

A Study on Open-Source Wiki Platforms

Lixăndroiu Radu

lixi.radu@unitbv.ro

Maican Cătălin

maican@unitbv.ro

Dovleac Lavinia

lavina.dovleac@unitbv.ro

Transilvania University of Brasov, Romania

In this study, the authors are looking for the latest trends in choosing an open-source wiki platform for document management. To rigorously substantiate the choice of the most appropriate platform for each case, the authors propose a mathematical model of comparison, based on the similarity of the platform characteristics with the ideal platform. Mainly, it is considered that in each situation we can identify the determined characteristics of the most appropriate platform (the ideal platform), characteristics that are then compared with the characteristics of the existing platforms on the market. The most suitable platform is the one with the highest score, meaning it is the more likely to the searched platform.

Keywords: wiki platform, Jaccard index, similarity indices

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1. Introduction

Wiki applications are web applications that allow users to add content and keep their own successive versions, similar to an Internet forum, but it also allows anyone else to modify the content. Wiki applications are part of the phenomenon called Web 2.0. The term Wiki also denotes the collaborative software used to create such a website.

Techniques and methods of Wiki applications are used by some domestic companies to collect and provide information and documentation. According to Wiki principles, information can be placed on the Wiki server by employees involved in the company's various processes. This kind of internal projects are called Enterprise Wiki or Corporate Wiki. Being internal information, they are usually made available to employees only, within an intranet of the company. If necessary, a limited access can also be given to non-corporate users within a protected extranet.

The required Wiki software can be obtained from many sources, both free (Open Source) and commercial.

Several advantages of a Wiki inside an enterprise are: the ability to create a user-friendly, unitary and very current multimedia documentary of all enterprise processes / products / projects, including archiving and version control; reducing email traffic; increasing the efficiency of internal communication; increasing employee identification with the enterprise. Some disadvantages are: the initial cost of implementing a Wiki system; the time needed by the employees to keep up with all Wiki content (but less time for traditional documentation).

Business Wikis are used by many of the world's innovative companies for team collaboration, document co-author, management and intranet, planning and contacting people, and for project work.

Fields of wiki usage

- for document co-author
- for textbooks
- as a database
- for intranet and / or extranet development

- for communication initiatives
- to display static and dynamic information
- to display answers to recent questions (FAQs)
- for an online topic chat feature
- to add requirements
- To store college notes
- Collect sources of information in a single accessible place from anywhere
- for team communication
- to access the software issues source
- to organize / manage projects
- to organize events
- To publish articles
- to publish checklists
- To publish the reference documents
- To record appointment notes
- To register a team or organization
- to resolve problems remotely
- to track deadlines
- to track invoices
- for brainstorming and mindmapping
- to create to-do lists
- for a journalistic conversation
- for record keeping
- for journals
- Create research notes
- plan and write novels

2. The Need for a Wiki Platform / Platform Requirements

The first step in finding the most appropriate wiki platform regarding a number of identified needs was to find the most representative wiki platforms on the market. The authors have conducted an exploratory research, looking for platforms that meet the identified requirements. Although the requirements to be met by the platform were previously identified, some platforms that only partially met these requirements were selected for comparison. The motivation was represented by the use of the Discosure index computation (DIC) model - the simple cardinal valuation method, which gave different values according to the importance of the criteria.

The top 24 wiki platforms identified are:

- | | |
|------------------------|-----------------------------|
| 1. BlueSpice MediaWiki | 13. SharePoint |
| 2. Central Desktop | 14. Socialtext |
| 3. ConnectedText | 15. Swiki |
| 4. DokuWiki | 16. TiddlyWiki |
| 5. FlexWiki | 17. Tiki Wiki CMS Groupware |
| 6. Gitit | 18. Trac |
| 7. IBM Connections | 19. TWiki |
| 8. Midgard Wiki | 20. UseModWiki |
| 9. MindTouch | 21. Wagn |
| 10. PBworks | 22. Wiki.js |
| 11. PhpWiki | 23. XWiki |
| 12. PmWiki | 24. ZWiki |

In the given situation, a free wiki platform with GPL software license, open source, multilingual , programming language PHP, ASP.NET or C #, intranet, scientific, technical, mathematical, file uploading, attachments etc.). The requirements of the research team related to the Wiki platform (closely related to the individual problem) were the following:

1. GPL Software license
2. Open source
3. Multilingual
4. Programming language PHP, ASP.NET or C#
5. Public
6. Private
7. Corporate
8. Enterprise
9. Education
10. Intranet
11. Personal
12. Scientific, technical, mathematical
13. File uploading
14. Attachments
15. Spam prevention
16. Page access control
17. Inline HTML
18. User-customizable interface
19. Document renaming
20. Web feeds
21. Export, import
22. Extensibility
23. Selectable wiki syntax
24. Wiki farms

3. Similarity indices - Jaccard index

Jaccard index, also known as the Jaccard similarity coefficient is a statistical indicator used to compare the similarity of several sets. Jaccard index of similarity measure between sets of finite sentences, and is defined as the intersection of the sets divided by the sample sets meeting:

$$J(A, B) = \frac{|A \cap B|}{|A \cup B|}$$

If A and B are empty, define $J(A, B) = 1$

$$0 \leq J(A, B) \leq 1$$

The Jaccard distance measures the dissimilarity between sample sets. The Jaccard distance is complementary to the Jaccard coefficient and is obtained by subtracting the Jaccard coefficient from 1:

$$d_J(A, B) = 1 - J(A, B) = \frac{|A \cup B| - |A \cap B|}{|A \cup B|}$$

Wiki software	GPL Software license	Open source	Multilingual	Programming language PHP, ASP.NET or C#	Public	Private	Corporate, enterprise	Education	Intranet	Personal	Scientific, technical, mathematical	File uploading, attachments	Spam prevention	Page access control	Inline HTML	User-customizable interface	Document renaming	Web feeds	Export, import	Extensibility	Selectable wiki syntax	Wiki farms	Jaccard index
BlueSpice MediaWiki	1	1	1	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1			1	0.909
Central Desktop				1	1	1	1	1	1			1	1		1	1		1					0.500
ConnectedText			1			1				1	1				1	1	1	1	1	1			0.455
DokuWiki	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.000
FlexWiki		1		1	1	1	1					1	1	1	1	1	1	1		1			0.591
Gitit	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.955
IBM Connections			1		1	1	1	1	1	1	1	1			1	1	1	1		1	1	1	0.727
Midgard Wiki	1	1		1	1	1	1					1		1	1	1		1		1			0.545
MindTouch			1	1	1	1	1	1	1			1	1	1	1	1	1	1		1			0.682
PBworks				1	1	1	1	1	1			1	1	1	1	1		1		1			0.591
PhpWiki	1	1	1	1	1	1	1	1	1			1	1	1	1	1	1	1		1	1		0.818
PmWiki	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.000
SharePoint			1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		1	1	1	0.864
Socialtext					1	1	1	1	1			1	1	1	1	1	1	1		1			0.591
Swiki	1	1			1	1		1				1	1	1	1	1	1		1				0.545
TiddlyWiki		1	1			1				1		1			1	1	1	1	1	1	1		0.545
Tiki Wiki CMS Groupware	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		1		1	0.909
Trac		1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			0.818
TWiki	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1		1	1		0.864
UseModWiki	1	1			1	1	1	1	1			1	1	1	1	1		1		1			0.636
Wagn	1	1	1		1	1	1	1	1	1		1	1	1	1	1	1	1		1			0.773
Wiki.js	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1		1	1	1		0.864
XWiki	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.955
ZWiki	1	1	1		1	1	1	1	1			1	1	1	1	1	1	1		1			0.727

4. Discourse index computation (DIC) - Simple cardinal valuation method

The decision maker establishes correlative relationships between the criteria ranked in importance, which progressively increase the share value associated. Evaluation algorithm is:

Step 1. Sort ascending criteria based on increased importance. Whether this order C_1, C_2, \dots, C_n , (C_1 being the least important criterion).

Step 2. We attribute the weight criterion C_1 value x , $w_1 := x$.

Step 3. The decision maker considers the more important criterion C_2 to C_1 by objective determination of the value of the ratio

$$\Delta w_2 = \frac{w_2}{w_1}$$

($\Delta w_2 \geq 1$ and equality occurs if one considers that C_1 and C_2 are of equal importance).

The process is applied to each criterion compared to the previous one. it based on: Δw_j , for $j = 2, 3, \dots, n$.

Step 4. The condition leads to the equation

$$(1 + \Delta w_2 + \Delta w_2 \cdot \Delta w_3 + \Delta w_2 \cdot \Delta w_3 \cdot \Delta w_4 + \dots + \Delta w_2 \cdot \Delta w_3 \cdot \dots \cdot \Delta w_{n-1} \cdot \Delta w_n) \cdot x = 1$$

It must solve the equation and obtain the value of x.

Step 5. It must calculate the weights of the n criteria:

$$w_j = w_{j-1} \cdot \Delta w_j, \text{ cu } j = 2, 3, \dots, n \text{ și } w_1 = x$$

The importance of the criteria was established by the research team closely related to the characteristics of the problem to be solved, taking into account all factors of both internal and environmental nature that may influence the future operation of the platform.

Criteria	Criteria importance	The weights of the criteria
GPL Software license	3	0.113
Open source	3	0.113
Multilingual	3	0.113
Programming language PHP, ASP.NET or C#	3	0.113
Public	3	0.113
Private	2	0.038
Corporate	2	0.038
Enterprise	2	0.038
Education	2	0.038
Intranet	2	0.038
Personal	2	0.038
Scientific, technical, mathematical	2	0.038
File uploading	1	0.019
Attachments	1	0.019
Spam prevention	1	0.019
Page access control	1	0.019
Inline HTML	1	0.019
User-customizable interface	1	0.019
Document renaming	1	0.019
Web feeds	1	0.019
Export, import	1	0.019
Extensibility	1	0.019
Selectable wiki syntax	1	0.019
Wiki farms	1	0.019

If:

$$(1 + \Delta w_2 + \Delta w_2 \cdot \Delta w_3 + \Delta w_2 \cdot \Delta w_3 \cdot \Delta w_4 + \dots + \Delta w_2 \cdot \Delta w_3 \cdot \dots \cdot \Delta w_{24} \cdot \Delta w_{25}) \cdot x = 1$$

we solve the equation and obtain the value:

$$x = 0.019$$

$$\text{Final Score} = \sum_{j=1}^n \text{Criteria Value} \cdot w_j$$

Wiki software	Jaccard Score	DIC Score	Jaccard Ranking	DIC Ranking
DokuWiki	1	1	1	1
PmWiki	1	1	1	1
Tiki Wiki CMS Groupware	0.909	0.962	2	2
BlueSpice MediaWiki	0.909	0.943	2	3
Gitit	0.955	0.887	3	4
PhpWiki	0.818	0.887	4	4
XWiki	0.955	0.887	5	4
TWiki	0.864	0.849	6	5
Wiki.js	0.864	0.849	6	5
Wagn	0.773	0.792	7	6
SharePoint	0.864	0.755	8	7
ZWiki	0.727	0.755	9	7
Trac	0.818	0.736	10	8
Midgard Wiki	0.545	0.642	11	9
MindTouch	0.682	0.642	12	9
UseModWiki	0.636	0.623	13	10
IBM Connections	0.727	0.604	14	11
FlexWiki	0.591	0.566	15	12
Swiki	0.545	0.547	16	13
PBworks	0.591	0.509	17	14
Central Desktop	0.500	0.472	18	15
TiddlyWiki	0.545	0.453	19	16
Socialtext	0.591	0.415	20	17
ConnectedText	0.455	0.340	21	18

Based on the Jaccard ranking and the DIC ranking, we note that for the identified requirements, based on their hierarchy, the most suitable platforms are DokuWiki and PmWiki.

Conclusion

For identifying the best platform, the authors propose a model based on both the Jaccard index and the Discosure index calculation (DIC) - Simple cardinal valuation method, depending on certain previously identified criteria.

Practically, starting from identifying requirements as well as their importance for a particular purpose, the model allows numerical comparison of multiple platforms.

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