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ORIGINAL ARTICLE

Online integrity and authentication checking for Quran electronic versions

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Received 24 April 2015; revised 18 July 2015; accepted 10 August 2015

KEYWORDS

Component;
Information retrieval;
Security;
Search engines;
Documents' auto-
matic evaluation;
Hashing algorithms;
Information
authentication

Abstract The ability to control data and information through the Internet can be challenging. Preliminary analysis showed that some tampering and forgery may occur to some words of the Quran in the electronic versions that span the Internet. Such small modifications may not be noticed by public audience. The holy book of Quran includes a unique feature in that its worldwide copies are all identical. The 114 chapters (Suras) and all their verses and words are preserved in the exact form. As such, we designed and evaluated a model and a tool to evaluate the integrity of the wording in the e-versions of the Quran through generating a Meta data related to all words in the Quran preserving the counts and locations. Such Meta data can be used in the same way hash algorithms are used in security to check the integrity of a disk and its data files where any small change in the data will result in a different hash value. We conducted several experiments to evaluate the different parameters and challenges that can impact the automatic authentication process of Quranic verses based on information retrieval and hashing algorithms.

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Peer review under responsibility of King Saud University.



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<http://dx.doi.org/10.1016/j.aci.2015.08.001>

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Please cite this article in press as: I. Alsmadi, M. Zarour, Online integrity and authentication checking for Quran electronic versions, Applied Computing and Informatics (2015), <http://dx.doi.org/10.1016/j.aci.2015.08.001>

1. Introduction

With the huge amount of information uploaded by users all over the world, internet is the central library that all humans in the world are using to exchange information. However, one of the major problems with the current web is that there is no control on the type, nature or details of information uploaded to the web by any user. Accordingly, credibility and accuracy are the foremost concerns when reading information from the web. Credibility can be linked to the website, hosting the information, author of uploaded data and the type of data or information itself. For example, in social networks or even news websites the same story can be told in exactly opposite versions given by two different websites or authors.

Authenticity and integrity of online documents is increasingly getting crucial as many organizations put their documents online. Providing facilities that allow both documents' owners and viewers to be able to ensure that their documents are authentic and not tampered is extremely important. Currently two major techniques or approaches are used to authenticate documents, or users online: Document control and digital signatures. Document control is related to permissions before and after publishing the document online. Document control then is needed to be dynamically applied in a manner that document can be tracked even after publishing it online. Integrity is about making sure that the document is not altered by any unauthorized person and hence is authenticated. In digital signatures, signed documents should be verified by the people who signed it (i.e. non-repudiation).

Nowadays, many multilingual copies of the holy Quran are available online. The holy Quran is originally written in Arabic language. The exact wording and statements in Quran verses are identical for all Arabic versions of the Quran.¹ However, one problem with translation is that it may change, intentionally or unintentionally the meaning of some verses when translated to another language. This is a general problem when dealing with translation. On the other hand, for the same language, it is possible that the same verse be written in different words due to intentional fraud or due to language translation issues.

Due to the sensitivity and the nature of Quran verses there is a vital need to continuously monitor Quran verses and chapters written through the Internet websites and pages to make sure that they are authenticated and not changed or fraud.

Hashing algorithms or checksums are used to verify the integrity of data in files, disks and databases. The hashing algorithms or tools take file or data as inputs and generate a unique decimal or hexadecimal number in a way where any small change that may occur to the data in the file will cause the hashing algorithm to produce a new random number that is different from the previous number that was generated before the modification. The Holy Quran is reserved and integrated

¹ Although different readings have few literal changes, those can impact the integrity checking process and hence we either use one reading or have different integrity datasets for the different readings. Experiments in this papers use "Hafs" reading.

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