



EVALUATION OF ISLAMIC WEBSITES' CONTENT RELIABILITY

Rasheed Mohammad Nassr¹, Murni Mahmud¹ and Mansur Aliyu²

¹Department of Information System, Kuliyyah of Information and Communication Technology, IIUM, Malaysia

²Department of Computer Science, Sokoto State Polytechnic, Nigeria

E-Mail: rasheedmn50@hotmail.com

ABSTRACT

Internet is an open platform for anyone to publish and share information without being subjected to the authenticity of information. For Muslims, religious information crucially should be reliable due to the very reason that many Muslims consider the Internet as a source in getting Islamic knowledge. Unfortunately, the assessment on reliability of the information provided by the Internet is complex. The huge amounts of data available and lack of knowledge among Muslims contribute to the users' incapability to recognize existences of unreliable information. Focusing on the reliability of information, this paper presents a software prototype, which uniquely automates and processes the reliability evaluation through inspections of references and scholars that are cited in the Islamic websites. Those references indicate that the Islamic websites derived their information from reliable religious sources.

Keywords: Islamic website, reliability evaluation, automation.

INTRODUCTION

Information as retrieves by the search engine is not necessary reliable [1]. Many domains of websites such as Healthcare have proposed and developed mechanisms to identify and assess the reliability indicators within websites [2]. Many researchers have developed various software and tools to automate this assessment process [2-5]. A similar phenomenon happens for Muslims when the reliability of online Islamic contents has the highest priority of consideration and needs to be addressed delicately. History shows Muslim scholars devoted their tremendous time and efforts to regulate the process in ensuring the reliability of Hadith in term of texts and narration of chains [6]. Muslims are more concerned about their religion and ethics when they are dealing with websites and they are more comfortable when those websites reflect their Islamic culture and ethics [6-8].

Nowadays, information in websites does not static anymore and involves RSS feed, video and audio; these are in addition to ad-hoc nature of contents. Such instances increase complications to the validation process of reliability [3]. A part of solutions directs to the need of having an automated tool activates when certain update takes place in certain website or "automatic quality detection", besides of referring to manual tools. However, a clear specification for turn of each tool is needed [3]. As a matter of facts, for a real quality assessment, people may need to rely on tangible criteria [4, 9]. Apparently, the complexity comes from the process of bringing tangibility to each criterion because of some of those criteria are subjective, hypothetical and most of the times, they are collected from behaviors of users [2, 4]. At the end, it is essential to remember that the website pages are texts; therefore, the process of locating reliability indicators is exhausting process of content analysis. Apart of having many indicators as placed in webpage's metadata -in case

it is provided-, texts and hyperlinks also need to be considered which may reduce time of evaluation [2].

The aim of this paper is to participate in assisting Muslims to know and recognize whether certain Islamic website meets the reliability criteria or not. The proposed tool is guided by guidelines as developed in Health on Net website (<http://www.hon.ch>). Hence, the focus of this paper is to bring the tangibility to the reliability criteria that have been proposed in previous studies in relation to reliability and credibility of online Islamic contents (Table-1). There is a lack of mechanisms and tools to help evaluating online Islamic content [10]. Therefore, this paper proposes a tool which able to assist in extracting indicators of reliability [2, 5] and evaluate them automatically.

LITERATURE REVIEW

Contents of information from websites are often lacking of structures. It is rare to find a website which offers enough semantic information regarding its content, goals and policy. Therefore, it is difficult to automate the process of reliability evaluation based on online information without human intervention. The major challenge lies on determining the indicators for reliability criteria and quantifies them, as well as to measure and evaluate them. Some of those indicators are easy to locate and measure such as the ones which relate to user interface, sponsor and authors; while others are subjective and hard to quantify such as the writer's honesty. Even though Knight & Burn, (2005) managed to quantify some information quality features; in certain stage of their model, users may need to interfere in order to measure information quality. Whereas, the model as developed by Wang and Liu [2] mainly focused on technical aspects of reliability. For that reason, this paper attempts to find a middle ground by bringing tangibility to non-technical reliability features in order to remove human factor in



reliability assessment process. This prototype appreciates the indicators which specified in studies as related to reliability of Islamic websites (Table-1). Nevertheless, this paper covers only text-based indicators of reliability and accordingly excludes indicators which relate to interface due to unavailability of resources that discuss their compliances with the Islamic culture.

Ibrahim, *et al.* [10] emphasized on the availability of source of information as the main reliability factor in religion websites. The importance of the source varies as a result of type and importance of the context [17]. However, there is an agreement in terms of the necessity for developing a mechanism to verify reliability of the information in the website [4, 5, 18]

As an encouragement for researchers of this paper in developing a computerized tool; while, bring tangibility to reliability criteria and automate the process of Islamic websites evaluation, a quite similar tool to the researchers' intended tool has been developed in evaluating the quality of health information on the internet as discussed in [2]. This tool uses 18 technical-based criteria with computerized detectable measurable indicators.

In relation to Islamic websites' evaluation, practical studies are currently limited and the concern is more focused on Quranic websites. Among few of practical studies can be seen from the study of Branden and Broeckart [19] which employed content analysis methodology to analyze 32 *fatwa* websites. The major keywords searched were "author, date, mustafti, subject, standpoint and elements of *usul alfiqh*". This research follows the same approach as adopted by Branden and Broeckart [19]. In another study, Wan-Chik, *et al.* [1] also utilized similar keyword-based approach. They aimed in evaluating search queries as directed to Islamic websites. Their major focus was on "query frequency, term frequency, query length, and session length were derived from the data". Those parameters were extracted after conducting interviews with 25 Muslim users who have good experiences in searching for Islamic and Quranic materials on the internet. The techniques used by Wan-Chik, *et al.* [1] are: 1) a quantitative approach: the researchers used the data stored in web-search engines that are based on real user-system interactions. (2) A qualitative approach: with interviews from 25 samples of information seekers. However, it is noticed that the keywords as they referred to are basic Islamic words such as *bissmillah* and *Alhamdulillah*. Those keywords unfortunately cannot disclose further about reliability. This research gets benefits from the study done by Wan-Chik, *et al.* [1] where consideration is given on the Islamic keywords. This research values advanced keywords which closely related to references and scholars in order to evaluate reliability. By doing so, the reliability evaluation is treated as a practical way in assessing Islamic-related websites. The proposed prototype as developed in this research appreciates electronic text analysis techniques

and utilizes database of Islamic keywords particularly related to scholars' names and main Islamic references.

Table-1. Indicators collected from studies for reliability of Islamic websites.

Indicators	Author	Quantification	Location
Authorship, Expertise	[10-12]	It can be represented by respected authors and writers as well as sponsors. By locating the names of scholars, it is a best way to quantify those indicators	Text and about us page (if provided)
Clear references		Islamic books and references to other reliable websites	Text and hyperlinks
Site policy	[10]	Explains the intentions and goals of the organization, by locating the page of site policy, it assists to quantify this indicator	Text privacy policy page (if provided)
Have Sahih Hadith	[12]	Authentic Hadith references such as Bukhari and Muslim	Text
Sponsorship		High respected scholar or Islamic organization (sponsor of the website)	Text particularly in about us page
Islamic-appropriately-compliant Images	[13]	Tools proposed in [5]	Images and video
User interface and accessibility	[14-16]	Website accessibility can be tested by using many tools: a list of those tools is provided in w3c website through this link: http://www.w3.org/WAI/ER/tools/complete	Text and tags

Muslim societies have lack of trusts and confidences in religious information as available in the websites which claimed to be Islamic websites. Many of the websites do not cite the sources of their information such as the respected scholars and reputable references [6, 10]. By generating a report which contains semantic



knowledge that describes the reliability of Islamic website, it has potential in instilling confidences to the Muslim users regarding the authenticity, reliability and dependability of the websites. Furthermore, in many other domains such as search engine and healthcare, it is found that many proposed tools prioritize websites according to the certain quality dimensions [2, 4, 5, 20]. The semantic information that successfully retrieved from the websites play a considerable role to determine which of quality dimensions that have met by the websites or otherwise.

METHOD

The approach which is followed in this research in order to develop an automate tool for reliability assessment can be referred from a study as done by [2]. This involves the following steps: (1) choosing reliability criteria: the necessary criteria of reliability are extracted from post-studies. (2) Defining measurable indicators for each criterion: for each criterion, tangible features are identified to be used as measurement for each criterion. The process involves investigation of previous studies. (3) Identifying on how to detect measurable indicators in Web pages. (5) Developing automatic detection prototype to locate the specified detectable indicators. (6) For usability, small number of experts is chosen to evaluate the usability of the prototype in order to determine the weaknesses.

The content-based reliability clues or features are identified from texts of WebPages [20-22]. In the context of Islamic website's reliability, the authentic sources of information are: Quran, Sirat or authentic books (such as ibn Kathir and ibn Hisham) of biography of Prophet Muhammad pbuh, Hadith books such as Bukhari and Muslim, books that reflect the opinions of Islamic schools of thoughts, such as for Hanbali (Al-Mughni, Al-Insaf fi ma`rifat al-rajih min al-khilaf, Sharh Al-Waraqat, Ghayat Al-Sul, Akhsar al-mukhtasirat, Dalil Al-Talib, Al-Udda Sharh Al-Umdat, and Al-Raudh Al-Murbi), for Ash-Shafi'i (Al-Umm, Abhaj fi Sharh al-Minhaj, Ashbah wa-al-Naza'ir fi Fiqh al-Shafiyah, and Bayan fi Fiqh al-Imam Shafi), for Hanafi (Fiqh al-Hanafi, Buhuth fi Qadhaya Fiqhiyyah Mu`asirah, Kanz al-Daqa'iq, Hidayah fi Sharh Bidayat al-Mubtadi, and Kanz al-Daqa'iq), and for Maliki (Ahkam al-Quran, Ayun al-Majales, Bayan Wal-Tahsil, Fath al-Malik, and Bidayat al-Mujtahid wa-Nihayat al-Muqtasid). Besides of the list, it also includes citing authentic scholars' such as Muhammad al-Ameen Ash-Shanqeetee, Abdallah Bin Bayyah, Muhammad Nasiruddin al-Albani, Taqiuddin al-Nabhani, Rashid Rida, Mohammed al-Ghazali etc. Additionally, referencing reports from authentic organizations such Azhar and JAKIM are also to be considered.

As previously discussed, the Islamic websites which are taken to be reliable must have refer to and cite Islamic authentic sources of knowledge. Therefore, there is a need to collect enough titles of authentic books and scholars' names as reliability keywords. This research collects samples of keywords from two authentic sources.

Firstly, from Muslim scholars' database with address of <http://muslimscholars.info>. It is a Saudi's governmental website which owns database that contains information about more than 25,000 scholars. Accordingly, this research uses samples from its database. Secondly, a reference is made in this research from almaktabah shamela or a "comprehensive library" which is also a Saudi's project which a host of 6111 Islamic books that addressed at <http://shamela.ws/>.

SYSTEM ARCHITECTURE

The structure of the proposed prototype is illustrated in Figure-1. At first, the component of "simple Web crawler" retrieves sample of WebPages. The number of pages depends on the parameters as passed to the prototype during the startup process. Following the increase of numbers, more time are needed; which means more WebPages are retrieved, more time is needed to evaluate. The simple web crawler is a simple java-based crawler (log4j). Next, the retrieved pages are processed on fly and only then, the text content without html, css, and scripts are stored in the file system. Eventually, the process of Text Extraction is done through Apache technology, which called Jsoup.

The retrieved text is stored, as text file in the file system. Then, Lucene indexing part goes through the file or files to create index file for all possible keywords and phrases. This index file is important for next processing. After such process, all Islamic keywords are retrieved from database in order to be searched within the index file. Second part of Lucene "searching part" subsequently takes keywords one by one and tries to find them within the indexed file. The results are stored in the text file to be used by JfreeChart tool in order to render statistical diagrams which have the ability to visualize the results. The visualization is done to simplify the understanding of the results for regular Muslim users.

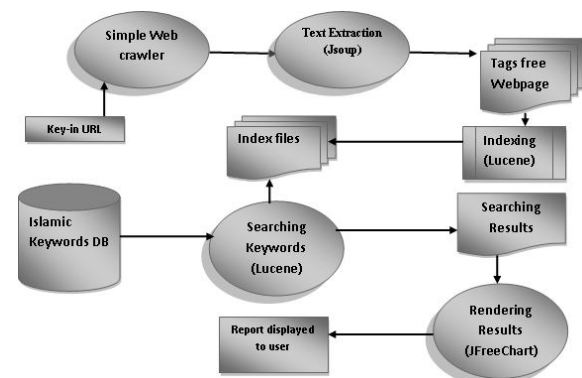


Figure-1. The architecture of the proposed prototype.

In portraying the processes on how the proposed prototype works, the proposed prototype is used to run by using a URL "<http://www.islamweb.net/emainpage/index.php>" and a



total of 100 WebPages is taken as a sample for collection. The URL is chosen for its function as one of the biggest Islamic websites sponsored by Qatar Government. The report of the results is presented in Figures-2-6.

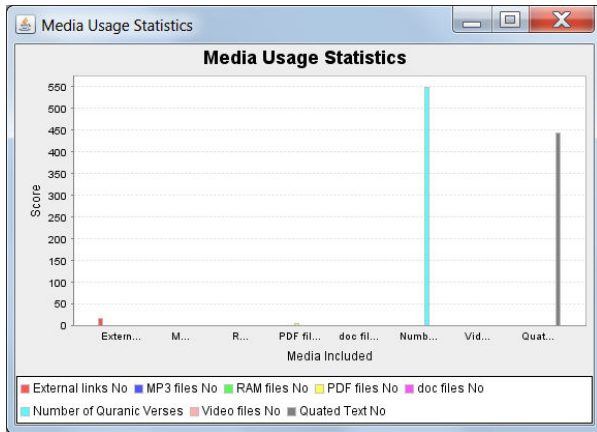


Figure-2. Media files statistics for “islamweb.net”

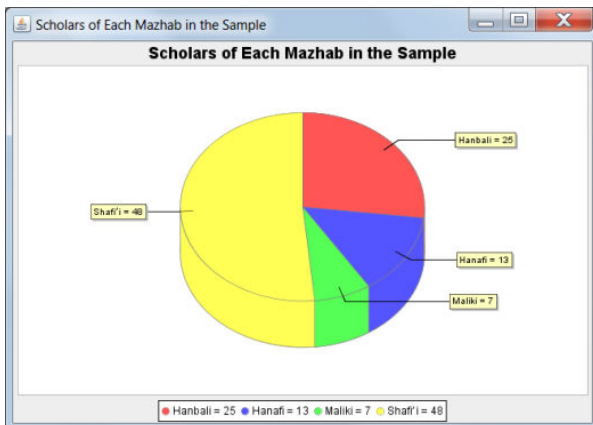


Figure-3. Hadith and fiqh books referenced in the sample website "islamweb.net".

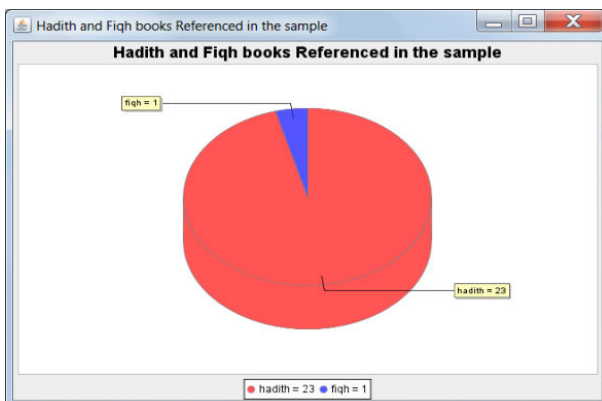


Figure-4. Number of scholars of the four main Sunni Mathahib in the sample “islamweb.net”

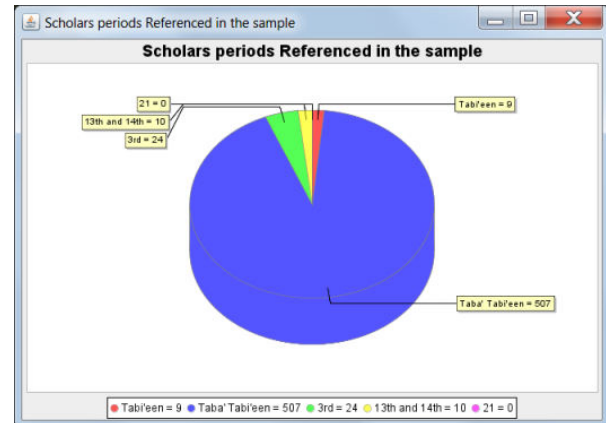


Figure-5. The number of scholars cited in the sample "islamweb.net" categorized according to their centuries

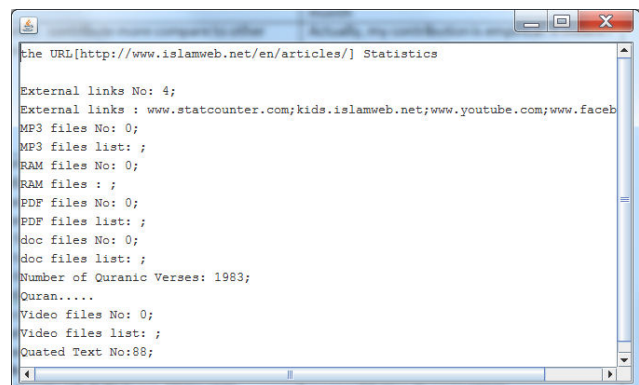


Figure-6. Statistics of multimedia files and external links

EVALUATION FROM PROTOTYPE

In evaluating the proposed prototype in term of easy to use and information presentation to Muslim users, a sample of evaluators must be experts in order to increase the quality of inspections for levels of compliances [23]. Such an expert's feedback is valuable for improvements of the proposed prototype. Pickard [23] considered that a total of 3-5 evaluators was reasonable numbers for purpose of identifying the usability problems.

The prototype must be easy to understand and shows useful information for Muslim users that can guide them to evaluate the reliability of the Islamic website they intend to use as a knowledge source. Therefore, the researchers carried out a heuristic evaluation which according done by considering the opinions of fifteen evaluators who are selected from IIUM, Malaysia. Heuristic evaluation is based on well-known guidelines, which is the Usability principles as developed by Jakob Nielsen (<http://www.nngroup.com/articles/author/jakob-nielsen/>) which accordingly be used by the evaluators in making their evaluations of the proposed prototype [23, 24].

A number of heuristic components successfully indicate each of the principles. Nielson's heuristic



principles showed the basics of this approach which identified existence of ten principles. The ten principles of Nielson vary from visibility of system's status to documentation. However many researchers have derived their own approaches from Nielsen's heuristic evaluation to fit their domains [25].

This research excludes the last principle "number ten" from Nielson's heuristic principles due to nature of the proposed prototype. It is not documented at stage of development, and it is replaced with knowledge on benefits that measures the overall benefits of reports as generated by the proposed prototype. Thus, a detailed heuristic checklist was designed to inspect particular usability's problems and it is also used to avoid the biasness that might occur if evaluators did not cover each of the heuristic principles.

The evaluators have experiences in programming and usability for period of five to fifteen years (Table-2). The heuristic checklist (see Table-3) was given to each of the evaluators. They were asked to perform a heuristic evaluation on the proposed prototype.

Table-2. Demography of the evaluators.

Gender	No.	%
Male	10	66.7
Female	5	33.3
Age		
18-25	2	13.3
26-33	6	40
34-41	5	33.3
42+	2	13.3
Professional		
Undergraduate	3	20
Postgraduate	10	66.7
Lecturer	2	13.3
Exp Years		
1-5	10	66.7
6-10	4	26.7
+15	1	6.7

Table-3. Evaluation principles and their means.

The principle	Mean
Visibility	3.9
Match	3.83
Error_Message	3.8
Help	3.6
Knowledge	4.15
Aesthetic	3.93
Flexibility	4.13
Recognition	3.93
Consistency	3.93

User control	3.73
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Additionally, the evaluators were asked to record any relevant suggestion concerning to each of heuristic principles, if possible. About 30 minutes is allocated for the evaluators in performing the prototype and to work through the given checklist. For a perfect proposed prototype, it is supposed to be awarded with 100% of the heuristic principles. However, this is not the case. In terms of user control, consistency, recognition, aesthetic, visibility, match, and Error_Message, the means were 3.73, 3.93, 3.93, 3.93, 3.9, 3.83, and 3.8 respectively. This indicates the tendency among evaluators in giving "agree" as answers to the heuristic principles on user control, consistency, recognition, aesthetic, visibility, match, and Error_Message.

These can be interpreted that the proposed prototype as performed is closely practiced and applied those three principles (Table-3).

Furthermore, flexibility and knowledge scored a high degree of agreement with means value at 4.13 and 4.15 respectively. This shows the tendency for strong agreements among evaluators that the proposed prototype is a practical with flexible design and content; moreover, the reports generated are providing beneficial information to the users. However, in relation to help, the obtained mean was 3.6 which indicated that help principle is moderate for the proposed prototype. The interpretation of such moderation can be said that since the model is still at prototype stage, the information to help users might be increased later.

These findings designate that the prototype is performing well and almost met all the required principles as available on the given checklist. However, perfection is not completely achieved due to the current stage of prototype which still at the stage of development and testing. Despite of these results, the Islamic websites' developers need to pay more attention to usability's issues.

It is found that the most critical principle is knowledge because the main objective of this proposed prototype is to provide information that able to give Muslim users an idea about the trends and knowledge which used and covered in the specified Islamic website. The evaluators reported that they get good ideas about references, scholars, and mathahib as cited or referred in the websites. However, the evaluators suggested that evaluation should be done to all WebPages of the website, instead of sample of pages in order to create a complete report about the reliability of Islamic website. This is possible and subjected to powerful hardware and a complete team of information collectors in order to collect huge amount of Islamic keywords, which currently not available to the researchers.



DISCUSSIONS

Therefore, the information provided by the proposed prototype is semantic information that guides Muslim users in terms of (i) the Quranic citations to support for content and give a clue that this content is seeking reliability by referring to Quranic verses that prove this content right. It is a common practice in Islamic literature (offline sources such as books) referring to Quranic verses to support any argument, this practice may make Muslim users to accept the online content as the way is written is familiar to them due to their interaction with offline sources. (ii) Hadith citations: the more referencing high reliable Hadith, the more indication of reliability of the content. This prototype can provide the reliability levels of the cited Hadith and Hadith books referenced and whether is it reliable or not based on database that has been developed with this prototype.

(iii) Islamic topics covered: the prototype will introduce information regarding the Islamic topics covered by the Islamic website's content by linking the referenced books and scholars into their well-known category. For instance, "Sahih Albukhari" will be classified in Hadith category. Therefore, this gives Muslim users a clue about the topics covered and then they decide to go on with it or not.

(iv) Schools of thoughts; many Sunni Muslims religiously belong to one of Islamic school of thoughts (the major schools are hanbali, shafie, malikie, and hanafie); this prototype gives them clues about the percentage of each school in the content of the website. This is good for Muslim users who would like to see references to books and scholars from their perspective school. (v) Scholars referenced: this prototype provides a list of scholars have been referenced in the website. This list might help Muslim users to see whether his/her favorite or trustful scholars have been referenced or not.

(vi) Multimedia and Rich text files statistics: this part shows the number and types of multimedia files (mp3, mp4, avi, etc.) and rich text files (pdf, doc, ppt, etc) provided in the website. Those files are important for reliability due to the fact that Muslims used to consume Islamic knowledge through attending lectures "doras" on mosques where there is a Muslim scholar lecturing; which it means they used to listen or watch and finding such material will encourage them to trust the website due to that this website refer to the source of the content and declare it explicitly, this shows that this website is transparent and that improves its reliability in the eyes of Muslims users.

As it could be seen; providing semantic information about Islamic website and delivered to Muslim users in very easy and understandable format is important in order to help Muslim users to judge the Islamic website; whether it is reliable or not. For clarity, this prototype is a tool to assist Muslim users to be capable to evaluate the reliability of Islamic content.

Existing of such material and also relieve them of reading text. By displaying statistics, it reveals for Muslim users that this website have access to solid sources of Islamic knowledge and therefore can be used as a reliable source of Islamic knowledge. (vii) eventually, a list of external links that are connected to this website; this list indicates

CONCLUSIONS

Currently, internet is very dynamic and can be considered as an open space for all to publish information, regardless of its reliability. The users should know that the online information is not always reliable and needs to be evaluated carefully. Possible as it may be, it is a tedious task to be achieved manually. Therefore, there is a need to develop tools that automate this process. This paper discussed on how Muslim users can evaluate the information and references as found from Islamic websites and they need to make sure that the Islamic websites have enough authentic references and multimedia materials (video, audio, word, pdf etc.) for purpose of supporting their contents.

The proposed prototype can be improved and can have potential use. For instance; Muslim regular users can use it to assist them evaluating Islamic website's reliability. Another use is by Islamic organizations to issue reliability certificate for Islamic website. Islamic organization can; with the help of this prototype; evaluate and assess Islamic website and issue certificate that declares that Islamic website cite and references reliable Islamic sources (scholars and books), cite enough Quranic verses, and high reliable Hadith. Another potential is using this prototype inside Islamic website as semantic meter; where all semantic details of the website can be generated and accessed by visitors.

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