

KUIHerb: Knowledge Unifying Initiator for Herbal Information

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Abstract. Knowledge about herbal medicine can be contributed from experts in several cultures. With the conventional techniques, it is hard to find the way which the experts can build a self-sustainable community for exchanging their information. In this work, the Knowledge Unifying Initiator for Herbal Information (KUIHerb) is used as a platform for building a web community for collecting the intercultural herbal knowledge with the concept of a collective intelligence. Four components are implemented on KUIHerb: accessing information, sharing opinions, providing information and web site statistics. In case of multiple opinions are provided, the majority voting will select the most preferable term used in the community. Herb identification, herbal vocabulary, medicinal usages and a list of experts in herbal medicine can be collected from this system.

1 Introduction

Many of Thai traditional medical treatments have been derived the origins in India. They have their roots in ancient Indian Ayurvedic practices. The derivation has been diversified through out many cultures since then [1]. For example, herb names and their medicinal usages are gradually spread out into communities resulting in distinction from each other according to their cultural background. Some are named different and hardly found the relation between each other. Some are complimentary knowledge of their usages.

We address the problem of collecting herbal information in many topics from several cultures. One of the difficulties in constructing a knowledge base for the different cultures is the development of a communication tool for realizing a self-sustainable community. To alleviate the problem, the Knowledge Unifying Initiator (KUI) is used as a platform for building a web community for collecting the intercultural knowledge. Features of the KUI, fulfill the process of human thought to record the knowledge [2]. In this work, KUI has been modified for collection herbal information so-called KUI for Herbal Information (KUIHerb for short). KUIHerb provides not only features for sharing and developing herbal

information but also a medicinal herb terminology. When multiple opinions are provided, some mechanisms should be applied for selecting the more preferable opinions used in the community.

In the rest of this paper, the concept of Web 2.0 and Web 3.0 system is described in Section 2. Section 3 gives a detail of herbal information. Section 4 presents the design of a model for collecting herbal information with the aspects that we describes above. The implementation is described in Section 5. A conclusion and future works is made in Section 6.

2 Collective Intelligence with Web 2.0 and Web 3.0

In Web 2.0 era, the Internet users easily share opinions and resources. Consequently, users can collectively contribute to the Web community and generate massive content behind their virtual collaboration [3]. For example, Wikipedia is a wiki that is used as an open encyclopedia. Wikipedia defines mashup as a web site which combines content from more than one source of information into an integrated experience [4]. It is the forming of stable explanation for the vocabulary. This situation can be considered as a content management for a term. For a system with collective intelligence, implementing scalability can indeed be challenging, but sensibility comes at variable sophistication levels. Several approaches are dealing with the sensibility e.g., user feedback, recommender systems, search engine, and mashups. As suggested by Gruber T., the true collective intelligence can be considered if the data collected from all those participants is aggregated and recombined to create new knowledge and new ways of learning that individual humans cannot do by themselves [5]. However, it provided only a little bit on control of information in Web 2.0.

Nowadays, we are going to the new generation of Web technology i.e., Web 3.0. Some useful features of Web 3.0 are described as follow. In Web 3.0, it can be considered as “The data Web” instead of “The document Web” in Web 2.0. The control of sharing information is better. The decision for the opinions which are provided in Web 3.0, is more accurate. The intelligence Web is a new important feature in Web 3.0 while in Web 2.0, it is only the social Web [6]. Unlike Web 2.0 which participants are usually general Internet users, wisdom of the expert is essential for constructing more valuable knowledge. From these features of Web 3.0, it should be a better collective intelligence system for building new knowledge by way of Information Technology (IT), especially medical knowledge, and herbal knowledge should be no exception.

3 Herbal Information

Herbal information is a special type of information dealing with medicinal herbs. Some topics such as name identification and medicinal uses which may be different among cultures, are still problems. For instance, the same species of an herb may be known by different names in different areas. On the other hand, a certain herbal name may mean one thing in one area but something completely

different in another. The relationship between herbs and their names is Many-Many i.e., a plant may have several names while a name may be several plants. For example, *Dracaena loureiri* Gagnep. We use its hard wood for fever and call Chan dang. Some time we call this plant in other names up to the area of country, e.g., Chan pha (northern part), and Lakka chan (central part) [7]. Lack of information about native herbs has made them more difficult for applying. The systematic collecting of herbal information among cultures is valuable for development of both traditional and modern herbal medicines. Herbal specialist usually seek herbal information in a standard monograph, the type of monograph deals with information to determine the proper identity of a plant and its medicinal usages. However, these sources of information are limited. In the case of the herb does not appear in the pharmacopoeia, it is hard to seek accurately information about the herb.

4 Design a model for Collecting Herbal Information

To design a model for collecting herbal information from multicultural community, some intellectual outputs should be considered i.e., herb identification, vocabulary collection and intercultural usage. The detail is described as follow.

4.1 Construction of Image Library

The images of an herb is excellent sources for sharing knowledge about herb identity. From the images, the users can discuss which species (including variety) it should be. The scientific name of an herb and its images are used for common understanding. The images would be the levels of macroscopic and microscopic. Furthermore, the users can discuss about which herb should be the real herb that appears in traditional herbal formulas.

4.2 Sharing and Voting for Herbal Information

Two main parts are applied majority voting to select a set of high ranged opinions i.e., local names and usages of herbs. As an opposite direction, vocabulary collection is a list of terms for the same object which is express with vocabulary management from the content. In the herbal world, the content is usually the scientific name and its pictures which can be use for identifying. As a result, the medicinal herb vocabulary especially local names of an herb, will be collected. These terms can be applied in herbal information retrieval and data mining system, which are crucial in the area of ethnopharmacology and modern pharmacology.

Several topics of medicinal usages should be collected such as part used, indication and methods for preparation. Information about each topic should be discussed from contributors in community. A contributor can post an opinion on the selected topic. Any opinions committed to voting. Opinions can be different but majority votes will cast the belief of the communities. These features naturally realize the online collaborative works to create the knowledge communities.

4.3 Reliable Improvement

Several mechanisms are used for improving the reliability of the system. Firstly, the users who would like to share information or their opinions need to be members. The members can contribute and also modify their information given to the system. Secondly, some main topics such as symptoms which the herb deal with, will be defined by specialists for herbal medicine. Finally, some reliable or standard references will be added for further finding information.

5 Implementation

KUIHerb has been implemented using all opensource software components. The system has been designed for general users who would like to participate. However, the users which are member and administrative groups have permission to share and modify data. Four components in KUIHerb are described as follow.

5.1 Accessing Information

Information of an herb can be reached by two methods i.e., keyword search and directory search. KUIHerb provides the ability to keyword search by using a Thai common name, a Thai local name, an English name, a scientific name of an herb as well as a family name. Is also provides the ability to browse categories of part used and symptom. In the Figure 1, it shows the Web page for searching information by a directory and keyword.



Fig. 1. The Home Page of the KUIHerb

The scientific name of an herb and its images are used for common understanding. In this platform, not only the text content can be shared among members but also images of an herb which can be uploaded to the system. This is very important for herbs whose part used rarely appear.

5.2 Sharing Information

For the first version of KUIHerb, six topics are taken into account i.e., general characteristics, pictures, local name, medicinal usages (i.e., part used with their indications and methods for preparation), toxicity, and additional information. Among these topics, a poll-based system is implemented on local names and medicinal usages. A contributor may choose to work individually by posting his/her opinion about those topics. Any opinions or suggestions are committed to voting. Opinions can be different but majority votes will cast the belief of the communities. These features naturally realize the online collaborative works to create the knowledge communities. In this version, all members are given equal weight. If users agree with the opinion, a simple click on the button “Vote” will increase the score by one. The opinion with higher score will be moved up to upper part of the window. The Figure 2 represents a list of names for an herb and their scores.



Fig. 2. Majority Voting System for the Thai Local Name

5.3 Providing Information

Two approaches are constructed for providing herbal information. The first approach is the current news about herbal information by Web links. The administrator of the KUIHerb usually added news about herbs and it is easy to link to the source of information. The other approach, information of an herb is randomly selected from KUIHerb database when users visit the homepage of the Web site. It also provides a list of new herbs added to the database.

5.4 Web Site Statistics

In KUIHerb, hit counters roughly indicate Web sites' relative popularity and users activity. Three set of counters are created for these proposes. The first set

is for herbal database activity. The volume of user information contributes to KUIHerb can be used as an indicator for the level of user participation. For this set, three counters are used i.e., the number of herbs, news and topics in Web board. The second set is for describing the members of the community i.e., the number of member, the newest member, the number of active members of that time. This set indicates the popularity of the system. The last statistical set reports the total activities in a period of a day, a month and a year.

6 Conclusion and Future Works

In this work, we addressed the problem of collecting herbal information from multicultural community. To alleviate this problem, the KUIHerb is used as a platform for building a web community for collecting the intercultural herbal knowledge based on Web 2.0 and some features of Web 3.0 concepts. For an herb, a scientific name and its images were used for common understanding. KUIHerb provides not only a feature for developing an herbal vocabulary but also a capability in expressing the information about part of herb in usages, indications and preparation. In case of multiple opinions are provided, the popular vote will select the most preferable term used in the community.

In the first version of KUIHerb, majority voting with equal weight from the members were used for selecting a set of the best opinions. However, one factor affects to the correctness of the opinions, is the level of expertise of a member. The member who trends to be more expert, should be given more weight. Furthermore, applying data mining to the collected data will be useful. These issues are left for our future works.

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