Design for Scientific RENAISSANCE

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Data mining in Sciences of the prophet's tradition in general and in impeachment and amendment in particular

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ABSTRACT

This paper presents the research background of a platform offering an illustrative graphic based decision aid tool enabling the expert of Hadith to easily observe the chain with chains connected to it as well as its weaknesses and strengthens as per the available evaluations. This enables the expert to rapidly identify where he/she should go in depth (specific narrator, place, period of time, connection to another chain, etc...). We also offer an additional tool that helps for decision making namely the link between Hadith's content and timing to Qur'an. For example the Hadiths related to the pledge of satisfaction (or pledge of the tree: **بيعة الرضوان أو البيعة تحت الشجرة**) are connected to Sourat Al-Fath (Chapter 48 of the Qur'an).

***Keywords*: data mining, graphic-based decision aid, Hadith science.**

1. INTRODUCTION

Hadith sciences (علوم الحديث) are a set of religious disciplines used in the study and evaluation of the Islamic Hadith by Muslim scholars (مُحدّثين أو مُصنّفين) like AlBukhari and Muslim, (البخاري ومسلم) (al Shahrazuri, 2006).
Today, authenticity of the quotes, texts, findings and works are an important issue in modern society and in the education system. For example, plagiarism is declared as a crime. The Islamic nation was a head in history with respect to this aspect. Since more than 14 centuries ago, this nation has been very careful in attributing quotes, texts, and findings to their real authors (Eba Muslim et al., 2013).

One of the most important Hadith sciences is the science of impeachment and amendment (الجرح والتعديل), also called biographical evaluation (علم الرجال). It consists in evaluating the narrators in order to rank the Hadiths and distinguish authentic and reliable (strong and good: صحيح وحسن) ones from unreliable and fake (weak and apocryphal: ضعيف وموضوع) ones in establishing the credibility of the narrators, using both historic and religious knowledge. In the remainder of the paper the biographical evaluation of a narrator by one scholar will be referred to as the "critics on the narrator by the scholar". Let us also refer to the scholar (المُحقق) criticizing the narrator, by "evaluator".

The Hadith (Sunnah in general) generally does not mean only the speeches of prophet, but also his deeds, confirmation (silence) and the position (الهيئة).

2. COMPLEXITY OF RANKING HADITHS

There are many elements of complexity including:

- One Hadith may be narrated by more than one chain.
- Chains may interfere in some parts (see Figure 1).
- One narrator may be involved in more than one Hadith that may have some apparent contradictions (في ظاهرها بعض التناقض).
- The narrators of two successive layers should have lived in a common time period. If a narrator (teacher) in one layer died before the birth of the narrator (student) of the immediate lower layer (further in the chain to the prophet), or when the student is 4-year old, the Hadith is not accepted. They should have lived together. Layer 1 is considered as the highest layer.
- The narrators of two successive layers should have lived in a common place (city) for a certain time period. If the student was in *Kuffa* when the professor was in Egypt, and when the student came to Egypt, the professor moved already to Andalusia, and they never met then the Hadith could not be accepted.
- The narrators of two successive layers should be mentally (good memory) able to transmit and receive the Hadith when they met.
- Each narrator should have never lied in his life.
- One narrator may be criticized by several evaluators in various, not necessarily converging ways.
- etc…

All these aspects and more should be taken into account by the scholars of Hadith sciences to be able to rank the Hadith according to authenticity. A huge set of data should be handled. The expert of Hadith should see the whole picture and mine all data. This data mining was done individually for long time without assistance of computers. We intend to offer a decision aid tool enabling the expert of Hadith to easily see the whole picture and to explore what he/she would like to explore (go in depth in a specific subject and/or for a specific narrator, and/or for a specific place and/or period of time, etc.).

Recently, the scholar Muhammad Nasir-ud-Din Al-Albani (محمد ناصر الدين الألباني) spent most of his life (1914-1999) in Hadith studies. He revised the book of Hadith of old scholars such as Abu Dawood, At-Tirmidhi and ibn Majah (أبو داود والترمذي وابن ماجة). He did an excellent work and produced more than 37 volumes ranking Hadiths. He could have done this work in significantly shorter time if he had in his disposal the platform we intend to produce through the present research project. He could have then been more productive and avoided some contradictions (same narrator in one strong Hadith and one weak Hadith, ...), that of course does not reduce the merit of his work and that we found in all similar works through history. We mention this from a pure academic and research point of view and do not put into question the excellence of his work as he did not put into question the excellence of the previous scholars the works of which he revised. Among others, one of the contemporary scholars of Hadith, Abdullah Alduwaish (عبد الله الدويش) supported the work of Al-Albani, but also criticized in a very polite academic way in a book entitled "Notice to the reader concerning the strengthening of what AlAbani declared as weak" (تنبيه القاري على تقوية ماضعفه الألباني). The book has been revised by AbdelAziz Al-Mishiqah (عبد العزيز بن أحمد بن محمد المشيقح) (Alduwaish, 1990).

The debate is still going on, concerning the authenticity of Hadiths. Old and recent books of Hadith are revised and re-revised again. Moreover readers, graduate students in Islamic sciences, academics and researchers in Islamic sciences are continuously discussing these issues in forums and conferences. Some Hadiths are also discussed in these events and also on social networks, each one is adding some pieces of information about this and that Hadith and an excerpt of what Ibn Hajr Al-Asqalani (ابن حجر العسقلاني) or Imam Al-Dhahabi (الإمام الذهبي) said, and so on. Then, some specialized web sites, like www.islamweb.net, find themselves obliged to expose the matter through a long document.

3. RELATED WORK

In literature, there have been some attempts to computerize the Hadith science. We mention the followings:

- (Hyder and Ghazanfer, 2008) defined a graphical representation of the chain of narrators and an aligned database structure suitable for saving the biographical data of the narrators and other historical events.
- (Ghazizadeh et al., 2008) used expert system to implement the fuzzy system in which the data knowledge base was designed and the necessary rules were extracted to determine the validity rank of Hadith.
- (Alrazo, 2004; Alrazo, 2008) described a methodology to computerize Hadith by using unsupervised learning classification is the process in which the available data instances are divided into a certain number of subgroups, based on the level of resemblance between the instances in a known group. Alrazo attempted to describe Hadith knowledge by using Rule– Based method
- (Aldhaln et al., 2012) used decision trees to classify Hadith according to its validity degree (Maudo', Da'eef, Sahih and Hasan).

4. METHODOLOGY

4.1 Quantitative parameters to assess authenticity:

Optimization algorithms could be used and analyzing tools for data mining the Hadiths are then applied. For example the concept of neural networks could be used as follows: Each evaluator may have a table of weights as the example of Table 1. To the critics on one narrator by this evaluator may be assigned one weight of Table 1. Then all weights are collected for the given narrator by considering the critics of all available evaluators. These weights are summed (normalized sum) as done in the neural network. Then a thresholding or a non-linear operator could be applied, as done in the artificial neural network. The results are then offered to the scholars, experts and researchers in Hadith studies in an illustrative graphical way.

Table 1: An example of weights assigned to the critics on one evaluator

Weights ضوارب	Critics by the evaluator	التصنيفات حسب المُحقق
-30	inventor	وضَّاع
-27	lies	يكذب
-24	Not considered for Hadith	متروك الحديث
...	...	…
-6	Subjected to criticism	فيه مقال
0	Not known to be a liar	لم يعرف عليه كذب
...		...
27	Reliable and have good memory	ثقة حافظ
30	The most reliable	أوثق الناس

The situation may be more complex than that: 1) There might be more than one chain. 2) Some narrators are unknown for some evaluators. 3) Some chains are longer than others, however shorter chains are stronger. How should this affect the weights? 4) The critics from different evaluators are not uniform. How should this affect the weights? 5) The way the narrators reported the Hadith may be different. There is a difference for some scholars, especially Muslim (الإمام مسلم), between "according to" (عن) and "He said: he told us" (قال حدثنا). Imam Bukhari (الإمام البخاري) sees no difference and arguments his opinion by saying that companions used both sayings in the same way. We should take the divergences of scholars and evaluators. 6) The content of the Hadith also intervenes in the evaluation process and should be considered in our work.

All of these aspects and more are considered in the platform in order to provide the most possible intelligent, objective, reliable and helpful platform. This platform will be also addressed to regular users who are not necessarily scholars, experts and researchers in Hadith studies.

4.2 Model for the Hadith:

The chains of narration came to us with abbreviations and are not connected together. The content may differ slightly. Some Hadiths are long then others but with the same content and different wordings. This presents an addition complexity. We need to setup a flexible but consistent structure to represent the Hadith including his narration chains. Connection to other narration chains should be enabled by this structure. We suggested the model of Figure 1. Further improvements will follow.

4.3 Model for the evaluator:

For any Hadith, there is at least one chain, composed of narrators. Each narrator is criticized by evaluators. Each evaluator has a long list of narrators who he has criticized. This list should appear in the model of the evaluator. The issue is more complex, since one evaluator may have different critics on one narrator, and these critics may be in disagreement with each other. This is known in Hadith sciences by "contradiction of impeachment and amendment by the same evaluator on the same narrator" (تعارض الجرح والتعديل من إمام واحد في راوٍ واحد) (Al-Maliki; Ibn Hazm Al-Andalusi, 1404; Al-Jouini, 1418; Ayman Abo Bakr, 2014). In our model, we should allow for more than one critic for one

narrator by one evaluator. While, most of scholars say that the last (recent) critics is valid, our model should present all of them for objectivity and for the fact that sometimes we do not know which one is the last. We suggest starting from the model of Figure 2.

4.4 Optimization of the weighting process:

We envisaged conceiving optimization algorithms for choosing weights. To each evaluator we will build a table like the Table 1. For example the concept of neural networks could be used as follows: Each evaluator may have a table of weights as the example of Table 1. To the critics on one narrator by this evaluator may be assigned one weights of Table 1. Then all weights are collected for the given narrator by considering the critics of all available evaluators. These weights are summed as done in the neural network. Then a thresholding or a non-linear operator could be applied, as done in the artificial neural network. The results are then offered to the scholars, experts and researchers in Hadith studies in an illustrative graphical way.

4.5 Hyperlinking data:

By creating hyperlinks between Hadiths, sentences and/or keywords inside each Hadith offers rapid access to Hadiths and comprehensive analysis. Linking Hadiths having the same subjects, similar ones or even with different ones, strengths the dimension of intelligence in Hadith analysis and gives a wider view and comprehension of the matter. Linking Hadith together will be also performed in terms of narration chain.

4.6 Connection to Qur'an:

The consistency of the Hadiths with the verses of the Qur'an is a fact to take into consideration. Hadiths of the prophet and his deeds come to further explain, detail and/or confirm the verses of Qur'an. As a matter of fact, many laws and acts of worships are briefly mentioned in the Qur'an, thus the Hadiths elaborate on such items and more details and offer more explanation, may specify the general, generalize the specified, limit the absolute, widen the limited, etc. We proposed to develop a method connecting the Hadith data to verses of the Holy book.

4.7 Process map:

The steps of the proposed system are presented in Figure 3. It uses seven steps when a new Hadith enters: 1) save the *Matn* (content) of in the data base, 2) Search on the corresponding chains of narrators in reliable sources. The search should be intelligent since the wording of the content may be not explicit. Keywords and an algorithm of similarity determination should be used. We should also search for similarities using existing sources since some experts of Hadith made already connections between similar Hadith contents. 3) For each narrator in the chain we should find critics done by evaluators; 4) For a given narrator, critics for each evaluator should be saved in the database of evaluators; 5) The list of critics and weights (see table 1 in Introduction) should be updated since the given evaluator may add a new critic that does not exist in his existing table. 6) keyword should be determined so that links with other Hadiths may be made; 7) the context of revelation of the Hadith should be saved in the database of Hadith; 8) If the Hadith is in relationship with versus in Qur'an this should be also saved in the database of Hadiths. The platform will be an extendible Web application. We proposed combining several tools including mainly Java and PHP.

Fig 1: Model of the Hadith: parameters of the Hadith are variables and lists.

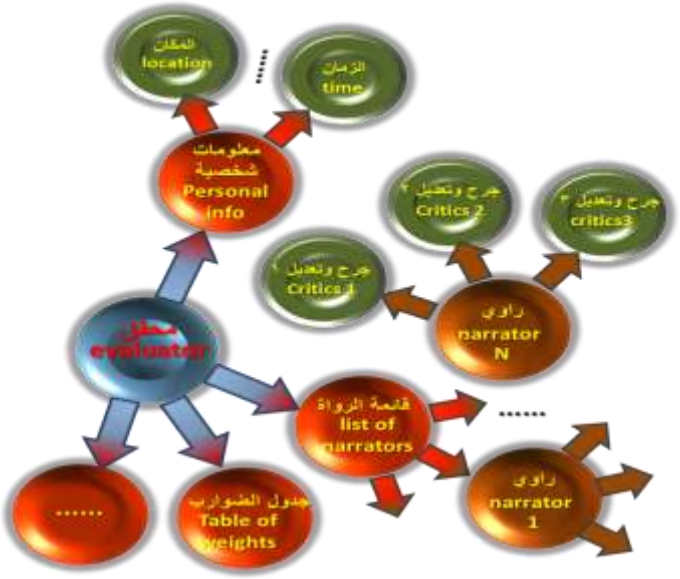

Fig 2 : Model of the evaluator: parameters of the evaluator are variables and lists.

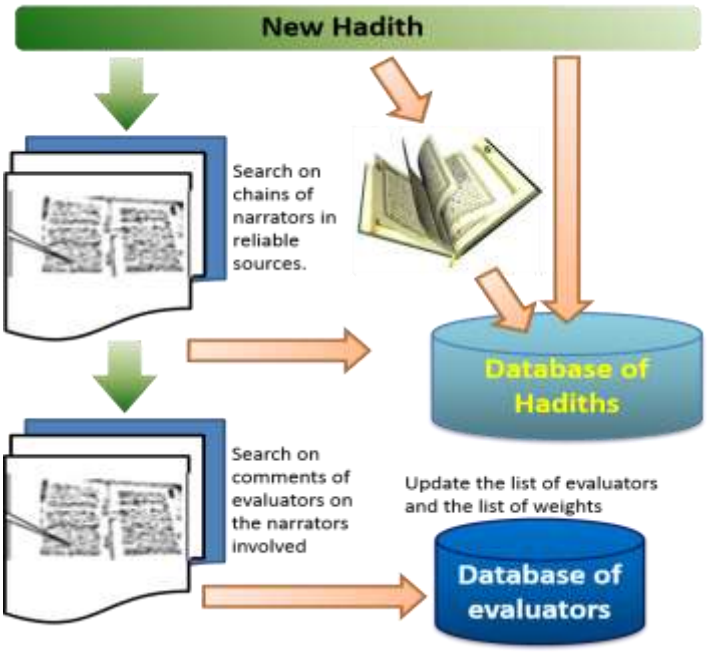

Fig 3 : Flowchart for entering a new Hadith in the platform.

5. RESULTS

The models are designed. The kernel of platform has been conceived by using the framework codeigniter. We also prepared the list of reliable sources to collect data. The process is long and requires human resources to enter data. We will start by validating the concept with few but illustrative data.

6. CONCLUSION

Our target is a platform offering an illustrative graphic based decision aid tool enabling the expert of Hadith to easily observe the chain with chains connected to it as well as its weaknesses and strengthens as per the available evaluations. This enables the expert to rapidly identify where he/she should go in depth (specific narrator, place, period of time, connection to another chain, etc...). We also offer an additional tool that helps for decision making namely the link between Hadith's content and timing to Qur'an. For example the Hadiths related to the pledge of satisfaction (or pledge of the tree: بيعة الرضوان أو البيعة تحت الشجرة) are connected to Sourat Al-Fath (Chapter 48 of the Qur'an).

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