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Development of Innovative Islamic Web Applications

Farrukh Shahzad

Abstract—The rich Islamic resources related to religious text, Islamic sciences, and history are widely available in print and in electronic format online. However, most of these works are only available in Arabic language. In this research, an attempt is made to utilize these resources to create interactive web applications in Arabic, English and other languages. The system utilizes the Pattern Recognition, Knowledge Management, Data Mining, Information Retrieval and Management, Indexing, storage and data-analysis techniques to parse, store, convert and manage the information from authentic Arabic resources. These interactive web Apps provide smart multi-lingual search, tree based search, on-demand information matching and linking. In this paper, we provide details of application architecture, design, implementation and technologies employed. We also presented the summary of web applications already developed. We have also included some screen shots from the corresponding web sites. These web applications provide an Innovative On-line Learning Systems (eLearning and computer based education).

Keywords—Islamic resources, Muslim scholars, hadith, narrators, history, fiqh.

I. Introduction

THERE are few websites and online resources available today which provide authentic Islamic knowledge in English or any other language except Arabic. There is huge collection of Islamic resources available online in Arabic. In this work, an effort is made to utilize some of these resources to develop innovative and interactive web applications.

The aim of this project is to provide easy to use, readily available and searchable authentic information related well known Islamic resources. It benefits Muslim community in general and students of knowledge in particular. As most of the Muslims are non-Arabs, this is the only source available online or offline today in English, for them to learn about different aspects of religious knowledge including ahadeeth of Prophet (saw) with chain of narrators, Muslim scholars, Islamic history, comparative Fiqh, etc. Non-Arabic speaking Muslims and student of knowledge can greatly benefit from this website without reading through huge volume of books in Arabic. Even for Arab Muslims, these web applications provide Islamic knowledge in an innovative and concise manner.

A. Benefits

- This is believed to be first extensive work in English on Islamic knowledge.
- The huge database of resources (Arabic) containing multi-volume books on Islamic sciences, hadith narrators and scholars are available for easy access.

F. Shahzad is with the Department of Information and Computer Science, KFUPM, Dhahran, Saudi Arabia (e-mail: farrukh@muslimscholars.info).

- The scholar information is interlinked within these resources, enabling access to original information about a particular scholar/narrator.
- Different variations of name and kunya for a particular narrator/scholar are captured.
- Known family members (parents, siblings, spouses, and children) are also recorded.
- Information like date of birth/death, places of stay, teacher and student list and narrator grade/rank provide useful details about hadeeth narrators.
- Student of hadeeth sciences can greatly benefit in the field of 'ilm al-rijal (knowledge of men/authorities), tabqat al-ruwat (classes of narrators) and al-jarh wa'l-ta'dil (impugnment and validation).
- This website/database can also serve as a resource for takhreej al-hadeeth.
- Quick access to all related scholars/narrators info is provided by utilizing time-lines.

B. Features

- It includes all major collections of ahadeeth (in progress).
- Arabic text and English translation are sourced from sunnah.com website.
- Information can be searched in many different ways (including keywords, Arabic text, Narrator name, etc.).
- Search options including Smart search box on top, Advanced search form and search by compilation or narrator.
- Narrators are linked to Muslim Scholar Database for detailed biography.
- Instant snapshot of Narrator's brief bio for each hadith.
- Detailed hadith referencing.
- Translation can be viewed in several languages using Google translate toolbox.
- Interactive Narrators' timeline for each hadith.
- Detailed Statistics based on ahadeeth narrated by a certain narrator.
- Color-coded narrator names based on generation (tabqa)

The rest of this paper is organized as follow. In Section II, we provide some background on Islamic writing with focus on books written on Men (scholars). In Section III, we provide the application design and implementation details in general. We presented summary of the some sites with screen shot in Section IV. The conclusion and future work are provided in Section V.

II. Background and Related Work

One of the first book written on Seerah of Prophet (saw) was dated back to around 150 AH (after Hijri) i.e around 700

CE by Ibn Ishaq [1]. Later specific books were written on scholars, including At-Thiqat [3], al-Tarikh-ul-Kabir [4] and Tabaqat [2]. These are considered original resources as they were complied in the 3rd century (Hijri). These compilation deals with the narrators of hadith in a general way. In the next few centuries (from 900 CE to 1200 CE), some great books were written on Islamic and general history such as The History of al-Tabari [5]. These resources not only describes the conquests and defeats but give detailed insight on the people living in those times in history including rulers, commander and scholars.

The later scholars wrote books on men of Hadith of particular book or group of books like 'six books'. Ibn Hajar al-'Asqalani [7] and Muhammad ibn Ahmed ibn 'Usman al-Dhahbi [6] are famous authors of such writings. They have written multiple books on hadeeth narrators and scholars including people who claimed to be scholars like lairs in hadith and fabricators. These writings are based on original sources mentioned above and other similar sources. Ibn Hajar al-'Asqalani placed the narrators into twelve ranks. The ranks as named and categorized by Ibn Hajar are widely accepted but not universal. Another great resource is Tahdheeb al-Kamal by al-Mizzi [8] with information broken down into lines, making it compatible with data mining tools available now a days. Recently, many of these books are translated in English and other languages. In our work, we utilized all above work as well as some recent books translated in English such as [9]-[11].

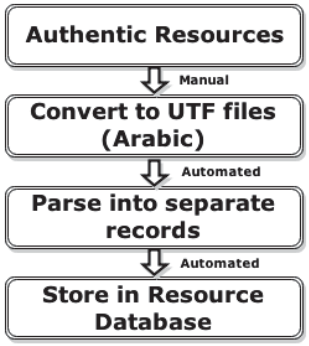

Fig. 1 Phase I - Raw data files to Resource database

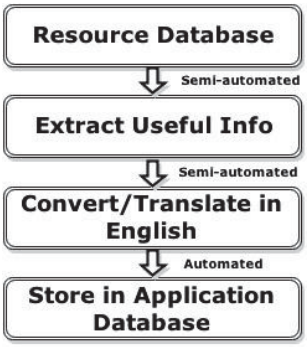

Fig. 2 Phase II - Information from Resource DB to Application DB

III. Application Design and Implementation Details

A. Offline Processing of Islamic Resources

The first phase was to process and convert needed huge collection of Islamic resources (mostly unstructured raw text files) into a structured database (RDMS). These resources, which are authentic multi-volume books in Arabic of Islamic knowledge and sciences, are available in the E-book format. They were downloaded and converted into several Arabic text files (UTF format). Some computer programs and scripts were written and run on these text files to convert raw information and store into a database (separating text into records). This resource database is also searchable via advanced search option in the web applications. This process is summarized in Fig. 1. In the second phase (Fig. 2), required information from resource database were extracted by running the set of intelligent computer programs using the knowledge management techniques and extract, transform and load methods (ETL). Another set of programs translated/converted the extracted information into English and stored them into the application database utilizing pattern recognition and artificial intelligence techniques. Then information is properly linked and cross-referenced among the different tables using semi-automatic methods where special computer programs were used to manually perform the job.

B. Software Reuse and Agile Development

In today's agile world of software development, applications are usually not created from scratch but already developed components and frameworks are employed as the starting point. The software is developed in phases where some parts of the complete system are developed in initial or prototype phase. We utilized all these modern concepts of software development. Several of the components developed for one web application are later utilized by the others. Similarly, the information or database is shared between applications.

C. Application Architecture

A system development methodology refers to the framework that is used to structure, plan, and control the process of developing an information system. Fig. 3 illustrates the generic architecture of the web application.

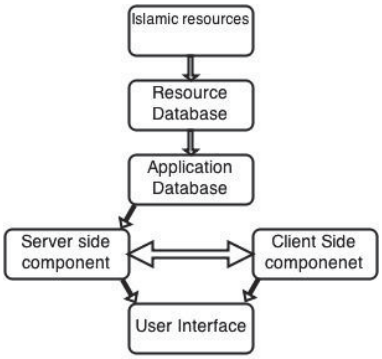

Fig. 3 Application architecture

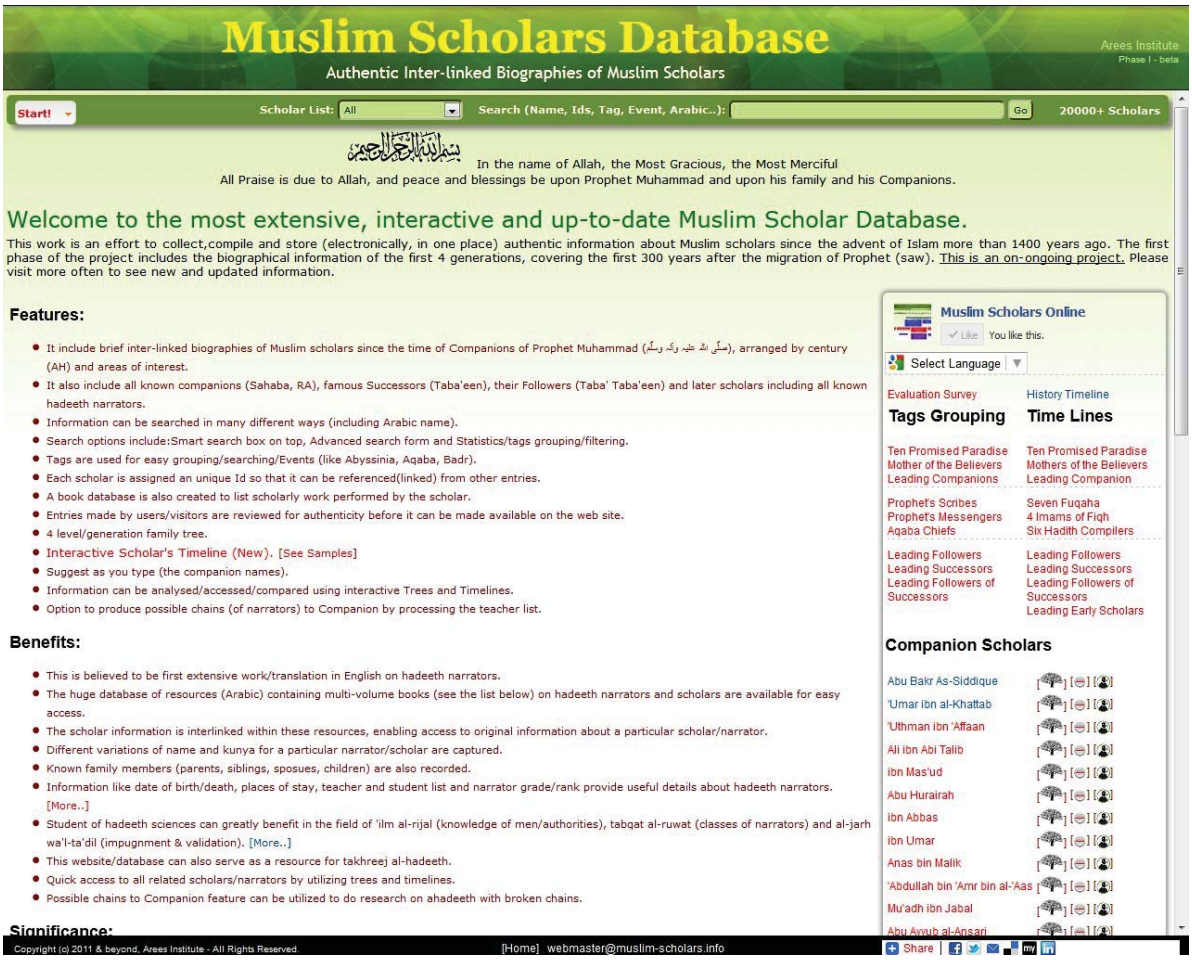

Fig. 4 Home page of Muslim Scholars Database website

D. Technology Employed

We have employed existing state-of-the-art technology of web design and development. We use Apache web server on Linux operating system to host our application. MySQL database is utilized to store all related tables for resources and application DB and to perform SQL queries (simple or complex) to search within the DB. We use PHP for dynamic content and on the user interface side we utilize, HTML, CSS, JavaScript and jQuery.

IV. Summary of Web Applications

There are four separate web applications which are available as of today. Although the framework is available, information has been added gradually and these applications will continue to expand in future.

A. Muslimscholars.info

This is an effort to collect, compile and store (electronically, in one place) authentic information about Muslim scholars since the advent of Islam more than 1400 years ago. The first phase of the project includes the biographical information of the first 4 generations, covering the first 300 years after the migration of Prophet (saw). This interactive website has been developed to display/search the information in various different ways. The work is in progress since March 2009. Fig. 4 shows the home page of the website with search bar. Some prominent companions and scholars are listed on the right side. Fig. 5 shows a part of a scholar detailed view (http://muslimscholars.info).

B. QaalaRasulAllah.com

It is an interactive and innovative web application which provides hadith text (matn), translation (English and other languages) and interactive chain of narrators (isnad) for all major hadith compilation. This huge effort is work in progress and is believed to be first extensive work in English on hadith narrators. The unique feature is that narrators are linked to Muslim Scholars Database (muslimscholars.info) to provide detailed biographies of each narrator. Information can be searched in many different ways (including keywords, Arabic text, Narrator name, etc.) and can be analyzed/accessed/compared using interactive Trees and Timelines. Other features include: Instant snapshot of narrator's brief bio for each hadith, detailed hadith referencing,

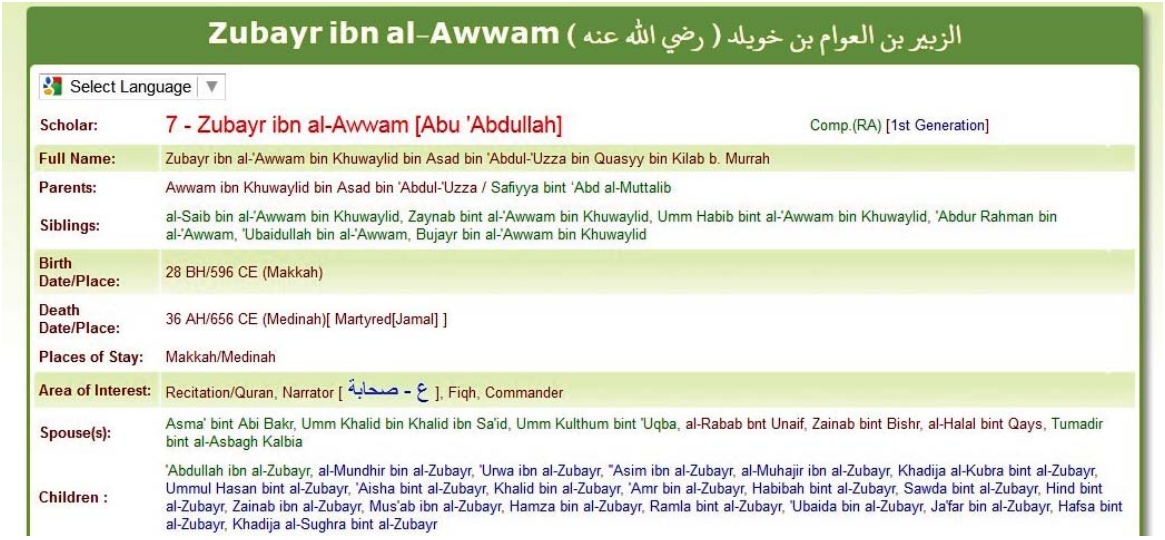

Fig. 5 A part of a scholar view from muslimscholars.info

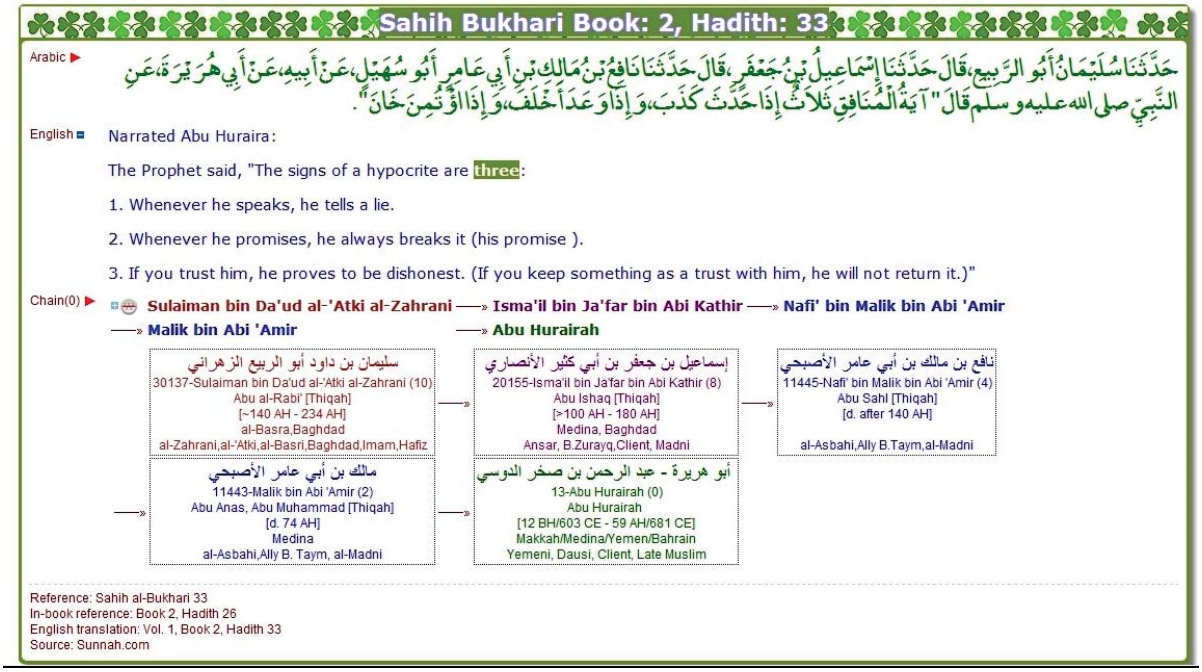

Fig. 6 A detailed hadith view from QaalaRasulAllah.com

translation can be viewed in several languages using Google translate toolbox, interactive narrators' timeline for each hadith, and color-coded narrator names based on his/her generation (tabqa). Fig. 6 shows http://qaalarasulallah.com/

C. Fiqhpedia.com

It is an Encyclopedia of Islamic Fiqh/Rulings containing Opinion of 4 Madhaib and other Scholars. It provides evidences from Quran & Sunnah, reasons for disagreements, rulings related of Ibadat and Mumalat, searchable Quran & Hadith Resources, English/Arabic search, Interactive Tree Lookup and much more. Fig. 7 shows detailed opinion of scholars on a fiqh issue. Quranic and hadith references are highlighted and can be viewed on mouse click. User can select the issues from the side tree (http://Fiqhpedia.com).

D. history.muslimscholars.info

This site provides authentic and Interactive timeline of Islamic History. It includes life and stories of Prophets, life and events during Prophet Muhammad (saw), history of rightly guided Caliphs, history of later caliphs (Umayyad, Abbasid, etc.), Islamic history of Spain, Africa, Sub-continent,

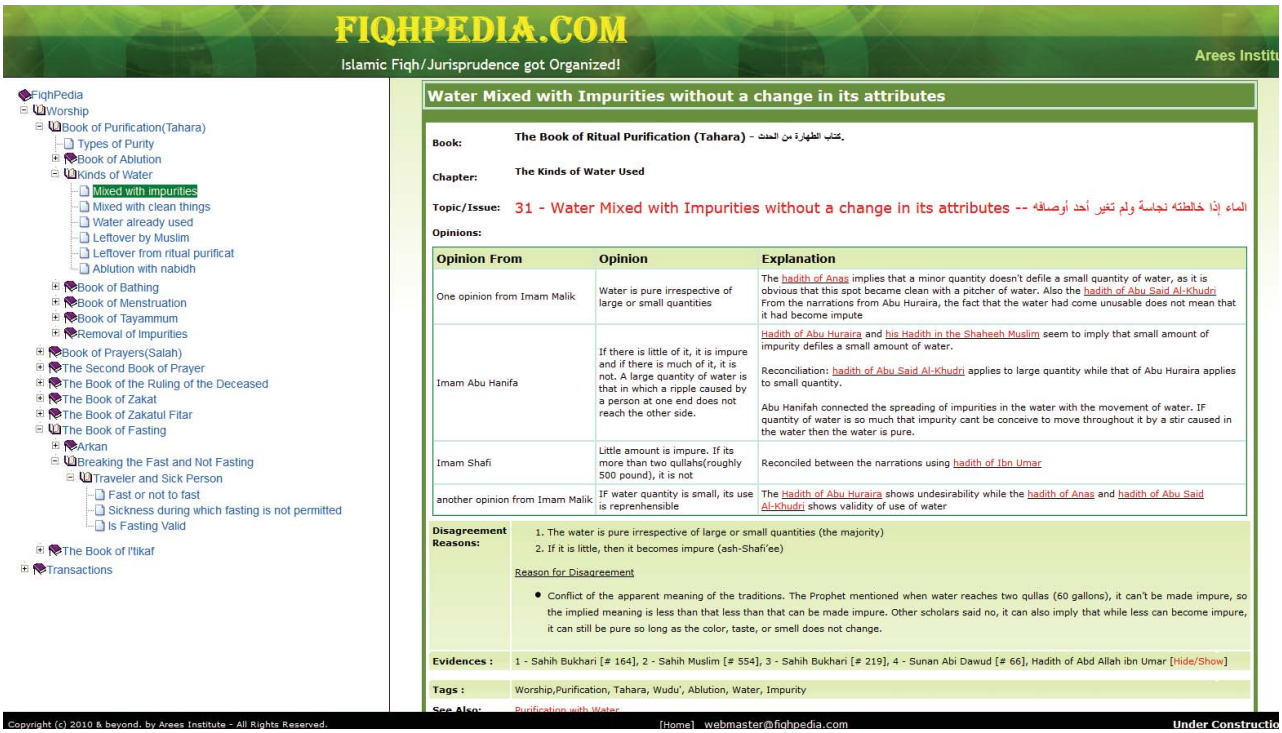

Fig. 7 Opinion of scholars on a Fiqh issue

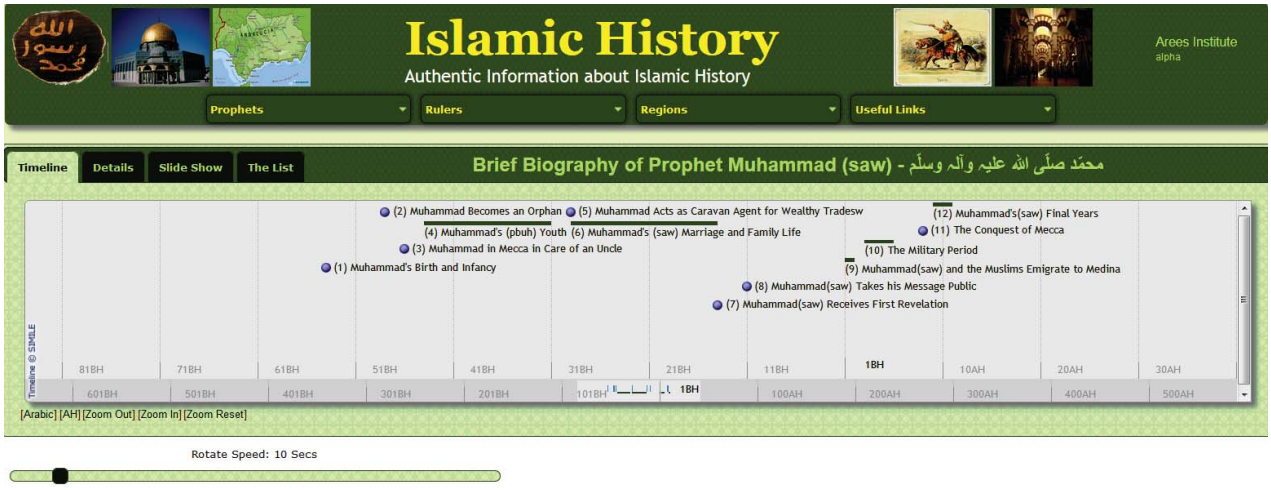

Fig. 8 A time-line showing events during Prophet (saw) life time

etc., information about rulers, battles and other events. The application contains information in English/Arabic, Timelines, Maps, Images and much more. Fig. 8 shows a time-line showing events during Prophet (saw) life time (http://history. muslimscholars.info).

V. Conclusion

Some interactive and beneficial/Islamic web applications are presented. The details of features, benefits, resources used, and implementation are also discussed. This is believed to be the first extensive work related to online Islamic knowledge in English. These applications can benefit general public as well as student of Islamic knowledge. It also provides information which was never available in any other language except Arabic, however, this site is quite useful for Arabic speaking Muslim as information is also available in Arabic. This work can be extended to have other collection of Islamic knowledge. We can also use state of the art data mining techniques to correlate between different Islamic sciences like ahadeeth can be matched in terms of subject matter with corresponding Qur'anic verses.

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Farrukh Shahzad received his BE (Electrical Engg.) from the NED University of Engineering & Technology, Karachi, Pakistan in 1992 , the MSEE from King Fahd University of Petroleum & Minerals (KFUPM), Dhahran, Saudi Arabia in 1996, and his Ph.D. from Information and Computer Science at KFUPM in 2015. In 1996, he moved to USA, where he gained 20 years field experience in product design, software development, engineering, and implementation of many M2M and satellite based remote monitoring systems. His current interests include Cloud storage security, Big Data analytics, Data sciences, Business intelligence, Machine learning and IoT/Wireless Sensor networks. He holds US copyright for four engineering software. His research activities resulted in publication of more than 15 technical papers in IEEE and other journals/proceedings.