

## Expertise Locator For Lecturers Based on Publication

*Rahmat Izwan Heroza<sup>1</sup>, Haniifah Putriani<sup>2</sup>, Ahmad Rifai<sup>3</sup>, and Putri Eka Sevdiyuni<sup>4</sup>*

<sup>1,2,4</sup>Information Systems Department, Universitas Sriwijaya, Indralaya Ogan Ilir

<sup>3</sup>Computerized Accounting Department, Universitas Sriwijaya, Indralaya Ogan Ilir

**Abstract.** Among the KM processes that function to guarantee access to knowledge is knowledge sharing. This process allows knowledge assets and experiences possessed by the organization to be accessed by anyone in the organization. Especially by using IT, this process can be done more optimally by capturing existing knowledge into a system so that this valuable information can be monitored anytime and anywhere. There are times when the knowledge possessed by experts is difficult to capture and represent in the system as in the case of tacit knowledge such as instincts, insights, and experiences of the experts. One of the challenges in inventorying these experts is the process of creating expert profiles automatically based on a particular approach. This research create an Expert Locator for lecturers who are considered as experts in their field of research using publication data produced by these lecturers as an indication of their expertise. The search feature is made as an implementation of the extraction results that can be used by other parties to find experts by entering keywords in the form of the desired expertise.

**Keywords:** expertise locator, knowledge, lecturer, publication

Received 9 November 2020 | Revised 27 January 2021 | Accepted 31 January 2021

### 1 Introduction

Knowledge Management (KM) has an important role in improving performance in various types of organizations, ranging from government [1], education [2] - [4], health [5] - [7], etc. Among the KM processes that function to guarantee access to knowledge is knowledge sharing [8]. This process allows knowledge assets and experiences possessed by the organization to be accessed by anyone in the organization. Especially by using IT, this process can be done more optimally by capturing existing knowledge into a system so that this valuable information can be monitored anytime and anywhere.

However, there are times when the knowledge possessed by experts is difficult to capture and represent in the system as in the case of tacit knowledge, an abstract knowledge stored in the head of an expert in the form of instincts, insights, and the like [8]. For this type of knowledge, a more appropriate way is not to elicit them. Instead we identify the experts that the organization has so that the knowledge finder can directly connect with the expert (expertise

\*Corresponding author at: Program Studi Sistem Informasi, Universitas Sriwijaya, Indralaya, South Sumatera

E-mail address: rahmatheroza@unsri.ac.id

locator). One of the challenges in inventorying these experts is the process of creating expert profiles automatically based on a particular approach.

Beham, et al [9] submitting a study to recommend experts by creating a user model in the work environment that represents the profile of a person who will perform an expert search. Next, the search objectives will be explored using the search keywords. The system will then propose experts who will be able to help achieve the search objectives while still paying attention to the user model which is the knowledge capital that expert seekers already have.

Ackerman, et al [10] distinguish two activities in knowledge management, namely sharing knowledge and sharing of experts. Sharing knowledge is defined as an activity in which the knowledge owned by the organization is recorded in an explicit form (externalization) and then shared with other members of the organization. Sharing of experts is defined as an activity in which experts who have a certain knowledge directly discuss / share their knowledge with other parties without going through the externalization process.

Gujral and Chandra [11] propose a 4-step expert search system life cycle model. The first step is converting data into knowledge. In this step, all data sources are collected to form a person's profile. The second step is to connect knowledge seekers with knowledge. The next step is to connect knowledge seekers with knowledge owners directly. The final step is to link knowledge with knowledge. In this step, it is hoped that new knowledge will be created as a result of combining several knowledge.

Attiaoui et al [12] assume that the method of measuring someone's expertise by relying solely on other people's assessments of one's answer, on the Stack Overflow question and answer site, is invalid. They assume that the reputation a person achieves from other people's perceptions of his activities does not reflect a measure of one's expertise. Instead, they applied the Theory of Believe Function as a quantitative measure of one's expertise on question and answer sites. This theory is a popular theory in reasoning in uncertain situations.

Vrabic et al [13] describes a method for determining experts using data available on the internet. Starting with the initialization of the entity to be managed, the next step is to search for public data to enrich the initial data. After that, a person's profile will be determined using a classification approach. Existing profiles are compared with each other to determine similar profiles to be merged. The final step is generating a network between profiles.

This research will create an Expert Locator for lecturers who are considered as experts in their field of research. In determining lecturer profiles, we will use publication data produced by these lecturers as an indication of their expertise. Abstract / publication metadata will be used as input in determining the expertise of lecturers. This study uses Sriwijaya University lecturers as case studies to represent experts. We believe this research will increase the knowledges on how expert lecturer locator can be implemented using publications as tacit knowledge so that knowledges in the university can be shared wider.

## **2 Materials and Method**

This research was conducted in 4 stages consisting of the stages of identifying experts (expert), searching for expert publications, identifying expertise (expertise), and searching for experts.

## 2.1 Expert Identification

In the first step, the experts were identified by looking for all lecturers affiliated with the university. We can find this data in several places such as the pddikti website, or local university sites which contain the entire list of lecturers' names. This stage produces all the names of lecturers who are researchers from the university. This research uses Sriwijaya University as a case study where the data of the lecturers is obtained from the unit that manages the lecturer publication data at Sriwijaya University.

## 2.2 Publication Finding

The second step is the search for expert publications. From the names of each lecturer that have been obtained, we can easily find the titles of publications that have been published by the author. The site used to search for publication titles is the Sinta site at <http://sinta.ristekbrin.go.id/>. Then, the publication abstract is searched based on the title of the publication on the site [researchgate.net](http://researchgate.net) or any other indexing website by using a python script.

## 2.3 Expertise Identification

The third step is the identification of expertise (expertise) of each expert using the abstract results of the publications they have produced. In determining expertise, the keyword extraction technique is used to produce several keywords that best represent the publication abstract. This phase is carried out to generate keywords from each existing publication.

## 2.4 Expertise Locator

The final step is the implementation of the expert search feature with input in the form of keywords / expertise description entered by those who want to find an expert. This phase uses a similarity analysis technique (similarity) to find experts who are closest to the search criteria. This step is at the same time the main output of this research where it is hoped that the process of sharing knowledge will increase by bringing together knowledge seekers with experts who have that knowledge.

## 3 Results and Discussion

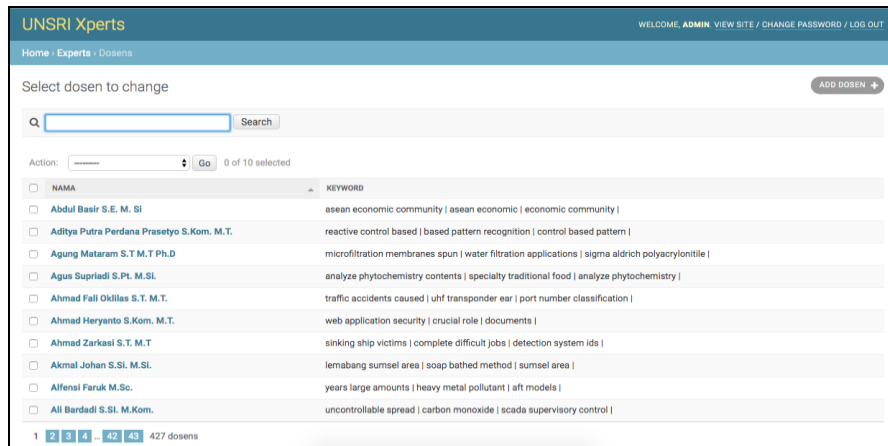
For the first step, the experts were identified by looking for all lecturers affiliated with the university from the unit that manages the lecturer publication data at Sriwijaya University. This stage produces all the names of lecturers who are researchers from the university. 1,405 titles of international publication articles were obtained from lecturers affiliated with Sriwijaya University. These articles were made by 427 researchers at Sriwijaya University.

In the second stage, article abstracts are sought based on the publication titles of each lecturer. The article abstract was obtained from the ResearchGate website (<https://researchgate.net>) using a python program that is run periodically against the article titles that were obtained in the first phase. Because one publication may be produced by several researchers, the data contained in this phase are still duplicated as shown in Table 1.

**Table 1: Author - publication list**

<b>Title</b>	<b>Abstract</b>	<b>Author</b>
Virtual leadership Concept expectation and future	This article discusses the concept expectation...	a
Virtual leadership Concept expectation and future	This article discusses the concept expectation...	b
Virtual leadership Concept expectation and future	This article discusses the concept expectation...	c
Virtual leadership Concept expectation and future	This article discusses the concept expectation...	d
Virtual leadership Concept expectation and future	This article discusses the concept expectation...	e
Virtual leadership Concept expectation and future	This article discusses the concept expectation...	f
Sustainability of market performance Moderatin...	This study examines the effect of ownership st...	g
Sustainability of market performance Moderatin...	This study examines the effect of ownership st...	h
Measuring the malindo airline passenger satisf...	Quality of service has become a tool to improv...	i
The effect of stock ownership structure capita...	Firstly establish the correlated networks of t...	j
The effect of stock ownership structure capita...	Firstly establish the correlated networks of t...	k
Diversification Complementary assets and super...	Diversification is a strategy choice at the co...	l
Diversification Complementary assets and super...	Diversification is a strategy choice at the co...	m
Diversification Complementary assets and super...	Diversification is a strategy choice at the co...	n

In the third phase, the keywords of each research article abstract are determined. There are many method used for extracting keyword from text. This research uses Rapid Automatic Keyword Extraction (RAKE) as a keyword extraction technique for its simplicity and easy to implement [14]. Nonetheless, this algorithm is computational efficient, fast, and precised [15]. RAKE does not need corpus for keyword discovery [16]. Instead, it will calculate every possible phrase to be the keyword. Thus, it is suitable for the purpose of this paper that identify keywords directly from the text without having any labeled data. The results of the first and third phases are a catalog of lecturers and keywords that represent the lecturer expertise as shown in Table 2. A website is created so that users can access information easily (Figure 1)



**Figure 1** Expert Catalog Website

In this phase, each lecturer has their own keywords which are obtained from extracting abstract documents from published scientific articles. Each keyword is separated by using the pipe character '|'

**Table 2: Author - profile list**

Author	Profile
a	asean economic community   asean economic   ec...
b	reactive control based   based pattern recogni...
c	microfiltration membranes spun   water filtrat...
d	analyze phytochemistry contents   specialty tr...
e	traffic accidents caused   uhf transponder ear...
f	web application security   crucial role   docu...
g	sinking ship victims   complete difficult jobs...
h	lemabang sumsel area   soap bathed method   su...
i	years large amounts   heavy metal pollutant   ...
j	uncontrollable spread   carbon monoxide   scad..

In the fourth phase, the expertise search feature based on keyword uses lexical method, that is the search keywords must be exactly the same as the lecturer keywords. This technique has been successfully implemented on the UNSRI Xpert website as shown in Figure 2.

UNRSRI Xperts WELCOME, ADMIN. VIEW SITE / CHANGE PASSWORD / LOG OUT

Home > Experts > Dosen

Select dosen to change ADD DOSEN +

Q  Search 3 results (427 total)

Action:  Go 0 of 3 selected

<input type="checkbox"/>	NAMA	KEYWORD
<input type="checkbox"/>	Ali Ibrahim M.T.	customer relationship management   crm scorecard framework   expanding rapidly crm
<input type="checkbox"/>	Dr. Luk Luk Fuadah S.E. MBA. Ak.	indonesian stock exchange   mediating variable   management accounting control
<input type="checkbox"/>	Prof. Dr. Ir. Dedik Budiarta M.S.	knuth morris pratt   knowledge management system   sembawa rubber research

3 dosen

Figure 2 Expert Locator

#### 4 Conclusion and Future Research

This study succeeded in developing an expertise locator for lecturers using the publications as input to extract the expertise of the lecturers. Input data can be found in several places such as the pddikti website, or local university sites which contain the entire list of lecturers' names. The site used to search for publication titles is the Sinta site. Then, the publication abstract is searched based on the title of the publication on the site researchgate.net by using a python script. The keyword extraction technique is used to produce several keywords that best represent the publication abstract. The search feature is made as an implementation of the extraction results that can be used by other parties to find experts by entering keywords in the form of the desired expertise. As a further step, semantic-based searches can be done so that users can use more flexible search keywords.

#### REFERENCES

- [1] Y. Zheng, L. A. Naylor, S. Waldron, and D. M. Oliver, "Knowledge management across the environment-policy interface in China: What knowledge is exchanged, why, and how is this undertaken?," *Environ. Sci. Policy*, vol. 92, pp. 66–75, 2019.
- [2] E. Honoré-Livermore, "CubeSats in University: Using Systems Engineering Tools to Improve Reviews and Knowledge Management," *Procedia Comput. Sci.*, vol. 153, pp. 63–70, 2019.
- [3] L. Ardito, A. Ferraris, A. M. Petruzzelli, S. Bresciani, and M. Del Giudice, "The role of universities in the knowledge management of smart city projects," *Technol. Forecast. Soc. Change*, vol. 142, pp. 312–321, 2019.
- [4] O. R. Mahdi, I. A. Nassar, and M. K. Almsafir, "Knowledge management processes and sustainable competitive advantage: An empirical examination in private universities," *J. Bus. Res.*, vol. 94, pp. 320–334, 2019.
- [5] E. E. Tripoliti *et al.*, "HEARTEN KMS--A knowledge management system targeting the management of patients with heart failure," *J. Biomed. Inform.*, vol. 94, p. 103203, 2019.
- [6] S. Nasiri, G. Zahedi, S. Kuntz, and M. Fathi, "Knowledge representation and management based on an ontological CBR system for dementia caregiving," *Neurocomputing*, vol. 350, pp. 181–194, 2019.
- [7] D. Gu, S. Deng, Q. Zheng, C. Liang, and J. Wu, "Impacts of case-based health knowledge system in hospital management: The mediating role of group effectiveness," *Inf. Manag.*, vol. 56, no. 8, p. 103162, 2019.
- [8] I. Becerra-Fernandez and R. Sabherwal, *Knowledge management: Systems and processes*. Routledge, 2014.
- [9] G. Beham, B. Kump, T. Ley, and S. Lindstaedt, "Recommending knowledgeable people in a work-integrated learning system," *Procedia Comput. Sci.*, vol. 1, no. 2, pp. 2783–

- 2792, 2010.
- [10] M. S. Ackerman, J. Dachtera, V. Pipek, and V. Wulf, "Sharing knowledge and expertise: The CSCW view of knowledge management," *Comput. Support. Coop. Work*, vol. 22, no. 4–6, pp. 531–573, 2013.
  - [11] M. Gujral and S. Chandra, "Beyond recommenders and expert finders, processing the expert knowledge," *Int. J. Comput. Sci. Issues*, vol. 11, no. 1, p. 151, 2014.
  - [12] D. Attiaoui, A. Martin, and B. Ben Yaghlane, "Belief measure of expertise for experts detection in question answering communities: Case study stack overflow," *Procedia Comput. Sci.*, vol. 112, pp. 622–631, 2017.
  - [13] D. Kozjek, E. Öztürk, L. T. Tunç, A. Malus, P. Butala, and others, "Identification of the CIRP expertise network based on public data," *Procedia CIRP*, vol. 72, pp. 165–168, 2018.
  - [14] J. Hu, S. Li, Y. Yao, L. Yu, G. Yang, and J. Hu, "Patent keyword extraction algorithm based on distributed representation for patent classification," *Entropy*, vol. 20, no. 2, p. 104, 2018.
  - [15] M. G. Thushara, T. Mownika, and R. Mangamuru, "A Comparative Study on different Keyword Extraction Algorithms," in *2019 3rd International Conference on Computing Methodologies and Communication (ICCMC)*, 2019, pp. 969–973.
  - [16] M. G. Thushara, M. S. Krishnapriya, and S. S. Nair, "A model for auto-tagging of research papers based on keyphrase extraction methods," in *2017 International conference on advances in computing, communications and informatics (ICACCI)*, 2017, pp. 1695–1700.