Building Software for the Knowledge Map: A Case Study with Kmap-IISc

By

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ABSTRACT

Information is the basic necessity for all organizations. New discoveries and inventions have lead to information explosion. It is difficult to avoid redundancy. Several sources and methods of tapping knowledge are available. Knowledge map is one such tool that acts as the pointer to experts in specific knowledge domains. The tool can best be utilized by librarians to identify the domain experts for referral services and to know who knows what in different domains and save the time of the user. Here is a small initiative to bring forward the web-based, database driven Knowledge Map: Kmap-IISc. This Knowledge Map would act as a pointer to experts in specific knowledge domains in Indian Institute of Science (IISc). It has the well-developed content management tool for addition, modification and deletion of expert's profiles. Search and browse for Kmap-IISc facilitates to retrieve the results of experts working in specific knowledge domains.

KEYWORDS: Knowledge map, Expert's database, Who Knows What, Referral Service, Building Knowledge Map.

## 0.	INTRODUCTION

Knowledge has become an important resource nowadays. Management and sharing of knowledge is as important as finance and human resource. Knowledge Map is an effective tool for sharing knowledge across organization. The map can act as pointers to experts in specific knowledge domain. This helps in exchange of human resources across and among the organization in the network of libraries.

Knowledge map is the ongoing quest within and among the organization that helps to discover, the location, ownership value and use of knowledge artifacts. It is a simple fusion of process, knowledge and it acts as a dynamic guide for an institution and its people as a means for providing access to resources and services at given point of time.

Knowledge map can act as an effective tool for providing referral service and to know who knows what in any organization. Due to technological development in networking, it has become a necessity to know the domain experts. It helps in the sharing of human resources amongst the network of libraries. Hence here is a small initiative in this direction to bring out the need, steps and processes involved in building the knowledge map, which enables the information professionals to identify domain experts in the respective domain. So this hand on information could be useful to save the time of the user. It briefly outlines the implementation, future development and conclusion.

1.   NEED FOR KNOWLEDGE MAP IN AN ORGANIZATION

As organizations downsize, expand globally and function in the constant mode of change, it becomes difficult to know and find the right person in the organization who has desired expertise. Often the organizations go out in search of experts that exist in-house. Many are addressing this problem by creating a knowledge map (database of experts) as a mechanism for identifying key people who are experts in specific knowledge domains. It suggests way to build bridges to increase knowledge sharing and helps for flow of knowledge with in and among the organizations. It encourages re-use and prevents re-invention, saving search time and acquisition costs. It reduces the burden on experts by helping staff to find critical information quickly.

2.   STEPS INVOLVED IN BUILDING THE KNOWLEDGE MAP

There are several steps involved in building the knowledge map. A brief description is given below.

·   **Identify objective:** To recognize the purpose and need to develop the knowledge map.

·   **Identify experts:** Expert chosen for inclusion should be an expert in the specific field and should be able to solve the problem. The experts may be identified by Peer recommendation, management recommendation, and self-nomination.

·   **Responsibility:** To decide the responsibility of the expert included in the   knowledge map. The person should be willing to be included in the knowledge map.

·   **Expert profile:** To collect the profile of the experts included in the database and it is necessary to add new profiles as and when necessary.

·   **Information technology requirement:** It is necessary to identify the infrastructure requirement. Decision should be taken for back end database, field types, easy to use search interface and it should be accessible 24 hours a day.

·   **Maintenance of the database:** Since the database contains the experts information, it is must that it should be up-to-date by including the new profile and removing profiles when an individual leaves the organization.

3.   KMAP-IISC: PROTOTYPE SOFTWARE OF KNOWLEDGE MAP FOR INDIAN INSTITUTE OF SCIENCE

Knowledge map is developed for Indian Institute of Science (IISc), Bangalore Kmap-IISc, a premier institution for research and development in science and technology. The map acts as a pointer to experts working in different knowledge domains. It involves identification of knowledge domains and experts in these domains. Users should be able to select the appropriate categories and sub-categories from the pop-up menu. The map would give relevant details of the experts working in those specific knowledge domains.

3.1   System Design

K-map contains four main modules: content management, actual content, search and browse and database. All these components are integrated to build kmap-IISc. The system flow is as shown below in figure-1.

Figure 1: System Design
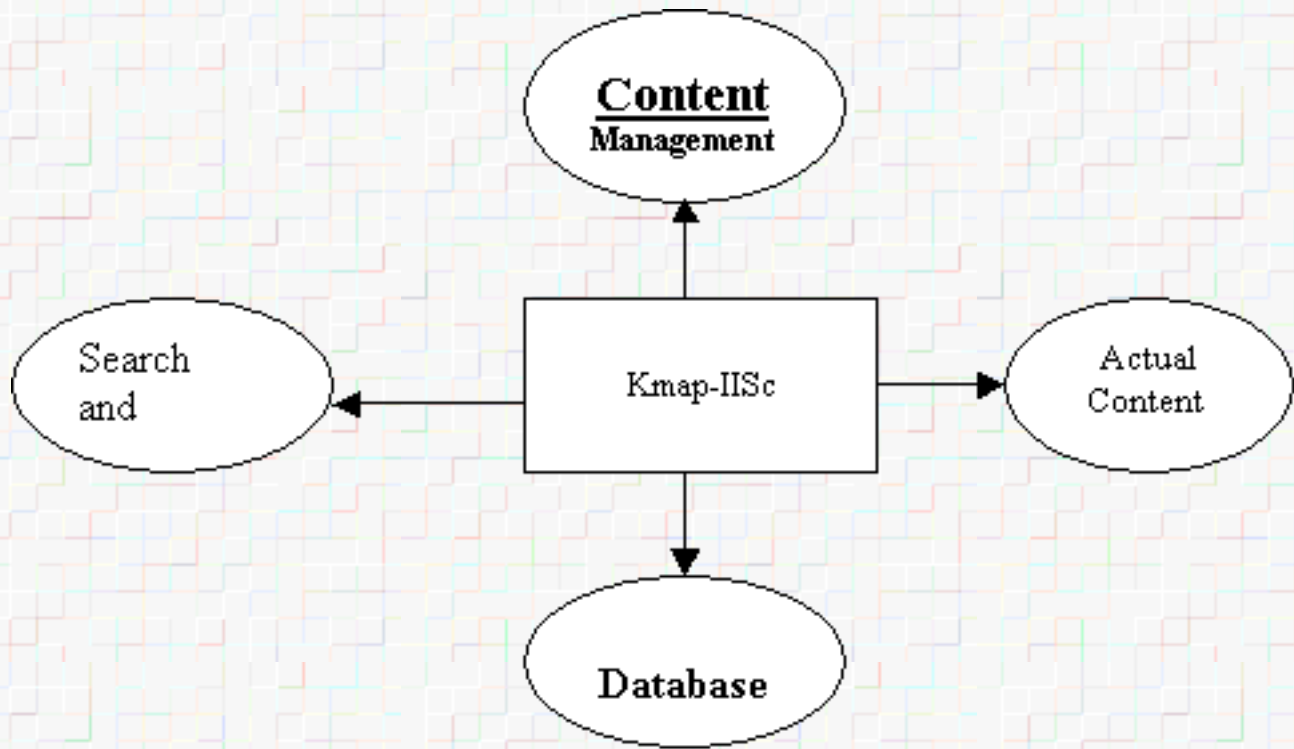
The objective is to develop the kmap-IISc that would serve as pointers to experts working in different knowledge domains. The identification of experts is the crucial task. Different organizations follow different procedure for selection of experts to be included in the database based on their goals and requirements. Thorough study was made to identify experts and to know who is working in what particular field. Since IISc is the research-based organization and it is spread out in different departments, the experts are identified following certain criteria like the educational background,

research area etc.

3.2   Metadata

Metadata elements play an important role. Metadata elements included in the database are: Experts identification number, which is unique to each expert generated automatically by the database, experts name, subject field containing educational background, department, e-mail id, url of the home page (if available), contact address, phone number (office/residence), area of expertise giving the details of core research area the experts has worked with, major consultancy projects the experts has handled, research interest and related terms.

3.3   Sources

Sources are the backbone information for the kmap-IISc database, from which the actual information is taken. The information was scattered, so different sources were consulted. The key source was the faculty web page hosted on departmental websites, printed sources like faculty profile and handbook brought out by IISc giving the details of experts working in different research areas in whole of the institute. A chart was prepared to link the different categories and sub-categories.

3.4   Classification

Classification is one of the important aspects, where in the experts can be grouped under different categories and sub-categories. A standard classification scheme can also be adopted or develop own classification based on the requirement. The classification scheme was developed to suit the requirement of IISc; the thesaurus was consulted to arrive at different categories and sub-categories. The hierarchy of subject was derived.

3.5   Information Technology Requirements

Kmap-IISc is developed on Linux operating system with apache as web server, MY-SQL as backend database. PHP as the scripting language. All these are open source software that can be easily downloaded from the Internet and installed. Any system after installation of the above software can easily be utilized for the development of the knowledge map

Kmap-IISc is right now developed for disciplines: aerospace, computer science and automation.

3.6   Database Design

Kmap-IISc uses MY-SQL as the back end database. It has only one main table containing the whole information of all fields included in the database that are discussed in the metadata element.

3.7   Content Management Interface

Content management is a completely web-based tool allowing adding new experts profile to the database or modifying the existing profile or deleting the existing resource from the database. Deletion does not physically delete from the database, but it is logically deleted that can be restored later.

Figure-2: Kmap-IISc Content Management Interface
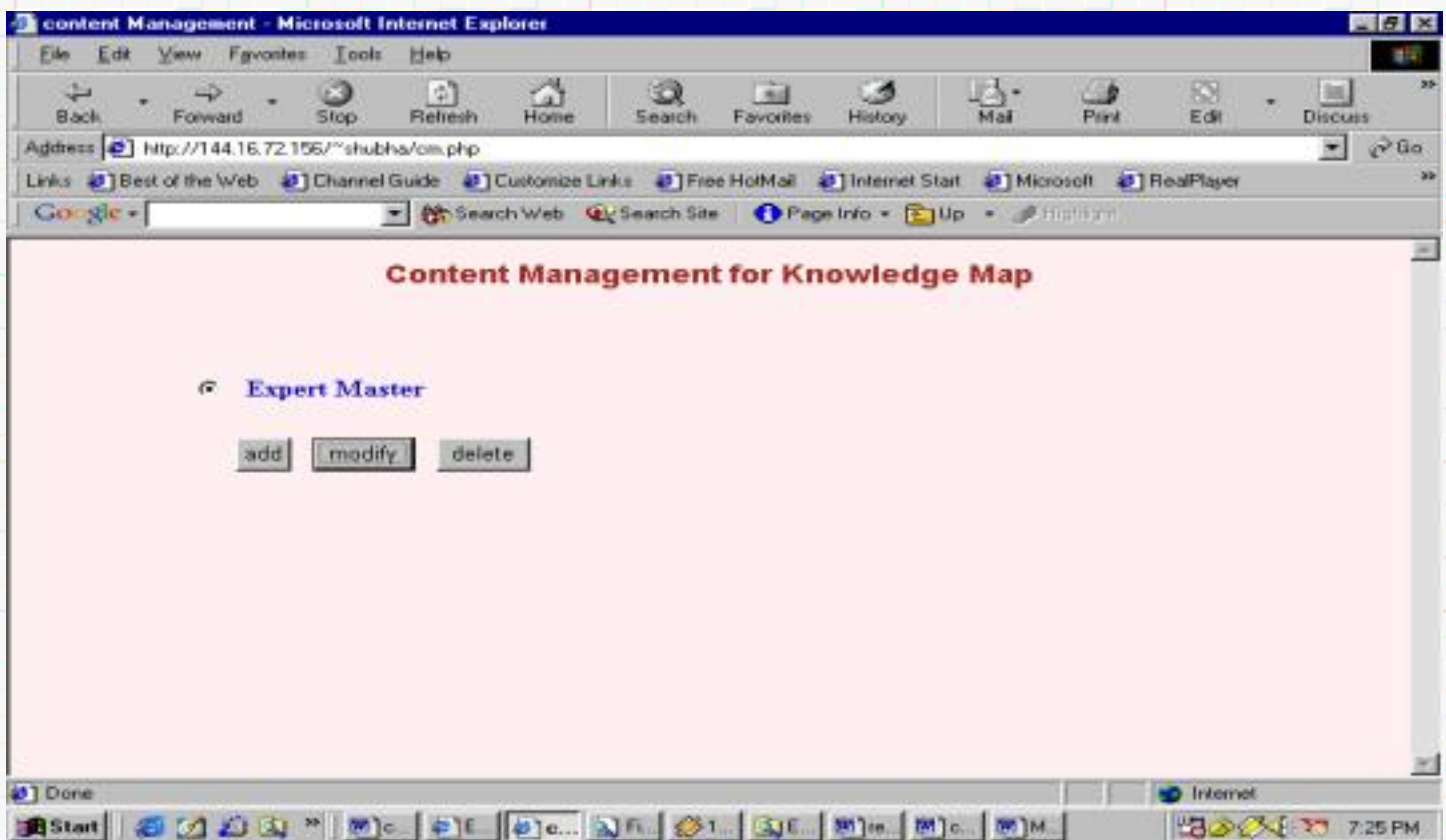
3.8   Search and Browse Interface

One of the important component of Kmap-IISc is the search and browse interface. It is a means to retrieve the results of the experts working in specific knowledge domains based on the keywords. Simple search retrieves the results based on the keywords with search performed on all the fields. Browse is an option where in the user is provided with the alphabetical list of experts and also by specific departments. Advanced search is the combination of Boolean operators within the specific fields or on all the fields on the set of keywords.

The result of all the three kinds of the searches will display major fields like name, subject, department, Email, campus phone number followed by more button for complete details.
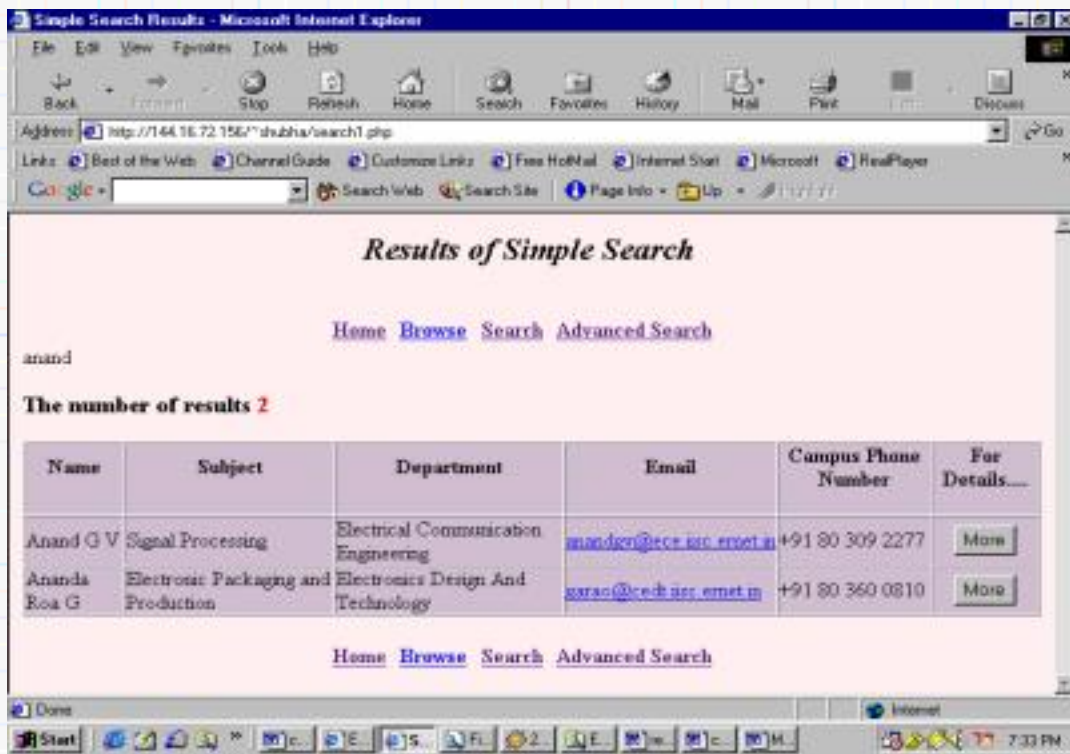
Figure 3: Kmap-IISc Simple Search Interface

Figure 4: Kmap-IISc Advanced Search Interface

Figure 5: Kmap-IISc Results Page

3.9 Maintenance

Maintenance of any service, once it is hosted, is an important task. Like wise, maintenance of the Kmap-IISc is one of the prominent issues for continuous and timely updation of the database so that the most recent and up-to-date information can be retrieved.

4. FUTURE DEVELOPMENT FOR KMAP-IISC

The Kmap-IISc can further be improved upon by including the thesaurus for expert's directory. The thesaurus can reflect the jargon, acronyms and terminology that are part of the daily lexicon of each domain. This would enable people who are looking for a particular form of expertise to type in the terms they use. A range of related words could than pop-up. The field of related words can then be narrowed and broadened according to searchers need.

5. CONCLUSION

Thus knowledge map acts as the pointer to experts in specific knowledge domain. The knowledge map facilitates better knowledge flow in and among the organizations and acts as the effective linkage between different user communities. It is a way to formalize and expand an organizations informal network. These informal networks exist in all the organization, but it takes time and connection to know about them and become part of one. Thus it helps to plug the gap in the information network and create new network that could otherwise not exist. It is a very effective tool for librarians for providing hand on information to the user at a single click.

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