Collaborative Platform for Herbal Information Creation

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Outline

1. Motivation
2. Herbal Information
3. Collecting Herbal Information
4. Collaborative Platform (KUIHerb)
5. Conclusion
1: Motivation

- Herbal medicine plays an important role in health care from the past until the present and also in the future
  -> problem of utilization

- Knowledge about herbal medicine varies from area to area and time to time
  -> problem of identification

- Using conventional methods, it is hard to collect herbal information from several cultures in a systematic approach
  -> problem of thoroughness
1: Motivation (cont.)

- The problems of collecting herbal information were addressed
  - Multicultural knowledge
  - Require several experts for contributing better knowledge
  - Locations of herbal experts

- The Internet is popular, collaborative work on the Internet is possible

- Some young generations who are interested in traditional medicine is a group of key persons who can transfer knowledge from traditional doctors (tacit knowledge) to the knowledge in digitized form (explicit knowledge)
The Aim of This Work

- Design a system for
  - Collecting Herbal Information
  - Using the concept of collective intelligence
  - Using the Internet for collaboration
  - Using the concept of the future web
  - Providing information reliability
2: Herbal Information

- Herb identification
- Vocabulary collection
- Multicultural usages
- Precaution and toxicity
2.1: Herb Identification

- A major problem on herbal medicine is herb identification.
- A name can represent several herbs. Which one is the right one in the herbal prescription?
- An herb can have several names (synonymy problem):
  - *Aloe vera* (L.) Burm.f.
    - Wan hang chora khe
    - Hang ta khe
    - Wan fai mai
- A name can refer to several herbs (polysemy problem):
  - Prayarakdum (พญารากต้า):
    - *Polyalthia cerasoides* (Roxb.) Benth. ex Bedd.
    - *Diospyros variegata* Kurz.
    - *Jussiaea suffruticosa* Linn.
2.1: Herb Identification

- A major problem on herbal medicine is herb identification.

- A name can represent several herbs. Which one is the right one in the herbal prescription?

**Prayarakdum**
(พญารากดำ)

**Diospyros variegata Kurz.**
http://www.biogang.net/biodiversity_view.php?menu=biodiversity&uid=26861&id=131880

**Jussiaea suffruticosa L.**
2.1: Herb Identification (cont.)

- Using **scientific name and images** of an herb for common understanding

- Several parts of a medicinal plant may be used with different proposes. Images of each part should be collected in **fresh form and dry form**

- The **synonyms** for an herb are useful for identification
2.2: Vocabulary Collection

- In KUIHerb, a set of names for an herb and the locations where it is called should be collected.
  - Some mechanisms should be applied for collecting the existing names and the locations.

- Names of the herb may
  - vary according to languages.
  - have both common and local names in each language.
An Herb with Several Names

(Aloe vera (L.) Burm. f.)

- ARABIC
  - الألوة

- CHINESE
  - 龙舌兰

- ENGLISH
  - Barbados aloe
  - Coastal aloe

- JAPANESE
  - アロエ
  - アロエベラ

- THAI
  - ว่านหางจระเข้
  - หางตะเข้
  - ว่านไฟไหม้
2.3: Multicultural Usages

- The usage of an herb depends on
  - Herb
  - Part in use
  - Method of preparation
  - Traditional knowledge of the culture
Common ginger grows from thick fleshy underground stems called “rhizomes”, but sometimes called “ginger root”

- **In China**
  - The dried root treats depleted yang, removes cold, is useful for "cold" pain of the stomach and abdomen, is useful for diarrhea due to cold deficiency, cough, rheumatism and many other symptoms.

- **In India**
  - Fresh ginger has been used for cold-induced disease, nausea, asthma, cough, colic, etc.

- **In Jamaica**
  - The warm steamy fumes of hot ginger tea are used as an inhalant to relieve head colds

- **In Europe**
  - European tradition values ginger tea for digestive disturbances

2.4: Precaution and Toxicity

- Although several herbs are frequently used, they may cause some problems.
- For example, *Ginkgo biloba* L.
  - Ginkgo may improve thinking, learning, and memory in people with Alzheimer's disease (AD).
  - Small children of few years old have died from taking just less than ten pieces of *Ginkgo biloba* L.
  - Adults are rarely affected by its toxicity but this does not mean it will not happen.
- Sharing experiences about precautions and toxicity is a very useful topic.
3: Collecting Herbal Information

- Herb name
- General description
- Image
- Part-preparation, and effect-symptom
- Precaution, and toxicity
- Additional Information
- Reference
Implementation of KUIHerb

- Tools for building KUIHerb
  - Linux
  - Apache
  - MySQL
  - PHP

- Four Components in KUIHerb
  - Accessing information
  - Providing information
  - Sharing information
  - Web site statistics
Levels of Access Information

- Administrator
  - Register
  - Administrative Right
  - Modify own and the other information/opinions

- Member
  - Register
  - Modify own information/opinions

- Visitor
  - View only
Accessing Information

- **Keyword search**
  - Thai common name
  - English common name
  - Local name
  - Scientific name
  - Family name

- **Directory search**
  - By part to use
  - By symptom
Conceptual Model of Herbal Information
Collaborative Platform (KuiHerb)  
http://inf.pharm.su.ac.th/~kuiherb (Thai version)
Sharing and Voting for Herbal Information

- A member can express his/her opinions
- The other members can vote for the opinions
- The weight for each vote can be
  - Equal weight
  - Not equal weight
- Type of Voting
  - Single side i.e., only positive opinions
  - Double side i.e., both positive and negative opinions
A Majority Voting is Applied on Two Topics

- Herb Name
  - Local Name
  - Location

- Medicinal Use
  - Part in use
  - Indication for the part in use
  - Method for preparation for the indication of the part in use
Control of Information

- Some main topics are maintained by experts
- Only members can share their opinions
- Some standard or reliable sources of information about herbal medicine, are added into the system
Herb Identification

- Given a scientific name, a member can contribute his/her images of the herb into the system.
- Whole plants and parts for medicinal uses should be contributed.
- A contributor may input some keywords and comments for the image.
- The order of image is ranked by popularity of viewing the image.
Image Property

- Right species (and some on varieties)
- Whole plant and its parts used
- Right part used
- Clear image
- Should be enlarge
- Provide some keywords
- Provide information of contributors (optional)
- Some mechanisms for delete incorrect or unnecessary images
- The popular images (view by several users) are shifted to the upper part of the window
Image Property

Please contribute images of this herb, the whole plant and the parts which can be used for medicinal or other proposes. Size of the image should not be exceed 800x600 in jpeg format. If the + does not appear, This indicates that you are not the member Go to Member Registration.

- Whole plant and part in use
- Click for larger view
- Ranked by image popularity

Comment

Please contribute the picture of its seed.

Add your comment:
Vocabulary Collection

- Local names of herbs are suggested by members
- Multi-lingual names can also be applied
- The location or the language which uses the name may be given
- The majority voting is applied
- Each member has only one vote for an opinion. The opinion with the higher score will be moved to the upper part of the window
# Sharing Herb Names and Its Locations

**KUIHerb** / Categorized by Part Used / 法/fruit / นารยา

Thai Common Name and Scientific Name: มะขาม - *Tamarindus indica* Linn.

<table>
<thead>
<tr>
<th>Herb Images</th>
<th>General Inform.</th>
<th>Herb Name</th>
<th>Part Used/Indication</th>
<th>Precaution/Toxicity</th>
<th>Additional Inform</th>
<th>Ref.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>มะขาม</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Please contribute names of this herb in your local language. If possible, please contribute the location where the herb is called. Click: VOTE for voting the names in a list OR Click: +Contribute Other Names for the new name. **If the + does not appear, This indicates that you are not the member, please click Go to Member Registration.**

## Other Names

<table>
<thead>
<tr>
<th>Local Name</th>
<th>Location</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>มะขามไทวัด</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>มะขามหน้าฮีดี</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>มะขามจีน</td>
<td>China</td>
<td>2</td>
</tr>
<tr>
<td>ส้าปะ flee</td>
<td>กะเหรี่ยงเฝงธงสวน</td>
<td>1</td>
</tr>
<tr>
<td>มะขามกวางฮีดี</td>
<td></td>
<td>1</td>
</tr>
</tbody>
</table>

**Voting Score**

**Names of an herb with multiple languages**
Multicultural Usages

- A list of predefined parts which may be used for treatments is provided
- A member may select the part and suggest its indications
- The method for preparation can be suggested
- The majority voting is applied
- The English or local languages can be conducted
Multicultural Usages

<table>
<thead>
<tr>
<th>Part Used</th>
<th>Indication</th>
<th>Method for Preparation</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stem/leaf</td>
<td>To treat sore throats</td>
<td>mixed with salt and used as a gargle</td>
<td>2</td>
</tr>
<tr>
<td>Stem/leaves</td>
<td>เป็นยาแก้ไข้ แก้ไข้แผล ชันเสาระได้ แก้ไข้</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Fruits/fruit</td>
<td>แผล ใช้เป็นยาแก้ไข้แผล ชันเสาระได้ แก้ไข้</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Bark</td>
<td>แก้ไข้แผลได้โดยเฉพาะในช่วงที่กำลัง</td>
<td></td>
<td>1</td>
</tr>
</tbody>
</table>

Preparation

Indication
Precaution/Toxicity and Additional Information

- Two topics are separated
  - Precautions and toxicity
  - Additional information

- Free text comment without the majority voting

- Some interesting topics should be suggested in additional information
A Precaution for an Herb

According to one survey, dust exposure to tamarind flours may induced chronic changes in lung function.
# Student Contribution in a Class Assignment
(160 third-year students in 2 weeks task)

<table>
<thead>
<tr>
<th>Topics</th>
<th>Vote</th>
<th>New</th>
<th>Old</th>
<th>No. of Herb</th>
<th>Max. contribution/ herb</th>
<th>Max. opinion/ herb</th>
<th>Max. vote/ opinion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local name</td>
<td>3086</td>
<td>2211</td>
<td>-</td>
<td>550</td>
<td>32</td>
<td>32</td>
<td>7</td>
</tr>
<tr>
<td>Medicinal usage</td>
<td>2407</td>
<td>1724</td>
<td>101</td>
<td>567</td>
<td>23</td>
<td>20</td>
<td>8</td>
</tr>
<tr>
<td>Image</td>
<td>-</td>
<td>591</td>
<td>-</td>
<td>399</td>
<td>8</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Precaution/Toxicity</td>
<td>-</td>
<td>166</td>
<td>-</td>
<td>139</td>
<td>4</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Additional info.</td>
<td>-</td>
<td>421</td>
<td>-</td>
<td>273</td>
<td>7</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
# System Evaluation

<table>
<thead>
<tr>
<th>Topics</th>
<th>Rating score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Collective Intelligence is important</td>
<td>0 0 5 41 10 4.09</td>
</tr>
<tr>
<td>2. Level of Interest in Herbal Medicine</td>
<td>1 4 23 26 2 3.43</td>
</tr>
<tr>
<td>3. Public Community gets benefit from collaboration in KUIHerb</td>
<td>0 0 8 33 15 4.13</td>
</tr>
<tr>
<td>4. Data Collection in the KUIHerb is a part of cultural preservation for herbal medicine</td>
<td>0 1 5 32 18 4.20</td>
</tr>
<tr>
<td>5. User's satisfaction for using the web site</td>
<td>0 0 16 36 4 3.79</td>
</tr>
<tr>
<td>6. Appropriate format for presenting herbal information on the KUIHerb</td>
<td>0 0 11 39 6 3.91</td>
</tr>
<tr>
<td>7. Contributions of opinions from members is an important mechanism</td>
<td>0 1 3 36 16 4.20</td>
</tr>
<tr>
<td>8. The KUIherb is able to use as a tool to support learning herbal medicine</td>
<td>0 0 8 36 12 4.07</td>
</tr>
<tr>
<td>9. The KUIherb supports students to be familiar with herbs</td>
<td>0 1 5 32 18 4.20</td>
</tr>
<tr>
<td>10. The ability in applying the concept of collaboration on the Internet for future work</td>
<td>0 1 9 39 7 3.93</td>
</tr>
</tbody>
</table>
Conclusion

- The problems of collecting herbal information were addressed
  - Multicultural knowledge and languages
  - Require several experts for contributing better knowledge
  - Different locations of herbal experts
- KUIHerb was introduced to solve these problems
- About 900 types of herb are recorded by 317 members.
Conclusion (cont.)

- Concepts of KUIHerb
  - Collective Intelligence
  - Internet technologies based on Web 2.0 and some features of the future web

- Several topics on herbal information are considered
  - Herb identification
  - Different Languages and Local Names
  - Part used, indication and method for preparation
  - Precaution/toxicity and additional information
Future Works

- The weight of voting score for each member may be different based on his/her expertise
- Double side score may be applied
- Using video representation for more understanding and interesting, e.g., methods for preparation
- Applying result from data mining on the collected data for knowledge discovery
- Herbal knowledge representation and reasoning for understanding and cross cultural study
Reference


- Verayuth Lertnattee, Sinthop Chomya, and Virach Sornlertlamvanich. A Supplement for Learning Herbal Medicine Using a Web-Based Tool and Social Network, Proceedings of The 9th International Conference on Web-based Learning (ICWL 2010), Shanghai University, Shanghai, China, December 7-11, 2010.


