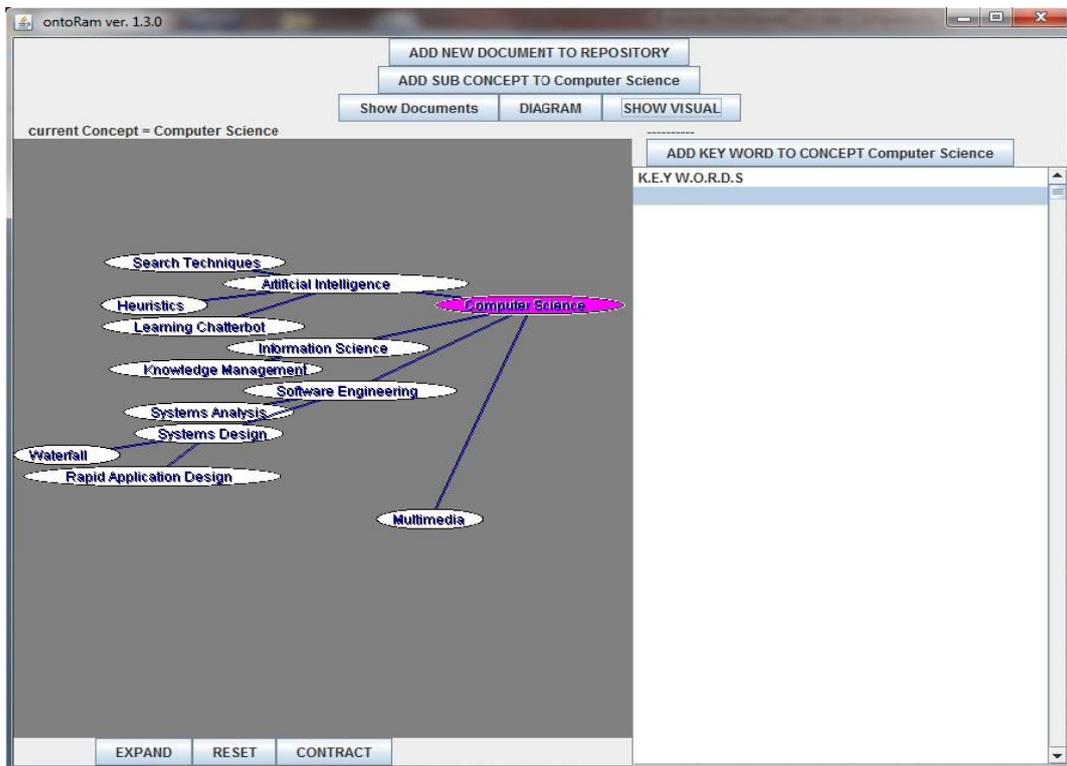

Fig. 1: Visual representation of "Computer Science" ontology

Fig. 2: Screenshot of relevant literature module

This research proposes an ontology based framework for developing this system in order to:
- Cover a great amount of literature
- Identify the most relevant literature
- Try to recognize some information in that literature

Subsequently, the system will create a framework based on notes taken by researchers and the outline they will specify to come up with a draft version of their research proposal. Fig. 3 is a sample graphical representation of the proposed environment for the system.
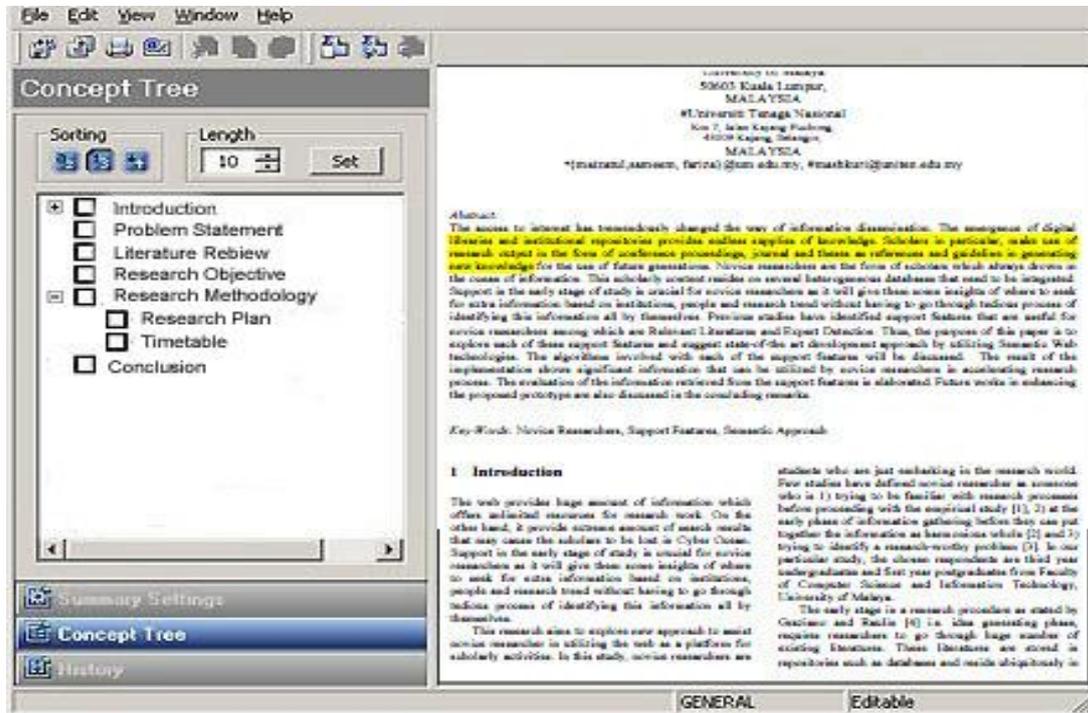

Fig. 3: A sample graphical representation of the proposed proposal preparation system

4.0 EXPECTED RESULT

A proposal preparation system will be developed which enables novice researchers to upload their desired proposal outline. It is supposed to have a semantic layer to help retrieve the most relevant literature and select the most appropriate parts to include in the proposal based on the proposed outline. We expect our system to provide a very draft version of the research proposal for the novice researcher, parts of which they may later alter or paraphrase for submission. Fig. 4 illustrates the diagram of the steps which need to be taken in preparing the system.
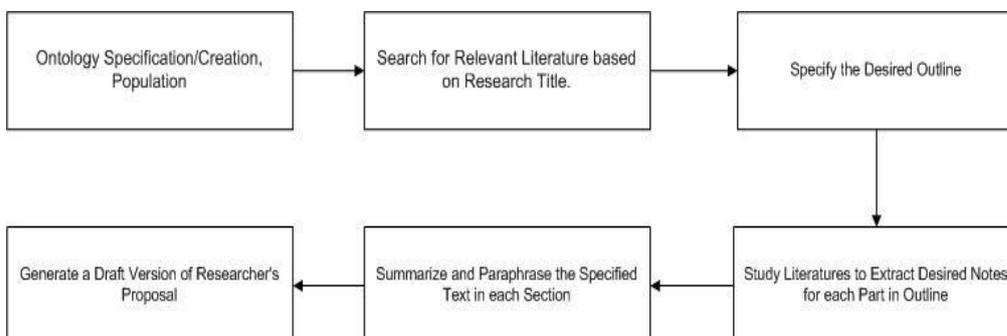

Fig. 4: Process of an ontology-based digital library system to assist novice researcher

5.0 CONCLUSION

Supporting novice researchers at the earlier stages of research would be very helpful in assisting them to take the right steps in collecting information. This would also definitely reduce the time they are going to spend, especially on

preparing the proposal which is the first phase of doing research. The researcher must also find a research problem and materials for study. This paper describes an ontology-based digital library which also provides a proposal preparation system to support in writing a research proposal. The system is based on the semantic context excerpted from documents. Future work involves choosing the right ontology development tool and starting the semantic layer of this proposal preparation system's development. Accordingly, a prototype system will be developed to prepare a draft version of the research proposal for researchers.

REFERENCES

[1]   A. Al-Riyami, "How to prepare a research proposal proposal", Oman Medical Journal, 2008.

[2]   J. R. Fraenkel, & N. E. Wallen, *How to design and evaluate research in education* (4th ed.). Boston, MA: McGraw Hill, Inc., 2000.

[3]   N. Shadbolt, N. Gibbins, H. Glaser, S. Harris & M. Schraefelm, "CS AKTive Space or how we learned to stop worrying and Love the Semantic Web". *IEEE Intelligent Systems*, Vol. 19 No. 3, 2004, pp. 41-47.

[4]   S. Buckingham, E. Motta & J. Domingue, "ScholOnto: An ontology-based digital library server for research documents and discourse". *International Journal on Digital Libraries*, Vol. 3 No. 3, 2000, pp. 237-248.

[5]   S. R. Kampa, Who are the experts? E-Scholars in the Semantic Web. Doctoral thesis, Department of Electronics and Computer Science, University of Southampton, UK, 2002.

[6]   M. A. Ismail, M. Yaacob, S. Abdul Kareem, & F. Nasaruddin, "Assisting Novice Researchers in Utilizing the Web as a Platform for Research: Semantic Approach," *WSEAS Transactions on Information Science and Applications*, Vol. 6 No. 2, 2009, pp. 221-231.

[7]   ProposalSmartz, Proposal generation software, *http://www.proposalsmartz.com, 2009.*

[8]   Quosal, Inc, *http://www.quosal.com/Wordpress*, 2008.

[9]   S. Youn, & D. McLeod, "Ontology Development Tools for Ontology-Based Knowledge Management", *Encyclopedia of E-Commerce, EGovernment and Mobile Commerce, Idea Group Inc.*, 2006.

[10]   B. Fortuna, M. Grobelnik, & D. Mladenic, "OntoGen: Semi-automatic Ontology Editor", *HCI International 2007, Beijing.*

[11]   M. A. Ismail, R. G. Raj, S. Abdul Kareem, "Dynamic Ontology Editor for a Knowledge Management System of Scholarly Activities", in *Proceeding of the International Conference on Semantic Technology and Information Retrieval, Putrajaya, Malaysia, 28-29 June 2011.*

[12]   DSpace, *http://www.dspace.org, 2003.*

[13]   ePrints, *http://www.eprints.org/software/, 2002.*

BIOGRAPHY

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