Quran ‘Search for a Concept’ Tool and Website

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The candidate confirms that the work submitted is her own and that appropriate credit has been given where reference has been made to the work of others.

Acknowledgements

سورة النجم

وأن لَّيْسَ لِلْإِنسَانِ إِلَّا مَا سَعَى (39) وَأنَّ سَعْيَهُ سَوْفَ يُرَى (40)

***Chapter** An-Najm (The Star)*

YUSEFALI: And that man shall have nothing but what he strives for-And that his striving shall soon be seen-

Developing a tool for the Holy Quran that helps people better understand the topics and the themes of this book is one of the best things I have achieved in my life. It was the main source of pleasure and enthusiasm for nearly eighteen months. I have tried hard to accomplish this task in the best possible way. May God accept this work from me.

First of all I would like to thank my lovely husband for his continual and kind support. His belief that I can do the job always inspired me to work harder. I would not have been able to carry on without his love and encouragement. I am certainly very lucky to have him in my life! Thank you Ashraf very much for all that you have done for me.

My parents, mum and dad, I love you so much. Your phone calls were always very supportive, important and warm. I am very grateful to you for all that you have done for me. I would not have been the person I am today without having such great parents. God bless you.

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Abstract

The Quran is undoubtedly an important book, covering many themes and concepts. To help readers of the Quran to find and understand these concepts, this project developed a bilingual (English/Arabic) comprehensive search tool for the Holy Quran that significantly enhances recall and precision when searching for concrete concepts as well as for abstract concepts. As most of the available tools on the web use one English translation in the search process, the average recall and precision values for these tools are 54% for recall and 48% for precision whereas this tool proves 87% recall value and 58% for precision. Besides, it is the only tool that offers users a comprehensive hierarchical classification of Quran abstract topics or themes using expert knowledge imported from 'Mushaf Al Tajweed' ontology of the Quran. The index of topics covers nearly 1100 concepts in the Quran. The concepts in this index have an aggregation relationship; the hierarchy of concepts is non-reflexive, non-symmetric, and transitive.

Version 1 (V1) of the tool discussed in this thesis consists of two modules: the keyword search module that searches for concrete concepts and a comprehensive index of topics module that covers all the abstract concepts. The keyword search tool extends keywords to synonyms and uses eight parallel English translations of the Quran that have been stemmed and tokenized as well as the original Arabic. This proves to enhance the results of the search significantly. Also, extending the search process to look for lemmas and morphemes rather than just the keyword increases the accuracy of the search. The abstract concepts module is a list of all the themes covered in the Quran corpus which consists of fifteen main concepts that subdivide into sub-concepts and sub-sub concepts covering all the themes of the Quran.

This tool was published on the WWW (version 2 or V2) using Google Appengine SDK and server, in addition to the Yahoo! User Interface Library.

Another web tool (version 3 or V3) for the Quran concepts was developed which enables users to search for concepts (concrete and/or abstract) using the powerful google search engine.

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Part I

Introduction and Literature Review

Chapter 1: Introduction

The aim of this research is to develop a tool for searching for concepts in the Holy Quran book. Although the Quran is one of the important religious books of the world, there is little computational analysis performed on it. This is down to many reasons; the absence of adequate morphological analyzers for Classical Arabic (the language of the Quran), the nature of the text itself as it is not an ordinary text that we can put to standard machine processing but rather text that is compiled in some special way in terms of linguistic structures that can reveal different meanings across the ages.

1.1. An Overview of the Quran

The Quran consists of 114 chapters of varying lengths, each known as a *sura*. The title of each sura is derived from a name or quality discussed in the text or from the first letters or words of the sura. In general, the longer chapters appear earlier in the Quran, while the shorter ones appear later. Each sura is formed from several ayahs or verses which originally means a sign or portent sent by God. The number of the ayahs aren't the same in various Suras[1]. The Quran was revealed in the Arabic language and has been translated to other languages. The Quran corpus consists of 77, 784 word tokens and 19,287 word types [Sawalha and Atwell, 2008].

1.2. An Overview of the Arabic Language

The Arabic language is a Semitic language with many varieties. It is the largest living member of the Semitic language family in terms of speakers. Modern Arabic is classified as a macrolanguage with 27 sub-languages in ISO 639-3. These varieties are spoken throughout the Arab world, and Standard Arabic is widely studied and known throughout the Islamic world . Modern Standard Arabic (MSA) derives from Classical Arabic, the only surviving member of the Old North Arabian dialect group.

[1] See URL http://en.wikipedia.org/wiki/Classical_Arabic

The modern Standard language is closely based on the Classical language, and most Arabs consider the two varieties to be two registers of one and the same language. Classical Arabic, also known as Koranic (or Quranic) Arabic, is the form of the Arabic language used in the Quran as well as in numerous literary texts from Umayyad and Abbasid times (7th to 9th centuries). Modern Standard Arabic (MSA) is a modern version used in writing and in formal speaking (for example, prepared speeches and radio broadcasts). It differs minimally in morphology but has significant differences in syntax and lexicon, reflecting the influence of the modern spoken dialects. Classical Arabic is often believed to be the parent language of all the spoken varieties of Arabic[2].

1.2.1. Morphological Analysis Systems Developed for the Arabic Language

There are a number of Arabic morphological analysis systems developed for the MSA as it is the usual form of everyday written and printed materials. To name a few of the tools: [Beesley 1996, Beesley 1998; Beesley 2001; Al-Shalabi 1996; Darwish 2002]. A complete survey of these systems and the morphological analysis techniques used in developing them can be reviewed in [Al-Sughaiyer and Al-Kharashi, 2004]. In [Sawalha and Atwell 2008], a comparison between the accuracy of different Part-of-Speech taggers for the MSA is conducted. Also, a recent Part-of-Speech tagging system for the MSA text has been developed by [Alqrainy et al, 2008] which achieved an accuracy of 91%. But the text of the Holy Quran and more generally the collections of classical Arabic poetry have a different lexicon, morphology and syntax from that of the MSA. Hence, the inadequacy of the available tools to be used for analyzing the classical Arabic material and especially the Quran which is the most important book in the Muslim world.

[2] See URL http://en.wikipedia.org/wiki/Classical_Arabic

1.3. Understanding the Concepts of the Quran

The Quran, the holy book of Islam, may well be the most powerful book in human history, with the arguable exception of the Bible. Both in world history and contemporary affairs, it is doubful that any other book now commands, or has in the past exerted, so profound an influence. Objectively, one of every five people on earth today is Muslim [Rippin, 2006]. Hence, the importance of understanding the Quran for every Muslim and also for those scholars who are interested in the study of man and society, since this book has been effectively instrumental not only in moulding the destinies of Islamic societies, but also in shaping the destiny of the human race as a whole [Mutahhari, 1984]. Therefore, understanding the concepts of the Quran is of paramount importance if one wishes to study this book comprehensively.

1.3.1. Defining the meaning of a 'Concept'

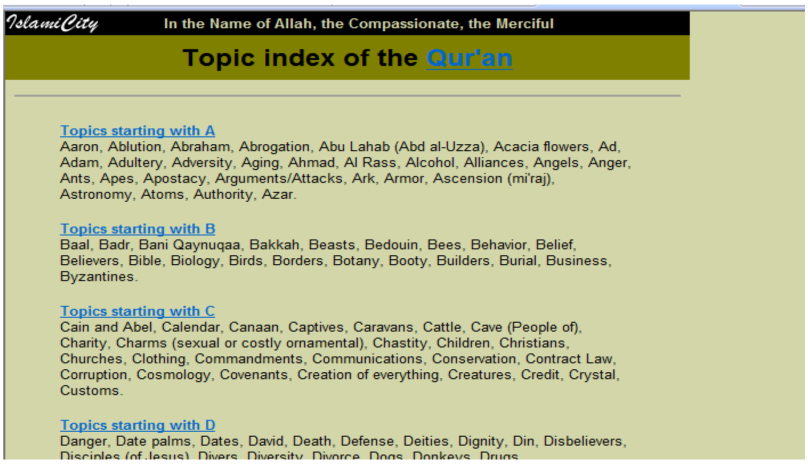
In the WordNet dictionary, a concept is defined as an abstract or general idea inferred or derived from specific instances. Defining concepts for any domain of knowledge is far from an easy task. [Bennett, 2005] considered the problem of defining concepts within formal ontologies. He concluded that the disagreement stems from the differences in understanding of the word 'concept'. Bennett says, "those who are skeptical about the idea of precision and universality tend to regard a 'concept' as something rather close to a natural language term, …But for a (classical) logician, a concept is an abstract entity that is largely independent of the vagaries of natural language: only in idealized circumstances can a concept within a formal system be regarded as the referent of a natural term." From a computational point of view, the second approach is more appealing. But, if we consider the case of holy books in general and the Quran in specific, all the classification of concepts are developed by people who come from a humanities background not from a computing one; they prefer the first approach.

1.3.2. Concepts/Themes of the Quran

Concepts could be classified in to two main categories: Concrete concepts (lexical or keyword concepts) and Abstract concepts (general concepts). An example of a concrete concept would be any word type or term that already exists in the text such as: names of persons, names of prophets, names of places or cities…etc. Abstract concepts are more general. They are not usually explicitly mentioned in the text. They represent general themes or features covered by the text. For instance, there are several verses in the Quran that describe the main pillars of Islam. This is an abstract concept and is the most important theme in the Quran but was never mentioned explicitly in the Quran book.

1.3.2.1. Concrete Concepts

Concrete concepts, consider every word type of the Quran as a concept. Developing computational systems for concrete terms generally involve using keyword search tools or providing a list of predefined topics (which is usually developed using a keyword search tool) or both. The main problem with the keyword search tools is their poor recall values (please, refer to chapter 6) and with the predefined lists of terms is the limited number of terms offered as shown in figure 1.



In the Name of Allah, the Compassionate, the Merciful

Topic index of the Qur'an

Topics starting with A
Aaron, Ablution, Abraham, Abrogation, Abu Lahab (Abd al-Uzza), Acacia flowers, Ad, Adam, Adultery, Adversity, Aging, Ahmad, Al Rass, Alcohol, Alliances, Angels, Anger, Ants, Apes, Apostacy, Arguments/Attacks, Ark, Armor, Ascension (mi'raj), Astronomy, Atoms, Authority, Azar.

Topics starting with B
Baal, Badr, Bani Qaynuqaa, Bakkah, Beasts, Bedouin, Bees, Behavior, Belief, Believers, Bible, Biology, Birds, Borders, Botany, Booty, Builders, Burial, Business, Byzantines.

Topics starting with C
Cain and Abel, Calendar, Canaan, Captives, Caravans, Cattle, Cave (People of), Charity, Charms (sexual or costly ornamental), Chastity, Children, Christians, Churches, Clothing, Commandments, Communications, Conservation, Contract Law, Corruption, Cosmology, Covenants, Creation of everything, Creatures, Credit, Crystal, Customs.

Topics starting with D
Danger, Date palms, Dates, David, Death, Defense, Deities, Dignity, Din, Disbelievers, Disciples (of Jesus), Divers, Diversity, Divorce, Dogs, Donkeys, Drugs

Figure 1 A snapshot for an Index of topics from the‘Islamicity’ website

As shown in figure 1, topics are arranged in alphabetical order. Limited number of topics is included in each section.

1.3.2.2. Abstract Concepts

1.3.2.2.1. The Need for Expert Knowledge

Understanding the meaning of the Quran verses through reading the *tafsir* (detailed explanation of the meaning of the verses) is quite helpful but does not draw the complete picture of the message that this book tries to convey to its readers. This is because the Quran covers one theme in many different chapters and to get the complete picutre, the reader must refer to all the passages with their context. In addition to that, the reader needs to relate the subject to the central themes, which are the main unifying ideas of the book. Therefore, the use of thematic approach helps us to comprehend the Quran's message by avoiding pitfalls and misuse of phrases by picking them out of context. This approach organizes subject matter around major or unifying themes, thus building them into a whole and enabling the readers to make important connections between them. This job must be carried out by an expert as there are some necessary conditions that needs to be fulfiled to be able to do this hard job properly. Murtada Mutahhari, a professor of theology in the University of Tehran, [Mutahhari, 1984] lists these conditions as follows:

The understanding of the Qur'an requires certain preliminaries which are briefly described here. The first essential condition necessary for the study of the Qur'an, is the knowledge of the Arabic language, such as for the understanding of Hafiz and Sa'di, it is impossible to get anywhere without the knowledge of the Persian language. In the same way, to acquaint oneself with the Qur'an without knowing the Arabic language is impossible. The other essential condition is the knowledge of the history of Islam. This book was revealed gradually during a long period of twenty-three years of the Prophet's life, a tumultuous time in the history of Islam. It is on this account that every verse of the Qur'an is related to certain specific historical incident called sha'n-i nuzul The sha'n-i nuzul, by itself does not restrict the meaning of the verses, but the knowledge of the particulars of revelation throws more light on the subject of the verses in an effective way. The third condition essential for the understanding of the Qur'an, is the correct knowledge of the sayings of the Prophet (S). He was, according to the Qur'an itself, the interpreter of the Qur'an par excellence. The Qur'an says:

We have revealed to you the Reminder that you may make clear to men what has been revealed to them ... (16:44) .

1.3.2.2.2. Existing (Expert) Theme Classifications for the Quran

There are some research carried out in this discipline which produced a number of invaluable classifications for the themes of the Quran. To name a few, Dr. Fazlur Rahman (1919 – 1988) classified the Quran in to eight main themes; God, Man as Individual, Man in Society, Nature, Prophet hood and Revelation, Eschatology, Satan and Evil, Emergence of Muslim Community. Another classification is found in Mushaf Al Tajweed [Habash, 2001]. Mushaf Al Tajweed is a version of the Quran that shows readers how to read the Quran correctly. 'Mushaf' is another name for the word 'Quran' book in Arabic and 'Al-Tajweed' refers to the rules for correctly reciting Quran in Arabic. This copy of the Quran contains a comprehensive index of topics that covers nearly 1100 concepts in the Quran. It is compiled by Dr. Mohamed Habash, who is the director of the Islamic Studies Centre in Damascus. It is published by Dar Al Maarifah in Syria and was authenticated also by Al Azhar Islamic Research Academy in Egypt. The list of themes classifies the Quran into fifteen main themes and subdivides the main themes into sub themes and sub sub themes and so on. Therefore, the relationship between the concepts is an aggregation one in which the concept of a parent concept is broader than that of a child concept. The 15 main themes are: The pillars of Islam, Faith, The Call for Allah, The Holy Quran, Jihad, Work, Man and the Moral Relations, Man and the Social Relations, Regulating the Financial Relations, Trade, Agriculture and Industry, Juridical Relations, The Political and the General Relations, Sciences and Arts, Religions, The Stories and the History.

The first concept or theme 'Pillars of Islam' is subdivided into: Islamic, Blessed Muhammad (PBUH), Religion, The Prayers, Due Alms and Charities, Fasting, Hajj and Umrah, and Miscellaneous Points of Worship.

The first sub-division 'Islamic' is subdivided into Oneness of Allah, The Ignorants of Religion, The Apostate's Punishment, Polytheism and the Polytheists, the Disbelievers, The Oppressive Liars, and The Apostates who Denies the Resurrection and so on.

Figure AI_1 in appendix I, shows a snapshot of this classification. Unfortunately, there is no computational tool that offers to search the Quran using any of these comprehensive classifications.

1.3.2.2.3. Developing a Conceptual Ontology Using OWL/ Protégé

Since the classification of concepts already exists, Owl and Protégé Owl are well documented as the best ontology tools to use in development. The W3C Web Ontology Working Group defined OWL aiming that it is going to be the standardized and broadly accepted ontology language of the Semantic Web[3], therefore, it seemed logical to use Protégé OWL in developing a Quran ontology. The Quran list of topics is considered an ontology if we interpret each label in this classification as "verses relating to this label" then each label refers to a set or class of verses. Hence, the classification or the index of topics does act as a class hierarchy or an ontology.

1.3.2.2.3.1. OWL/Protégé as an Ontology Tool

OWL builds on the power of Description Logics and allows both the definition of concepts and their interrelations as well as the description of instances [Vrandecic, 2005]. OWL has more facilities for expressing meaning and semantics than XML, RDF, and RDF-S, and thus OWL goes beyond these languages in its ability to represent machine interpretable content on the Web. OWL can be used to explicitly represent the meaning of terms in vocabularies and the relationships between those terms. This representation of terms and their interrelationships is called an ontology[4]. Often an ontology of a domain is not a goal in itself, it is akin to defining a set of data and their structure for other programs to use [Noy and McGuinness, 2001]. In this project, this ontology should be integrated with a keyword search tool that has already been developed using the Python programming language. The existing Python libraries which partially integrates RDF and OWL with Python are Sparta[5], Tramp[6] and Seth[7]. The first two basically bind RDF graph

[3] See URL http://www.cs.vu.nl/~frankh/postscript/OntoHandbook03OWL.pdf

[4] See URL http://xml.coverpages.org/owl.html

[5] See URL http://www.mnot.net/sw/sparta/

nodes to Python objects and RDF arcs to attributes of such objects. The projects however do not clearly address OWL and are mainly considered with RDF. Seth aims to deeply integrate Python (or any scripting language) to OWL. Instead of mapping OWL classes to Python classes, Seth maps them to intensional sets. Intensional sets are sets that are not defined by individual assertions of membership for all elements, but instead are described with OWL DL's construct and then, according to this description, encompass all fitting instances [Babik and Hluchy, 2006]. Unfortunately, Seth is an alpha version and was developed merely to present the deep integration idea only.

A prototype for the Quran ontology was developed, that consists of one parent class, 3 subclasses and one property using Protégé OWL. One of the subclasses contains a couple of instances (the instance consists of verse number and the corresponding chapter number). Protégé Owl allows users to export files in the RDF/XML format. A sample of the exported Ontology file and the python code to handle it is shown in figures AI_2 & AI_3 in appendix I. This illustrates the complexity of the RDF notation and also the sparta API for the accomplishment of the task.

Figures AI_2 & AI_3 (in appendix I) show the Python code used to map the ontology file using the Sparta API. Sparta is a wrapper around an rdflib Graph. An RDF node is represented as a Python object in Sparta, whose properties correspond to RDF arcs. To start working with a node, you must instantiate it with its identity. My detailed ontology contains more than 1100 nodes and nearly 18000 instances. Therefore, creating a Quran ontology in OWL and binding it to Python using an API will certainly lead to an enormous amount of time spent in programming and much effort just to map the nodes to my Python program compared to the same task carried out using the powerful Python data types.

[6] See URL http://www.aaronsw.com/2002/tramp

[7] See URL http://seth-scripting.sourceforge.net/

1.4. Summary

Little computational work has been done on the Quran. This is down to many reasons, among them are: the lack of adequate morphological analysers for Classical Arabic (the original language of the Quran text) as well as to the nature of the Quran text itself. In order to fully understand the concepts of the Quran, expert knowledge is needed.

1.5. Goals

Therefore, the main goals for this research project are:

- To build a bilingual (Arabic/English) tool for the Quran that can find matches for a comprehensive predefined sets of categories of topics covering all the abstract concepts of the Quran.
- To develop a bilingual (Arabic/English) tool that improves on the accuracy of the available keyword search tools already existing. This could be achieved by extending the English keyword search to rather a lemma search. The search for lemmas or morphemes increases the accuracy of the search and improves the recall value.
- Also, increasing the number of the English translations used in the search process. This should increase the chances of a term to be found in one of the translations used.
- To publish the final tool on the web.

This thesis covers three versions of the system. Version 1 (V1) is a standalone version of the Quran ‘Search for a Concept’ tool on my laptop. Version 2 (V2) is the ported tool on Google AppEngine Server. Version 3 (V3) is a revised architecture of the tool on the School of Computing server.

The thesis consists of seven chapters. Chapter 2 is a literature review chapter of the computational research performed on the Quran and on other religious books. Chapter 3 explains in detail the design of the Qurany ’ Search for a Concept’ tool, the features of the keyword search tool as well as the abstract tree of concepts tool. Chapter 4 discusses the tools used to publish this tool on the web and the details of the implementation of the ‘Qurany’ website. Chapter 5 explains the details of developing another web tool for the Quran; QuranyConcepts tool which is published on the University of Leeds server. Chapter 6 evaluates the Qurany ‘Search for a Concept’ tool as well as the published website. Chapter 7 concludes on all the work achieved in this research project.

Chapter 2: Literatature Review

2.1. Computational Research Performed on the Quran

The lack of computational research performed on the Quran is down to many reasons. One of them is due to the nature of the text itself as will be discussed in detail in section 1.2., another is the language of the Quran; Classical Arabic.

2.1.1. Morphological Analysis and Annotation of the Quran

A computational system for morphological analysis and annotation of the Quran was developed in the University of Haifa. The copy of the Quran used is a phonemic transcription of the text rather than a standard Arabic script. The transcription is based on ASCII notation. This system performs a number of queries on the Quran text that make reference not only to the words but also to their linguistic attributes [Talmon and Wintner, 2003]. Thus, users are able to extract from the text certain words or word patterns, using features of the words (such as root, pattern, lexeme, gender, number, dependent pronouns, tense and aspect, etc.); or combinations of words which conform to a particular structure [Dror et al, 2004]. A complete lexicon for the Quran in addition to a complete set of morphological rules of the language were stipulated using a finite-state based toolbox (LEXC/XFST, [Beesley and Karttunen, 2003]). This information is then compiled into finite-state transducers which constitute the morphological analyzer [Dror et al, 2004]. This system performed a full morphological analysis of the entire corpus of the Quran. Its accuracy was evaluated manually by annotating the eighth sura, consisting of a subset of 1248 words. For this subset, the system produced 1440 analyses, with an average degree of ambiguity 1.15. Comparing the analyses of the system to the manually annotated subset, 69 of the analyses were deemed incorrect, 205 as possible (but perhaps contextually wrong) and 1162 as the correct analysis. These figures yield 93% recall and 80% precision (see chapter 6). The results of the analysis are stored in a database in a form that encodes, for each analyzed word, its morphological features and their values. For example, an analysis for the first verse in the first chapter is shown in figure 2.

l-faatiHat-I	Def+ftH+Verb+Triptotic+Stem1+ActPart+Fem+Sg+Gen
bi-sm-I	b+Prep+sm+Noun+Triptotic+Masc+Sg+Gen
llaah-I	Def+llaah+ProperName+Gen
l-raHmaan-i	Def+rHm+fa&laan+Noun+Triptotic+Adjective+Masc+Sg+Gen
l-raHiim-I	Def+rHm+fa&iil+Noun+Triptotic+Adjective+Masc+Sg+Gen
l-Hamd-u	Def+Hmd+fa&l+Noun+Triptotic+Masc+Sg+Nom
li-llaah-I	l+Prep+Def+llaah+ProperName+Gen
rabb-i	rbb+fa&l+Noun+Triptotic+Masc+Sg+Pron+Dependent+1P+Sg
rabb-I	rbb+fa&l+Noun+Triptotic+Masc+Sg+Gen
l-&aalam-iina	Def+&lm+faa&al+Noun+Triptotic+Masc+Pl+Obliquus

Figure 2 Analysis for the first verse in the first Quran chapter

The University of Haifa Quran corpus was considered a suitable gold standard for comparing the results of Arabic morphological analyzers in [Sawalha and Atwell, 2008], and was reformatted and adapted as a gold standard for the MorphoChallenge 2009 morphological analysis research contest.

2.1.2. Understanding the Thematic Structure of the Quran

Another tool was developed for stemming a transliterated version of the Quran [Thabet, 2004]. It uses a new Light Stemming methodology to prepare the text for multivariate analysis of the lexical semantics of the Quran. The stemming technique used proved to lead to superior results over the other stemmers developed for the Arabic language. It also facilitated the study of the thematic structure of the chapters of the Quran [Thabet, 2005]. In this study, the construction and semantic interpretation of cluster trees based on lexical frequency proved to be a useful approach to discovering thematic interrelationships among the suras that constitute the Quran.

2.1.3. Developing a Chatbot for the Quran

[Abu-Shawar and Atwell, 2007] reported on a chatbot developed for the Quran at Leeds University; this chatbot answers questions from the Quran but it does not really understand the input, it just tries to find the most "significant" words in the question, and then finds verses from the Quran that match these words. This is essentially an extension of keyword-search: the user can type in a question as a full sentence, rather than just some keywords, but the system still in effect performs keyword-searches.

2.1.4. A Statistical Classifier for the Quran (two chapters only)

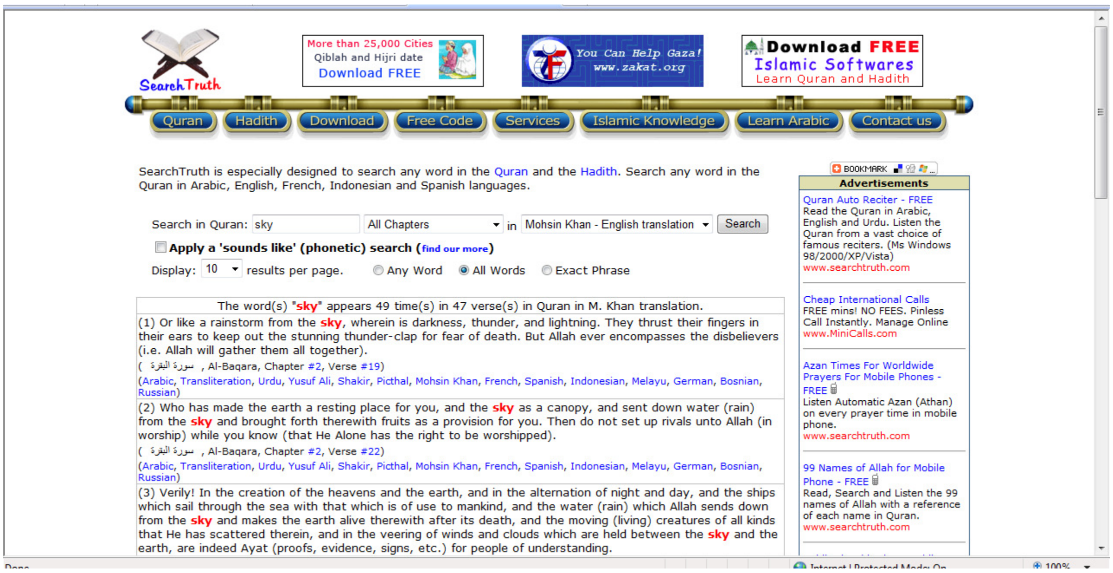
Another avenue of research is Machine Learning of topics. A statistical classifier for the Quran was developed that automatically classifies the verses of two chapters only (Fatiha and Yaseen chapters) from the Quran to a predefined set of features that complies with the classifications of Islamic scholars (Mushaf Al Tajweed's topic classification was used). This system uses data mining techniques to find patterns in the data that would map these verses to a set of predefined categories [Al-Kabi et al, 2005].

2.1.5. Quran Search Tools Available on the Web

There are many Quran search tools on the web. Most of them allow users to search in one English translation at a time which often leads to inaccurate results. Moreover, the keyword search does not allow semantic search for verses containing synonyms or semantically related words. Five popular Quran search tools have been studied, tested and compared to the Qurany 'Search for a Concept' tool.

2.1.5.1. The Search Truth tool

The Search Truth Quran search tool[8], allows users to search the Quran using one translation at a time. It does not search for the exact match of the word but rather if the word (to be searched for) is part of any word in the Quran. For instance, if you search for the word 'ship', all the verses that contain the words worship, friendship,...etc will be retrieved. The user is given the option of viewing the same verse in other languages as well as other English translations. As a result of using just one English translation in the search process, the Search Truth tool achieves a recall value of 53% and a precision value of 59% [please, see section 6.1. on evaluation]. It allows users to search for Arabic keyword/s.



SearchTruth is especially designed to search any word in the Quran and the Hadith. Search any word in the Quran in Arabic, English, French, Indonesian and Spanish languages.

Search in Quran: sky | All Chapters | in | Mohsin Khan - English translation

□ Apply a 'sounds like' (phonetic) search (find our more)

Display: 10 results per page. ○ Any Word ● All Words ○ Exact Phrase

The word(s) "sky" appears 49 time(s) in 47 verse(s) in Quran in M. Khan translation.

(1) Or like a rainstorm from the sky, wherein is darkness, thunder, and lightning. They thrust their fingers in their ears to keep out the stunning thunder-clap for fear of death. But Allah ever encompasses the disbelievers (i.e. Allah will gather them all together).
(سورة البقرة , Al-Baqara, Chapter #2, Verse #19)
(Arabic, Transliteration, Urdu, Yusuf Ali, Shakir, Picthal, Mohsin Khan, French, Spanish, Indonesian, Melayu, German, Bosnian, Russian)

(2) Who has made the earth a resting place for you, and the sky as a canopy, and sent down water (rain) from the sky and brought forth therewith fruits as a provision for you. Then do not set up rivals unto Allah (in worship) while you know (that He Alone has the right to be worshipped).
(سورة البقرة , Al-Baqara, Chapter #2, Verse #22)
(Arabic, Transliteration, Urdu, Yusuf Ali, Shakir, Picthal, Mohsin Khan, French, Spanish, Indonesian, Melayu, German, Bosnian, Russian)

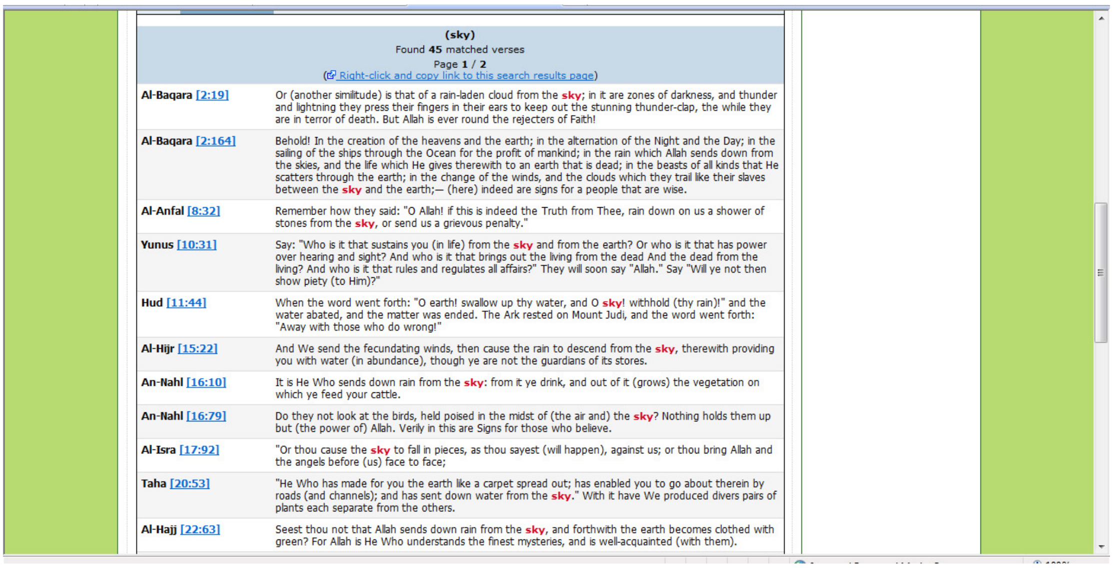
(3) Verily! In the creation of the heavens and the earth, and in the alternation of night and day, and the ships which sail through the sea with that which is of use to mankind, and the water (rain) which Allah sends down from the sky and makes the earth alive therewith after its death, and the moving (living) creatures of all kinds that He has scattered therein, and in the veering of winds and clouds which are held between the sky and the earth, are indeed Ayat (proofs, evidence, signs, etc.) for people of understanding.

Figure 3 A snapshot of the Search Truth tool

[8] See URL http://www.searchtruth.com/

2.1.5.2. The Guided Ways tool

The Guided Ways Quran search tool[9], allows users to search the Quran using one translation at a time. The user can choose the Quran translation used in the search process. It searches the Quran for an exact match of the input word. When tested, it scored a recall value of 49% and a precision value of 58% [please, see section 6.1. on evaluation]. The user can search for Arabic keyword/s.



(sky)
Found **45** matched verses
Page **1** / **2**
(Right-click and copy link to this search results page)

Al-Baqara [2:19]	Or (another similitude) is that of a rain-laden cloud from the **sky**; in it are zones of darkness, and thunder and lightning they press their fingers in their ears to keep out the stunning thunder-clap, the while they are in terror of death. But Allah is ever round the rejecters of Faith!
Al-Baqara [2:164]	Behold! In the creation of the heavens and the earth; in the alternation of the Night and the Day; in the sailing of the ships through the Ocean for the profit of mankind; in the rain which Allah sends down from the skies, and the life which He gives therewith to an earth that is dead; in the beasts of all kinds that He scatters through the earth; in the change of the winds, and the clouds which they trail like their slaves between the **sky** and the earth;— (here) indeed are signs for a people that are wise.
Al-Anfal [8:32]	Remember how they said: "O Allah! if this is indeed the Truth from Thee, rain down on us a shower of stones from the **sky**, or send us a grievous penalty."
Yunus [10:31]	Say: "Who is it that sustains you (in life) from the **sky** and from the earth? Or who is it that has power over hearing and sight? And who is it that brings out the living from the dead And the dead from the living? And who is it that rules and regulates all affairs?" They will soon say "Allah." Say "Will ye not then show piety (to Him)?"
Hud [11:44]	When the word went forth: "O earth! swallow up thy water, and O **sky**! withhold (thy rain)!" and the water abated, and the matter was ended. The Ark rested on Mount Judi, and the word went forth: "Away with those who do wrong!"
Al-Hijr [15:22]	And We send the fecundating winds, then cause the rain to descend from the **sky**, therewith providing you with water (in abundance), though ye are not the guardians of its stores.
An-Nahl [16:10]	It is He Who sends down rain from the **sky**: from it ye drink, and out of it (grows) the vegetation on which ye feed your cattle.
An-Nahl [16:79]	Do they not look at the birds, held poised in the midst of (the air and) the **sky**? Nothing holds them up but (the power of) Allah. Verily in this are Signs for those who believe.
Al-Isra [17:92]	"Or thou cause the **sky** to fall in pieces, as thou sayest (will happen), against us; or thou bring Allah and the angels before (us) face to face;
Taha [20:53]	"He Who has made for you the earth like a carpet spread out; has enabled you to go about therein by roads (and channels); and has sent down water from the **sky**." With it have We produced divers pairs of plants each separate from the others.
Al-Hajj [22:63]	Seest thou not that Allah sends down rain from the **sky**, and forthwith the earth becomes clothed with green? For Allah is He Who understands the finest mysteries, and is well-acquainted (with them).

Figure 4 A snapshot of the Guided Ways tool

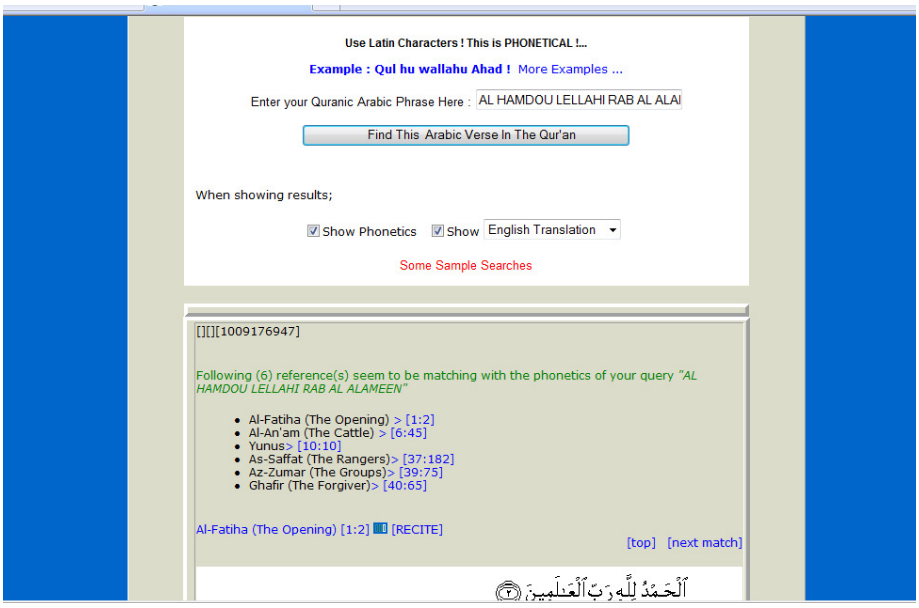
2.1.5.3. The IslamiCity tool

The IslamiCity search tool[10], searches the Quran using one English translation at a time. When a user inputs a word (to be searched for), the tool matches it against identical matches or partial matches (part of the word). It scored a value of 43% for recall and 43% for precision when Pickthall translation was used [please, see section 6.1. on evaluation]. It does not allow users to search for Arabic keyword/s.

[9] See URL http://www.guidedways.com/search.php

[10] See URL http://www.islamicity.com/mosque/quran/

The site also offers the users a phonetic search for the Quran. To be able to use the phonetic search tool correctly, the user must have a good knowledge of the transcription into the Roman alphabet or the transliteration adopted. With phonetical search, the user has the freedom to spell the Arabic words his/her way, using the familiar English alphabet and submit them for search. The errors that might be present in the spelling are tolerated, corrected and then searched within the Quran. Phonetical search presented by this site is performed on the Arabic Quran.



Use Latin Characters ! This is PHONETICAL !...

Example : Qul hu wallahu Ahad ! More Examples ...

Enter your Quranic Arabic Phrase Here : AL HAMDOU LELLAHI RAB AL ALAI

When showing results;

☑ Show Phonetics ☑ Show English Translation

[][][1009176947]

Following (6) reference(s) seem to be matching with the phonetics of your query *"AL HAMDOU LELLAHI RAB AL ALAMEEN"*

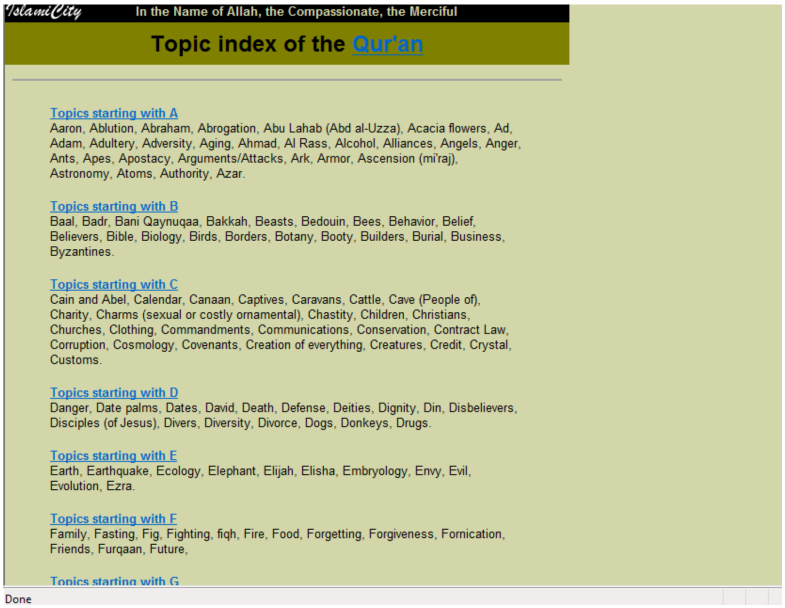
- Al-Fatiha (The Opening) > [1:2]
- Al-An'am (The Cattle) > [6:45]
- Yunus> [10:10]
- As-Saffat (The Rangers)> [37:182]
- Az-Zumar (The Groups)> [39:75]
- Ghafir (The Forgiver)> [40:65]

Al-Fatiha (The Opening) [1:2] [RECITE]

ٱلْحَمْدُ لِلَّهِ رَبِّ ٱلْعَٰلَمِينَ ﴿٢﴾

Figure 5 A snapshot of the IslamiCity Phonetical Search

The IslamiCity website also offers a Quran topics search which is basically a list of topics arranged in an alphabetical order as shown in the figure below. The website does not state the source of the list of topics, so we have no idea of its academic credibility.



IslamiCity In the Name of Allah, the Compassionate, the Merciful

Topic index of the Qur'an

Topics starting with A
Aaron, Ablution, Abraham, Abrogation, Abu Lahab (Abd al-Uzza), Acacia flowers, Ad, Adam, Adultery, Adversity, Aging, Ahmad, Al Rass, Alcohol, Alliances, Angels, Anger, Ants, Apes, Apostacy, Arguments/Attacks, Ark, Armor, Ascension (mi'raj), Astronomy, Atoms, Authority, Azar.

Topics starting with B
Baal, Badr, Bani Qaynuqaa, Bakkah, Beasts, Bedouin, Bees, Behavior, Belief, Believers, Bible, Biology, Birds, Borders, Botany, Booty, Builders, Burial, Business, Byzantines.

Topics starting with C
Cain and Abel, Calendar, Canaan, Captives, Caravans, Cattle, Cave (People of), Charity, Charms (sexual or costly ornamental), Chastity, Children, Christians, Churches, Clothing, Commandments, Communications, Conservation, Contract Law, Corruption, Cosmology, Covenants, Creation of everything, Creatures, Credit, Crystal, Customs.

Topics starting with D
Danger, Date palms, Dates, David, Death, Defense, Deities, Dignity, Din, Disbelievers, Disciples (of Jesus), Divers, Diversity, Divorce, Dogs, Donkeys, Drugs.

Topics starting with E
Earth, Earthquake, Ecology, Elephant, Elijah, Elisha, Embryology, Envy, Evil, Evolution, Ezra.

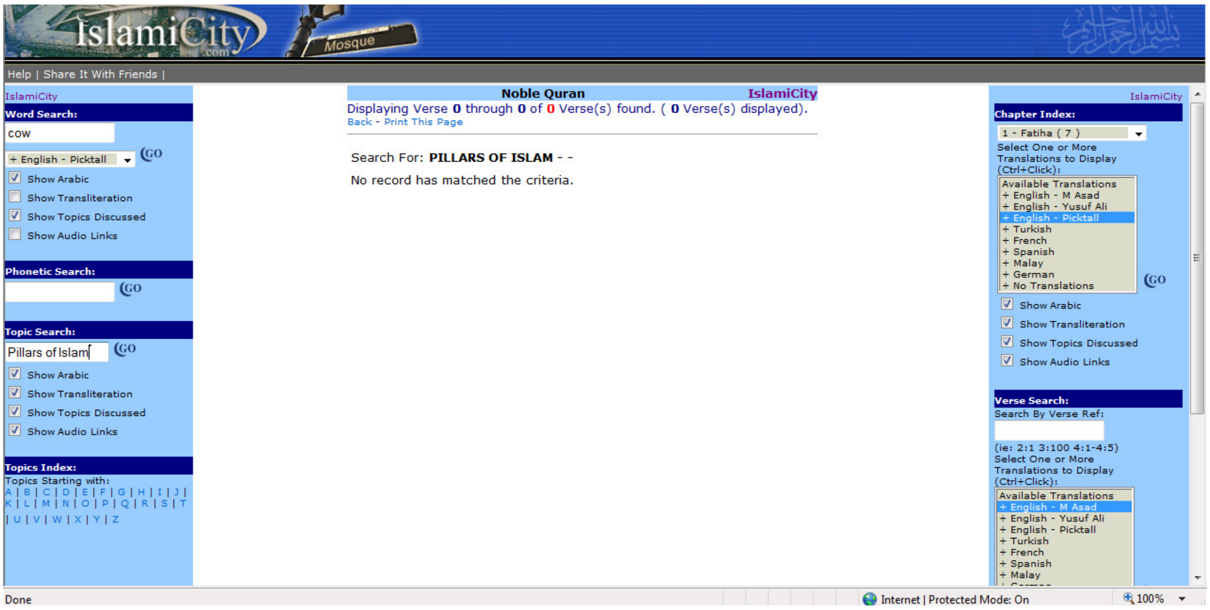
Topics starting with F
Family, Fasting, Fig, Fighting, fiqh, Fire, Food, Forgetting, Forgiveness, Fornication, Friends, Furqaan, Future,

Topics starting with G

Done

Figure 6 A snapshot of IslamiCity Topics Search

Besides, the IslamiCity website offers a search tool for the topics of the Quran. When asked to search for ‘Pillars of Islam’ which is a fundamental concept in the Quran, it failed to retrieve any results as shown in the figure below. This concept is not included in the predefined list of topics either.



Word Search: cow

+ English - Picktall GO

☑ Show Arabic
☐ Show Transliteration
☑ Show Topics Discussed
☐ Show Audio Links

Phonetic Search: GO

Topic Search: Pillars of Islam GO

☑ Show Arabic
☑ Show Transliteration
☑ Show Topics Discussed
☑ Show Audio Links

Topics Index:
Topics Starting with:
A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z

Noble Quran IslamiCity

Displaying Verse 0 through 0 of 0 Verse(s) found. (0 Verse(s) displayed).
Back - Print This Page

Search For: PILLARS OF ISLAM - -

No record has matched the criteria.

IslamiCity

Chapter Index: 1 - Fatiha (7)

Select One or More Translations to Display (Ctrl+Click):
Available Translations
+ English - M Asad
+ English - Yusuf Ali
+ English - Picktall
+ Turkish
+ French
+ Spanish
+ Malay
+ German
+ No Translations
GO

☑ Show Arabic
☑ Show Transliteration
☑ Show Topics Discussed
☑ Show Audio Links

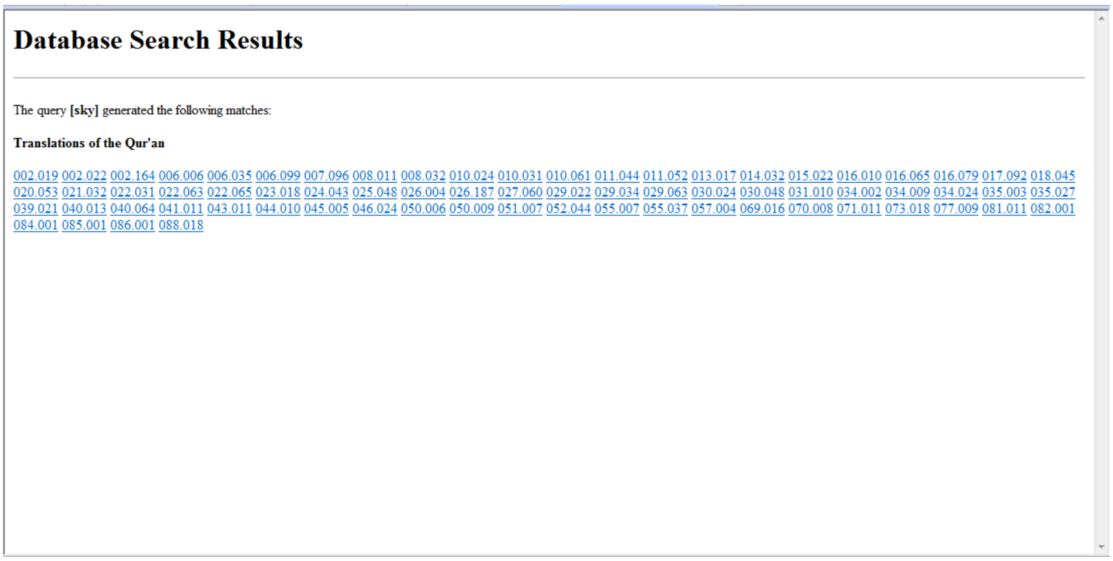
Verse Search:
Search By Verse Ref:
(ie: 2:1 3:100 4:1-4:5)
Select One or More Translations to Display (Ctrl+Click):
Available Translations
+ English - M Asad
+ English - Yusuf Ali
+ English - Picktall
+ Turkish
+ French
+ Spanish
+ Malay

Done | Internet | Protected Mode: On | 100%

Figure 7 A snapshot of the IslamiCity Topics Search Tool

2.1.5.4. The MSA tool

The MSA Quran search tool[11] searches the Quran using three English translations; Yusef Ali, Pickthall, Shakir by default. It matches exact words only. The search results are displayed as urls for the matching verses as shown in the figure below. The MSA tool scored a value of 58% for recall and 61% for precision [please, see section 6.1. on evaluation].



Database Search Results

The query [sky] generated the following matches:

Translations of the Qur'an

002.019 002.022 002.164 006.006 006.035 006.099 007.096 008.011 008.032 010.024 010.031 010.061 011.044 011.052 013.017 014.032 015.022 016.010 016.065 016.079 017.092 018.045 020.053 021.032 022.031 022.063 022.065 023.018 024.043 025.048 026.004 026.187 027.060 029.022 029.034 029.063 030.024 030.048 031.010 034.002 034.009 034.024 035.003 035.027 039.021 040.013 040.064 041.011 043.011 044.010 045.005 046.024 050.006 050.009 051.007 052.044 055.007 055.037 057.004 069.016 070.008 071.011 073.018 077.009 081.011 082.001 084.001 085.001 086.001 088.018

Figure 8 A snapshot of the Search Results page for the MSA tool

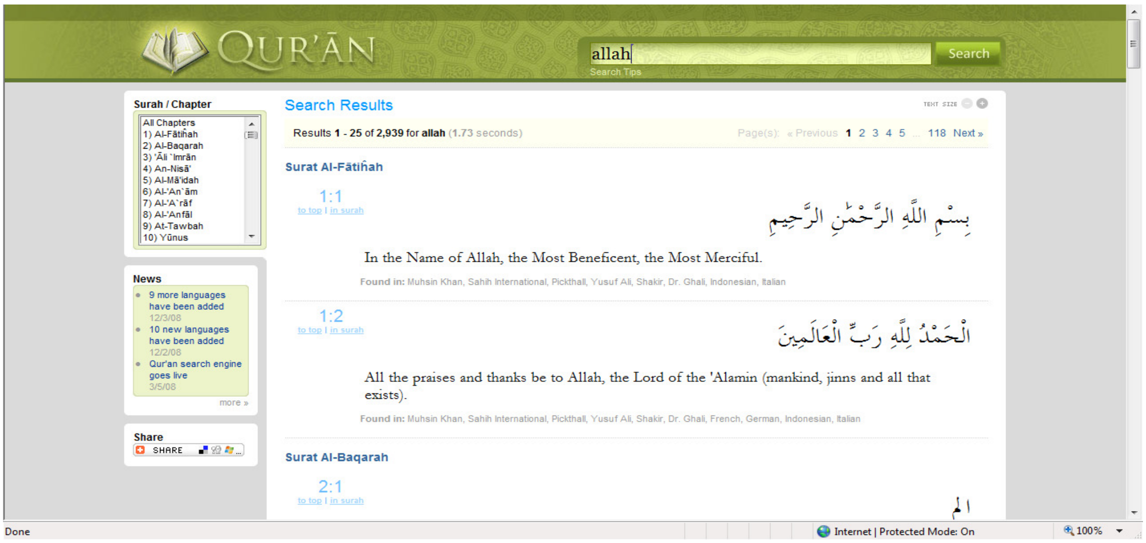
2.1.5.5.The Quran Iman tool

The Quran Iman search tool[12] searches the Quran using five English translations by default; Khan, Sahih International, Pickthall, Yusuf Ali, Shakir and Dr Ghali. It searches for lemmas of the word rather than for the exact match. It

[11] See URL http://www.usc.edu/dept/MSA/reference/searchquran.html

[12] See URL http://quran.iman.net/news/2008/03/05

scored a value of 74% for recall and 52% for precision [please, see section 6.1. on evaluation]. It allows users to search for Arabic keyword/s.



9 more languages have been added 12/3/08

10 new languages have been added 12/2/08

Qur'an search engine goes live 3/5/08

Search Results

Results **1** - **25** of **2,939** for **allah** (1.73 seconds)

Surat Al-Fātiĥah

1:1

بِسْمِ اللَّهِ الرَّحْمَٰنِ الرَّحِيمِ

In the Name of Allah, the Most Beneficent, the Most Merciful.

Found in: Muhsin Khan, Sahih International, Pickthall, Yusuf Ali, Shakir, Dr. Ghali, Indonesian, Italian

1:2

الْحَمْدُ لِلَّهِ رَبِّ الْعَالَمِينَ

All the praises and thanks be to Allah, the Lord of the 'Alamin (mankind, jinns and all that exists).

Found in: Muhsin Khan, Sahih International, Pickthall, Yusuf Ali, Shakir, Dr. Ghali, French, German, Indonesian, Italian

Surat Al-Baqarah

2:1

الم

Figure 9 A snapshot of the Search Results page for the Quran Iman tool

2.1.6. Summary – Key Ideas from Quran Search Tools

Quran search tools allow users to search for English keyword/s. Some of them enable users to search for Arabic keyword/s as well. Some search tools search the Quran for an exact match of the word/s, others search for lemmas or morphemes and some match only part of the word. The number of the English translations used in the search vary. Searching for abstract topics is not supported by any of the Quran tool surveyed in this study.

QuranTools Features	Search Truth	Guided Ways	IslamiCity	MSA	Quran Iman
English Keyword/s Search	Y	Y	Y	Y	Y
Arabic Keyword/s Search	Y	Y	N	N	Y
Number of	1	1	1	3	5

Translations Used **Search for Exact-Match (E), Lemma (L), Part of the word (P)**	P	E	P	E	L
Topics Index	N	N	Y	N	N

2.2. Computational Research Performed on Other Religious Books

2.2.1. Latent Semantic Analysis of Religious Text

[Nakov, 2000] conducted a study to show the general application of Latent Semantic Analysis (LSA) for textual information retrieval. LSA is used to find generic “similarity” between texts; based on the vocabulary in the texts. The study used an English language collection of 1424 files for different religious books; The Bible (the Old Testament, the New Testament), the Dead Sea scripts, 4 kinds of apocripha (acts, apocalypses, gospels, writings), Buddhism, Confucianism, The Egyptian Book of the Dead, Sun Tzu: The Art of War, Zoroastrianism, the Quran and the Book of Mormons. LSA is a two-stage process and includes education and analysis of the indexed data. During the education phase LSA performs an automatic document indexing. The second phase is the analysis phase. Most often this includes the study of the proximity between a couple of documents, a couple of words or between a word and a document. The proximity degree between two documents can be calculated as the dot product between their normalized LSA vectors.

The results of this study reveal that the proximity between the English versions of two religious texts belonging to different religions whose original is not English is highly influenced by the translation process. This is especially the case with the religious texts that have been submitted to several translations before being published in English on the Internet. A good example is the Egyptian Book of the Dead which was first translated to French and then from French to English.

2.2.2. The Bible

Like the Quran, the Bible has not been widely used as a multilingual corpus by the computational linguistics and information retrieval community. The reason for the Bible being ignored may be the often unspoken assumption that the domain of the Bible is too limited (being a religious document) or that its content is too archaic [Chew et al, 2006]. Much of the Bible's content has to do with enduring human concerns (life, death, war, love,…etc.), and the main reason for the archaic language is down to the translation style used rather than the content itself [Chew et al, 2006]. Two main similarities between the Quran and the Bible are that the text is largely standardized in terms of chapters and verses and both of them have been carefully translated into many languages.

2.2.2.1. Evaluation of the Bible as a Resource for Cross-Language Information Retrieval

An area of recent interest in Cross-Language Information Retrieval (CLIR) is the question of which parallel corpora might be the best suited to tasks in CLIR or even to what extent parallel corpora can be obtained or are necessary [Chew et al, 2006]. Essentially, this study is trying to find an answer to the question of how ideologically aligned two documents are, regardless of their respective languages is the main interest of this study. Choosing the Bible for this study is down to many reasons. Firstly, it is the world's most translated book, with translations in over 2100 languages (often, multiple translations per language) and easy availability, often in electronic form and in the public domain. Secondly, it covers a variety of literary styles including narrative, poetry, and correspondence. Thirdly, great care is taken over the translations. Also, it has a standard structure which allows parallel alignment on a verse-by-verse basis [Chew et al, 2006].

All their work was implemented using the Sandia Text Analysis Extensible Library (STANLEY). They used three methods to validate the results obtained; preliminary analysis, simple validation and validation on a larger test set. In their third method of validation, the validation on a larger test set, they used the Bible against the 114 suras of the Quran, performing a four-by four-way test using; the original Arabic text, the English text, the Russian and the Spanish translations. The results showed that for 52.63% of the 114 English documents used as input, the correct Spanish document was retrieved first.

2.2.2.2. A Project to Annotate the Bible Text Creating an Aligned Multilingual Bible Corpus

The annotated aligned multilingual Bible corpus is for research purposes. A standard intermediate-level of annotation has been achieved, delimiting book, chapter and verse, for a growing collection of languages [Resnik et al, 1999]. Analyses using the LDOCE control vocabulary and the Brown Corpus of American English show that the Bible covers a wide range of modern-day vocabulary. This coverage, and the collection's remarkable qualities as a cross-language database, makes the Bible as-multilingual-corpus a unique resource for linguistic research.

2.2.2.3. A System for Automatic Segmentation, Annotation and Image Retrieval for the Bible

[Grana et al, 2008] conducted a research that presents a system for automatic analysis and image retrieval by content, focusing on a specific set of images coming from the digitalization of the Borso d'Este Holy Bible. A set of techniques has been studied in order to obtain good retrieval results with a limited computational effort. The texture features with circular statistics, in particular Von Mises distribution is very general and could be applied in many other document analysis applications. The research also proposes a flexible annotation structure that will be used to store the analysis results and to integrate semantic information (from experts) about retrieved images. Retrieval functionalities and commentaries will be proposed as a standalone application, suitable for a large scale implementation in museums, in order to give to the user a new innovative way to interact with masterpieces.

2.2.3. The Greek New Testament

2.2.3.1. A Computational Model for Text Reuse for the Greek New Testament

A model of text reuse tailored for the Greek New Testament text with novel features that account for source alternation patterns has been presented by [Lee, 2007]. These features were validated on the Lukan Passion Narrative, an instance of text reuse in the Greek New Testament. The model's predictions on this passage are compared to nine scholarly hypotheses. When tuned on the text-reuse hypothesis of a certain researcher on the training text, it favours the hypothesis of the same person on the test text. This demonstrates the model's ability to capture the researcher's particular understanding of text reuse.

2.2.3.2. A Morphological Analysis System for the Greek New Testament

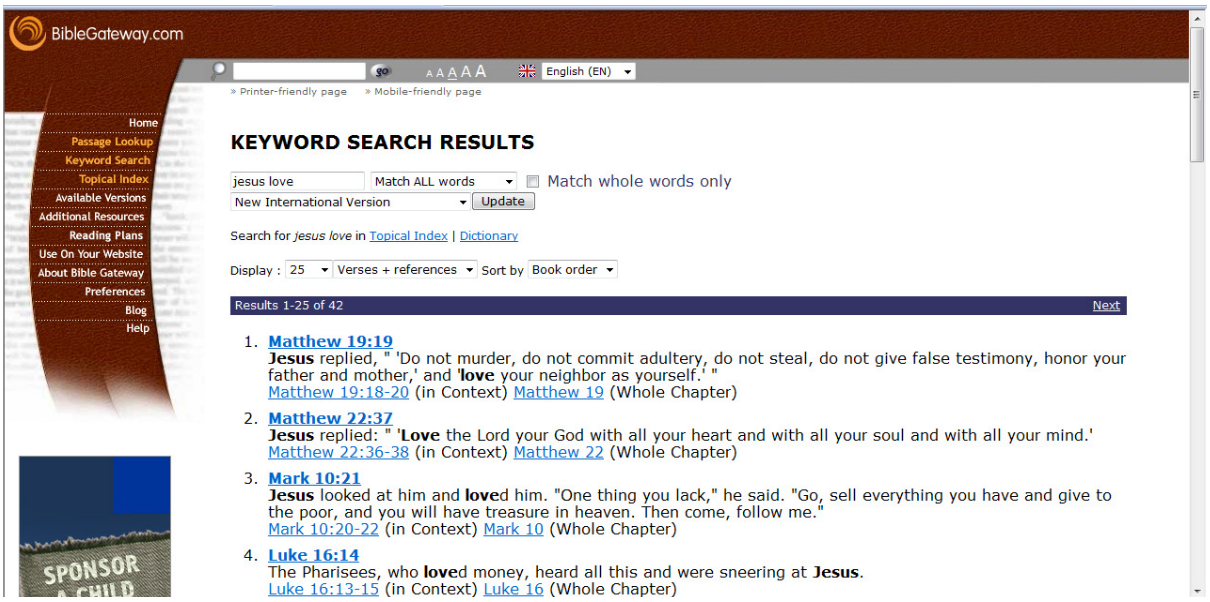
The system described in [Stringer, 1996] is based upon the two-level model, first described by [Koskenniemi, 1983] and implemented in the form of PC-KIMMO [Antworth, 1990], and adds a simple post-processor to provide further disambiguation and enhanced readability of output.

The initial aim of the study was to provide a parsing mechanism which would allow simpler access to dictionary headwords, by supplying the root of any given inflected form, since inflectional prefixes make dictionary access difficult, especially for beginners [Stringer, 1996]. This was then extended to provide limited morphological information, which could be generated with little extra effort by the parser. The post-processor was added later, in order to translate the raw parsed analysis into something more readable. The complexity of the Greek morphological system, and constraints have necessitated restricting the scope of the parser to a subset of verbal inflection; though the end result is not a comprehensive working system, it provides the basis for further work in accomplishing this goal.

2.2.4. Search Tools for the Bible and the New Testament

2.2.4.1 ‘Bible Gateway.com’ Search Tool

The ‘Bible Gateway.com’[13], allows users to choose whether to search the whole Bible, the Old Testament, the New Testament, the Gospels and other religious books.



KEYWORD SEARCH RESULTS

jesus love | Match ALL words ▾ | □ Match whole words only

New International Version ▾ | Update

Search for *jesus love* in Topical Index | Dictionary

Display : 25 ▾ Verses + references ▾ Sort by Book order ▾

Results 1-25 of 42 Next

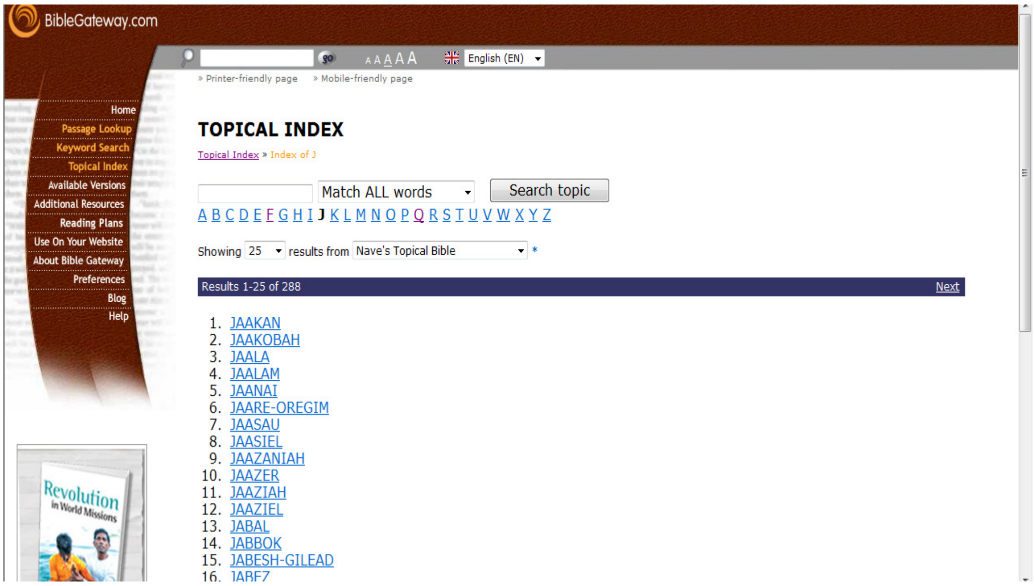
1. **Matthew 19:19**
Jesus replied, " 'Do not murder, do not commit adultery, do not steal, do not give false testimony, honor your father and mother,' and '**love** your neighbor as yourself.' "
Matthew 19:18-20 (in Context) Matthew 19 (Whole Chapter)
2. **Matthew 22:37**
Jesus replied: " '**Love** the Lord your God with all your heart and with all your soul and with all your mind.'
Matthew 22:36-38 (in Context) Matthew 22 (Whole Chapter)
3. **Mark 10:21**
Jesus looked at him and **love**d him. "One thing you lack," he said. "Go, sell everything you have and give to the poor, and you will have treasure in heaven. Then come, follow me."
Mark 10:20-22 (in Context) Mark 10 (Whole Chapter)
4. **Luke 16:14**
The Pharisees, who **love**d money, heard all this and were sneering at **Jesus**.
Luke 16:13-15 (in Context) Luke 16 (Whole Chapter)

Figure 10 A Snapshot for the Bible Gateway.com Search Results page

In figure 10, the search words ‘Jesus love’ were searched for. The search results page displays the matching verses and offer the user to choose whether to view the whole chapter that contains the matching word/s or just the words matched in their context.

The tool also provides a Topical Index for searching the topics. The topics are arranged in alphabetical order. This topical index is divided into two tools. An index of a predefined topics and a keyword search tool. The predefined topics are just a list of the common search terms.

[13] See URL http://www.biblegateway.com/



TOPICAL INDEX

Topical Index » Index of J

Match ALL words

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

Showing 25 results from Nave's Topical Bible *

Results 1-25 of 288

1. JAAKAN
2. JAAKOBAH
3. JAALA
4. JAALAM
5. JAANAI
6. JAARE-OREGIM
7. JAASAU
8. JAASIEL
9. JAAZANIAH
10. JAAZER
11. JAAZIAH
12. JAAZIEL
13. JABAL
14. JABBOK
15. JABESH-GILEAD
16. JABEZ

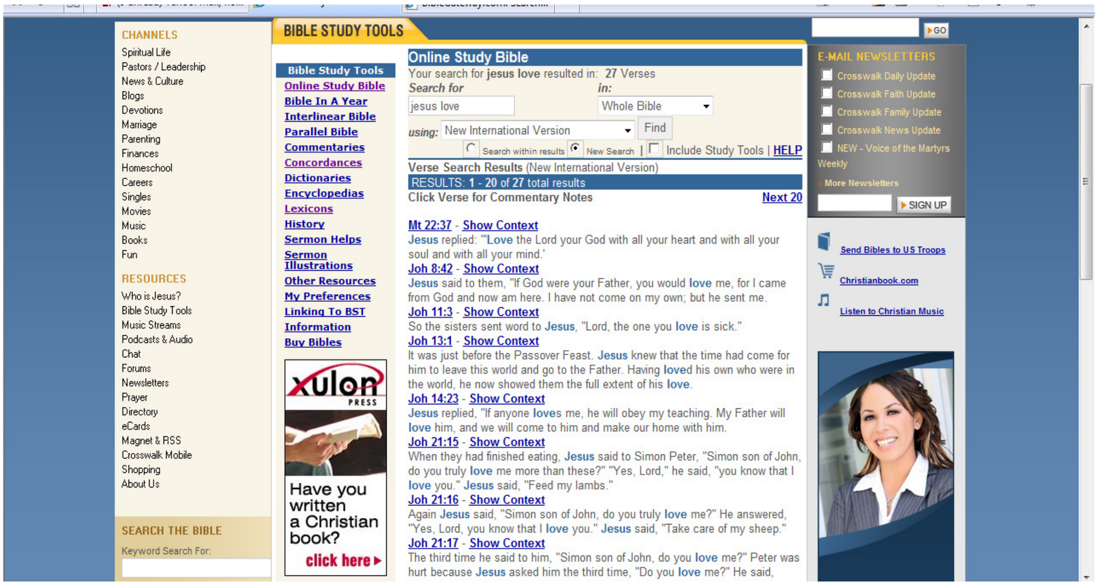
Figure 11 A Snapshot for BibleGateway.com Search Tool

The above figure, shows the predefined topics for the letter ‘J’.

2.2.4.2. ‘CrossWalk.com’ Search Tool

The ‘CrossWalk.com’[14] search tool, allows users to choose whether to search the whole Bible, the Old Testament, the New Testament, the Gospels or other religious books. The search results page does not only show the matching verses but also offers the user the option of viewing the verses in their context. This is a useful feature as the matching phrase or verse, is usually part of a bigger story or text. The tool displays four verses that precede the matching verse and another three that come after it.

[14] See URL http://bible.crosswalk.com/



Online Study Bible

Your search for **jesus love** resulted in: 27 Verses

Search for jesus love *in:* Whole Bible

using: New International Version Find

○ Search within results ● New Search | □ Include Study Tools | HELP

Verse Search Results (New International Version)

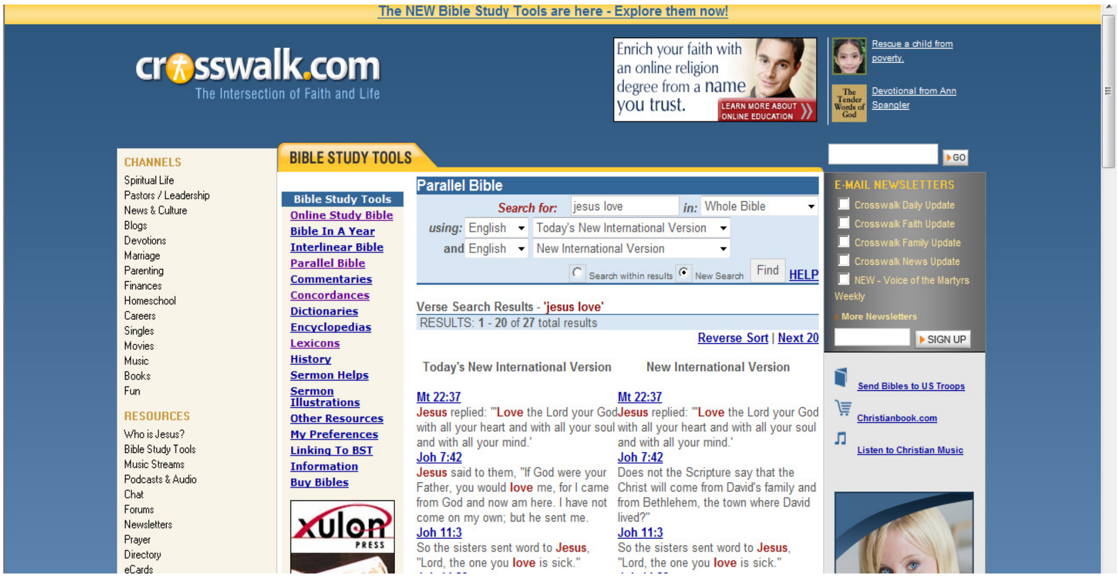
RESULTS: 1 - 20 of 27 total results

Click Verse for Commentary Notes Next 20

Mt 22:37 - Show Context
Jesus replied: "'Love the Lord your God with all your heart and with all your soul and with all your mind.'
Joh 8:42 - Show Context
Jesus said to them, "If God were your Father, you would love me, for I came from God and now am here. I have not come on my own; but he sent me.
Joh 11:3 - Show Context
So the sisters sent word to Jesus, "Lord, the one you love is sick."
Joh 13:1 - Show Context
It was just before the Passover Feast. Jesus knew that the time had come for him to leave this world and go to the Father. Having loved his own who were in the world, he now showed them the full extent of his love.
Joh 14:23 - Show Context
Jesus replied, "If anyone loves me, he will obey my teaching. My Father will love him, and we will come to him and make our home with him.
Joh 21:15 - Show Context
When they had finished eating, Jesus said to Simon Peter, "Simon son of John, do you truly love me more than these?" "Yes, Lord," he said, "you know that I love you." Jesus said, "Feed my lambs."
Joh 21:16 - Show Context
Again Jesus said, "Simon son of John, do you truly love me?" He answered, "Yes, Lord, you know that I love you." Jesus said, "Take care of my sheep."
Joh 21:17 - Show Context
The third time he said to him, "Simon son of John, do you love me?" Peter was hurt because Jesus asked him the third time, "Do you love me?" He said,

Figure 12 A snapshot of the CrossWalk Search Results for the words: Jesus love

This tool also offers users the option to search two different translations for the same keyword at the same time. This should help users who are interested in comparing the differences in the translation styles. This option aligns the two translations next to each other to facilitate the study of both of them.



Parallel Bible

Search for: jesus love *in:* Whole Bible

using: English Today's New International Version

and English New International Version

○ Search within results ● New Search Find HELP

Verse Search Results - 'jesus love'

RESULTS: 1 - 20 of 27 total results

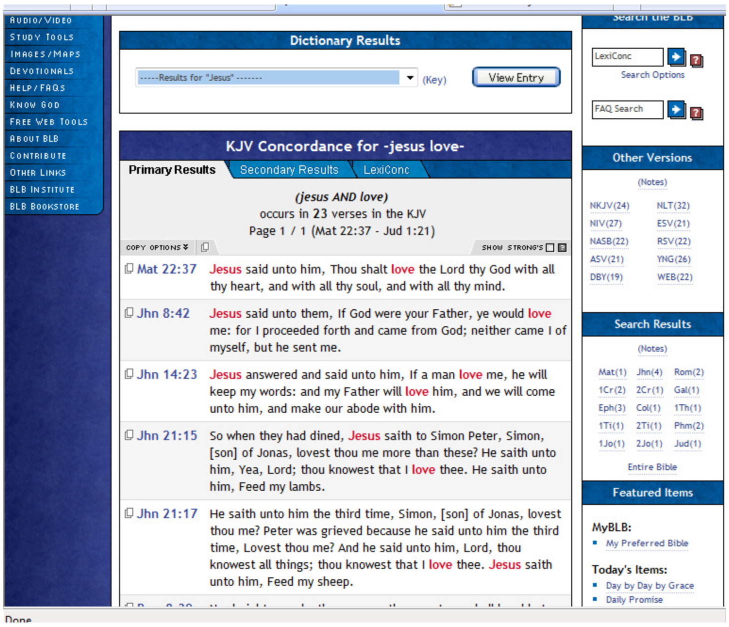
Reverse Sort | Next 20

Today's New International Version	New International Version
Mt 22:37	Mt 22:37
Jesus replied: "'Love the Lord your God with all your heart and with all your soul and with all your mind.'	Jesus replied: "'Love the Lord your God with all your heart and with all your soul and with all your mind.'
Joh 7:42	Joh 7:42
Jesus said to them, "If God were your Father, you would love me, for I came from God and now am here. I have not come on my own; but he sent me.	Does not the Scripture say that the Christ will come from David's family and from Bethlehem, the town where David lived?"
Joh 11:3	Joh 11:3
So the sisters sent word to Jesus, "Lord, the one you love is sick."	So the sisters sent word to Jesus, "Lord, the one you love is sick."

Figure 13 A snapshot for the CrossWalk.com parallel translations for the matching verses

2.2.4.3. ‘Blue Letter Bible’ Search Tool

The ‘Blue Letter Bible’[15] search tool allows users to choose whether to search the Bible, the Old Testament, the New Testament, the Gospels or other religious books. As shown in figure 14, 15 & 16 (the three figures display the search results page), the first tab displays the primary results for the search for the words: Jesus love; the matching verses, the second tab shows the secondary results; the number of verses that has the word ‘Jesus’ on its own and the number of verses that contain the word ‘love’ on its own (if the user inputs one word only, this tab will not be included in the search results page), and the third tab is for the LexiConc definitions for the words. The LexiConc option allows users to search the English definitions of Hebrew and Greek words.



KJV Concordance for -jesus love-

(jesus AND love)
occurs in 23 verses in the KJV
Page 1 / 1 (Mat 22:37 - Jud 1:21)

Mat 22:37 Jesus said unto him, Thou shalt love the Lord thy God with all thy heart, and with all thy soul, and with all thy mind.

Jhn 8:42 Jesus said unto them, If God were your Father, ye would love me: for I proceeded forth and came from God; neither came I of myself, but he sent me.

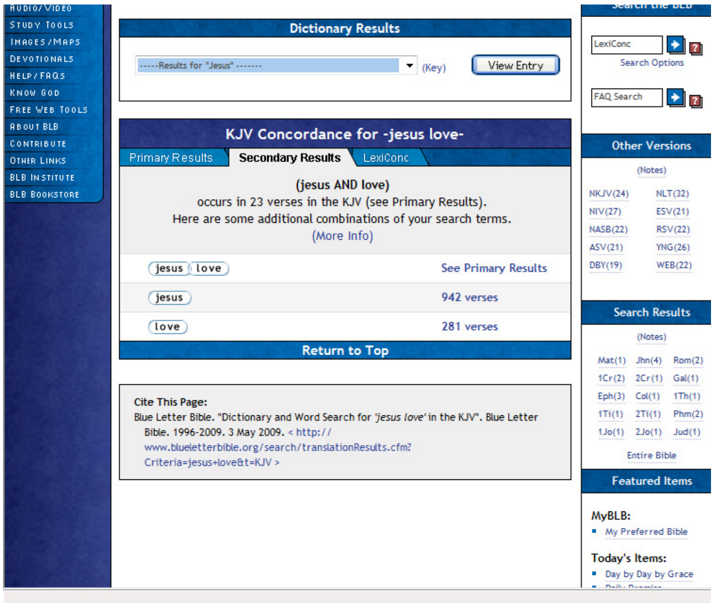
Jhn 14:23 Jesus answered and said unto him, If a man love me, he will keep my words: and my Father will love him, and we will come unto him, and make our abode with him.

Jhn 21:15 So when they had dined, Jesus saith to Simon Peter, Simon, [son] of Jonas, lovest thou me more than these? He saith unto him, Yea, Lord; thou knowest that I love thee. He saith unto him, Feed my lambs.

Jhn 21:17 He saith unto him the third time, Simon, [son] of Jonas, lovest thou me? Peter was grieved because he said unto him the third time, Lovest thou me? And he said unto him, Lord, thou knowest all things; thou knowest that I love thee. Jesus saith unto him, Feed my sheep.

Figure 14 A snapshot for the Blue Letter Bible ‘Primary Results’ page

[15] See URL http://www.blueletterbible.org/



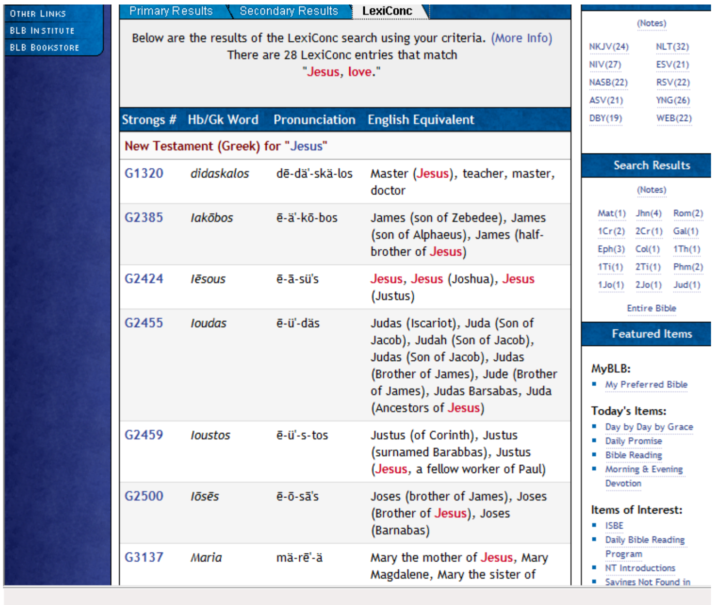
KJV Concordance for -jesus love-

(jesus AND love)
occurs in 23 verses in the KJV (see Primary Results).
Here are some additional combinations of your search terms.
(More Info)

jesus love	See Primary Results
jesus	942 verses
love	281 verses

Cite This Page:
Blue Letter Bible. "Dictionary and Word Search for *'jesus love'* in the KJV". Blue Letter Bible. 1996-2009. 3 May 2009. < http://www.blueletterbible.org/search/translationResults.cfm?Criteria=jesus+love&t=KJV >

Figure 15 A snapshot for the Blue Letter Bible ‘Secondary Results’ page



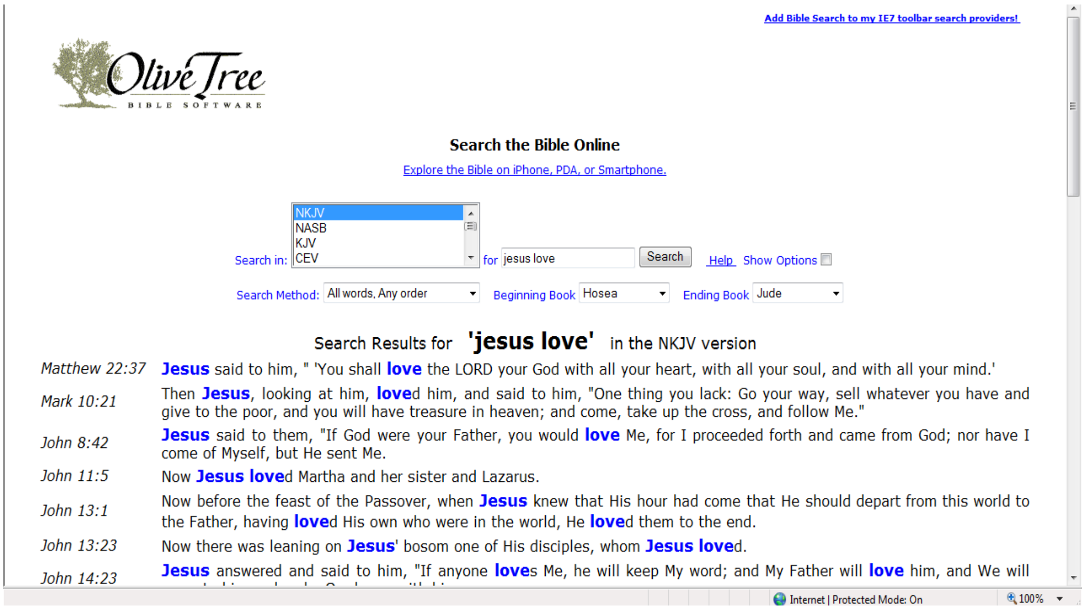
Below are the results of the LexiConc search using your criteria. (More Info)
There are 28 LexiConc entries that match
"Jesus, love."

Strongs #	Hb/Gk Word	Pronunciation	English Equivalent
New Testament (Greek) for "Jesus"			
G1320	*didaskalos*	dē-dä'-skä-los	Master (Jesus), teacher, master, doctor
G2385	*Iakōbos*	ē-ä'-kō-bos	James (son of Zebedee), James (son of Alphaeus), James (half-brother of Jesus)
G2424	*Iēsous*	ē-ā-sü's	Jesus, Jesus (Joshua), Jesus (Justus)
G2455	*Ioudas*	ē-ü'-däs	Judas (Iscariot), Juda (Son of Jacob), Judah (Son of Jacob), Judas (Son of Jacob), Judas (Brother of James), Jude (Brother of James), Judas Barsabas, Juda (Ancestors of Jesus)
G2459	*Ioustos*	ē-ü'-s-tos	Justus (of Corinth), Justus (surnamed Barabbas), Justus (Jesus, a fellow worker of Paul)
G2500	*Iōsēs*	ē-ō-sā's	Joses (brother of James), Joses (Brother of Jesus), Joses (Barnabas)
G3137	*Maria*	mä-rē'-ä	Mary the mother of Jesus, Mary Magdalene, Mary the sister of

Figure 16 A snapshot for the Blue Letter Bible ‘LexiConc’ page

2.2.4.4. ‘Olive Tree’ Search Tool

The Olive Tree[16] search tool asks users to specify the historical period that the words entered by the user need to be searched for. It claims that users can choose the colour of the words matched in verses but actually this option does not work.



Add Bible Search to my IE7 toolbar search providers!

Search the Bible Online

Explore the Bible on iPhone, PDA, or Smartphone.

Search in: NKJV / NASB / KJV / CEV   for jesus love   Search   Help   Show Options ☐

Search Method: All words, Any order   Beginning Book Hosea   Ending Book Jude

Search Results for **'jesus love'** in the NKJV version

Matthew 22:37	**Jesus** said to him, " 'You shall **love** the LORD your God with all your heart, with all your soul, and with all your mind.'
Mark 10:21	Then **Jesus**, looking at him, **love**d him, and said to him, "One thing you lack: Go your way, sell whatever you have and give to the poor, and you will have treasure in heaven; and come, take up the cross, and follow Me."
John 8:42	**Jesus** said to them, "If God were your Father, you would **love** Me, for I proceeded forth and came from God; nor have I come of Myself, but He sent Me.
John 11:5	Now **Jesus love**d Martha and her sister and Lazarus.
John 13:1	Now before the feast of the Passover, when **Jesus** knew that His hour had come that He should depart from this world to the Father, having **love**d His own who were in the world, He **love**d them to the end.
John 13:23	Now there was leaning on **Jesus**' bosom one of His disciples, whom **Jesus love**d.
John 14:23	**Jesus** answered and said to him, "If anyone **love**s Me, he will keep My word; and My Father will **love** him, and We will

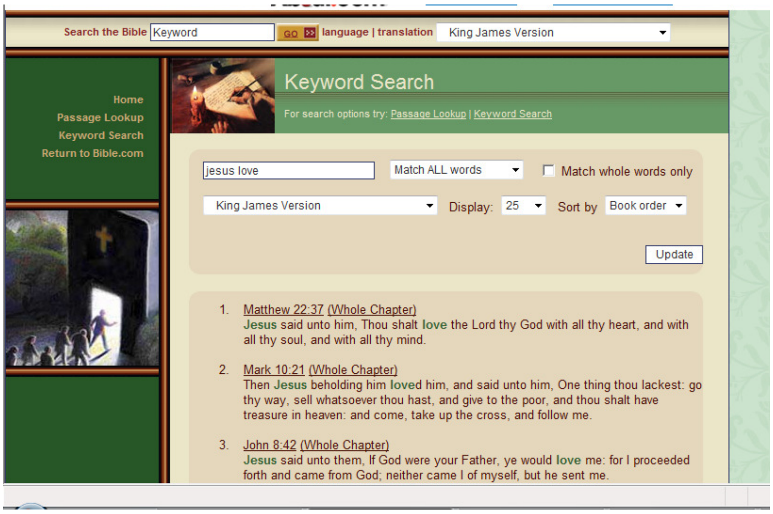
Figure 17 Displays a snapshot for the Olive Tree search results page

2.2.4.5. The ‘Bible’ Search Tool

The ‘Bible’[17] search tool allows users to search in the Bible, the New Testament, the Old Testament and other religious books. The search results page displays the matching verses and gives the user the option to view the whole chapter that includes this verse as well.

[16] See URL http://www.olivetree.com/bible/

[17] See URL http://christianity.about.com/gi/dynamic/offsite.htm?zi=1/XJ&sdn=christianity&cdn=religion&tm=232&gps=65_156_1276_628&f=10&tt=3&bt=0&bts=0&zu=http%3A//www.bible.com/



For search options try: Passage Lookup | Keyword Search

jesus love

Match ALL words

□ Match whole words only

King James Version

Display: 25

Sort by Book order

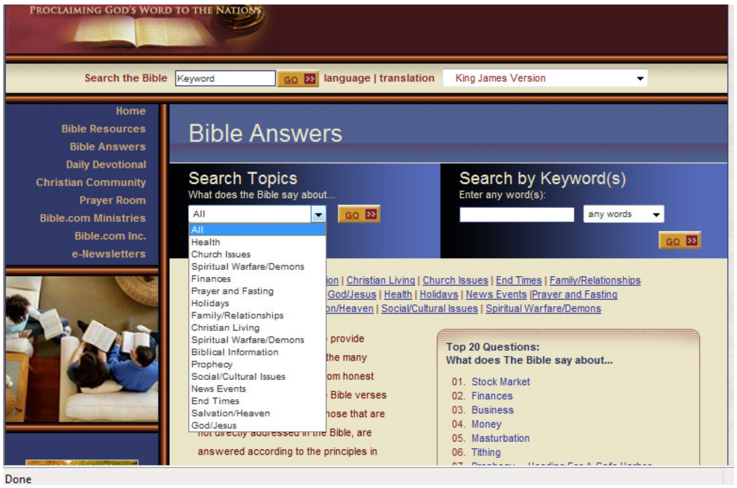
1. Matthew 22:37 (Whole Chapter)
Jesus said unto him, Thou shalt love the Lord thy God with all thy heart, and with all thy soul, and with all thy mind.

2. Mark 10:21 (Whole Chapter)
Then Jesus beholding him loved him, and said unto him, One thing thou lackest: go thy way, sell whatsoever thou hast, and give to the poor, and thou shalt have treasure in heaven: and come, take up the cross, and follow me.

3. John 8:42 (Whole Chapter)
Jesus said unto them, If God were your Father, ye would love me: for I proceeded forth and came from God; neither came I of myself, but he sent me.

Figure 18 A snapshot of the Bible search results for the words: Jesus love

The tool also provides a topics search tool which is basically predefined terms in a drop-down list in addition to a keyword search tool.



What does the Bible say about...

All

Enter any word(s):

ion | Christian Living | Church Issues | End Times | Family/Relationships
God/Jesus | Health | Holidays | News Events |Prayer and Fasting
on/Heaven | Social/Cultural Issues | Spiritual Warfare/Demons

provide
the many
om honest
Bible verses
hose that are
not directly addressed in the Bible, are
answered according to the principles in

Top 20 Questions:
What does The Bible say about...

01. Stock Market
02. Finances
03. Business
04. Money
05. Masturbation
06. Tithing

Figure 19 A snapshot of the Bible Topics Search page

2.2.5. Summary – Key Ideas from other Search Tools

The other search tools allow users to choose the book that they want to use in the search. Very few of them offer an index of topics which does not cover abstract topics and is merely an index of common search terms. Some tools offer users the option of viewing the whole chapter that contains the matched term or just the context in which the term occurred. All the tools focus on an English translation rather than original source-language texts.

Search Tools Features	Bible Gateway .com	CrossWalk .com	Blue Letter Bible	Olive Tree	The Bible
English Keyword/s Search	Y	Y	Y	Y	Y
View word/s in Context	Y	Y	Y	N	Y
Topics Index	Y	N	N	N	Y

Part II

Qurany ‘Search for a Concept’ Tool

Chapter 3: (V1): Qurany 'Search for a Concept' Tool Design

The Qurany 'Search for a Concept' Tool consists of two modules; a keyword search module and a tree of concepts module. It uses eight parallel English translations [Smith] for the Quran as well as the original Arabic Quran[18].

3.1.The Keyword Search Module

3.1.1. Overview of the Keyword Search Module

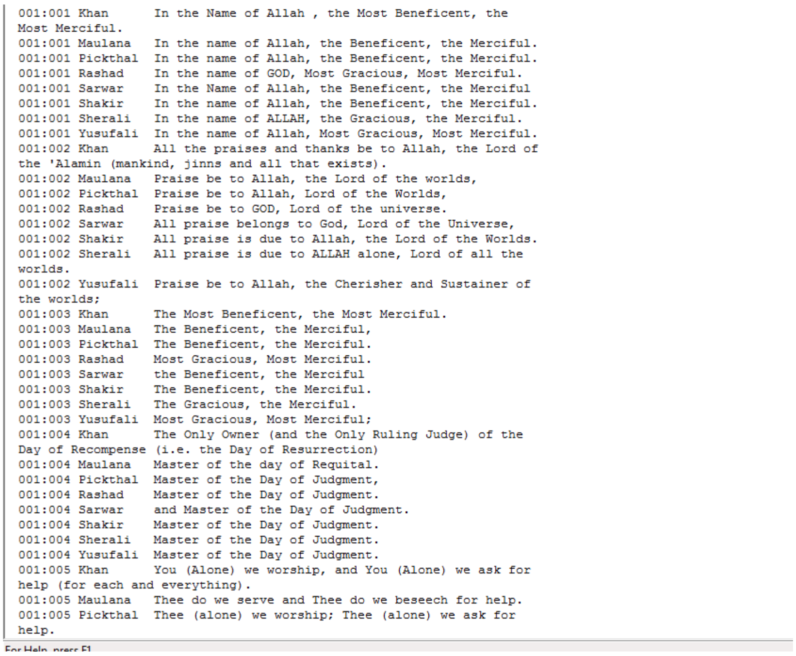
Searching the Quran for keywords using one English translation (as mentioned in section 2.1.5.), produced incomplete results. The recall values improved when the number of translations used in the search process increased as in the case of the Quran Iman search tool (uses five English translations by default). As the file that contains the eight English parallel translations is available as an open source resource on the web, it was used to improve the recall values even further reaching a recall value of 87% (please, see section 6.1. on evaluation). Compiling this file from scratch will consume much time that could be spent in enhancing the search tool functionality and adding more useful features to it. Therefore, the main objective of the keyword search tool is to search the eight parallel English translations (in case of English words) as well as the original Arabic Quran (in case of Arabic words) for the occurrence of the word/s that the user is querying for. If the word to be searched for exists in any of the eight parallel translations or in the Arabic Quran, the verse is added to the list of matches to be displayed.

[18] See URL http://www.al-islam.org/quran/

3.1.2. Features of the Keyword Search Module

3.1.2.1. The Use of Eight Parallel English Translations

Using one or two English translations in the search for the occurrence of a word does not produce complete and accurate results due to the fact that frequently in the Quran, more than one verse describes a person or a place. Therefore, the person's name, for instance, will be mentioned once in the first verse but not necessarily mentioned again in the next verses. Using eight parallel English translations increases the chances that one of the eight translators will mention a certain keyword between brackets and another translator will mention another synonym for the same word (for the same verse) and so on, covering a range of synonym keywords for the same verse. As the keyword serach tool searches all the text (even the text placed between a pair of brackets), the chances of finding a match for the term searched for is higher. This, in turn, enhances the accuracy of the results. The translators are: [Khan 1977, Maulana 1917, Pickthal 1930, Rashad 1985, Sarwar 1981, Shakir 1959, Sherali 1955, Yusufali 1934]; from [Kidway 2000, Clay 2009]



```
001:001 Khan      In the Name of Allah , the Most Beneficent, the
Most Merciful.
001:001 Maulana   In the name of Allah, the Beneficent, the Merciful.
001:001 Pickthal  In the name of Allah, the Beneficent, the Merciful.
001:001 Rashad    In the name of GOD, Most Gracious, Most Merciful.
001:001 Sarwar    In the Name of Allah, the Beneficent, the Merciful
001:001 Shakir    In the name of Allah, the Beneficent, the Merciful.
001:001 Sherali   In the name of ALLAH, the Gracious, the Merciful.
001:001 Yusufali  In the name of Allah, Most Gracious, Most Merciful.
001:002 Khan      All the praises and thanks be to Allah, the Lord of
the 'Alamin (mankind, jinns and all that exists).
001:002 Maulana   Praise be to Allah, the Lord of the worlds,
001:002 Pickthal  Praise be to Allah, Lord of the Worlds,
001:002 Rashad    Praise be to GOD, Lord of the universe.
001:002 Sarwar    All praise belongs to God, Lord of the Universe,
001:002 Shakir    All praise is due to Allah, the Lord of the Worlds.
001:002 Sherali   All praise is due to ALLAH alone, Lord of all the
worlds.
001:002 Yusufali  Praise be to Allah, the Cherisher and Sustainer of
the worlds;
001:003 Khan      The Most Beneficent, the Most Merciful.
001:003 Maulana   The Beneficent, the Merciful,
001:003 Pickthal  The Beneficent, the Merciful.
001:003 Rashad    Most Gracious, Most Merciful.
001:003 Sarwar    the Beneficent, the Merciful
001:003 Shakir    The Beneficent, the Merciful.
001:003 Sherali   The Gracious, the Merciful.
001:003 Yusufali  Most Gracious, Most Merciful;
001:004 Khan      The Only Owner (and the Only Ruling Judge) of the
Day of Recompense (i.e. the Day of Resurrection)
001:004 Maulana   Master of the day of Requital.
001:004 Pickthal  Master of the Day of Judgment,
001:004 Rashad    Master of the Day of Judgment.
001:004 Sarwar    and Master of the Day of Judgment.
001:004 Shakir    Master of the Day of Judgment.
001:004 Sherali   Master of the Day of Judgment.
001:004 Yusufali  Master of the Day of Judgment.
001:005 Khan      You (Alone) we worship, and You (Alone) we ask for
help (for each and everything).
001:005 Maulana   Thee do we serve and Thee do we beseech for help.
001:005 Pickthal  Thee (alone) we worship; Thee (alone) we ask for
help.
```

Figure 20 Displays Chapter Al-Fatiha 's eight parallel English Translations

As shown in figure 20, each verse starts with the chapter number followed by a colon and then the verse number. This is followed by the name of the translator and then the verse text. For instance, the first verse would be represented as: 001:001 + Translator Name + Verse Text

3.1.2.2. Searching for English Lemmas

The keyword search tool does not only search for words but rather for lemmas or morphemes of the word and highlights the matching word in the verses displayed (in the eight parallel translations). A lemma is a set of lexical forms having the same stem, the same major part-of-speech, and the same word-sense [Jurafsky and Martin, 2000]. For example, the words: 'appeared', 'appears' and 'appearing' have the same lemma, namely 'appear'. A morphme is often defined as the minimal meaning-bearing unit in a language [Jurafsky and Martin, 2000]. There are two classes of morphemes: stems and affixes. Affixes are further divided into prefixes, suffixes, infixes and circumfixes [Jurafsky and Martin, 2000]. For instance, the word 'appeared' consists of two morphemes: the morpheme 'appear' and the morpheme 'ed'.

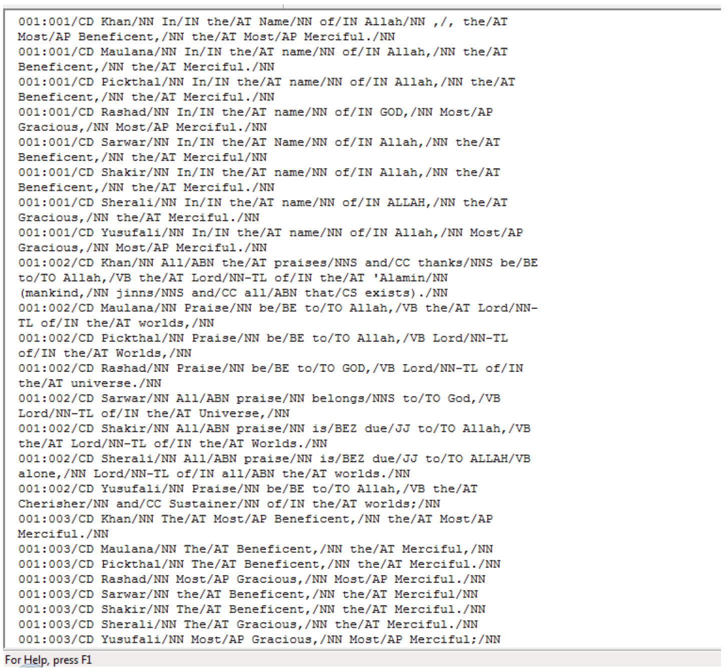
The search for lemmas or morphemes increases the accuracy of the search and improves the recall value. For instance, if the user is searching for the word 'merciful', all the verses that have the words 'mercy', 'merciful' and 'mercifully' will be retrieved. This is because all these words have the same stem: 'mercy'. Hence, this feature retrieves more relevant verses to the search than irrelevant ones.

To achieve this task, the following annotating procedures have been implemented:

3.1.2.2.1. Tagging the English Quran

Initially, the text was analyzed in several ways in case this could add useful functionality. Therefore, the process of tagging the English parallel translations was carried out. The eight parallel English translations of the Quran have been tagged using the Python Natural Language toolkit's 'Brill Tagger'. The Brill Tagger was trained on the Brown corpus data and uses a regular expression tagger as a backoff. A QuranTager.py module has been developed to carry out this task. This module is designed to read one line at a time, tags it and writes the new tagged line to a new file. As a naming convention, the Quran text files names are prefixed with the word ’Tag’ + ChapterName.txt and kept in one folder.

At the beginning of launching the application, a copy of the Tagged Quran is loaded in a Python dictionary data structure. However, the part-of-speech tags were not useful in the search process, so the text tags are not used.



```
001:001/CD Khan/NN In/IN the/AT Name/NN of/IN Allah/NN ,/, the/AT
Most/AP Beneficent,/NN the/AT Most/AP Merciful./NN
001:001/CD Maulana/NN In/IN the/AT name/NN of/IN Allah,/NN the/AT
Beneficent,/NN the/AT Merciful./NN
001:001/CD Pickthal/NN In/IN the/AT name/NN of/IN Allah,/NN the/AT
Beneficent,/NN the/AT Merciful./NN
001:001/CD Rashad/NN In/IN the/AT name/NN of/IN GOD,/NN Most/AP
Gracious,/NN Most/AP Merciful./NN
001:001/CD Sarwar/NN In/IN the/AT Name/NN of/IN Allah,/NN the/AT
Beneficent,/NN the/AT Merciful/NN
001:001/CD Shakir/NN In/IN the/AT name/NN of/IN Allah,/NN the/AT
Beneficent,/NN the/AT Merciful./NN
001:001/CD Sherali/NN In/IN the/AT name/NN of/IN ALLAH,/NN the/AT
Gracious,/NN the/AT Merciful./NN
001:001/CD Yusufali/NN In/IN the/AT name/NN of/IN Allah,/NN Most/AP
Gracious,/NN Most/AP Merciful./NN
001:002/CD Khan/NN All/ABN the/AT praises/NNS and/CC thanks/NNS be/BE
to/TO Allah,/VB the/AT Lord/NN-TL of/IN the/AT 'Alamin/NN
(mankind,/NN jinns/NNS and/CC all/ABN that/CS exists)./NN
001:002/CD Maulana/NN Praise/NN be/BE to/TO Allah,/VB the/AT Lord/NN-
TL of/IN the/AT worlds,/NN
001:002/CD Pickthal/NN Praise/NN be/BE to/TO Allah,/VB Lord/NN-TL
of/IN the/AT Worlds,/NN
001:002/CD Rashad/NN Praise/NN be/BE to/TO GOD,/VB Lord/NN-TL of/IN
the/AT universe./NN
001:002/CD Sarwar/NN All/ABN praise/NN belongs/NNS to/TO God,/VB
Lord/NN-TL of/IN the/AT Universe,/NN
001:002/CD Shakir/NN All/ABN praise/NN is/BEZ due/JJ to/TO Allah,/VB
the/AT Lord/NN-TL of/IN the/AT Worlds./NN
001:002/CD Sherali/NN All/ABN praise/NN is/BEZ due/JJ to/TO ALLAH/VB
alone,/NN Lord/NN-TL of/IN all/ABN the/AT worlds./NN
001:002/CD Yusufali/NN Praise/NN be/BE to/TO Allah,/VB the/AT
Cherisher/NN and/CC Sustainer/NN of/IN the/AT worlds;/NN
001:003/CD Khan/NN The/AT Most/AP Beneficent,/NN the/AT Most/AP
Merciful./NN
001:003/CD Maulana/NN The/AT Beneficent,/NN the/AT Merciful,/NN
001:003/CD Pickthal/NN The/AT Beneficent,/NN the/AT Merciful./NN
001:003/CD Rashad/NN Most/AP Gracious,/NN Most/AP Merciful./NN
001:003/CD Sarwar/NN the/AT Beneficent,/NN the/AT Merciful/NN
001:003/CD Shakir/NN The/AT Beneficent,/NN the/AT Merciful./NN
001:003/CD Sherali/NN The/AT Gracious,/NN the/AT Merciful./NN
001:003/CD Yusufali/NN Most/AP Gracious,/NN Most/AP Merciful;/NN
```

Figure 21 A snapshot for the file ‘TagAl-Fatiha.txt’

In the above figure, a snapshot of the tagged verses of the first chapter in the Quran (Al-Fatiha) are shown. For instance, the input to the tagger is the first line in the file ‘Al-Fatiha.txt’:

001:001 Khan In the Name of Allah , the Most Beneficent, the Most Merciful.

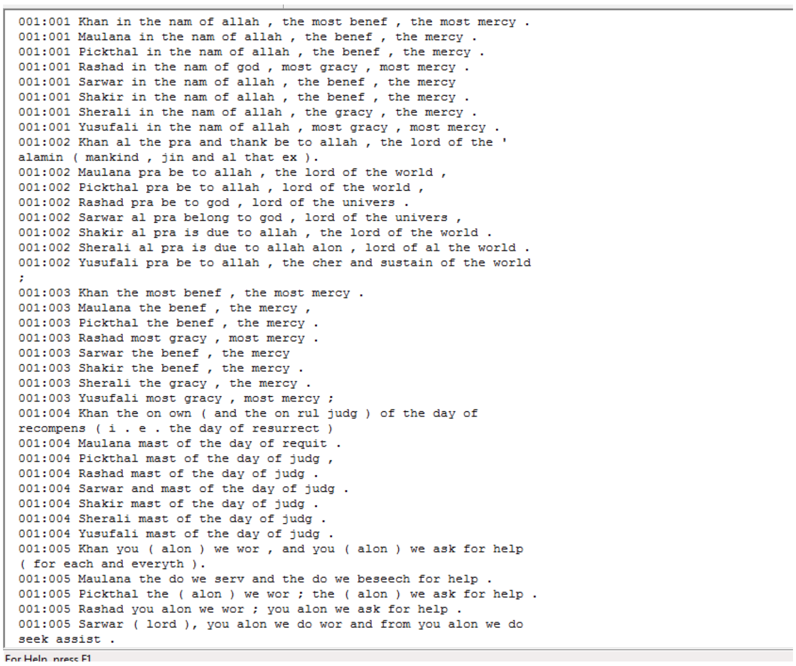
This line is tagged according to the Brown Tag Set as follows:

001:001/CD Khan/NN In/IN the/AT Name/NN of/IN Allah/NN ,/, the/AT Most/AP Beneficent,/NN the/AT Most/AP Merciful./NN

Each word is separated from its tag by a ‘/’. The tags: ‘CD’ stands for cardinal numbers, ‘NN’ stands for nouns, ‘IN’ stands for prepositions, ‘AT’ for articles and ‘AP’ for determiner/pronoun, post-determiner.

3.1.2.2.2. Stemming and tokenizing the English Quran

The English translations of the Quran have been stemmed using the Python Natural Language Toolkit's 'Lancaster Stemmer'. It has been also tokenized for punctuation marks to facilitate accurate and fast retrieval of Quran verses. A QuranStemmedTokenized.py module was developed to carry out this task. The stemmed/tokenized Quran text file names are prefixed with the word 'StemTok' + ChapterName.txt. At the beginning of launching the application a copy of Stemmed/Tokenized Quran is loaded in a Python dictionary data structure.



```
001:001 Khan in the nam of allah , the most benef , the most mercy .
001:001 Maulana in the nam of allah , the benef , the mercy .
001:001 Pickthal in the nam of allah , the benef , the mercy .
001:001 Rashad in the nam of god , most gracy , most mercy .
001:001 Sarwar in the nam of allah , the benef , the mercy
001:001 Shakir in the nam of allah , the benef , the mercy .
001:001 Sherali in the nam of allah , the gracy , the mercy .
001:001 Yusufali in the nam of allah , most gracy , most mercy .
001:002 Khan al the pra and thank be to allah , the lord of the '
alamin ( mankind , jin and al that ex ).
001:002 Maulana pra be to allah , the lord of the world ,
001:002 Pickthal pra be to allah , lord of the world ,
001:002 Rashad pra be to god , lord of the univers .
001:002 Sarwar al pra belong to god , lord of the univers ,
001:002 Shakir al pra is due to allah , the lord of the world .
001:002 Sherali al pra is due to allah alon , lord of al the world .
001:002 Yusufali pra be to allah , the cher and sustain of the world
;
001:003 Khan the most benef , the most mercy .
001:003 Maulana the benef , the mercy ,
001:003 Pickthal the benef , the mercy .
001:003 Rashad most gracy , most mercy .
001:003 Sarwar the benef , the mercy
001:003 Shakir the benef , the mercy .
001:003 Sherali the gracy , the mercy .
001:003 Yusufali most gracy , most mercy ;
001:004 Khan the on own ( and the on rul judg ) of the day of
recompens ( i . e . the day of resurrect )
001:004 Maulana mast of the day of requit .
001:004 Pickthal mast of the day of judg ,
001:004 Rashad mast of the day of judg .
001:004 Sarwar and mast of the day of judg .
001:004 Shakir mast of the day of judg .
001:004 Sherali mast of the day of judg .
001:004 Yusufali mast of the day of judg .
001:005 Khan you ( alon ) we wor , and you ( alon ) we ask for help
( for each and everyth ).
001:005 Maulana the do we serv and the do we beseech for help .
001:005 Pickthal the ( alon ) we wor ; the ( alon ) we ask for help .
001:005 Rashad you alon we wor ; you alon we ask for help .
001:005 Sarwar ( lord ), you alon we do wor and from you alon we do
seek assist .
```

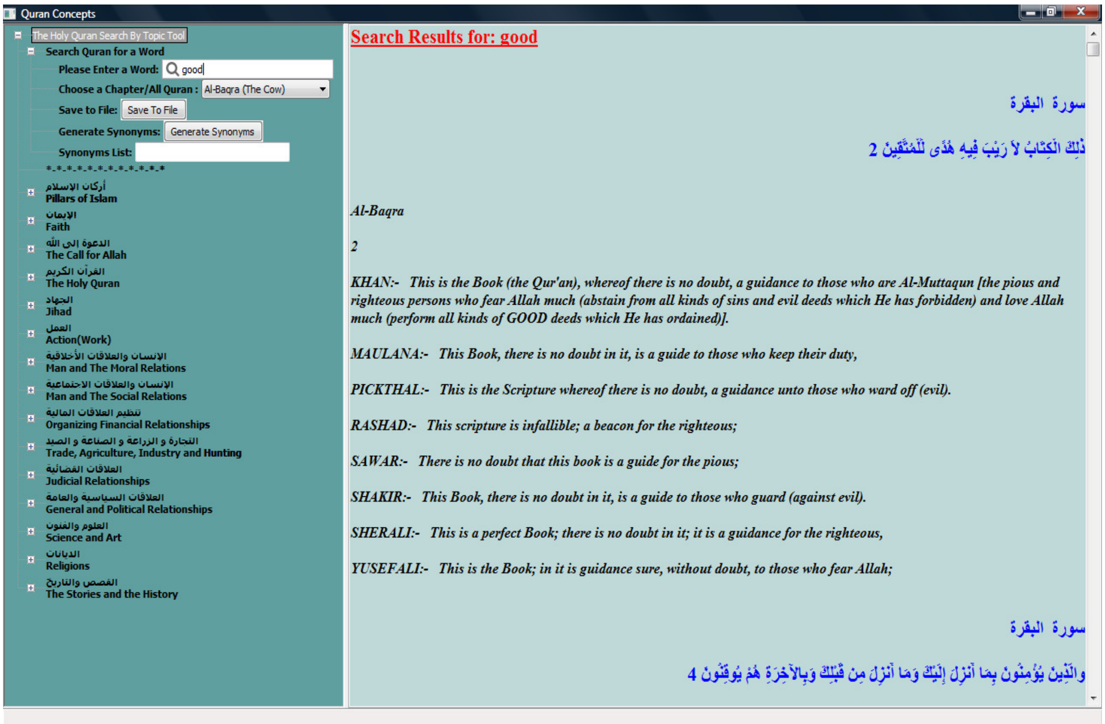
Figure 22 A snapshot for the file 'StemTokAl-Fatiha.txt'

3.1.2.2.3. Searching for English Words

The Keyword Search Tool searches the English Quran as follows:

- When the user inputs a word/s to be searched for, the word is stemmed using the Python Natural Language Tool Kit (NLTK) Lancaster Stemmer, tokenized and then used in the search.
- The tool checks each verse (in the Stemmed/Tokenized copy of the English Quran) for the occurrence of the Stemmed/Tokenized word.

- If a match is found, the word is converted to upper case.
- The search results for each word are displayed on the right hand side frame. The Arabic verses are right aligned in blue and the English translations are left aligned in black.


Quran Concepts
The Holy Quran Search By Topic Tool
Search Quran for a Word
Save To File
Generate Synonyms
--*-*-*-*-*-*-*-*-*-*-*
أركان الإسلام
Pillars of Islam
الإيمان
Faith
الدعوة إلى الله
The Call for Allah
القرآن الكريم
The Holy Quran
الجهاد
Jihad
العمل
Action(Work)
الإنسان والعلاقات الأخلاقية
Man and The Moral Relations
الإنسان والعلاقات الاجتماعية
Man and The Social Relations
تنظيم العلاقات المالية
Organizing Financial Relationships
التجارة و الزراعة و الصناعة و الصيد
Trade, Agriculture, Industry and Hunting
العلاقات القضائية
Judicial Relationships
العلاقات السياسية والعامة
General and Political Relationships
العلوم والفنون
Science and Art
الديانات
Religions
القصص والتاريخ
The Stories and the History

Please Enter a Word: good

Choose a Chapter/All Quran : Al-Baqra (The Cow)

Save to File:

Generate Synonyms:

Synonyms List:

Search Results for: good

سورة البقرة

ذٰلِكَ الْكِتَابُ لاَ رَيْبَ فِيهِ هُدًى لِّلْمُتَّقِينَ 2

Al-Baqra

2

KHAN:- This is the Book (the Qur'an), whereof there is no doubt, a guidance to those who are Al-Muttaqun [the pious and righteous persons who fear Allah much (abstain from all kinds of sins and evil deeds which He has forbidden) and love Allah much (perform all kinds of GOOD deeds which He has ordained)].

MAULANA:- This Book, there is no doubt in it, is a guide to those who keep their duty,

PICKTHAL:- This is the Scripture whereof there is no doubt, a guidance unto those who ward off (evil).

RASHAD:- This scripture is infallible; a beacon for the righteous;

SAWAR:- There is no doubt that this book is a guide for the pious;

SHAKIR:- This Book, there is no doubt in it, is a guide to those who guard (against evil).

SHERALI:- This is a perfect Book; there is no doubt in it; it is a guidance for the righteous,

YUSEFALI:- This is the Book; in it is guidance sure, without doubt, to those who fear Allah;

سورة البقرة

والَّذِينَ يُؤْمِنُونَ بِمَا أُنزِلَ إِلَيْكَ وَمَا أُنزِلَ مِن قَبْلِكَ وَبِالآخِرَةِ هُمْ يُوقِنُونَ 4

Figure 23 Displays the Search Results for the word ‘good’ in chapter ‘Al-Baqra’

In the figure 23, the word ‘good’ is changed to ‘GOOD’ in every translation that this word is mentioned in. It was mentioned in Khan’s translation only in verse number 2.

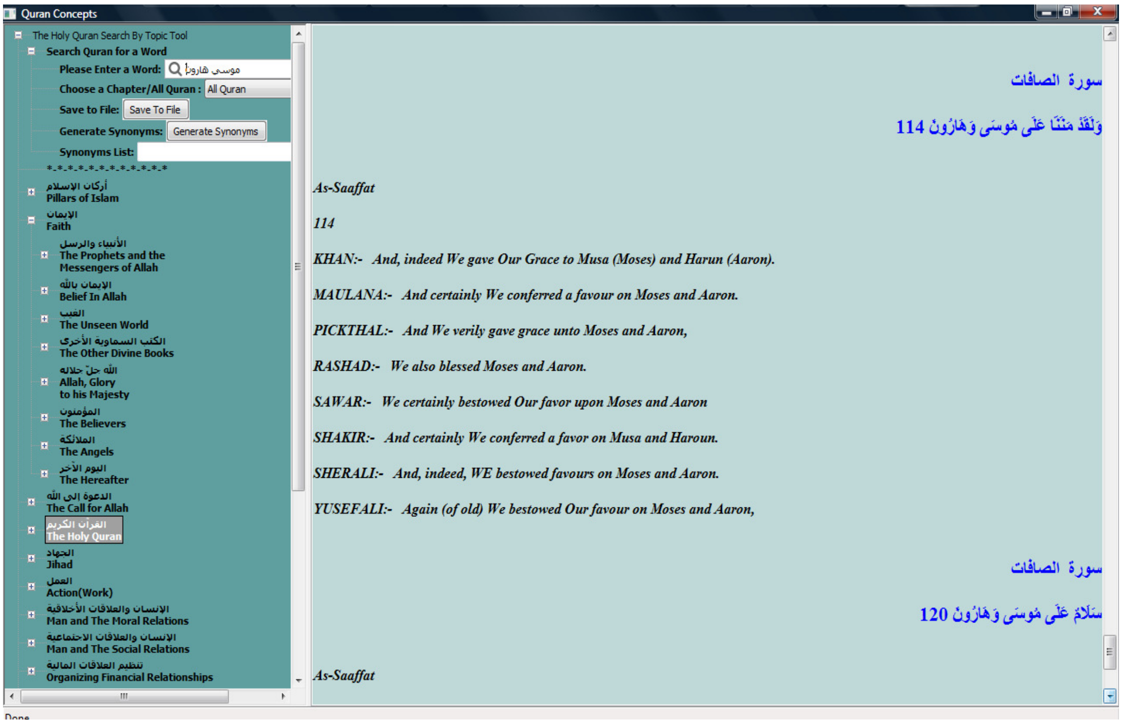
3.1.2.3. Searching for Arabic Words

The keyword search tool enables users to search the Arabic Quran using Arabic input keywords. Very few Quran search tools on the web offer this functionality. The reason for adding this feature is to enable all the Arabic speaking people who read the Quran in Arabic to search the Quran for the occurrence of specific Arabic words only. Also, all the Islamic scholars study the Quran in Arabic (the original language of the Quran) and a tool that offers this feature could help them in their studies.

The keyword search tool searches a copy of the Arabic Quran that has been tokenized for diacritics marks using regular expressions for the occurrence of input Arabic keywords and displays the original Arabic verse along with the eight parallel translations for that verse. The Arabic input words are tokenized for diacritics marks before the search process takes place.

As mentioned before, the original Quran is written in the classical Arabic language. Performing morphological analysis on Arabic in general and classical Arabic in particular is a difficult task. There are few tools for Arabic natural language processing and these are not sufficiently complete or accurate for carrying out NLP research on the Quran. For example, the Arabic WordNet is available only as a ready to use tool on the net and Arabic stemmers and morphological analyzers generally have error-rates of 25% or more [Sawalha and Atwell 2008]. Therefore, performing morphological analysis on the Arabic Quran is out of the scope of this research project.

At the beginning of launching the application a copy of the original Arabic Quran along with the Tokenized Arabic Quran is loaded in a Python dictionary data structure.



Please Enter a Word: موسى هارون

Choose a Chapter/All Quran : All Quran

سورة الصافات

وَلَقَدْ مَنَنَّا عَلَى مُوسَى وَهَارُونَ 114

As-Saaffat

114

KHAN:- And, indeed We gave Our Grace to Musa (Moses) and Harun (Aaron).

MAULANA:- And certainly We conferred a favour on Moses and Aaron.

PICKTHAL:- And We verily gave grace unto Moses and Aaron,

RASHAD:- We also blessed Moses and Aaron.

SAWAR:- We certainly bestowed Our favor upon Moses and Aaron

SHAKIR:- And certainly We conferred a favor on Musa and Haroun.

SHERALI:- And, indeed, WE bestowed favours on Moses and Aaron.

YUSEFALI:- Again (of old) We bestowed Our favour on Moses and Aaron,

سورة الصافات

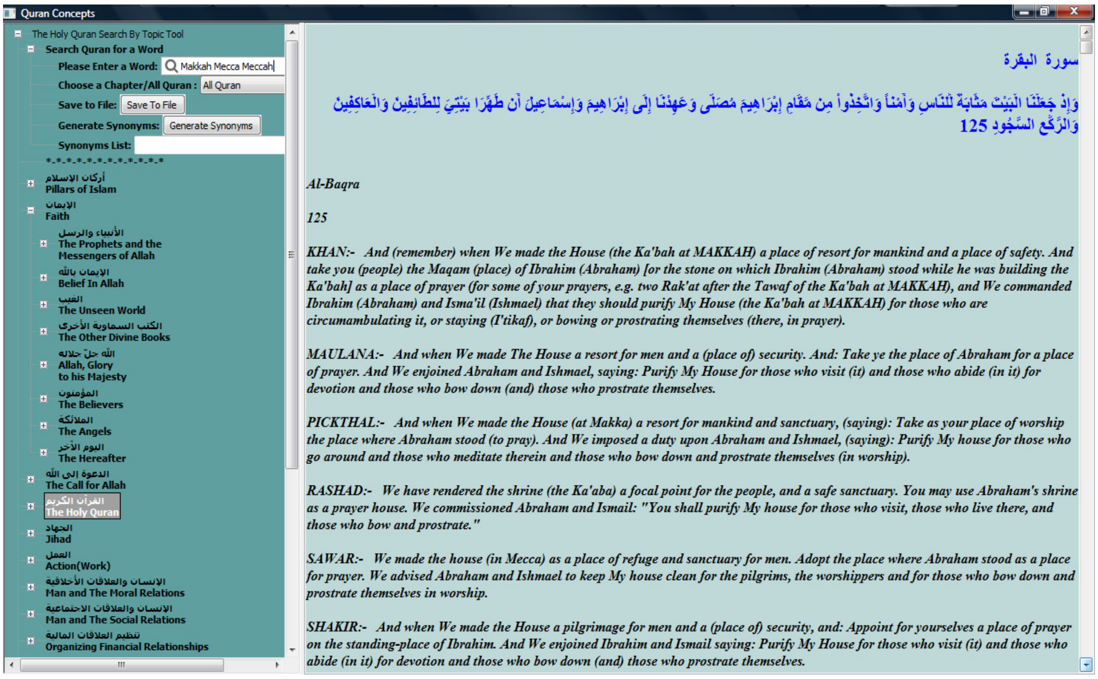
سَلَامٌ عَلَى مُوسَى وَهَارُونَ 120

As-Saaffat

Figure 24 A snapshot of the Search Results for the words ‘موسى هارون’ (Moses Aaron)

3.1.2.4. Searching for Unlimited Number of English and/or Arabic Words

This feature is particularly important as different translators use different ways of spelling the names of persons, places, books, …etc. For instance, the city Mecca could be written as Makkah or Mecca or Meccah and all of them refer to the same place. Therefore, enabling the user to search for the three words in one search run which could save time and provide a means of comparing the translation style for different translators.



Please Enter a Word: Makkah Mecca Meccah

Choose a Chapter/All Quran : All Quran

Synonyms List:

سورة البقرة

وَإِذْ جَعَلْنَا الْبَيْتَ مَثَابَةً لِّلنَّاسِ وَأَمْناً وَاتَّخِذُواْ مِن مَّقَامِ إِبْرَاهِيمَ مُصَلًّى وَعَهِدْنَا إِلَى إِبْرَاهِيمَ وَإِسْمَاعِيلَ أَن طَهِّرَا بَيْتِيَ لِلطَّائِفِينَ وَالْعَاكِفِينَ وَالرُّكَّعِ السُّجُودِ 125

Al-Baqra

125

KHAN:- And (remember) when We made the House (the Ka'bah at MAKKAH) a place of resort for mankind and a place of safety. And take you (people) the Maqam (place) of Ibrahim (Abraham) [or the stone on which Ibrahim (Abraham) stood while he was building the Ka'bah] as a place of prayer (for some of your prayers, e.g. two Rak'at after the Tawaf of the Ka'bah at MAKKAH), and We commanded Ibrahim (Abraham) and Isma'il (Ishmael) that they should purify My House (the Ka'bah at MAKKAH) for those who are circumambulating it, or staying (I'tikaf), or bowing or prostrating themselves (there, in prayer).

MAULANA:- And when We made The House a resort for men and a (place of) security. And: Take ye the place of Abraham for a place of prayer. And We enjoined Abraham and Ishmael, saying: Purify My House for those who visit (it) and those who abide (in it) for devotion and those who bow down (and) those who prostrate themselves.

PICKTHAL:- And when We made the House (at Makka) a resort for mankind and sanctuary, (saying): Take as your place of worship the place where Abraham stood (to pray). And We imposed a duty upon Abraham and Ishmael, (saying): Purify My house for those who go around and those who meditate therein and those who bow down and prostrate themselves (in worship).

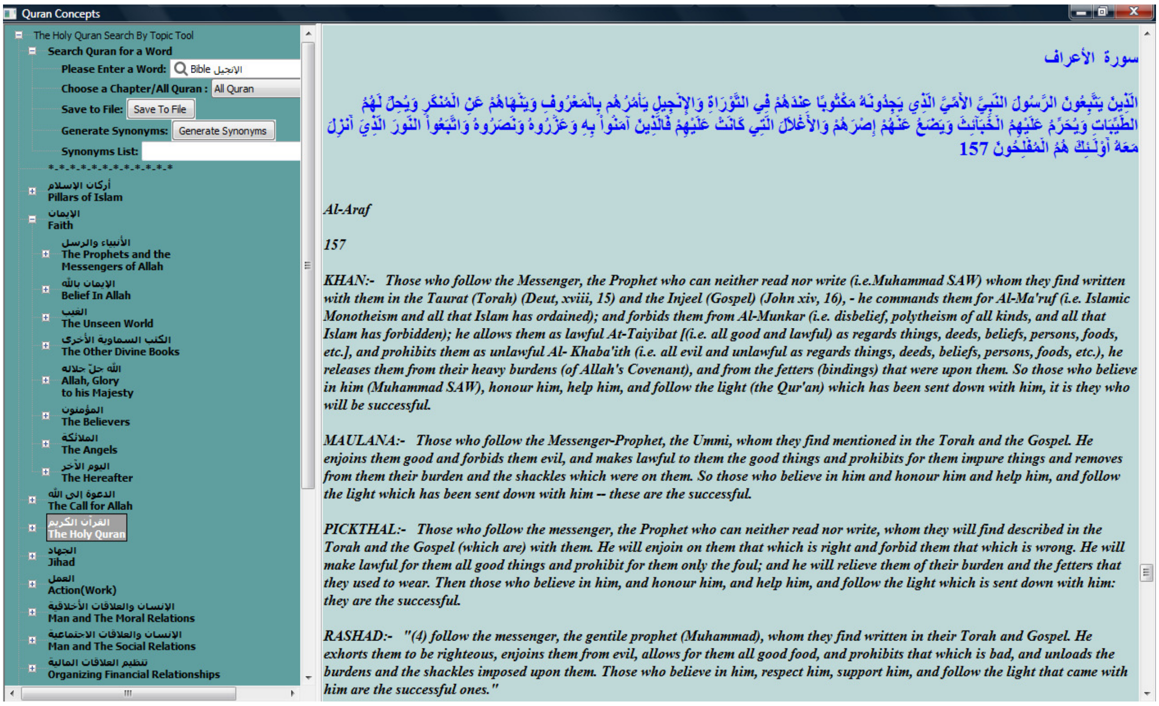
RASHAD:- We have rendered the shrine (the Ka'aba) a focal point for the people, and a safe sanctuary. You may use Abraham's shrine as a prayer house. We commissioned Abraham and Ismail: "You shall purify My house for those who visit, those who live there, and those who bow and prostrate."

SAWAR:- We made the house (in Mecca) as a place of refuge and sanctuary for men. Adopt the place where Abraham stood as a place for prayer. We advised Abraham and Ishmael to keep My house clean for the pilgrims, the worshippers and for those who bow down and prostrate themselves in worship.

SHAKIR:- And when We made the House a pilgrimage for men and a (place of) security, and: Appoint for yourselves a place of prayer on the standing-place of Ibrahim. And We enjoined Ibrahim and Ismail saying: Purify My House for those who visit (it) and those who abide (in it) for devotion and those who bow down (and) those who prostrate themselves.

Figure 25 A snapshot for the Search Results for the words ‘Makkah Mecca Meccah’

In addition to that, this tool is the only tool that allows mixing Arabic and English words in one search go as shown in the figure below.



Please Enter a Word: Bible الانجيل

Choose a Chapter/All Quran : All Quran

Synonyms List:

سورة الأعراف

الَّذِينَ يَتَّبِعُونَ الرَّسُولَ النَّبِيَّ الأُمِّيَّ الَّذِي يَجِدُونَهُ مَكْتُوبًا عِندَهُمْ فِي التَّوْرَاةِ وَالإِنْجِيلِ يَأْمُرُهُم بِالْمَعْرُوفِ وَيَنْهَاهُمْ عَنِ الْمُنكَرِ وَيُحِلُّ لَهُمُ الطَّيِّبَاتِ وَيُحَرِّمُ عَلَيْهِمُ الْخَبَآئِثَ وَيَضَعُ عَنْهُمْ إِصْرَهُمْ وَالأَغْلاَلَ الَّتِي كَانَتْ عَلَيْهِمْ فَالَّذِينَ آمَنُواْ بِهِ وَعَزَّرُوهُ وَنَصَرُوهُ وَاتَّبَعُواْ النُّورَ الَّذِيَ أُنزِلَ مَعَهُ أُوْلَـئِكَ هُمُ الْمُفْلِحُونَ 157

Al-Araf

157

KHAN:- Those who follow the Messenger, the Prophet who can neither read nor write (i.e.Muhammad SAW) whom they find written with them in the Taurat (Torah) (Deut, xviii, 15) and the Injeel (Gospel) (John xiv, 16), - he commands them for Al-Ma'ruf (i.e. Islamic Monotheism and all that Islam has ordained); and forbids them from Al-Munkar (i.e. disbelief, polytheism of all kinds, and all that Islam has forbidden); he allows them as lawful At-Taiyibat [(i.e. all good and lawful) as regards things, deeds, beliefs, persons, foods, etc.], and prohibits them as unlawful Al- Khaba'ith (i.e. all evil and unlawful as regards things, deeds, beliefs, persons, foods, etc.), he releases them from their heavy burdens (of Allah's Covenant), and from the fetters (bindings) that were upon them. So those who believe in him (Muhammad SAW), honour him, help him, and follow the light (the Qur'an) which has been sent down with him, it is they who will be successful.

MAULANA:- Those who follow the Messenger-Prophet, the Ummi, whom they find mentioned in the Torah and the Gospel. He enjoins them good and forbids them evil, and makes lawful to them the good things and prohibits for them impure things and removes from them their burden and the shackles which were on them. So those who believe in him and honour him and help him, and follow the light which has been sent down with him -- these are the successful.

PICKTHAL:- Those who follow the messenger, the Prophet who can neither read nor write, whom they will find described in the Torah and the Gospel (which are) with them. He will enjoin on them that which is right and forbid them that which is wrong. He will make lawful for them all good things and prohibit for them only the foul; and he will relieve them of their burden and the fetters that they used to wear. Then those who believe in him, and honour him, and help him, and follow the light which is sent down with him: they are the successful.

RASHAD:- "(4) follow the messenger, the gentile prophet (Muhammad), whom they find written in their Torah and Gospel. He exhorts them to be righteous, enjoins them from evil, allows for them all good food, and prohibits that which is bad, and unloads the burdens and the shackles imposed upon them. Those who believe in him, respect him, support him, and follow the light that came with him are the successful ones."

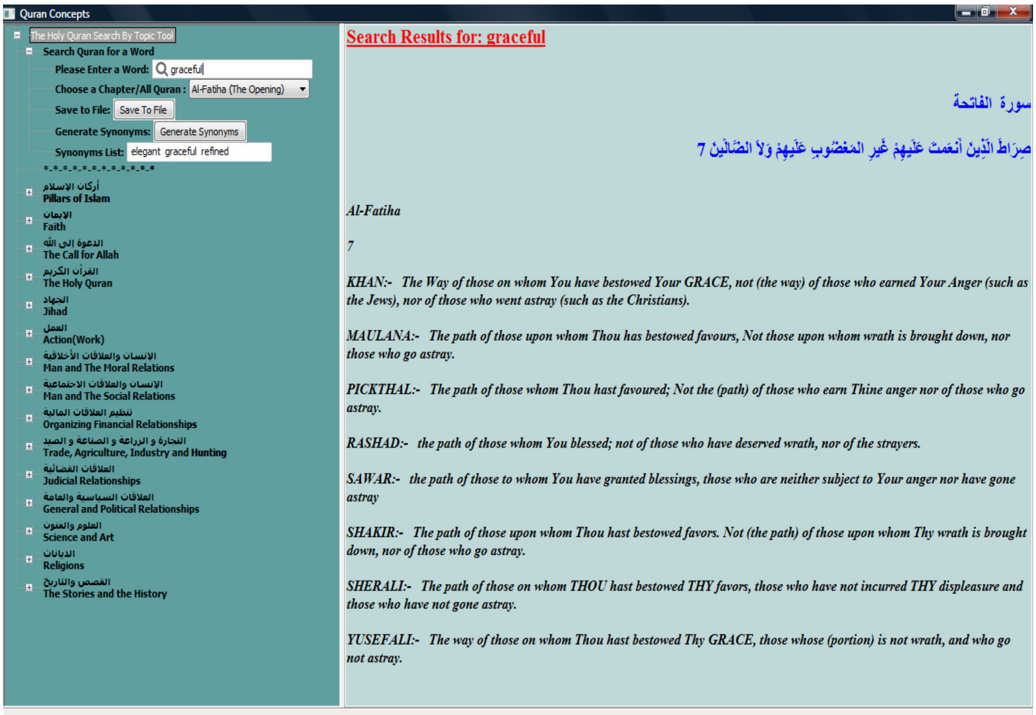
Figure 26 A snapshot of the Search Results for the words ‘Bible الإنجيل’

‘الإنجيل’ is the Arabic name for the word ‘Bible’

3.1.2.5. Generating Synonyms for the English Words

The keyword search tool generates synonyms for the English word searched for using the NLTK WordNet dictionary. WordNet groups words into synonym sets or synsets, each with its own definition and with links to other synsets. WordNet 3.0 data is distributed with NLTK, and includes 145,000 synsets. WordNet contains four dictionaries: N (nouns), V (verbs), ADJ (adjectives), and ADV (adverbs). As each word often has more than one sense, where each sense is represented by a synset, the word has to be looked up in the four dictionaries to fetch the different synsets for that word. The list of synsets is displayed in a text box for the user to use in other searches.

Unfortunately, the Arabic WordNet is not available as an API. It is available as a stand alone tool on the web. Therefore, I was unable to add the Arabic WordNet to this tool. Generating synonyms for the words searched for can help the user find more verses that cover the same theme.


Quran Concepts
The Holy Quran Search By Topic Tool
Search Quran for a Word
Save To File
Generate Synonyms
--*-*-*-*-*-*-*-*-*-*
أركان الإسلام
Pillars of Islam
الإيمان
Faith
الدعوة إلى الله
The Call for Allah
القرآن الكريم
The Holy Quran
الجهاد
Jihad
العمل
Action(Work)
الإنسان والعلاقات الأخلاقية
Man and The Moral Relations
الإنسان والعلاقات الاجتماعية
Man and The Social Relations
تنظيم العلاقات المالية
Organizing Financial Relationships
التجارة و الزراعة و الصناعة و الصيد
Trade, Agriculture, Industry and Hunting
العلاقات القضائية
Judicial Relationships
العلاقات السياسية والعامة
General and Political Relationships
العلوم والفنون
Science and Art
الديانات
Religions
القصص والتاريخ
The Stories and the History

Please Enter a Word: graceful

Choose a Chapter/All Quran : Al-Fatiha (The Opening)

Save to File:

Generate Synonyms:

Synonyms List: elegant graceful refined

Search Results for: graceful

سورة الفاتحة

صِرَاطَ الَّذِينَ أَنعَمتَ عَلَيهِمْ غَيرِ المَغضُوبِ عَلَيهِمْ وَلاَ الضَّالِّينَ 7

Al-Fatiha

7

KHAN:- The Way of those on whom You have bestowed Your GRACE, not (the way) of those who earned Your Anger (such as the Jews), nor of those who went astray (such as the Christians).

MAULANA:- The path of those upon whom Thou has bestowed favours, Not those upon whom wrath is brought down, nor those who go astray.

PICKTHAL:- The path of those whom Thou hast favoured; Not the (path) of those who earn Thine anger nor of those who go astray.

RASHAD:- the path of those whom You blessed; not of those who have deserved wrath, nor of the strayers.

SAWAR:- the path of those to whom You have granted blessings, those who are neither subject to Your anger nor have gone astray

SHAKIR:- The path of those upon whom Thou hast bestowed favors. Not (the path) of those upon whom Thy wrath is brought down, nor of those who go astray.

SHERALI:- The path of those on whom THOU hast bestowed THY favors, those who have not incurred THY displeasure and those who have not gone astray.

YUSEFALI:- The way of those on whom Thou hast bestowed Thy GRACE, those whose (portion) is not wrath, and who go not astray.

Figure 27 A snapshot of looking up the synonyms of the word ‘graceful’

As shown in figure 27, WordNet generated the set of synonyms: ‘elegant’, ‘graceful’, and refined for the word ‘graceful’

3.1.2.6. Saving the Search Results to a File

The user can save the search results to a file. When the Save To File option is clicked, the system ‘save to file’ widget is called to write the search results to a file. Saving the search results to a file could help users study these files later on, share them with friends or even print them out.

3.2. The Tree of Concepts Module

3.2.1. An Overview of the Tree of Concepts Module

The Tree of Concepts Module aims to enable users to find matches for predefined sets of categories of topics. As mentioned above, in order to cover all the topics mentioned in the Quran chapters, an expert is needed to classify the concepts not only according to their lexical structure but also bearing in mind the context of the verses and other circumstances that accompanied the chapter revelation. The ‘Mushaf Al Tajweed’ (MAT) list of concepts which is in the form of a conceptual structure or ontology of concepts is adopted in this module.

3.2.2. Advantages of Developing this Module

1. Facilitates the process of looking up the information about a certain topic and all the other themes related to this topic. By just one click, you can get all the different verses that cover this topic rather than manually finding them.
2. In principle, enables scholars to perform some natural language processing and analysis on the verses that relate to the same topic.
3. Will be an invaluable lexical resource for other researchers to use in the future.
4. It could be easily mapped to copies of the Quran translated to other languages.

3.2.3.Building the Tree of Concepts Module using Python

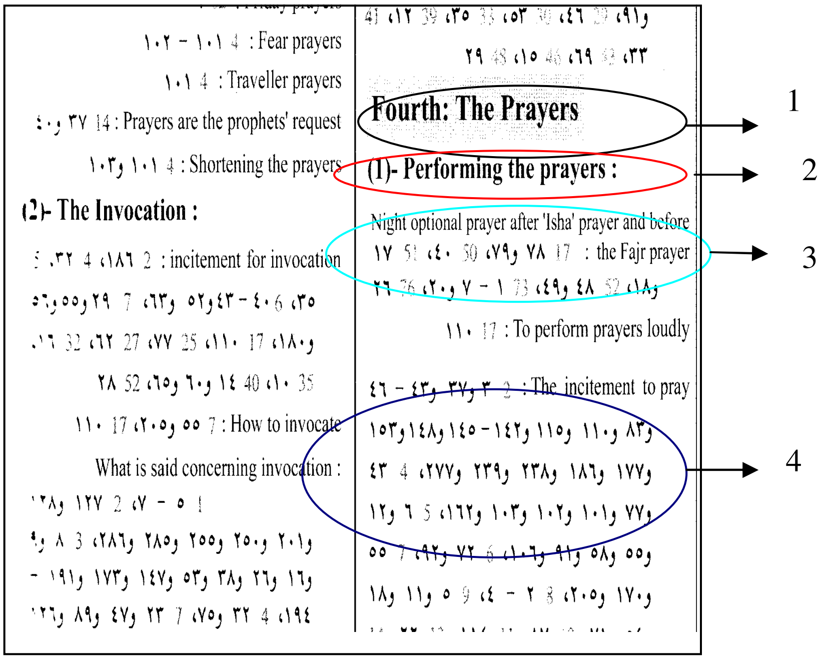
The job of using OWL to build an ontology for the Quran using Mushaf Al Tajweed list of topics involves spending much time and effort unnecessarily, when I don’t need any additional features that OWL provides such as disjointness of classes, cardinality restrictions, local scope of properties,…etc., and also no reasoning is required. The simple but powerful Python Lists and Dictionaries did a better job in much less time and in a straight forward way.

Building the Tree of Concepts Module using the Python programming language involves:

1. Mapping all the lists of chapter numbers and verse numbers for each topic in a machine readable form.
2. Building an interface for the tree of concepts.

3.2.3.1. Mapping the Lists of Chapter Numbers/Verse Numbers for each Topic

A sample of the original Arabic and its English translation pages that include the lists of chapter numbers and the corresponding verse numbers are shown. In figure 28 and 29, 1 refers to the main topic, 2 refers to subtopic, 3 refers to sub sub topic and 4 refers to relvant verses.



١٠٢ - ١٠١ 4 : Fear prayers

١٠١ 4 : Traveller prayers

٤٠و ٣٧ 14 : Prayers are the prophets' request

١٠٣و ١٠١ 4 : Shortening the prayers

(2)- The Invocation :

5 ،٣٢ 4 ،١٨٦ 2 : incitement for invocation
٥٦و ٥٥و ٢٩ 7 ،٦٣و ٥٢و ٤٣ - ٤٠ 6 ،٣٥
،١٦ 32 ،٦٢ 27 ،٧٧ 25 ،١١٠ 17 ،١٨٠و
٢٨ 52 ،٦٥و ٦٠و ١٤ 40 ،١٠ 35

١١٠ 17 ،٢٠٥و ٥٥ 7 : How to invocate

What is said concerning invocation :
١٢٨و ١٢٧ 2 ،٧ - ٥ 1
٩و ٨ 3 ،٢٨٦و ٢٨٥و ٢٥٥و ٢٥٠و ٢٠١و
- ١٩١و ١٧٣و ١٤٧و ٥٣و ٣٨و ٢٦و ١٦و
١٢٦و ٨٩و ٤٧و ٢٣ 7 ،٧٥و ٣٢ 4 ،١٩٤

41 ،١٢ 39 ،٣٥ 33 ،٥٣ 30 ،٤٦ 29 ،٩١و
٢٩ 48 ،١٥ 46 ،٦٩ 43 ،٣٣

Fourth: The Prayers

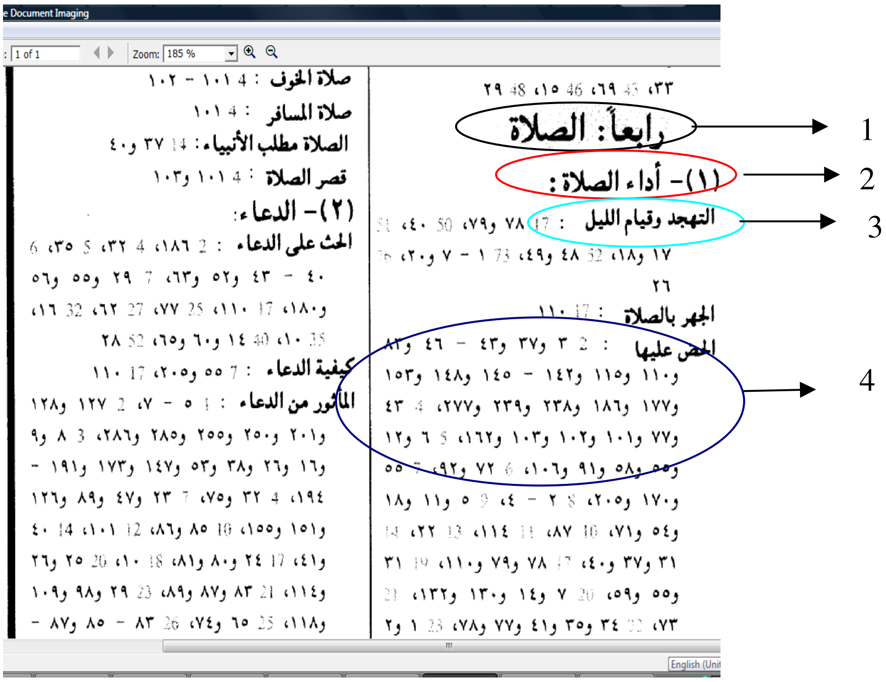
(1)- Performing the prayers :

Night optional prayer after 'Isha' prayer and before
١٧ 51 ،٤٠ 50 ،٧٩و ٧٨ 17 : the Fajr prayer
٢٦ 76 ،٢٠و ٧ - ١ 73 ،٤٩و ٤٨ 52 ،١٨و

١١٠ 17 : To perform prayers loudly

٤٦ - ٤٣و ٣٧و ٣ 2 : The incitement to pray
١٥٣و ١٤٨و ١٤٥ - ١٤٢و ١١٥و ١١٠و ٨٣و
٤٣ 4 ،٢٧٧و ٢٣٩و ٢٣٨و ١٨٦و ١٧٧و
١٢و ٦ 5 ،١٦٢و ١٠٣و ١٠٢و ١٠١و ٧٧و
٥٥ 7 ،٩٢و ٧٢ 6 ،١٠٦و ٩١و ٥٨و ٥٥و
١٨و ١١و ٥ 9 ،٤ - ٢ 8 ،٢٠٥و ١٧٠و

Figure 28 A snapshot of the English index of topics in the Quran



٣٣، 43 ٦٩، 46 ١٥، 48 ٢٩

رابعاً: الصلاة

(١)- أداء الصلاة:

التهجد وقيام الليل : 17 ٧٨ و٧٩، 50 ٤٠، 51
١٧ و١٨، 52 ٤٨ و٤٩، 73 ١ - ٧ و٢٠، 76
٢٦

الجهر بالصلاة : 17 ١١٠

الحض عليها : 2 ٣ و٣٧ و٤٣ - ٤٦ و٨٣
و١١٠ و١١٥ و١٤٢ - ١٤٥ و١٤٨ و١٥٣
و١٧٧ و١٨٦ و٢٣٨ و٢٣٩ و٢٧٧، 4 ٤٣
و٧٧ و١٠١ و١٠٢ و١٠٣ و١٦٢، 5 ٦ و١٢
و٥٥ و٥٨ و٩١ و١٠٦، 6 ٧٢ و٩٢، 7 ٥٥
و١٧٠ و٢٠٥، 8 ٢ - ٤، 9 ٥ و١١ و١٨
و٥٤ و٧١، 10 ٨٧، 11 ١١٤، 13 ٢٢، 14
٣١ و٣٧ و٤٠، 17 ٧٨ و٧٩ و١١٠، 19 ٣١
و٥٥ و٥٩، 20 ٧ و١٤ و١٣٠ و١٣٢، 21
٧٣، 22 ٣٤ و٣٥ و٤١ و٧٧ و٧٨، 23 ١ و٢

صلاة الخوف : 4 ١٠١ - ١٠٢

صلاة المسافر : 4 ١٠١

الصلاة مطلب الأنبياء: 14 ٣٧ و٤٠

قصر الصلاة : 4 ١٠١ و١٠٣

(٢)- الدعاء:

الحث على الدعاء : 2 ١٨٦، 4 ٣٢، 5 ٣٥، 6
٤٠ - ٤٣ و٥٢ و٦٣، 7 ٢٩ و٥٥ و٥٦
و١٨٠، 17 ١١٠، 25 ٧٧، 27 ٦٢، 32 ١٦،
35 ١٠، 40 ١٤ و٦٠ و٦٥، 52 ٢٨

كيفية الدعاء : 7 ٥٥ و٢٠٥، 17 ١١٠

المأثور من الدعاء : 1 ٥ - ٧، 2 ١٢٧ و١٢٨
و٢٠١ و٢٥٠ و٢٥٥ و٢٨٥ و٢٨٦، 3 ٨ و٩
و١٦ و٢٦ و٣٨ و٥٣ و١٤٧ و١٧٣ و١٩١ -
١٩٤، 4 ٣٢ و٧٥، 7 ٢٣ و٤٧ و٨٩ و١٢٦
و١٥١ و١٥٥، 10 ٨٥ و٨٦، 12 ١٠١، 14 ٤٠
و٤١، 17 ٢٤ و٨٠ و٨١، 18 ١٠، 20 ٢٥ و٢٦
و١١٤، 21 ٨٣ و٨٧ و٨٩، 23 ٢٩ و٩٨ و١٠٩
و١١٨، 25 ٦٥ و٧٤، 26 ٨٣ - ٨٥ و٨٧ -

Figure 29 A snapshot of the Arabic index of topics in the Quran

Using Python dictionaries and lists data structures to map the information that exists in the conceptual structure for the Quran enhanced code readability and certainly performance (as less code needs to be executed). Hence, a dictionary of lists created for each concept is created.

In my Python program, a typical list will look like the following list:

```
L4_1_1= ['17:78', '17:79' , '50:40' , '51:17' , '51:18' , '52:48' , '52:49' , '73:1' ,
'73:2' , '73:3' , '73:4' , '73:5' , '73:6' , '73:7' , '73:20' , '76:26']


L4_1_1   stands for concept no. 4, sub concept no. 1, sub-sub concept no. 1
’17:78’   stands for chapter number 17 and verse number 78
```

Figure 30 A snapshot for a Quran Concept List

The file that contains all the lists of different concept Quran verses, contains 1063 lists that cover 17, 979 verses. All of them have been input manually and revised twice to ensure there is no human error while trying to input this massive number of verses and lists.

Importing these Python lists into my Python module is a straight forward task. The dictionaries and their lists are then linked to a TreeCtrl object.

3.2.3.2. Building the Tree of Concepts Interface

Secondly, as mentioned above, an interface is implemented for the index of topics. As the original Quran topics hierarchy is divided into a predefined set of topics and sub topics, I had different options for implementing this structure such as pull down menus for each main concept, a main window that contains the main concepts and sub windows for the children concepts or use the tree structure. The tree structure has more advantages over the other options. It enables the user to still view all the branches leading to the desired concept all the time. As my interface is implemented using wxPython, I used the CustomTreeCtrl for my tree of concepts.

Since the structure of this ontology is non-uniform as there is no tree for any concept that looks like another, I had to build nearly 1700 nodes one by one. Each node needs to have a label that reflects a concept in the Arabic/English hierarchy, suitable icons as whether it is an expandable child or not and a name.

For example, the concept of “Monotheism” has 8 children. Each child has many sub children. For instance, the child “Allah’s Characteristics” has 181 children as shown in the figure A1_1 in appendix I. The rest of the children have sub children too but were not shown in the figure for space reasons (the figure will be too cluttered to be understood easily).

A sample of my Python code to create some children is shown in figure 31:

```
child1 = self.AppendItem (self.root, u'أركان الإسلام\n' + "Pillars of Islam")
 self.SetItemBold (child1, True)
 self.SetPyData (child1, None)
 self.SetItemImage(child1, 24, CT.TreeItemIcon_Normal)
 self.SetItemImage(child1, 13, CT.TreeItemIcon_Expanded)

 child11 = self.AppendItem(child1, u'التوحيد\n' + "Islamic")
 self.SetItemBold(child11, True)
 self.SetPyData(child11, None)
 self.SetItemImage(child11, 24, CT.TreeItemIcon_Normal)
```

```
    self.SetItemImage(child11, 13, CT.TreeItemIcon_Expanded)

    child111 = self.AppendItem(child11, u'توحيد الله تعالي\n' + "Oneness of
Allah")
    self.SetItemBold(child111, True)
    self.SetPyData(child111, None)
    self.SetItemImage(child111, 24, CT.TreeItemIcon_Normal)
    self.SetItemImage(child111, 13, CT.TreeItemIcon_Expanded)

    child111_1 = self.AppendItem(child111, u'إرادته\n' + "His Will")
    self.SetItemBold(child111, True)
    self.SetPyData(child111, None)
    self.SetItemImage(child111, 24, CT.TreeItemIcon_Normal)
    self.SetItemImage(child111, 13, CT.TreeItemIcon_Expanded)
```

Figure 31 A sample implementation of the nodes in the tree of topics

At the beginning of the run, the tree of concepts is displayed along with the Keyword Search Tool as shown in figure 32. The tree initially displays the 15 main concepts. When any expandable concept is clicked, it loads the next level of concepts and so on. If a leaf node is clicked, the OnSelChanging event is triggered, the tree label is obtained and the corresponding list of verses that cover this concept is displayed using the DisplayListOfVerses (ListofVerses) function.

The DisplayListOfVerses (ListofVerses) function does the following:

For each item in the ListofVerses

1. Right aligns the Arabic Verses and colours them blue.
2. Left Aligns the English translations and colours them black.

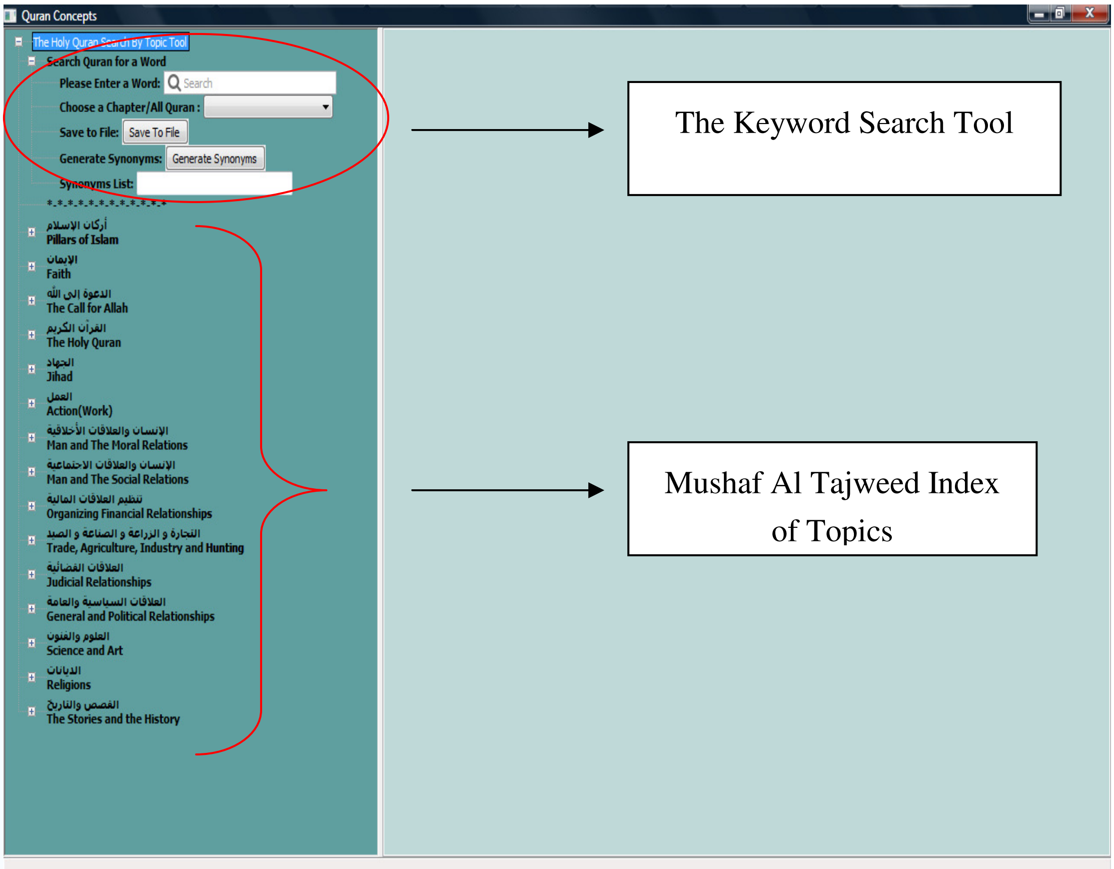


Figure 32 A snapshot of the Qurany 'Search for Concept' Tool

Summary:

The Qurany 'Search for a Concept' tool consists of two modules; the keyword search module and the tree of concepts module.

Features of the keyword search tool are:

- Uses eight English parallel Quran translations for lemmas or morphemes when the user searches for English word/s.
- Searches for Arabic words in the original Arabic Quran.
- The user can search for a mix of English and/or Arabic words.
- Generates a set of synonyms for the English word searched for.
- The user could save the search results to a file for future use.

The tree of concepts module covers all the abstract concepts covered in the Quran. It is imported from Mushaf Al Tajweed list of topics (expert knowledge). It is implemented using a TreeView control to help the user view the different levels of the tree when looking up any concept.

Part III

Qurany Website

Chapter 4: (V2): Developing the ‘Qurany’ Website for the Quran Tool

Developing a website for the Qurany ‘Search for a Concept’ tool will enable a larger number of people to make use of this tool as well as getting valuable feedback from different users who have different backgrounds and seek different features to be added to the tool.

4.1. Challenges of Publishing the Quran Tool on the WWW

- Using the NLTK tools on the web; Lancaster Stemmer, Tokenizer, and WordNet
- Loading all copies of the Quran; the tagged English Quran, the stemmed/tokenized English Quran, the tokenized Arabic Quran, and the original Arabic Quran when the web page is launched.
- Efficient response time for the keyword query request.
- Loading the massive tree of concepts in a short time.
- Loading the verses related to concepts in a short time as some concepts load a huge number of verses. For instance, the concept of 'Singularity of Allah (God)' is a major theme in the Quran and nearly 509 verses cover this topic. Therefore, it is actually loading 509 Arabic Verses in addition to 509 * 8 (= 4072) English translations.

4.2. Introduction to the Client-Server Approach

Web development is generally divided into client side coding covering aspects such as the layout and design, and server side coding, which covers the website’s functionality and back end systems.

Looking at these items from an “umbrella approach”, client side coding such as XHTML is executed and stored on a local client (in a web browser) whereas server side code is not available to a client and is executed on a web server which generates the appropriate XHTML which is then sent to the client[19]. Standard networked functions such as email exchange, web access and database access, are based on the client-server model. To check your bank account from your computer, a web browser client program in your computer forwards your request to a web server program at the bank. That program may in turn forward the request to its own database client program that sends a request to a database server at another bank computer to retrieve your account balance. The balance is returned to the bank database client, which in turn serves it back to the web browser client in your personal computer, which displays the information for you[20].

The client-server model has become one of the central ideas of network computing. Most business applications being written today use the client-server model. So do the Internet's main applications protocols, such as HTTP, SMTP, Telnet, DNS, etc. Each instance of the client software can send data requests to one or more connected servers. In turn, the servers can accept these requests, process them, and return the requested information to the client. The requested information returned to the client could either repaint the client's browser web page with the requested data or update the client's browser web page with the requested information only without having to repaint the whole web page saving much precious time. The latter technique is called AJAX (Asynchronous JavaScript and XML). AJAX is a set of technologies that provide a new way of designing and developing Web applications[21].

4.3. Available Web Tools

As this Quran tool is developed using the Python programming language, it was essential to find a server that supports this language rather than re-implement the whole tool in other popular web languages like ASP, .Net, PHP, Perl,…etc.

[19] See URL http://en.wikipedia.org/wiki/Web_development

[20] See URL http://en.wikipedia.org/wiki/Client_server

[21] See URL http://www.adaptivepath.com/ideas/essays/archives/000385.php

Fortunately, Google has provided the facility to host Python code on Google App Engine (GAE) server.

4.3.1. Google App Engine (GAE)

4.3.1.1. Overview of GAE

Google App Engine applications communicate with the web server using the CGI Standard. CGI stands for the Common Gateway Interface. It is a standard mechanism by which a Web server can pass queries to my program and display the result as a web page. When the server receives a request for my application, it runs the application with the request data in environment variables and on the standard input stream (for POST data). To respond, the application writes the response to the standard output stream, including HTTP headers and content.

The CGI standard is simple, but it would be cumbersome to write all of the code that uses it by hand. Web application frameworks handle these details efficiently instead. Google App Engine supports any framework written in pure Python that speaks CGI (and any WSGI-compliant framework using a CGI adaptor). App Engine includes a simple web application framework of its own, called **`webapp`**.

4.3.1.2. Advantages of Using GAE

The advantages of using the GAE tools are numerous. To name a few:

- **Easy to get started:** App Engine is a complete development stack that uses familiar technologies to build and host web applications. With App Engine you write your application code, test it on your local machine and upload it to Google. Once your application is uploaded to Google, Google will host and scale the application for me. I no longer need to worry about system administration, bringing up new instances of my application.
- **Automatic Scalability:** Applications can take advantage of the same scalable technologies that Google applications are built on. Automatic scaling is built in with App Engine. No matter how many users or how much

data the application stores, App Engine can scale to meet the application needs

- **The reliability, performance and security of Google's infrastructure:** Google has a reputation for highly reliable, high performance infrastructure. The same security, privacy and data protection policies for Google's applications applies to all App Engine applications.
- **Cost Efficient Hosting:** App Engine is free to get started. Providing a free quota of 500 MB of storage and around 5M page views per month.
- **The Python Runtime Environment:** The Python runtime environment uses Python 2.5.2. The environment includes the Python Standard library. Application code must be written exclusively in Python. App Engine also provides a simple Python web application framework called **webapp** and the Django web application framework to make it easy to start building applications.

4.4. Implementing the Qurany Website using GAE

Using the Google App Engine Python Software Development Kit (SDK), one can write his/her application code, test it on his/her local machine and upload it to Google server. The Python SDK includes a web server application that simulates the App Engine environment, including a local version of the datastore, Google Accounts, and the ability to fetch URLs and send email directly from one’s computer using the App Engine APIs. The Python SDK runs on any computer with Python 2.5, and versions are available for Windows, Mac OS X and Linux.

Any application must have at least two files. The first is the Python file (Qurany.py) that basically contains the CGI code for handling the communication between the python code and the server. The other file is a configuration file (app.yaml). This configuration file describes which handler scripts should be used for which URLs.

4.4.1. Qurany.py File Structure

App Engine includes a simple web application framework of its own, called webapp. The webapp framework is already installed in the App Engine environment and in the SDK.

Any webapp application has three parts:

- one or more RequestHandler classes that process requests and build responses
- a WSGIApplication instance that routes incoming requests to handlers based on the URL. WSGI stands for Web Server Gateway Interface.
- a main routine that runs the WSGIApplication using a CGI adaptor.

This is implemented in my Qurany.py file as shown in figure 33

```
from google.appengine.ext import webapp
from google.appengine.ext.webapp import template
from google.appengine.ext.webapp import util
import wsgiref.handlers

class MainPage(webapp.RequestHandler):
        """ Renders the main template."""
        def get(self):
            template_values    =    {    'title':'Keyword
Search', }
            path                                   =
os.path.join(os.path.dirname(__file__),
                                          "index.html")

self.response.out.write(template.render(path,
                                      template_values))

class KeywordSearchRPCHandler(webapp.RequestHandler):
     ‘‘‘Handles all the requests for searching the Quran
        for  keywords’’’
```

```
class RPCHandler(webapp.RequestHandler):
    ‘’’Handles all the requests for expanding parent
     tree nodes and fetching the corresponding verses’’’

class ContactusHandler (webapp.RequestHandler):
    ‘’’Handles the information supplied by the users and
       sends an email to the web site administrator.’’’

    def main():
        application = webapp.WSGIApplication([('/',
          MainPage),('/Search',KeywordSearchRPCHandler),

('/rpc',RPCHandler),('/Contactus',ContactusHandler),])
        wsgiref.handlers.CGIHandler().run(application)

if __name__ == "__main__":
        QChapter                                             =
EnglishQuranChapters.EnglishQuranChapters()
                                                   #English Quran
        AChapter                                             =
ArabicQuranChapter.ArabicQuranChapters()
                                                    #Arabic Quran
        AChapter.LoadAllChapters()
        QChapter.LoadAllChapters()
        QuranTopicList                                       =
QuranClassificationLists.QuranClassificationLists()
        TreeLabels = TreeConcepts.TreeConcepts()
               #used in dynamic loading of tree children
           main()
```

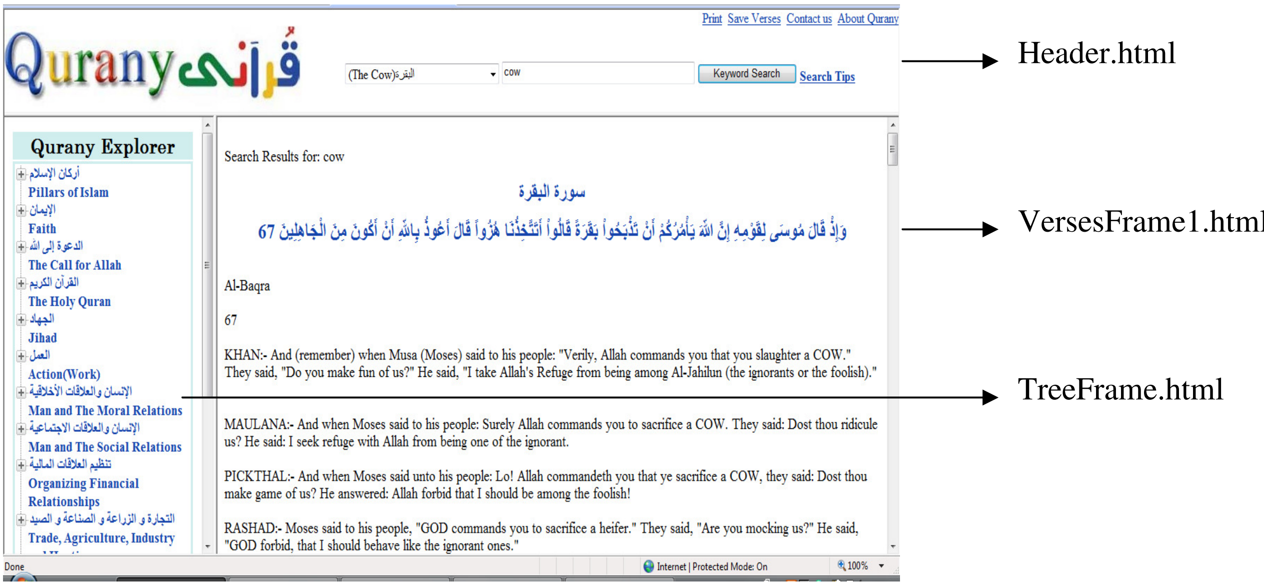
Figure 33 Qurany.py structure

This code defines four request handlers: MainPage, KeywordSearchRPCHandler, RPCHandler, and ContactusHandler. The first request handler; MainPage, is mapped to the root URL (/). When webapp receives an HTTP GET request to the URL /, it instantiates the MainPage class and calls the instance's ‘get’ method. Inside the method, information about the request is available using ‘self.request’. Typically, the method sets properties on ‘self.response’ to prepare the response, then exits. Webapp sends a response based on the final state of the MainPage instance.

The application itself is represented by a webapp WSGIApplication instance. The function run_wsgi_app() takes a WSGIApplication instance (or another WSGI-compatible application object) and runs it in App Engine's CGI environment. run_wsgi_app() is similar to the WSGI-to-CGI adaptor provided by the 'wsgiref' module in the Python standard library, but includes a few additional features. For example, it can automatically detect whether the application is running in the development server or on App Engine, and display errors in the browser if it is running on the development server.

In addition to that, templates were used to render the html files. HTML embedded in code is messy and difficult to maintain. It is better to use a templating system, where the HTML is kept in a separate file with special syntax to indicate where the data from the application appears. The webapp module includes Django's templating engine. This is included with the SDK and is part of App Engine. Hence, when the user requests to view the Qurany web site, the first html file to be rendered will be 'index.html'**.** The file 'index.html' has the interface for both the keyword search tool and the tree of concepts tool. The 'index.html' file is divided into two horizontal frames and the lower frame is sub divided into two vertical frames. Each frame pane displays one html file specified in the 'src' tag.

Figure 34 shows how the pages divide into three frames. The upper horizontal frame displays the file 'header.html'. This file handles the keyword search module. The lower left frame displays the file 'Treeframe.html' handling the tree of concepts. The lower right frame displays the file 'VersesFrame1.html' and it is responsible for displaying the Quran verses.



Search Results for: cow

سورة البقرة

وَإِذْ قَالَ مُوسَى لِقَوْمِهِ إِنَّ اللّهَ يَأْمُرُكُمْ أَنْ تَذْبَحُواْ بَقَرَةً قَالُواْ أَتَتَّخِذُنَا هُزُواً قَالَ أَعُوذُ بِاللّهِ أَنْ أَكُونَ مِنَ الْجَاهِلِينَ 67

Al-Baqra

67

KHAN:- And (remember) when Musa (Moses) said to his people: "Verily, Allah commands you that you slaughter a COW." They said, "Do you make fun of us?" He said, "I take Allah's Refuge from being among Al-Jahilun (the ignorants or the foolish)."

MAULANA:- And when Moses said to his people: Surely Allah commands you to sacrifice a COW. They said: Dost thou ridicule us? He said: I seek refuge with Allah from being one of the ignorant.

PICKTHAL:- And when Moses said unto his people: Lo! Allah commandeth you that ye sacrifice a COW, they said: Dost thou make game of us? He answered: Allah forbid that I should be among the foolish!

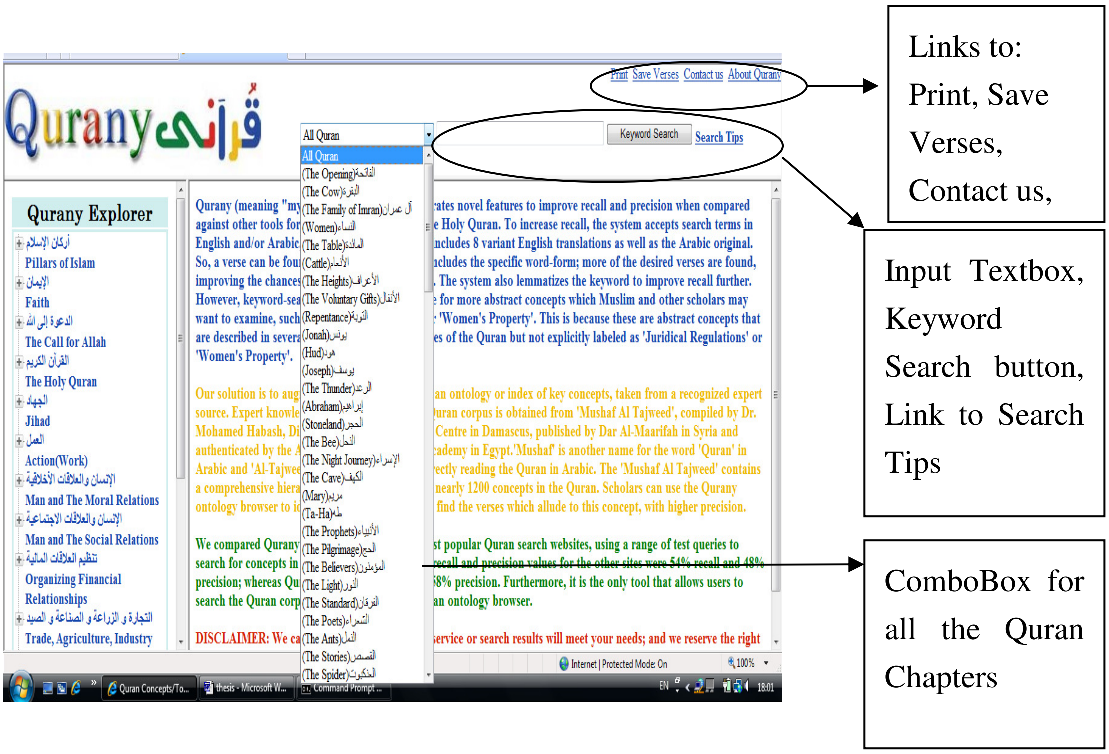
RASHAD:- Moses said to his people, "GOD commands you to sacrifice a heifer." They said, "Are you mocking us?" He said, "GOD forbid, that I should behave like the ignorant ones."

Figure 34 A snapshot for the Qurany Website

4.4.2. The Keyword Search Tool on the Web

4.4.2.1. A Detailed Explanation of How the Keyword Search Tool Works on the Web

As mentioned above, the file 'header.html' displays on the upper horizontal frame. It displays an html form, in addition to displaying other links to services or other pages. The form displayed contains: a combo box where the user can choose a specific Quran chapter to search in or search in all Quran chapters, a textbox for the user to input the keyword/s, 'Keyword Search' button, a Print option where the users can print the verses displayed in the lower right pane (as there is no other way that the user could print the verses provided there are multiple frames in one page), a 'Save Verses' to a file option, a link to 'About Qurany' page for more information about the tool, a 'Contact us' option and a link to a 'Search Tips' window. When the user clicks on the button 'Keyword Search', in other words, the client browser issues a request to search for a word/s in the Quran corpus, this request should be sent to the server to be handled by the KeywordSearchRPCHandler.



Qurany (meaning "my
against other tools for
English and/or Arabic.
So, a verse can be foun
improving the chances
However, keyword-sea
want to examine, such
are described in severa
'Women's Property'.

rates novel features to improve recall and precision when compared
e Holy Quran. To increase recall, the system accepts search terms in
ncludes 8 variant English translations as well as the Arabic original.
ncludes the specific word-form; more of the desired verses are found,
. The system also lemmatizes the keyword to improve recall further.
e for more abstract concepts which Muslim and other scholars may
'Women's Property'. This is because these are abstract concepts that
es of the Quran but not explicitly labeled as 'Juridical Regulations' or

Our solution is to aug
source. Expert knowle
Mohamed Habash, Di
authenticated by the A
Arabic and 'Al-Tajwee
a comprehensive hiera
ontology browser to id

an ontology or index of key concepts, taken from a recognized expert
uran corpus is obtained from 'Mushaf Al Tajweed', compiled by Dr.
Centre in Damascus, published by Dar Al-Maarifah in Syria and
cademy in Egypt.'Mushaf' is another name for the word 'Quran' in
ectly reading the Quran in Arabic. The 'Mushaf Al Tajweed' contains
nearly 1200 concepts in the Quran. Scholars can use the Qurany
find the verses which allude to this concept, with higher precision.

We compared Qurany
search for concepts in
precision; whereas Qu
search the Quran corp

st popular Quran search websites, using a range of test queries to
recall and precision values for the other sites were 54% recall and 48%
58% precision. Furthermore, it is the only tool that allows users to
an ontology browser.

DISCLAIMER: We ca

service or search results will meet your needs; and we reserve the right

Links to: Print, Save Verses, Contact us,

Input Textbox, Keyword Search button, Link to Search Tips

ComboBox for all the Quran Chapters

Figure 35 A snapshot for the Layout of the Qurany website

Searching for keywords on the web differs from the ordinary search (performed on our pcs) in that it has to be fast .

Sending a request to the server and waiting for the search process to take place, then repainting the web page again to display the results of the search could get very slow and will eventually discourage users from using the Qurany website. Therefore, the AJAX techniques had to be used to save much of the time taken in handling these requests making the keyword tool more interactive by using JavaScript to pull updated information from the server and modify the Verses page displayed in the browser on the fly. Thus, it allows the Qurany website to be much more dynamic and responsive by enabling the client browser to make RPC (Remote Procedure Call) requests to Google App Engine server.

As far as Google App Engine is concerned, keyword/s AJAX requests are just another type of HTTP request. App Engine will handle keyword/s HTTP requests via the webapp.RequestHandler class. So, to handle AJAX requests we simply create a KeywordSearchRPCHandler (webapp.RequestHandler) for a '/ Search' path on the server.

This Request Handler (on the server side) will parse the HTTP Request for the function name and parameters that the client wants the server to call, make the call, and then return the result as an HTTP Response. HTTP Response only returns a single result; in that single result may be a collection of multiple values expected by the client.

But, the client and the server are not guaranteed to be running the same language, so a light-weight language-neutral data format that represents the RPC call needs to be chosen. The "X" in "AJAX" is for the XML that was traditionally used as this data format. A better data format for RPC requests is JSON. JSON is more compact and more human readable than XML. To be able to use JSON, the json2.js module must be downloaded first.

Following is a side by side comparison of some JSON and XML:

JSON	XML
{	<data>
"string",	<string>"string"</string>
1,	<int32>1</int32>
3.14,	<float>3.14</float>
[	<list>
"a",	<item>"a"</item>
"list"	<item>"list"</item>
],	</list>
{	<dictionary>
key1:"value1",	<key1>"value1"</key1>
key2:"value2"	<key2>"value2"</key2>
}	</dictionary>
}	</data>

While XML has its advantages, in most cases JSON is lighter-weight and more conducive to RPC than XML. JSON is also a good choice because it is supported by many of the relevant programming languages.

This example will follow an AJAX call sequence:

1. Client invokes a method that wants to call the server (ex: clicks on the 'Keyword Search' button)

2. Client creates an XMLHttpRequest object

3. Client JSON encodes the parameters for the request

4. Server JSON decodes the request

5. Server executes the request (searches the Quran corpus for matches)

6. Server JSON encodes the response

7. Client JSON decodes response

8. Client processes response (displays the Quran verses in the lower right

frame pane)

Therefore, when the user clicks the button 'Keyword Search' the function Search() will be invoked as shown in figure 36:

```
var server = {};
function     InstallFunction(obj,     functionName)     {
obj[functionName] = function() {
        RequestKeywordSearch(functionName, arguments); }
                    }
function doKeywordSearch(KeywordInfo) {
                     server.KeywordSearch(KeywordInfo,
onKeywordSearchSuccess);
                 }
// Insert 'KeywordSearch' as the name of a callable
method
InstallFunction(server, 'KeywordSearch');


function onKeywordSearchSuccess(response) {
    // Callback for after a successful doKeywordSearch
    //Displays the verses in the lower right frame pane
```

```
                  }
function Search(){
            var               FormDetails             =
document.forms[0].elements;
            var                Keywords               =
FormDetails.InputString.value;
            var              QuranChapterNo           =
FormDetails.QChapterNo.value;
            if (Keywords != null){
                KeywordInfo =  new Array();
                KeywordInfo[0] = QuranChapterNo;
                KeywordInfo[1] = Keywords;
                doKeywordSearch(KeywordInfo);} }
```

Figure 36 Shows the Ajax sequence of events

On the client side, the function Search(), retrieves all the details supplied by the client about the search, stores them in an array and calls the doKeywordSearch(KeywordInfo).

The function doKeywordSearch(KeywordInfo) has already an AJAX server method to call; ‘KeywordSearch’ on the server side. This will automatically invoke the InstallFunction() for the specified server method (‘KeywordSearch’)which will consequently execute the RequestKeywordSearch() function.

The RequestKeywordSearch() function is responsible for encoding the data into the JSON format, creating an XMLHttpRequest object that will be used in sending the data asynchronously and doing the actual send of the data to the server side for the processing to take place.

The final URL looks like the following:

http://localhost:8080/Search?action=KeywordSearch&arg0=%221cow%22&time=1210006014945

On the server side, the above URL will be decoded. Since the **KeywordSearchRPCHandler** class is mapped to the URL (‘/Search’), the above URL will be handled by the **KeywordSearchRPCHandler** methods; RPCMethods(). Class RPCMethods contains only one method; **KeywordSearch**.

This method searches the Quran Corpus for the occurrence of the words (after being stemmed/tokenized in case of English words and tokenized only if the words were Arabic) received from the ‘arg0’ parameter and sends the result back to the client browser to be displayed.

4.4.2.2. Removing the English WordNet Option

As the NLTK WordNet files are larger than the file size limit that GAE permits, it refused to load the WordNet dictionary files to GAE server. The limitation is not on upload file size, but on size of python dictionary data-structure after uploading within the system, so splitting the files would not help. Consequently, I had to remove this option from the Qurany website.

4.4.3. The Tree of Concepts Tool on the Web

As the tree or index of concepts is a large resource, it needs special care when porting it on the web. In many cases, the number of children nodes for a parent node could reach a hundred or more which will lead to a very slow performance on the web. Another issue is that some concepts are covered in hundreds of verses i.e. the verses that cover the concept of Monotheism of God. Therefore, the ordinary html TreeVeiw control (displayed on the client browser) can not achieve the task efficiently. Very few open source TreeView controls support AJAX and dynamic loading. After researching some of them, I chose the Yahoo! User Interface Library that includes a TreeView control which supports Ajax and dynamic loading.

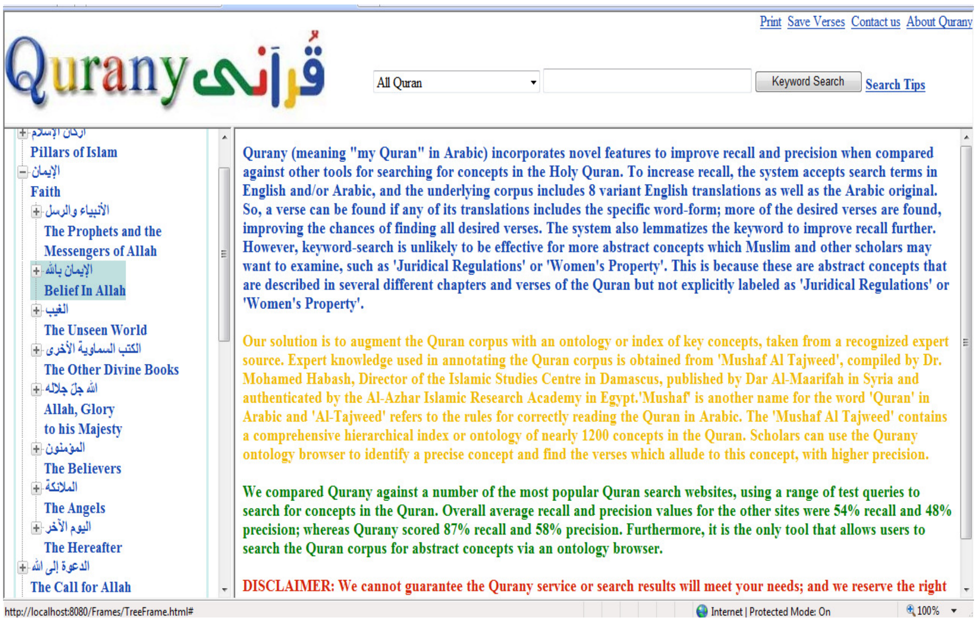
4.4.3.1. Advantages of using the Yahoo! User Interface Library

- The Yahoo! User Interface (YUI) Library is a set of utilities and controls, written in JavaScript, for building richly interactive web applications using techniques such as DOM scripting, DHTML and AJAX. This will enable me not only to use the Yahoo! TreeView control but also some other controls like the Connection Manager which will facilitate the sending of data from the client to the server side.

- It is an open source library.
- Yahoo! Is well established, and at the forefront cutting edge web technology. The utilities and controls provided by the library have already been tried, tested and are well documented.
- The YUI TreeView Control provides a rich, compact visual presentation of hierarchical node data. Dynamic loading of nodes is supported.
- YUI's light, powerful core and offers language utilities, DOM normalizations, and a complete event/custom event suite. For 17.4KB, the user can include the Core plus the YUI Loader, which can dynamically load the requirements for any YUI-based module using a single HTTP request for JS and one more for CSS. No other front-end kit offers a better combination of lightness and power.

4.4.3.2. An Overview of how the Tree View Control Works

Hence, the ‘index.html’ file loads the file ‘treeframe.html’ in the lower left frame pane. The first level of tree nodes (that includes the main fifteen concepts) is loaded initially. When the user clicks on one of those nodes to expand the tree, the children nodes are retrieved dynamically (from the server) using the AJAX techniques. In addition to that, the verses associated with any leaf node are also fetched from the server side using the AJAX techniques.



Qurany (meaning "my Quran" in Arabic) incorporates novel features to improve recall and precision when compared against other tools for searching for concepts in the Holy Quran. To increase recall, the system accepts search terms in English and/or Arabic, and the underlying corpus includes 8 variant English translations as well as the Arabic original. So, a verse can be found if any of its translations includes the specific word-form; more of the desired verses are found, improving the chances of finding all desired verses. The system also lemmatizes the keyword to improve recall further. However, keyword-search is unlikely to be effective for more abstract concepts which Muslim and other scholars may want to examine, such as 'Juridical Regulations' or 'Women's Property'. This is because these are abstract concepts that are described in several different chapters and verses of the Quran but not explicitly labeled as 'Juridical Regulations' or 'Women's Property'.

Our solution is to augment the Quran corpus with an ontology or index of key concepts, taken from a recognized expert source. Expert knowledge used in annotating the Quran corpus is obtained from 'Mushaf Al Tajweed', compiled by Dr. Mohamed Habash, Director of the Islamic Studies Centre in Damascus, published by Dar Al-Maarifah in Syria and authenticated by the Al-Azhar Islamic Research Academy in Egypt.'Mushaf' is another name for the word 'Quran' in Arabic and 'Al-Tajweed' refers to the rules for correctly reading the Quran in Arabic. The 'Mushaf Al Tajweed' contains a comprehensive hierarchical index or ontology of nearly 1200 concepts in the Quran. Scholars can use the Qurany ontology browser to identify a precise concept and find the verses which allude to this concept, with higher precision.

We compared Qurany against a number of the most popular Quran search websites, using a range of test queries to search for concepts in the Quran. Overall average recall and precision values for the other sites were 54% recall and 48% precision; whereas Qurany scored 87% recall and 58% precision. Furthermore, it is the only tool that allows users to search the Quran corpus for abstract concepts via an ontology browser.

DISCLAIMER: We cannot guarantee the Qurany service or search results will meet your needs; and we reserve the right

Figure 37 A snapshot for the Tree of Concepts

In the figure shown above, when the parent node ‘الإيمان/Faith’ is clicked, eight children nodes were fetched from the server side asynchronously.

When the ‘treeframe.html’ file is loaded, the function CreateTree() is called. CreateTree() basically, instantiates a tree object, sets the DynamicLoad attribute on (so that, if the client wants to expand any non-leaf node, the function loadNodeData() is called to handle this task). In order to retrieve verses for leaf nodes, the event ‘labelClick’ has to be subscribed (set active) and only then the doAddVerses() function will be executed. The event ‘collapse’ has also been subscribed so that when a tree node collapses, all its children will be removed; get ready to the next dynamic loading to take place, if any. The first level of the tree is loaded when the tree is first created. Therefore, there are two possible client AJAX requests that could take place: to ask for the children of a parent node or the verses associated with a leaf node.

4.4.3.3. Loading tree nodes dynamically

4.4.3.3.1. Client Side

When the client clicks on a parent node to obtain its children nodes, the function loadNodeData(node, fnLoadComplete) will be invoked. First, the index of the parent node (at the first level) will be retrieved. For example, if the first parent node was clicked, the index of this node will be used to retrieve its children. This reduces the amount of time to 1/15 of the time it was going to take if it was going to look in all the concepts to find the specified children nodes. Then, the index of that node, its label and the AJAX server method that will be used in retrieving the children nodes are sent asynchronously using the YUI Connection Manger to the server side (after encoding the data using the JSON format). The Connection Manager is a neat method of sending data asynchronously. It creates an XMLHttpRequest object as well, but all the code for that is encapsulated in the Connection Manager. Similar to any asynchronous data communication, a callback function should be specified to handle the situation in case of either the success or the failure of the AJAX call. A time out of 7 seconds is also specified so that the user does not wait forever if the request fails.

4.4.3.3.2. Server Side

The RPCHandler class will route the URL (/rpc) to the ConceptsRPCMethods class. The method that should be invoked here is the 'Add' method. The 'Add' method will use the **Number (No)** for the main concept sent by the client to locate the children of the label of the parent (sent also by the client browser) in the file 'TreeConcepts.py'. Consequently, the children node labels are sent back to the client browser and the tree of concepts is updated. The 'TreeConcepts.py' file contains a dictionary of the fifteen main concepts. Each main concept has a dictionary of all the labels related to that concept where the key is the parent label and the values for that key are the children labels.

4.4.3.4. Retrieving Verses from leaf nodes

4.4.3.4.1. Client Side

Retrieving verses for leaf nodes is done asynchronously as mentioned before. When a tree leaf node is clicked, the function **doAddVerses(node.data.label)** is called. The doAddVerses() function will invoke the server method **'AddVerses'** which in turn will invoke the

InstallFunction2() function (which handles server methods). Consequently, the **RequestVerses()** function will be invoked to carry out the encoding of the data into a URL and then encoding this URL to the JSON format and sending it to the server side.

4.4.3.4.2. Server Side

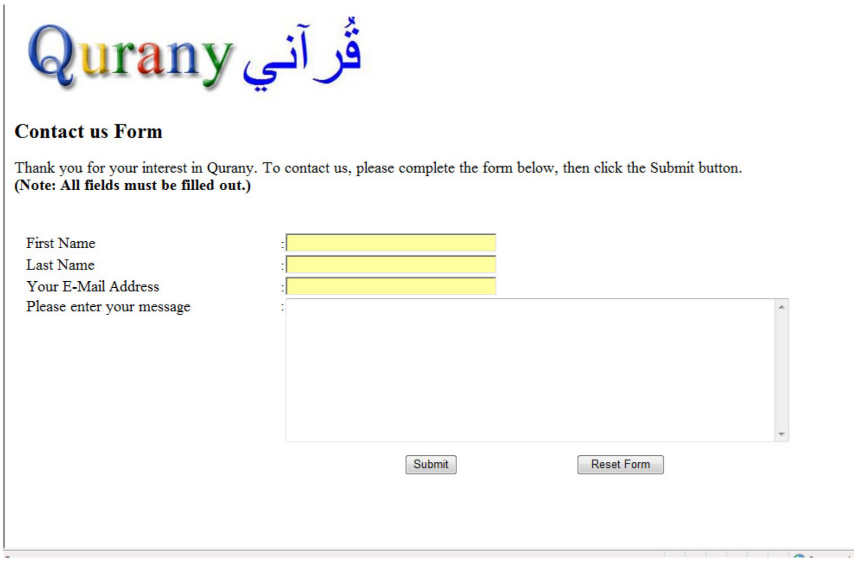
The RPCHandler class will route the URL (/rpc) to the 'ConceptsRPCMethods' class. This time, the method that should be invoked is 'AddVerses'. The 'AddVerses' method will call the GetConceptList() function which will find the corresponding list of verses to the node label sent by the client.

4.4.4. The 'Contact Us' Form

When the client clicks on the link 'Contact us' in the 'header.html' file, the file 'contactus.html' is loaded. It displays a form for the client to fill in. Each field in this form is checked using regular expressions to ensure the validity of the data supplied.

The user data is sent to the webmaster of the Qurany web site via the GAE mail API. This method of sending personal information on the web is preferred over the easier 'mailto:' method. A disadvantage with "mailto:" is however that it will often not work for computer shared between several people, or where the user has not correctly initialized his/her browser with his/her e-mail address. After sending the email to the Qurany webmaster, the user is notified of the success of this task.

On the server side, when this information is received the 'ContactusHandler' class will route the data to ContactusMethods class. This class will check whether the user is signed in to Google or not. If the user is not signed in, he/she will be redirected to the sign in page and then redirected again to the Qurany website sending the information to the webmaster using the 'mail' API provided by the App Engine.



Contact us Form

Thank you for your interest in Qurany. To contact us, please complete the form below, then click the Submit button.
(Note: All fields must be filled out.)

First Name	:
Last Name	:
Your E-Mail Address	:
Please enter your message	:

Figure 38 A snapshot of the Contact us page

In figure 38, the user is asked to input his/her information; First Name, Last Name, E-mail Address, and Message. The user can click on the Submit button when he/she finishes his email or can click on the Reset button to clear all the fields in the Contact us form.

Summary

The Qurany website (V2) is developed using the client-server architecture. The server side script or cgi is saved on Google App Engine server. The client side code is developed using HTML and JavaScript. The communication between the client queries and the server response to those queries is handled asynchronously using AJAX techniques.

The keyword search module fetches the matching verses for any search query asynchronously. The tree of concepts is imported from the Yahoo! User Interface Library as it supports dynamic loading of children nodes and AJAX techniques. The tree of concepts expands its children nodes asynchronously and fetches the list of Quran verses asynchronously. Chapter 5: Evaluation, discusses unforeseen practical limitations, which led us to develop a completely different architecture for V3 of the system.

Chapter 5: (V3): Qurany Concepts Tool (An Alternative Approach)

The main objective of the Keyword Search module is to allow users to search the Quran (English/Arabic) for concrete concepts. Due to Google Appengine's request time restiriction (30 seconds per request), the Keyword search tool was unable to load all the Quran files required for performing the searches. Therefore, another tool (Qurany Concepts tool) had to be developed to cover the concrete concepts of the Quran. Two main approaches were researched for this purpose; using the tagging option offered by social book marking tools or creating HTML file for each verse that contain the abstract concepts covered by the verse.

5.1. Using Social Bookmarking tools

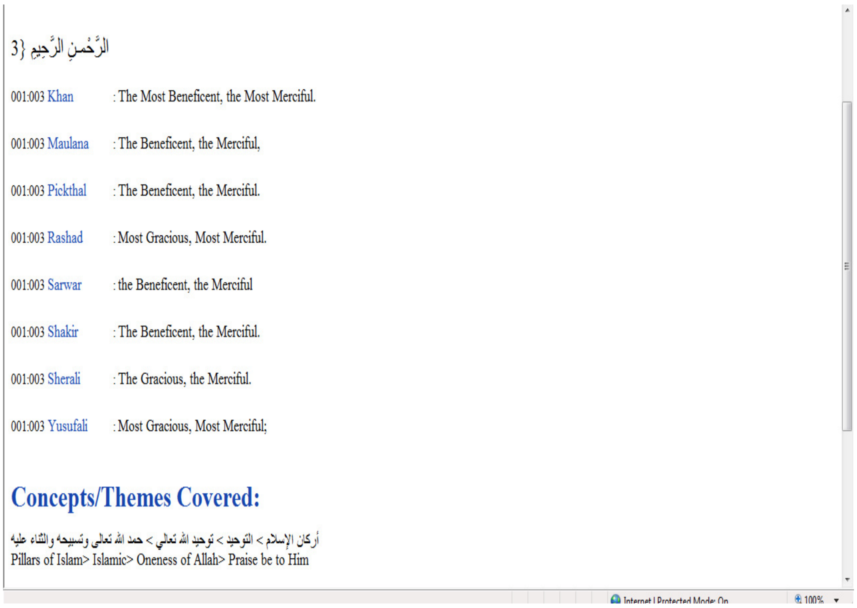
Making use of popular social bookmarking tools like Del.icio.us is very appealing. Millions of documents are being tagged on these sites enabling others to benefit from those documents and also facilitates web search for documents (using the document tags). This approach works well with medium size documents but adopting this approach for the Quran corpus is not practical for the following reasons:

- Tagging the verses of the Quran corpus manually is unpractical. The numbers of verses that will need to be tagged manually are nearly 18,000 verses.
- To be able to keep the hierarchy structure of the concepts covered by the verses, much unnecessary work needs to be done to parse the tree of concepts and input it manually for all the verses of the Quran corpus.

Therefore, the second approach was adopted leading to the development of the Qurany Concepts web tool.

5.2. Overview of the Qurany Concepts Tool

The main idea of this tool is to create an HTML file for each Quran verse as shown in figure 39. Each file should contain: the Arabic verse, the eight English parallel translation for this verse and all the abstract concepts covered by this verse. These files should be saved on the University of Leeds Computing server along with an index file for all the html files.



الرَّحْمـنِ الرَّحِيمِ {3

001:003 Khan	: The Most Beneficent, the Most Merciful.
001:003 Maulana	: The Beneficent, the Merciful,
001:003 Pickthal	: The Beneficent, the Merciful.
001:003 Rashad	: Most Gracious, Most Merciful.
001:003 Sarwar	: the Beneficent, the Merciful
001:003 Shakir	: The Beneficent, the Merciful.
001:003 Sherali	: The Gracious, the Merciful.
001:003 Yusufali	: Most Gracious, Most Merciful;

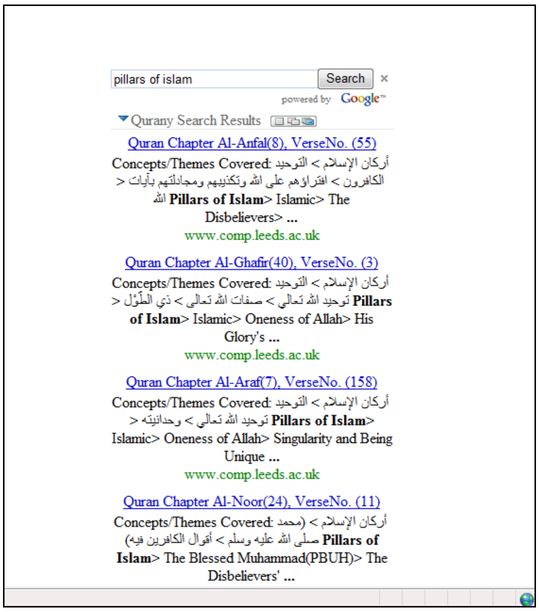
Concepts/Themes Covered:

أركان الإسلام > التوحيد > توحيد الله تعالي > حمد الله تعالى وتسبيحه والثناء عليه
Pillars of Islam> Islamic> Oneness of Allah> Praise be to Him

Figure 39 A snapshot of the html file ‘1-3.html’

At the beginning of each file, the chapter name and the verse number is mentioned. Then the Arabic verse text followed by the eight parallel English translations and finally all the concepts covered in the verse. This method has the advantage of retrieving all the concepts covered in each verse as often in the Quran, a verse covers more than one theme or concept.

Also, users can search the Quran corpus using the Google Site Search option allowing them to make use of the powerful Google search engine facilities. Alternatively, users could use the url http://quranywords.appspot.com/ to search the Quran Concepts HTML files. In this website, a Google Ajax Search uploader API has been used to facilitate the process of searching the files. Therefore, the users do not have to remember the University of Leeds Computer server Qurany Concepts url to be able to search the HTML files for words, instead, they should visit the above url, input any word/s and as the Google search API is restricted programmatically on the University of Leeds Computer Server Qurany Concepts website, it will only display results from the Qurany Concepts HTML files.



pillars of islam Search ×

powered by Google™

Qurany Search Results

Quran Chapter Al-Anfal(8), VerseNo. (55)

Concepts/Themes Covered: أركان الإسلام > التوحيد > الكافرون > افتراؤهم على الله وتكذيبهم ومجادلتهم بآيات الله **Pillars of Islam**> Islamic> The Disbelievers> **...**

www.comp.leeds.ac.uk

Quran Chapter Al-Ghafir(40), VerseNo. (3)

Concepts/Themes Covered: أركان الإسلام > التوحيد > توحيد الله تعالي > صفات الله تعالى > ذي الطَّوْل > **Pillars of Islam**> Islamic> Oneness of Allah> His Glory's **...**

www.comp.leeds.ac.uk

Quran Chapter Al-Araf(7), VerseNo. (158)

Concepts/Themes Covered: أركان الإسلام > التوحيد > توحيد الله تعالي > وحدانيته > **Pillars of Islam**> Islamic> Oneness of Allah> Singularity and Being Unique **...**

www.comp.leeds.ac.uk

Quran Chapter Al-Noor(24), VerseNo. (11)

Concepts/Themes Covered: أركان الإسلام > (محمد صلى الله عليه وسلم > أقوال الكافرين فيه) **Pillars of Islam**> The Blessed Muhammad(PBUH)> The Disbelievers' **...**

Figure 40 A snapshot for the QuranyConcepts Tool

In the figure shown above, search results for the term ‘pillars of islam’ are displayed. The Quran chapter number and the matching verse number form the title of each item in the search results pages. This is encoded in the meta tags of each HTML file. As the search is restricted only to the HTML files directory on the Leeds computing server, all the search results are matching verses from files found in this directory.

5.2.1. The Design of the Qurany Concepts Tool

A file generator module has been developed for this purpose. The module generates the HTML files in three steps.

The first step involves creating a new file for each verse, writing HTML code specifying all the meta tags, styles, the Arabic verse (with the correct encoding;utf-8), and tabulating the eight English parallel translations.

The second step is responsible for writing the abstract concepts to the files. As I already have a dictionary called QuranClassificationLists which contains all the lists of concepts and those verses covered by these concepts, I just needed to parse the tree of concepts in order to generate a text file for these parses. For instance, the concept 'Good Conduct' is a sub-concept for the concept 'The Good Deeds' which is a sub-concept for the main concept 'Action (Work)'. This concept would be represented in the tree parses text file as follows:

العمل > العمل الصالح > حسن السلوك
Action (Work)> The Good Deeds>Good Conduct

I have created the tree parses file manually and have revised it twice to ensure it is flawless (this file contains 1063 concepts and 1063*2 lines). Hence, for every concept in the tree parses file, there is a list of verses in the QuranClassificationLists file.

The third step is for creating the navigation links between the files and for writing the footer of the files. The navigation links are important as they allow users to access the next page, the previous page as well as the home page. Also, the footer links this tool with the Google tool developed earlier.

5.2.2. Ensuring Convenient Display of the Arabic Text in Client Browser

After generating all the HTML files and saving them on the University of Leeds server, the Arabic text in these files was not displayed in the correct encoding; UTF-8, whenever the files are launched. The only way to get it encoded correctly was to change the browser encoding options for each page every time the user wants to use this tool. As this will definitely discourage users from using the tool, I had to investigate whether the problem is in the HTML files or in how the server reads these files. The HTML files worked fine when launched from my computer. Therefore, I had to seek the School of Computing Support staff's help.

They explained that on 'comp.leeds.ac.uk' the server will tell the browser that the page is in the iso-8859-1 character set, unless the server is instructed otherwise (even if the <meta > tags placed in each HTML file specify that the content of the HTML file should be encoded using the utf-8 format. This is because the <meta> tag is for the benefit of the browser not the server). Thus, to override this, a world-readable file needs to be created. It must be called .htaccess (the leading dot is important) and the following line should be given to it : AddCharset UTF-8 .HTML. This instructs the server to send all .HTML files in that directory as UTF-8. Consequently, all the Arabic text is displayed in the correct encoding as expected.

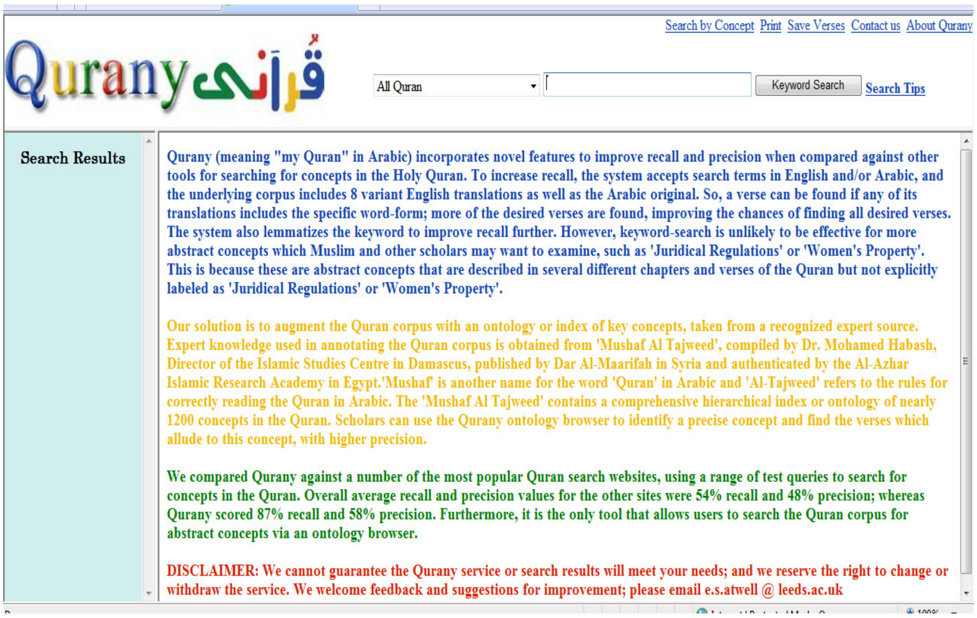
5.3.The Enhanced Keyword Search Tool

As mentioned in the evaluation of the Qurany (tree of concepts and keyword search tool) website, the main problem with publishing the Qurnay website was down to being unable to load the Keyword Search tool on the GAE server because of the restriction placed by GAE on the request time used by any application for any service; should not exceed 30 seconds. Consequently, the keyword search tool failed to load all the four copies of the Quran; the English Quran, the Stemmed/Tokenized English Quran, the Tokenized Arabic Quran and the original Arabic Quran. This has lead to the necessity of separating the tree of concepts tool from the keyword search tool. The tree of concepts tool was published on the web on the url http://quranytopics.appspot.com/ .

The keyword search process for any word uses only two copies; the Stemmed/Tokenized English Quran and the Tokenized Arabic Quran (the other two copies are used to display the verses correctly). Therefore, getting the keyword search tool to work again was only possible if the number of Quran copies used is reduced.

5.3.1.A New Design for the Keyword Search Tool

Google App Engine allows each administrator (or each Google Account holder) a maximum of ten applications to upload on Google Server. Another application for the Keyword Search Tool was created with the same layout as the Tree of Concepts Tool. The only difference is that the tree of concepts is removed from the left lower frame and left empty.



Qurany (meaning "my Quran" in Arabic) incorporates novel features to improve recall and precision when compared against other tools for searching for concepts in the Holy Quran. To increase recall, the system accepts search terms in English and/or Arabic, and the underlying corpus includes 8 variant English translations as well as the Arabic original. So, a verse can be found if any of its translations includes the specific word-form; more of the desired verses are found, improving the chances of finding all desired verses. The system also lemmatizes the keyword to improve recall further. However, keyword-search is unlikely to be effective for more abstract concepts which Muslim and other scholars may want to examine, such as 'Juridical Regulations' or 'Women's Property'. This is because these are abstract concepts that are described in several different chapters and verses of the Quran but not explicitly labeled as 'Juridical Regulations' or 'Women's Property'.

Our solution is to augment the Quran corpus with an ontology or index of key concepts, taken from a recognized expert source. Expert knowledge used in annotating the Quran corpus is obtained from 'Mushaf Al Tajweed', compiled by Dr. Mohamed Habash, Director of the Islamic Studies Centre in Damascus, published by Dar Al-Maarifah in Syria and authenticated by the Al-Azhar Islamic Research Academy in Egypt.'Mushaf' is another name for the word 'Quran' in Arabic and 'Al-Tajweed' refers to the rules for correctly reading the Quran in Arabic. The 'Mushaf Al Tajweed' contains a comprehensive hierarchical index or ontology of nearly 1200 concepts in the Quran. Scholars can use the Qurany ontology browser to identify a precise concept and find the verses which allude to this concept, with higher precision.

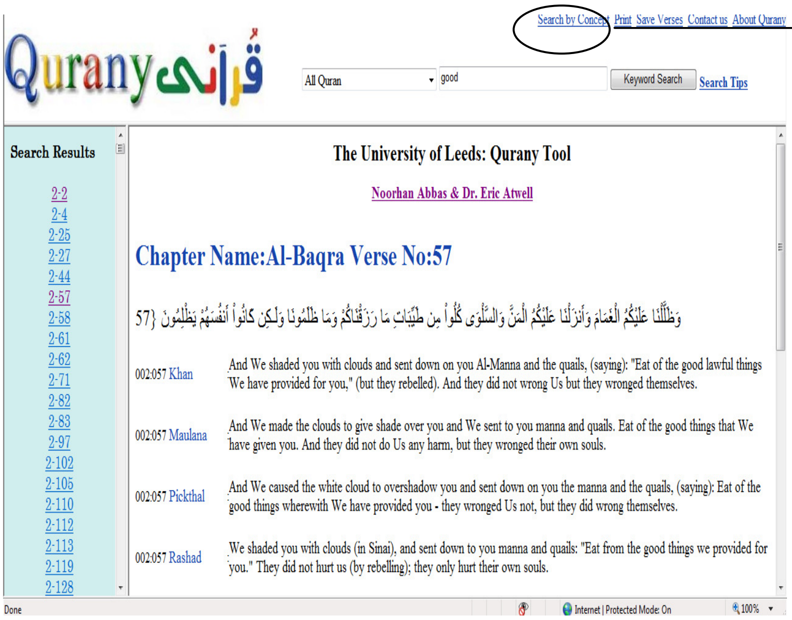
We compared Qurany against a number of the most popular Quran search websites, using a range of test queries to search for concepts in the Quran. Overall average recall and precision values for the other sites were 54% recall and 48% precision; whereas Qurany scored 87% recall and 58% precision. Furthermore, it is the only tool that allows users to search the Quran corpus for abstract concepts via an ontology browser.

DISCLAIMER: We cannot guarantee the Qurany service or search results will meet your needs; and we reserve the right to change or withdraw the service. We welcome feedback and suggestions for improvement; please email e.s.atwell @ leeds.ac.uk

Figure 41 A snapshot of the Keyword Search tool

As shown in the above figure, the tree of concepts is removed from the left lower frame and instead the urls to the matching verses will be displayed.

The new Keyword Search Tool uses only two copies of the Quran in the search process and the other two to display the verses in the correct format. As, I already have an HTML file for each verse (saved on the University of Leeds Computing Server), with little modification, the Keyword Search Tool could generate urls for the matching verses instead of displaying the actual verses in the left lower frame. The user can then choose which verse to display in the lower right frame. The HTML file displayed in the lower right frame is actually launched from the Leeds University Server. This is because of the number of files restriction imposed by Google App Engine as it does not allow more than 1000 files to be uploaded with any application and the total number of HTML files is 6,236 files.



The University of Leeds: Qurany Tool

Noorhan Abbas & Dr. Eric Atwell

Chapter Name:Al-Baqra Verse No:57

وَظَلَّلْنَا عَلَيْكُمُ الْغَمَامَ وَأَنزَلْنَا عَلَيْكُمُ الْمَنَّ وَالسَّلْوَى كُلُواْ مِن طَيِّبَاتِ مَا رَزَقْنَاكُمْ وَمَا ظَلَمُونَا وَلَـكِن كَانُواْ أَنفُسَهُمْ يَظْلِمُونَ {57

002:057 Khan — And We shaded you with clouds and sent down on you Al-Manna and the quails, (saying): "Eat of the good lawful things We have provided for you," (but they rebelled). And they did not wrong Us but they wronged themselves.

002:057 Maulana — And We made the clouds to give shade over you and We sent to you manna and quails. Eat of the good things that We have given you. And they did not do Us any harm, but they wronged their own souls.

002:057 Pickthal — And We caused the white cloud to overshadow you and sent down on you the manna and the quails, (saying): Eat of the good things wherewith We have provided you - they wronged Us not, but they did wrong themselves.

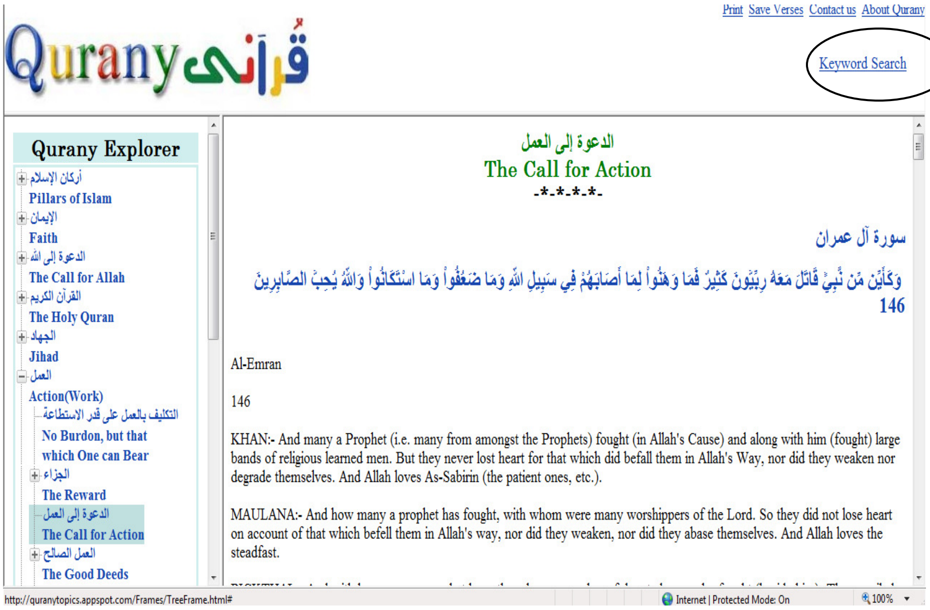
002:057 Rashad — We shaded you with clouds (in Sinai), and sent down to you manna and quails: "Eat from the good things we provided for you." They did not hurt us (by rebelling); they only hurt their own souls.

A link to the Tree of Concepts tool

Figure 42 A snapshot of the Keyword Search tool search results

As shown in the figure above, the search results for the word ‘good’ generated many verses that contain this word. On the lower left frame, a url to each verse is displayed. When I clicked on the verse 2-57, the file at the url ‘http://www.comp.leeds.ac.uk/nora/html/2-57.html’ was launched and displayed on the lower right frame. The user can also browse through the concepts covered by the verse by scrolling down to the end of the HTML file displayed. Another link to the tree of concepts tool is added to the links at the top of page to facilitate the navigation between the tools.

The keyword application’s url is http://quranykeywords.appspot.com/ and the tree of concepts application’s url is http://quranytopics.appspot.com/.


Quranyقرآنى
Print Save Verses Contact us About Qurany
Keyword Search
http://quranytopics.appspot.com/Frames/TreeFrame.html#
Internet | Protected Mode: On
100%

Qurany Explorer

أركان الإسلام
Pillars of Islam
الإيمان
Faith
الدعوة إلى الله
The Call for Allah
القرآن الكريم
The Holy Quran
الجهاد
Jihad
العمل
Action(Work)
التكليف بالعمل على قدر الاستطاعة
No Burdon, but that which One can Bear
الجزاء
The Reward
الدعوة إلى العمل
The Call for Action
العمل الصالح
The Good Deeds

الدعوة إلى العمل
The Call for Action
-*-*-*-*-

سورة آل عمران

وَكَأَيِّن مِّن نَّبِيٍّ قَاتَلَ مَعَهُ رِبِّيُّونَ كَثِيرٌ فَمَا وَهَنُواْ لِمَا أَصَابَهُمْ فِي سَبِيلِ اللَّهِ وَمَا ضَعُفُواْ وَمَا اسْتَكَانُواْ وَاللَّهُ يُحِبُّ الصَّابِرِينَ
146

Al-Emran

146

KHAN:- And many a Prophet (i.e. many from amongst the Prophets) fought (in Allah's Cause) and along with him (fought) large bands of religious learned men. But they never lost heart for that which did befall them in Allah's Way, nor did they weaken nor degrade themselves. And Allah loves As-Sabirin (the patient ones, etc.).

MAULANA:- And how many a prophet has fought, with whom were many worshippers of the Lord. So they did not lose heart on account of that which befell them in Allah's way, nor did they weaken, nor did they abase themselves. And Allah loves the steadfast.

A link to the Keyword Search Tool

Figure 43 A snapshot of the Tree of concepts tool

In the figure above, the tree of concepts tool is launched and the user is given the option to search for keywords as well.

5.3.2. Advantages of the Enhanced Keyword Search Tool

- It is faster than the original tool as it does not carry out all the steps needed to change the word searched for in to upper case.
- It displays not only the matching verses but also the abstract concepts covered by these verses.

Summary

The Qurany Concepts tool is a collection of HTML files. Each file contains one Quran verse (Arabic verse followed by its eight parallel English translations), in addition to, all the abstract concepts covered by the verse. An index file is created for all the HTML files and saved on the University of Leeds server. The main aim of this tool is to allow users to search through these HTML files for concrete as well as abstract concepts.

These HTML files were used by the keyword search module overcoming the resources limitations placed by Google App Engine. By reducing the number of

Quran files loaded when the application launches, the keyword search tool was able to load correctly. A simple but important enhancement was needed for the keyword search tool to produce urls for the matching verses instead of displaying the matching verses straight away. The urls to the matching verses, are basically urls to the HTML files stored on the University server.

Chapter 6: Evaluation of the Qurany Tool and Website

6.1. Quantitative Evaluation

6.1.1. The Keyword Search Module of V1 and V2

In order to compare and asses the precision and the recall values for the Keyword Search Tool, five other popular Quran search tools were chosen from the internet. All the six tools were tested using a predefined set of search terms as shown in table 2 and 3. The Gold standard (for the exact matches of the words searched for in the Quran) was obtained from Mushaf Al Tajweed (Expert knowledge).

6.1.1.1 The Gold Standard (Mushaf Al Tajweed)

As mentioned before, Muhaf Al Tajweed (MAT) is a copy of the Quran book that enables people to read the Quran verses correctly. It also includes an ontology of topics at the end of the book. This ontology of topics/themes is arranged in a hierarichal order. It covers nearly 1100 topics and was compiled by Dr. Mohamed Habash (who is the director of the Islamic Studies Center in Damascus). The MAT ontology of topics is chosen as the gold standard as it represents expert Islamic knowledge. It arranges the verses of the Quran according to the context of the verses (rather than according to the lexical terms of the verses) which draws an accurate picture of the correct meaning of the verses.

The set of terms chosen from MAT ontology of topics were chosen at random. All of them consisted of one word only. Some of them represent places, others represent names, others represent animals, …etc. These set of terms represent a possible user query submitted to any of the Quran search tools available on the web. The exact verses matches for each term are shown in table 1. As the main aim of this evaluation is to obtain the recall and the precision values for the Quran tools not to test the correctness of the English translation used, a different spelling for the names of some people and places was tried out to make sure that it is the spelling adopted by the English Quran translation used by the tool. For instance, some translators used Mecca, others used Makkah. Both names refer to the same place and should yield the same set of Quran verses.

Term	Verses
Mountains	7:74, 11:43, 15:19, 15:82, 16:15, 18:47, 19:90, 20:105, 20:106, 20:107, 21:31, 21:79, 22:18, 26:149, 26:150, 27:61, 31:10, 33:72, 34:10, 35:27, 38:18, 38:19, 41:10, 52:10, 56:5, 56:6, 69:14, 70:9, 73:14, 77:10, 77:27, 78:7, 78:20, 79:32, 81:3, 88:19, 101:5
Sea	2:50, 2:164, 5:96, 6:59, 6:63, 6:97, 7:138, 7:163, 10:22, 10:90, 14:32, 16:14, 17:66, 17:67, 17:70, 18:61, 18:62, 18:63, 18:79, 18:109, 20:77, 22:65, 24:40, 25:53, 26:63, 27:61, 27:62, 27:63, 30:41, 31:27, 31:31, 35:12, 42:32, 42:33, 42:34, 44:24, 45:12, 52:6, 55:19, 55:20, 55:24, 81:6, 82:3
Iron	57:25
Hunting	5:1, 5:94, 5:95, 5:96
Qarun / Qaroun	28:76, 28:79, 29:39, 29:40, 40:24
Horses	3:14, 8:60, 16:8, 17:64, 59:6
Gabriel	2:97, 2:98, 26:193, 66:4, 81:20
Makkah / Mecca	2:126, 3:96, 6:92, 8:35, 22:25, 22:26, 22:27, 27:91, 28:57, 28:58, 28:59, 29:67, 42:7, 48:24, 90:1, 95:3
Bedouins	9:90, 9:97, 9:98, 9:99, 9:100, 9:101, 9:102, 9:103, 9:104, 9:105, 9:106, 9:107, 9:108, 9:109, 9:110, 9:120, 48:11, 48:12, 48:15, 48:16, 49:14, 49:17
Magog	18:94, 18:95, 18:96
Disciples	3:52, 5:111, 5:112, 61:14

Table 1 Shows the gold standard for the search terms

6.1.1.2. Evaluating the Results of the Quran Search Tools

The five tools are: Search Truth, MSA, IslamiCity, Guided Ways, and Quran Iman. The search terms shown in table 1 were used in evaluating the recall and the precision values for the different tools. The formulas used to calculate these two values are:

$$\text{Precision} = \frac{number\_of\_correct\_answers\_given\_by\_the\_system}{total\_number\_of\_answers\_given\_by\_the\_system}$$

$$\text{Recall} = \frac{number\_of\_correct\_answers\_given\_by\_the\_system}{total\_number\_of\_possible\_correct\_answers\_in\_text}$$

The formulas for the precision and the recall values were obtained from [Jurafsky and Martin, 2000].

For each tool, the search results for each term were compared to the gold standard shown in table 1. A summary of the results obtained is shown in tables 2 and 3.

	Search Truth (%)	**Guided Ways (%)**	**IslamiCity (%)**	**MSA (%)**	**Quran Iman (%)**	**Qurany (%)**
Mountains	72	67	60	75	63	46
Sea	32	80	45	74	70	61
Iron	20	20	20	20	9	67
Hunting	0	0	0	0	33	57
Qarun	100	100	0	100	100	100
Horses	100	75	100	100	50	50
Gabriel	100	100	100	100	13	14
Makkah	50	33	16	50	18	20
Bedouins	0	0	0	0	90	85
Magog	100	67	33	50	25	40
Disciples	80	100	100	100	100	100
Precision	**59**	**58**	**43**	**61**	**52**	**58**

Table 2 A detailed analysis of the Precision values for different tools

	Search Truth (%)	Guided Ways (%)	IslamiCity (%)	MSA (%)	Quran Iman (%)	Qurany (%)
Mountains	76	84	24	73	81	87
Sea	56	75	84	47	77	91
Iron	100	100	100	100	100	100
Hunting	0	0	0	0	25	100
Qarun	80	80	0	80	100	100
Horses	40	60	60	40	100	100
Gabriel	60	60	60	60	80	80
Makkah	6	6	6	6	81	81
Bedouins	0	0	0	0	41	50
Magog	67	67	33	33	33	67
Disciples	100	100	100	100	100	100
Recall	**53**	**58**	**43**	**49**	**74**	**87**

Table 3 A detailed analysis of the Recall values for different tools

Table 4 shows the differences between the criteria used by each Quran search tool in looking up the search terms. In table 4, the 'No.of English Translations Used' column shows the number of English translations used by the tool. Search Truth tool and Guided Ways tool, allow the user to choose one English translation to be used in the search. In this case, the choice was 'Yusuf Ali's English translation as it is recognized as the most popular English translation used on the web. IslamiCity tool was chosen to search in Pickthall's English translation. The rest of the tools search a predefined number of translations by default, without asking the user to specify a certain translation for the search. The column 'Exact match/lemma/match part of the word', illustrates whether the search tool searches for lemmas, exact words or matches part of the words (if the user searches for the word 'ship', matches like 'hardship' and 'worship' will be displayed).

Search Tool	No. of English Translations Used	Exact match/ lemma/match part of the word (E/L/P)	Recall Values	Precision Values	Arabic Keyword/s Search (Y/N)
Search Truth	1(Yusuf Ali)	P	53%	59%	Y
Guided Ways	1(Yusuf Ali)	E	49%	58%	Y
IslamiCity	1 (Pickthall)	P	43%	43%	N
MSA	3	E	58%	61%	N
Quran Iman	5	L	74%	52%	Y
Qurany	8	L	87%	58%	Y

Table 4. Compares the Search tools found on the web to the Quran'Search Concept' tool (V1 and V2)

Both the Search Truth tool and the Guided Ways tool use the 'Yusuf Ali's English translation. The only difference that justifies the difference in the recall value 53% for Search Truth and 49% for the Guided Ways is the programmer's choice of whether to search for exact words or search for the 'part of the word' match. Obviously, searching for part of the words or lemmas improves the coverage of the search results. On the contrary, the IslamiCity tool, performed the searches using the Pickthall's English translation which resulted in a recall value of 43% (much lower than the results obtained for searching for the same set of terms using 'Yusuf Ali's' English translation). This signifies that the use of different English translations could lead to different recall values. We can also notice that as the number of English translations used in the search process increases, the recall value increases. The MSA tool used three translations scoring 58% , the Quran Iman uses five English translations scoring 74% and the Qurany 'Search for a Concept' tool uses eight translations leading to a major enhancement in the recall value of 87%. The results also show that many of the tools found on the web, do not perform Arabic keyword search. Therefore, the Qurany 'Search for a Concept' tool offers the highest recall value in addition to allowing the user to search for Arabic keywords, not to mention that it is the only tool that allows the users to search for a mixed set of Arabic and English words in one search run.

6.1.2. Evaluation of the Tree of Concepts Module

The tree of concepts module is the first tool on the web to offer a hierarchal classification for the Quran themes. It adds more advantages over the conventional predefined alphabetical set of words (offered by some Quran tools on the web) as the user can view the other related themes to his theme of choice, which in turn, paints a bigger picture for the Quran theme.

As the IslamiCity is the only Quran site which offers a topic search tool. Looking up the term ‘Divorce’ using this tool yields the following results:

2:227, 2:228, 2:229, 2:230, 2:232, 2:233, 2:236, 2:237, 2:241, 33:4, 33:37, 33:49, 58:2, 58:3, 58:4, 65:1, 65:2, 65:3, 65:4, 65:5, 65:6, 65:7, 66:5.

The gold standard for the term ‘Divorce’ in Mushaf Al Tajweed is as shown in table 5:

Concept	Verses
The husband’s oath	2:226, 2:227
Arbitration before divorce	4:35
Divorce rules	2:228, 2:230, 2:231, 2:232, 2:236, 2:237, 2:241, 2:242, 33:49, 65:4, 65:5, 65:6, 65:7
Conditions required before divorce	4:34, 65:1, 65:2
Number of uttering divorce	2:229

Table 5 The gold standard for the term ‘Divorce’

As the concept ‘Divorce’ is an abstract concept in some verses and a concrete concept in others, the IslamiCity topic search tool was able to find the verses that contained the word ‘divorce’ in the English translation regardless of the verse’s context and was unable to locate the verses that covered this concept without mentioning the word ‘divorce’ in the English translation.

By analyzing the results of the IslamiCity topics search tool and comparing them to the gold standard we find the following:

Verses 2:233, 33:37 and 66:5 should not be displayed in the search results as the concept of ‘divorce’ is not in the context of the verses.

Verse 2:233:

Verse 2:233 is displayed in the search results because the translation used by the IslamiCity website has the word ‘divorced’ but the verse context is general to all mothers. Comparing the translation used to the eight parallel English translations used in the Qurany tool and website, the word ‘divorce’ was mentioned only in Rashad’s English translation.

Verse 2:233 in the IslamiCity website:

2:233 **(Asad)** And the [**divorce**d] mothers may nurse their children for two whole years, if they wish to complete the period of nursing; and it is incumbent upon him who has begotten the child to provide in a fair manner for their sustenance and clothing. No human being shall be burdened with more than he is well able to bear: neither shall a mother be made to suffer because of her child, nor, because of his child, he who has begotten it. And the same duty rests upon the [father's] heir. And if both [parents] decide, by mutual consent and counsel, upon separation [of mother and child], they will incur no sin [thereby]; and if you decide to entrust your children to foster-mothers, you will incur no sin provided you ensure, in a fair manner, the safety of the child which you are handing over. But remain conscious of God, and know that God sees all that you do.

Verse 2:233 in the Qurany website:

KHAN:- The mothers shall give suck to their children for two whole years, (that is) for those (parents) who desire to complete the term of suckling, but the father of the child shall bear the cost of the mother's food and clothing on a reasonable basis. No person shall have a burden laid on him greater than he can bear. No mother shall be treated unfairly on account of her child, nor father on account of his child. And on the (father's) heir is incumbent the like of that (which was incumbent on the father). If they both decide on weaning, by mutual consent, and after due consultation, there is no sin on them. And if you decide on a foster suckling-mother for your children, there is no sin on you, provided you pay (the mother) what you agreed (to give her) on reasonable basis. And fear Allah and know that Allah is All-Seer of what you do.

MAULANA:- And mothers shall suckle their children for two whole years, for him who desires to complete the time of suckling. And their maintenance and their clothing must be borne by the father according to usage. No soul shall be burdened beyond its capacity. Neither shall a mother be made to suffer harm on account of her child, nor a father on account of his child; and a similar duty (devolves) on the (father's) heir. But if both desire weaning by mutual consent and counsel, there is not blame on them. And if you wish to engage a wetnurse for your children, there is no blame on you so long as you pay what you promised according to usage. And keep your duty to Allah and know that Allah is Seer of what you do.

PICKTHAL:- Mothers shall suckle their children for two whole years; (that is) for those who wish to complete the suckling. The duty of feeding and clothing nursing mothers in a seemly manner is upon the father of the child. No-one should be charged beyond his capacity. A mother should not be made to suffer because of her child, nor should he to whom the child is born (be made to suffer) because of his child. And on the (father's) heir is incumbent the like of that (which was incumbent on the father). If they desire to wean the child by mutual consent and (after) consultation, it is no sin for them; and if ye wish to give your children out to nurse, it is no sin for you, provide that ye pay what is due from you in kindness. Observe your duty to Allah, and know that Allah is Seer of what ye do.

RASHAD:- Divorced mothers shall nurse their infants two full years, if the father so wishes. The father shall provide the mother's food and clothing equitably. No one shall be burdened beyond his ability. No mother shall be harmed on account of her infant, nor shall the father be harmed because of his infant. (If the father dies), his inheritor shall assume these responsibilities. If the infant's parents mutually agree to part, after due consultation, they commit no error by doing so. You commit no error by hiring nursing mothers, so long as you pay them equitably. You shall observe GOD, and know that GOD is Seer of everything you do.

SAWAR:- Mothers will breast feed their babies for two years if the fathers want them to complete this term. The father has to pay them reasonable expenses. No soul is responsible for what is beyond its ability. None of the parents should suffer any loss from the other because of the baby. The heirs are responsible to look after the children of a deceased. It is no sin for the parents to have a mutual agreement about weaning the baby. There is no sin in hiring a woman to breast feed your children for a reasonable payment. Have fear of God and know that God is well aware of what you do.

SHAKIR:- And the mothers should suckle their children for two whole years for him who desires to make complete the time of suckling; and their maintenance and their clothing must be, borne by the father according to usage; no soul shall have imposed upon it a duty but to the extent of its capacity; neither shall a mother be made to suffer harm on account of her child, nor a father on account of his child, and a similar duty (devolves) on the (father's) heir, but if both desire weaning by mutual consent and counsel, there is no blame on them, and if you wish to engage a wet-nurse for your children, there is no blame on you so long as you pay what you promised for according to usage; and be careful of (your duty to) Allah and know that Allah sees what you do.

SHERALI:- And mothers shall give suck to their children for two whole years; this is for those who desire to complete the period of suckling. And the man to whom the child belongs shall be responsible for their (the mothers') maintenance and clothing according to usage. No soul is burdened beyond its capacity.

Neither shall a mother be made to suffer on account of her child, nor shall he to whom the child belongs be made to suffer on account of his child and the same is incumbent on the father's heir. If they both decide upon weaning the child by mutual consent and consultation, there is no blame on them. And if you desire to engage a wet-nurse for your children, there shall be no blame on you, provided you pay what you have agreed to pay in a fair manner. And fear ALLAH and know that ALLAH sees what you do.

YUSEFALI:- The mothers shall give such to their offspring for two whole years, if the father desires to complete the term. But he shall bear the cost of their food and clothing on equitable terms. No soul shall have a burden laid on it greater than it can bear. No mother shall be Treated unfairly on account of her child. Nor father on account of his child, an heir shall be chargeable in the same way. If they both decide on weaning, by mutual consent, and after due consultation, there is no blame on them. If ye decide on a foster-mother for your offspring, there is no blame on you, provided ye pay (the mother) what ye offered, on equitable terms. But fear Allah and know that Allah sees well what ye do.

Verse 33:37:

Verse 33:37 does not address the concept of ‘divorce’ at all and does not have the word ‘divorce’ in the English translation text used.

Verse 33:37 in the IslamiCity website:

33:37 **(Asad)** AND LO, [O Muhammad,] thou didst say unto the one to whom God had shown favour and to whom thou hadst shown favour, “Hold on to thy wife, and remain conscious of God!” And [thus] wouldst thou hide within thyself something that God was about to bring to light for thou didst stand in awe of [what] people [might think], whereas it was God alone of whom thou shouldst have stood in awe! [But] then, when Zayd had come to the end of his union with her, We gave her to thee in marriage, so that [in future] no blame should attach to the believers for [marrying] the spouses of their adopted children when the latter have come to the end of their union with them. And [thus] God’s will was done.

Verse 66:5:

The context of this verse is listed in the gold standard in the following concepts:

- The pillars of Islam> Blessed Muhammed(PBUH)>Memorable qualities given to the prophet by Allah
- The pillars of Islam>Blessed Muhammed(PBUH)>His wives and daughters
- The pillars of Islam>Blessed Muhammed(PBUH)>His manners and attributes.

The verse is calling the prophet's wives to behave in a better way otherwise the prophet will divorce them. The context here is God's command to the prophet's wives to do what pleases God and the prophet.

66:5 **(Asad)** [O wives of the Prophet!] Were he to **divorce** [any of] you, God might well give him in your stead spouses better than you - women who surrender themselves unto God, who truly believe, devoutly obey His will, turn [unto Him] in repentance [whenever they have sinned] worship [Him alone] and go on and on [seeking His goodly acceptance] - be they women previously married or virgins.

Verses 33:4, 58:2, 58:3 and 58:4 cover the concept of 'Az-zihar' which was common in prophet Mohamed days.

Men in those days used to tell their wives when they (the men) get angry that their wives are like their mothers. This is not the proper context of the concept 'divorce' and that is why it is separated from the main concept 'divorce' in the Qurany website.

Verses 2:242, 4:34, 2:226, and 4:35 are missing from the IslamiCity search results.

Verse 2:242 completes the meaning of the previous verse 2:241.

2:241 YUSEFALI:- For divorced women Maintenance (should be provided) on a reasonable (scale). This is a duty on the righteous.

2:242 YUSEFALI:- Thus doth Allah Make clear His Signs to you: In order that ye may understand.

Verse 4:34 deals with the conditions required or that could lead to a divorce.

YUSEFALI:- Men are the protectors and maintainers of women, because Allah has given the one more (strength) than the other, and because they support them from their means. Therefore the righteous women are devoutly obedient, and guard in (the husband's) absence what Allah would have them guard. As to those women on whose part ye fear disloyalty and ill-conduct, admonish them (first), (Next), refuse to share their beds, (And last) beat them (lightly); but if they return to obedience, seek not against them Means (of annoyance): For Allah is Most High, great (above you all).

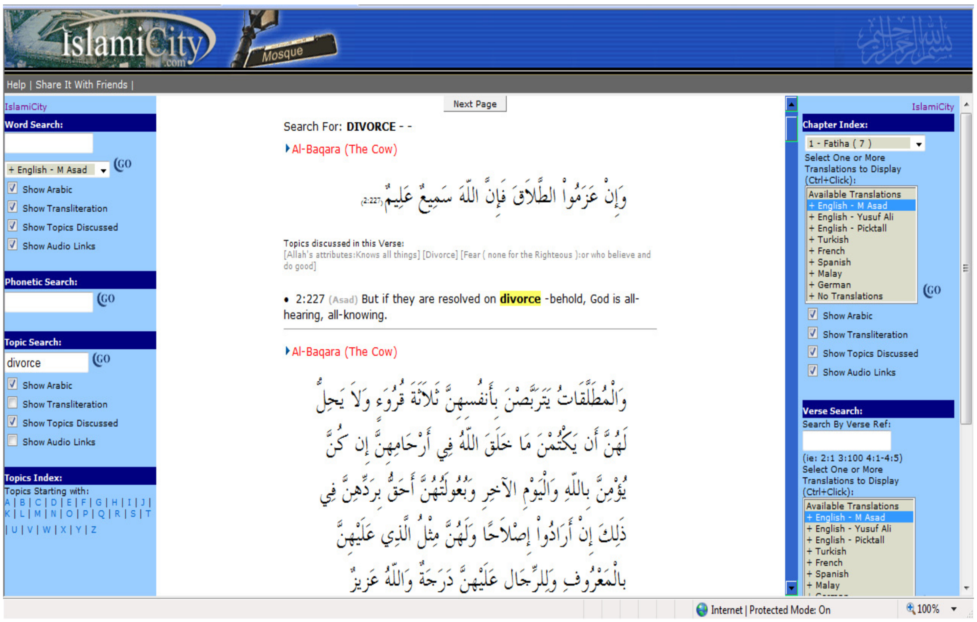
Verse 2:226 covers the concept ‘the divorce oath’

YUSEFALI:- For those who take an oath for abstention from their wives, a waiting for four months is ordained; if then they return, Allah is Oft-forgiving, Most Merciful.

Verse 4:35 covers the concept of the ‘arbitration before divorce’

YUSEFALI:- If ye fear a breach between them twain, appoint (two) arbiters, one from his family, and the other from hers; if they wish for peace, Allah will cause their reconciliation: For Allah hath full knowledge, and is acquainted with all things.

Therefore, the IslamiCity topic search tool is really a keyword search tool rather than a topics search tool. It is unable to locate the verses that cover the context of a certain topic if the English translation used does not contain the topic explicitly in the translation.



Word Search:

+ English - M Asad

☑ Show Arabic
☑ Show Transliteration
☑ Show Topics Discussed
☑ Show Audio Links

Phonetic Search:

Topic Search:

divorce

☑ Show Arabic
☐ Show Transliteration
☑ Show Topics Discussed
☐ Show Audio Links

Topics Index:
Topics Starting with:
A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z

Search For: **DIVORCE** - -

Al-Baqara (The Cow)

وَإِنْ عَزَمُواْ الطَّلاَقَ فَإِنَّ اللّهَ سَمِيعٌ عَلِيمٌ (2:227)

Topics discussed in this Verse:
[Allah's attributes:Knows all things] [Divorce] [Fear (none for the Righteous):or who believe and do good]

- 2:227 (Asad) But if they are resolved on **divorce** -behold, God is all-hearing, all-knowing.

Al-Baqara (The Cow)

وَالْمُطَلَّقَاتُ يَتَرَبَّصْنَ بِأَنفُسِهِنَّ ثَلاَثَةَ قُرُوَءٍ وَلاَ يَحِلُّ
لَهُنَّ أَن يَكْتُمْنَ مَا خَلَقَ اللّهُ فِي أَرْحَامِهِنَّ إِن كُنَّ
يُؤْمِنَّ بِاللّهِ وَالْيَوْمِ الآخِرِ وَبُعُولَتُهُنَّ أَحَقُّ بِرَدِّهِنَّ فِي
ذَلِكَ إِنْ أَرَادُواْ إِصْلاَحًا وَلَهُنَّ مِثْلُ الَّذِي عَلَيْهِنَّ
بِالْمَعْرُوفِ وَلِلرِّجَالِ عَلَيْهِنَّ دَرَجَةٌ وَاللّهُ عَزِيزٌ

Chapter Index:

1 - Fatiha (7)

Select One or More Translations to Display (Ctrl+Click):

Available Translations
+ English - M Asad
+ English - Yusuf Ali
+ English - Picktall
+ Turkish
+ French
+ Spanish
+ Malay
+ German
+ No Translations

☑ Show Arabic
☑ Show Transliteration
☑ Show Topics Discussed
☑ Show Audio Links

Verse Search:
Search By Verse Ref:

(ie: 2:1 3:100 4:1-4:5)
Select One or More Translations to Display (Ctrl+Click):

Available Translations
+ English - M Asad
+ English - Yusuf Ali
+ English - Picktall
+ Turkish
+ French
+ Spanish
+ Malay

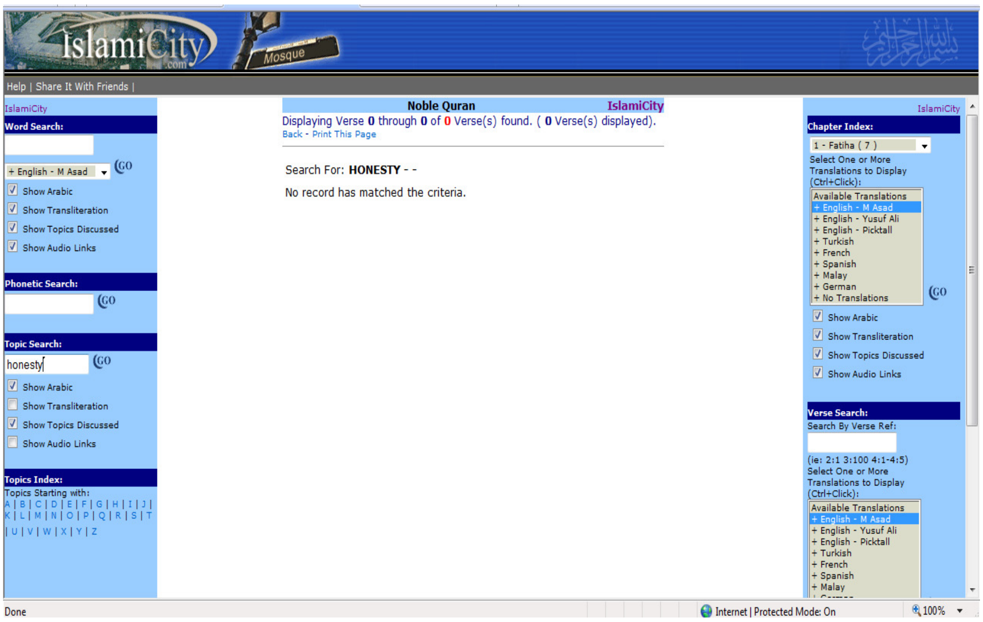
Internet | Protected Mode: On

100%

Figure 44 A snapshot for the IslamiCity topics search for ‘divorce’

Besides, the alphabetical list of topics displays the same verses for the term ‘divorce’.

Trying to search for the concept ‘honesty’ will yield no matches though the concept ‘honesty’ is an important concept in the Quran. It is mentioned in many verses that advise people to be honest in trade, in punishment (equality in punishing the wrong-doers whether they were poor or rich), being honest in giving back deposits to their owners, in one’s talk, and in every aspect of one’s life. The alphabetical list of topics does not contain the term ‘honesty’ as well.



Word Search:
+ English - M Asad
☑ Show Arabic
☑ Show Transliteration
☑ Show Topics Discussed
☑ Show Audio Links

Phonetic Search:

Topic Search: honesty
☑ Show Arabic
□ Show Transliteration
☑ Show Topics Discussed
□ Show Audio Links

Topics Index:
Topics Starting with:
A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z

Displaying Verse 0 through 0 of 0 Verse(s) found. (0 Verse(s) displayed).

Search For: HONESTY - -

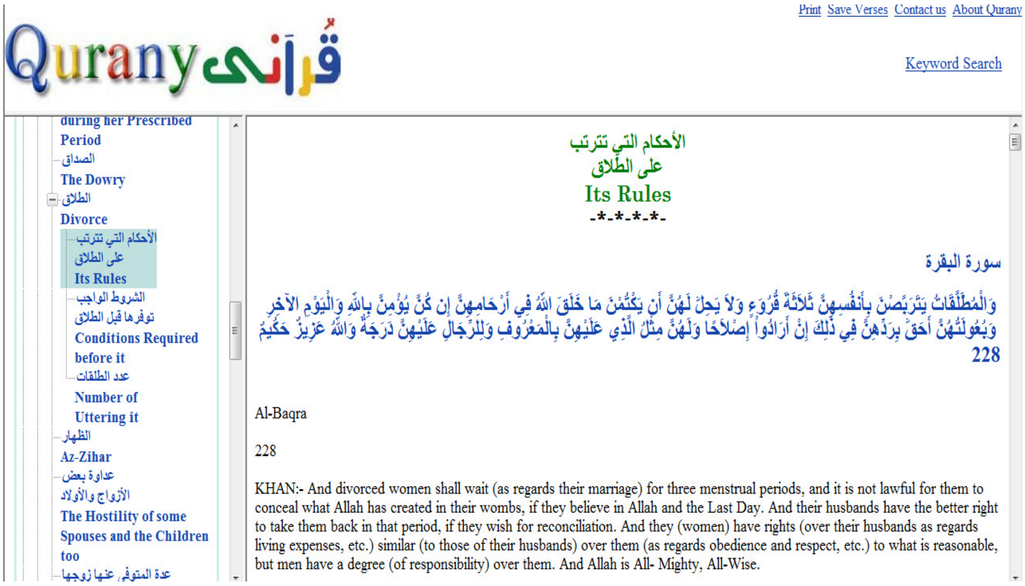
No record has matched the criteria.

Chapter Index: 1 - Fatiha (7)
Select One or More Translations to Display (Ctrl+Click):
Available Translations
+ English - M Asad
+ English - Yusuf Ali
+ English - Picktall
+ Turkish
+ French
+ Spanish
+ Malay
+ German
+ No Translations
☑ Show Arabic
☑ Show Transliteration
☑ Show Topics Discussed
☑ Show Audio Links

Verse Search:
Search By Verse Ref:
(ie: 2:1 3:100 4:1-4:5)
Select One or More Translations to Display (Ctrl+Click):
Available Translations
+ English - M Asad
+ English - Yusuf Ali
+ English - Picktall
+ Turkish
+ French
+ Spanish
+ Malay

Figure 45 A snapshot for the topic search results for ‘honesty’

Testing the Qurany ‘Search for a Concept’ tree of concepts tool for the same terms yields different results. For instance, if the user wants to retrieve all the verses that cover the word ‘Divorce’ in the Quran (this word is mentioned is some verses explicitly and in others implicitly) using the keyword search tool will lead to obtaining a long list of verses that contain the word ‘Divorce’. This list of verses is not classified in any particular order. On the other hand, looking up the concept ‘Divorce’ in this tree of concepts Qurany tool, will allow the user to choose which sub concept in the ‘Divorce’ concepts to look up; its rules, conditions required before it, or Number of uttering it. It will also put the verses in the correct context that was meant to in the verse.



الأحكام التي تترتب
على الطلاق
Its Rules
-*-*-*-*-

سورة البقرة

وَالْمُطَلَّقَاتُ يَتَرَبَّصْنَ بِأَنفُسِهِنَّ ثَلاَثَةَ قُرُوَءٍ وَلاَ يَحِلُّ لَهُنَّ أَن يَكْتُمْنَ مَا خَلَقَ اللّهُ فِي أَرْحَامِهِنَّ إِن كُنَّ يُؤْمِنَّ بِاللّهِ وَالْيَوْمِ الآخِرِ وَبُعُولَتُهُنَّ أَحَقُّ بِرَدِّهِنَّ فِي ذَلِكَ إِنْ أَرَادُواْ إِصْلاَحًا وَلَهُنَّ مِثْلُ الَّذِي عَلَيْهِنَّ بِالْمَعْرُوفِ وَلِلرِّجَالِ عَلَيْهِنَّ دَرَجَةٌ وَاللّهُ عَزِيزٌ حَكُيمٌ 228

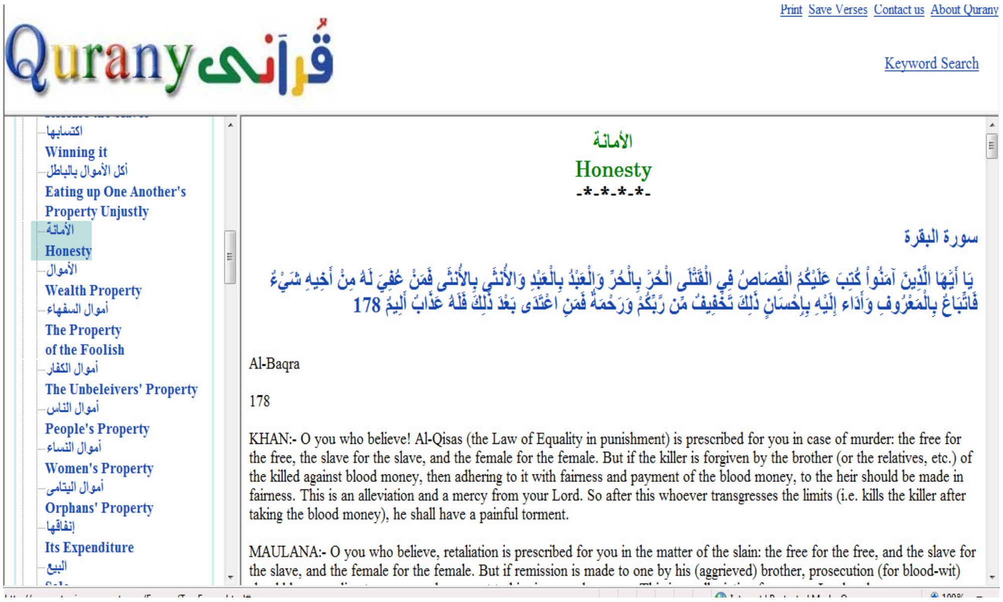
Al-Baqra

228

KHAN:- And divorced women shall wait (as regards their marriage) for three menstrual periods, and it is not lawful for them to conceal what Allah has created in their wombs, if they believe in Allah and the Last Day. And their husbands have the better right to take them back in that period, if they wish for reconciliation. And they (women) have rights (over their husbands as regards living expenses, etc.) similar (to those of their husbands) over them (as regards obedience and respect, etc.) to what is reasonable, but men have a degree (of responsibility) over them. And Allah is All- Mighty, All-Wise.

Figure 46 A snapshot of the ‘Divorce’ concept in the Qurany website

Also, if the user wants to know more about the term honesty in the Quran, searching for the keyword ‘honesty’ will lead to a large number of verses that are not necessarily related to the moral honesty (searched for). Again, searching the main concept ‘Man and Moral Relations’ then the sub concept ‘Good Morals’ will offer him all the good morals mentioned in the Quran. It is also a sub concept in the main concept ‘Organizing Financial Relationships’.



الأمانة
Honesty
-*-*-*-*-

سورة البقرة

يَا أَيُّهَا الَّذِينَ آمَنُواْ كُتِبَ عَلَيْكُمُ الْقِصَاصُ فِي الْقَتْلَى الْحُرُّ بِالْحُرِّ وَالْعَبْدُ بِالْعَبْدِ وَالأُنثَى بِالأُنثَى فَمَنْ عُفِيَ لَهُ مِنْ أَخِيهِ شَيْءٌ فَاتِّبَاعٌ بِالْمَعْرُوفِ وَأَدَاء إِلَيْهِ بِإِحْسَانٍ ذَلِكَ تَخْفِيفٌ مِّن رَّبِّكُمْ وَرَحْمَةٌ فَمَنِ اعْتَدَى بَعْدَ ذَلِكَ فَلَهُ عَذَابٌ أَلِيمٌ 178

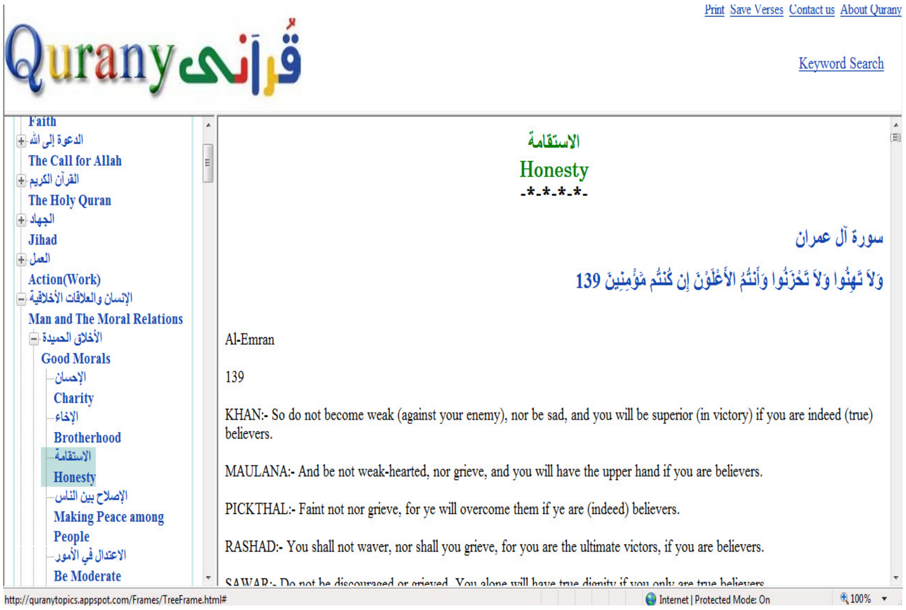
Al-Baqra

178

KHAN:- O you who believe! Al-Qisas (the Law of Equality in punishment) is prescribed for you in case of murder: the free for the free, the slave for the slave, and the female for the female. But if the killer is forgiven by the brother (or the relatives, etc.) of the killed against blood money, then adhering to it with fairness and payment of the blood money, to the heir should be made in fairness. This is an alleviation and a mercy from your Lord. So after this whoever transgresses the limits (i.e. kills the killer after taking the blood money), he shall have a painful torment.

MAULANA:- O you who believe, retaliation is prescribed for you in the matter of the slain: the free for the free, and the slave for the slave, and the female for the female. But if remission is made to one by his (aggrieved) brother, prosecution (for blood-wit)

Figure 47 A snapshot of the concept ‘Organizing Financial Relationships>Honesty’



الاستقامة
Honesty
-*-*-*-*-

سورة آل عمران

وَلاَ تَهِنُوا وَلاَ تَحْزَنُوا وَأَنتُمُ الأَعْلَوْنَ إِن كُنتُم مُؤْمِنِينَ 139

Al-Emran

139

KHAN:- So do not become weak (against your enemy), nor be sad, and you will be superior (in victory) if you are indeed (true) believers.

MAULANA:- And be not weak-hearted, nor grieve, and you will have the upper hand if you are believers.

PICKTHAL:- Faint not nor grieve, for ye will overcome them if ye are (indeed) believers.

RASHAD:- You shall not waver, nor shall you grieve, for you are the ultimate victors, if you are believers.

SAWAR:- Do not be discouraged or grieved. You alone will have true dignity if you only are true believers

Figure 48 A snapshot of the concept ‘Man and Moral Relations>Good Morals>Honesty’

6.2. Evaluation of the Process of Mounting of the Qurany Website on GAE Server (V2)

The Qurany website worked well on my computer (during the testing phase) but when I uploaded it on Google App Engine server, I encountered some problems.

6.2.1. Loading the NLTK Files

Installing the NLTK suite on Google App Engine server is not possible. Also, uploading all the NLTK files along with my Quran files was not allowed as there is a restriction on the number of files permitted to be uploaded with any application (1000 files only). In fact, I need the NLTK Lancaster Stemmer only from all the NLTK API. Therefore, I have asked Dr. Edward Loper if it is possible to use this module only and to import its files (after isolating them from the rest of the connected modules to them). He encouraged me to do that as long as I do not distribute these files. His letter is in Appendix III.

6.2.2. Unable to Load the Home Page

Being the Administrator of the Qurany website, I am allowed to view the performance of my application. Although Google App Engine is generous in the bandwidth it offers to applications, there is a Request Time restriction for any request made by any application. This request time should not exceed 30 seconds. As I have to load two copies of the eight parallel English translations in addition to two copies of the Arabic Quran, the request time was exceeded and the home page was never loaded correctly. In order to load the Qurany website home page I had to try different scenarios to sort out this problem.

6.2.2.1. Importing the Stemmed/Tokenized English Quran as a Dictionary

One way of sorting out the request time restriction is: instead of loading the Stemmed/Tokenized copy of the English Quran at the beginning of launching the application, I would save this copy as a dictionary in another file that will be uploaded with the application files and then import this file from inside my application. I actually created this file but GAE refused to upload it as it is 11 times bigger than the allowed file size (this is another restriction that is not documented in the library).

6.2.2.2. Removing the Keyword Search Module

The Keyword Search Module uses all the four copies of the Quran but the Tree of Concepts Module uses only two; the tagged English Quran along with the original Arabic Quran. Therefore, I removed the Keyword Search Module from my application altogether. Consequently, the website home page loaded correctly on the url http://quranytopics.appspot.com/ .

6.2.2.3. Getting the Google "Spiders" Software to Index the Qurany Website

Usually Google "Spiders" software index websites regularly but in order to make sure this process happens quickly and that the website will not be missed out, Google provides a Webmaster Tools site. To use these tools, a sitemap file has to be created and submitted to these tools. The sitemap file could be text, HTML or an xml file. It contains information about the pages that the website contains and their urls. Submitting this file to the Webmaster Tools along with verifying the application (the Webmaster tools verifies that I am the owner of the tools developed), should accelerate the indexing of the websites.

6.2.2.3.1 Indexing the Qurany Files Containing Ajax Calls

When Google "Spiders" software tried to index my applications, they failed to do that as it was unable to differentiate between an Ajax call and a static link to another HTML file.

For instance, the line containing the Ajax call for children nodes of a parent node would send the name of the RPCHanlder in the request; '/rpc?' but Google spiders would interpret it as another static HTML page called 'rpc' and consequently will not be able to find that file.

```
req.open('GET', '/rpc?' + query, async);
```

Therefore, I had to add another file called 'robots.txt'. This file must be in the root directory of the application. This file tells Google Spiders which urls to ignore. By default, Google spiders check this file first and then check the sitemap file.

6.3. Comparison between the (V1/V2) Keyword Search tool and the Qurany Concepts tool (V3)

Keyword Search Tool (V1/V2)	Qurany Concepts Tool (V3)
It searches the Quran corpus for lemmas or morphemes rather than exact words	**It searches the Quran corpus and the abstract concepts covered by verses for exact words**
Searches for each keyword independently	**Searches for words or phrases**
User can mix English and Arabic	**User can mix English and Arabic search words or phrases in the same**

search words in the same search run	**search run**

Table 6 Comparison between the Keyword Search tool and the Qurany Concepts tool

6.4. Possible Users of the Qurany tools

A sample of fifteen people from different backgrounds were asked to use the Qurany websites and to decide on whether it is a useful website that they would use in the future or not. The sample represents the following classes of users:

6.4.1. Junior Students studying for the degree of BA in Arabic and Islamic Studies

The sample included some students in their second year of studying in the Departement of Arabic and Middle Eastern Studies at Leed University. They found the website useful, especially, as they are frequently asked to write essays on a specific Islamic topic. They said, they found it particularly difficult to collect all the relevant verses to the topic of study as it is usually an abstract concept in Islam that no keyword search tool could be used for that purpose.

6.4.2. Non-Arabic Speakers Learning Quranic Arabic

The sample included some Muslims of Asian origin. Most of these Muslims can read out loud the Arabic script fluently but they can not understand any of it. They said that by organizing the topics in a hierarchal order and displaying the English translations along with the Arabic script, they were able to learn the meaning of the Arabic script and link the English translations to the Arabic verses in an easy way.

6.4.3. General Use by both Muslims and Converts / Reverts to Islam

Both Muslims and non-Muslims interested in understanding the Quran can use the tool for this purpose. A Muslim participant in the sample wrote: “I personally find it beneficial especially that sometimes I have a concept in mind and know that Qura'an mentions it and can't remember which sura or aya, so I can use this tool as it portrays concepts that I can follow to reach the sura or aya.” Another participant who has just converted to Islam wrote:” As a recent revert, I found your website very rewarding, ….I shall be logging onto it for help with my studies, it is very easy to work round, full of useful information.”

6.4.4. People Interested in Parallel Translations Study

The Qurany tool could be used in comparing the accuracy of the different English translations of the Quran to the original Arabic script. Among the sample was a candidate who holds a PhD degree from the department of Arabic and Middle Eastern Studies, he expressed great interest in this issue. He also was impressed by the option of searching for the Arabic keywords and the accuracy of the tool.

6.4.5. Researchers in Arabic and Middle Eastern Studies

Research staff and postgraduates in the Departement of Arabic and Middle Eastern Studies at Leeds University expressed interest in using Qurany in research. We were invited to present the system at the BriSMES 2008 Conference held at Leeds, a wider audience of researchers in the British Society for Middle Eastern Studies [Atwell et al, 2008].

Chapter 7: Conclusion and Future Work

7.1. Conclusion

Understanding the concepts covered in the Quran is important to Muslims, Islamic scholars and non-Muslims. These concepts need expert knowledge to be identified accurately as the major themes of the Quran are not discussed in a single chapter but in many chapters throughout the text. The Qurany 'Search for a Concept' computational tool and website, provides the expert knowledge in an easy and comprehensive way.

The Qurany keyword search tool improved the recall and the precision values of the search scoring a recall value of 87% and a precision value of 58%. These enhanced results are down to many reasons: the use of eight English parallel translations for the Quran as well as extending the search to lemmas rather than searching for the exact match of the word. These enhanced results should paint a more comprehensive picture for concrete Quran concepts.

The Qurany keyword search tool also offers users more features than the other existing Quran search tools available on the web. It allows users to search for Arabic words as well as mixing English and Arabic words in one search run. This feature is particularly important to researchers who are interested in comparing the English translations to the Arabic original text.

Besides, the hierarchal list of abstract concepts is a useful tool in understanding how the abstract concepts of the Quran are related to each other. The hierarchal list of abstract concepts represents expert Islamic knowledge imported from Mushaf Al Tajweed Quran book, compiled by Dr. Mohammed Habash (the director of the Islamic Studies Center in Damascus), published by Dar Al-Maarifa in Syria and authenticated by Al Azhar Islamic Research Academy in Egypt. It covers nearly

1100 Quran topics/themes. The tree structure keeps the user aware of the different other themes related to the theme he/she is studying which helps in correctly understanding how each topic is related to other themes in the Quran and how all the themes relate to the main themes of this book.

The Qurany website was developed using Google App Engine SDK and the Yahoo! User Interface library. It was published on the Google App Engine server. The AJAX technologies were adopted to accelerate the process of fetching children nodes and also in retrieving relevant verses for a tree leaf node from the server.

Due to the limited resources and restrictions placed by Google App Engine on web applications, the keyword search tool had to be separated from the tree of concepts module and placed in another website. The enhanced keyword search module displays urls to the matching verses instead of the actual verses. The urls are to HTML Quran files placed in the University of Leeds server. These HTML files display the verse text in Arabic along with the eight English parallel translation in addition to the abstract concepts covered by that verse.

The Qurany Concepts tool is developed to help users search for phrases in the Quran. Each Arabic verse is placed along with its corresponding eight English parallel translations and all the abstract concepts covered by that verse in an HTML file (as mentioned above) and saved on the University of Leeds server. The user can use any search engine to search for either concrete or abstract concepts in the Quran in both Arabic and/or English.

In the future, more Quran translations in different languages could be integrated with the search tool. The topics classification ontology files built using Python data types could easily be imported in multilingual Quran tools.

7.2. Statement of Main Novel Research Contributions

The overall novel research contribution is the development of better search techniques to find knowledge and concepts in the Quran. This was achieved by improved keyword search, using both Arabic and a wider range of English parallel translations, and improved search by concepts as an alternative to user-supplied keywords. This overall research contribution subsumes a number of specific achievements:

- Improving the recall value of searching for terms in the Quran by extending it to search for lemmas or morphemes rather than the exact match of the word.
- Generating synonyms for the terms searched for.
- Adding the hierarchy of abstract concepts that covers all the concepts in the Quran to the system.
- Publishing both modules on the WWW
- Developing Qurany Concepts (V3) website that allows users to search for concrete and abstract concepts using Google search facilities.

7.3. Future Work

A number of possible directions for future research are envisaged, to enhance Quran search capabilites further; for example:

- Enhance the list of topics tool by adding the option of searching the abstract concepts using a search box rather than browsing the concepts manually. This involves developing an Arabic Quranic synonyms lexicon offering users other concepts or synonyms for the input words.
- Using supervised maching learning techniques in improving the results of the keyword search tool. The tree of concepts list of topics could be used in this process.
- Extend the Qurany website to other languages; for example, [Atwell 2008] suggests English, Arabic, Urdu and Malay, and there are many

Muslim (and non-Muslim) speakers of these languages who might want to use improved Quran search tools.

- Dissemination and exploration – conduct a wider survey of potential uses and users, then building on user needs/requests for extension.
- To use the framework of cross-language information retrieval (performed on the bible) in evaluating the relative faithfulness of different translations of the Quran. For example, we would expect to see similar statistical relationships within the model for a translation of the Quran as are seen in its original language; Arabic. Statistical comparisons could be used as the basis for evaluating a translation's faithfulness to the original. Such an analysis could be of theological, as well as linguistic, interest.
- Extend the search tool to querying in the Hadeith corpus as well, linking Quran verses with relevant Hadeithes.
- Using versions of the software for other books like the Torah, the Bible,…etc, if I can identify an index ontology developed by experts for them.

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Appendix I

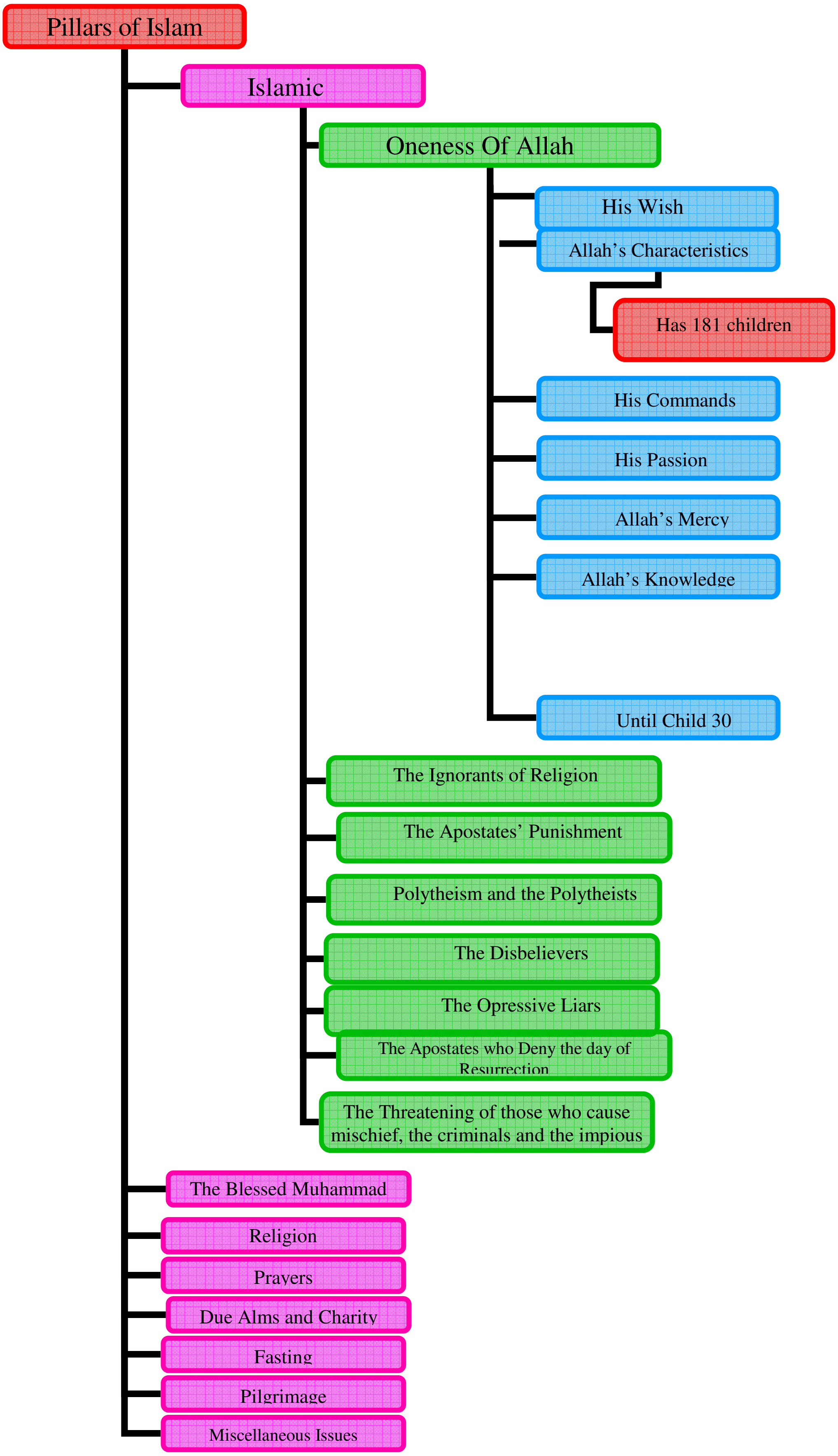


Figure AI_1 Mushaf Al Tajweed list of topics

RDF/XML file of a prototype for the Quran Ontology

```
    <?xml version="1.0"?>
    <rdf:RDF
        xmlns="http://www.owl-
ontologies.com/QuranOntology.owl#"
        xmlns:rdf="http://www.w3.org/1999/02/22-rdf-
syntax-ns#"
        xmlns:xsd="http://www.w3.org/2001/XMLSchema#"
        xmlns:rdfs="http://www.w3.org/2000/01/rdf-
schema#"
        xmlns:owl="http://www.w3.org/2002/07/owl#"
      xml:base="http://www.owl-
ontologies.com/QuranOntology.owl" >
      <rdf:Description rdf:nodeID="A0">
        <rdf:rest
rdf:resource="http://www.w3.org/1999/02/22-rdf-syntax-
ns#nil"/>
        <rdf:first rdf:resource="#C058V008"/>
      </rdf:Description>
      <rdf:Description rdf:about="#Monotheism">
        <rdf:type
rdf:resource="http://www.w3.org/2002/07/owl#Class"/>
      </rdf:Description>
      <rdf:Description rdf:nodeID="A1">
        <owl:oneOf rdf:nodeID="A2"/>
        <rdf:type
rdf:resource="http://www.w3.org/2002/07/owl#Class"/>
      </rdf:Description>
      <rdf:Description rdf:nodeID="A3">
        <owl:onProperty rdf:resource="#hasVerses"/>
        <rdf:type
rdf:resource="http://www.w3.org/2002/07/owl#Restrictio
n"/>
        <owl:hasValue rdf:resource="#C058V008"/>
      </rdf:Description>
      <rdf:Description rdf:about="#C058V010">
        <rdf:type rdf:resource="#His_Pleasure"/>
      </rdf:Description>
      <rdf:Description rdf:about="#C058V008">
        <rdf:type rdf:resource="#His_Pleasure"/>
      </rdf:Description>
      <rdf:Description rdf:nodeID="A4">
        <rdf:type
rdf:resource="http://www.w3.org/2002/07/owl#Restrictio
n"/>
        <owl:onProperty rdf:resource="#hasVerses"/>
        <owl:hasValue rdf:resource="#C058V010"/>
      </rdf:Description>
      <rdf:Description rdf:about="#His_Passion">
        <rdf:type
rdf:resource="http://www.w3.org/2002/07/owl#Class"/>
        <rdfs:subClassOf rdf:resource="#Monotheism"/>
      </rdf:Description>
      <rdf:Description rdf:about="">
        <rdf:type
rdf:resource="http://www.w3.org/2002/07/owl#Ontology"/
>
      </rdf:Description>
      <rdf:Description rdf:about="#hasVerses">
        <rdf:type
rdf:resource="http://www.w3.org/2002/07/owl#ObjectProp
erty"/>
      </rdf:Description>
      <rdf:Description rdf:nodeID="A2">
        <rdf:rest rdf:nodeID="A0"/>
        <rdf:first rdf:resource="#C058V010"/>
      </rdf:Description>
      <rdf:Description rdf:about="#His_Pleasure">
        <owl:equivalentClass rdf:nodeID="A1"/>
        <rdfs:subClassOf rdf:resource="#Monotheism"/>
        <rdfs:subClassOf rdf:nodeID="A4"/>
        <rdfs:subClassOf rdf:nodeID="A3"/>
        <rdf:type
rdf:resource="http://www.w3.org/2002/07/owl#Class"/>
      </rdf:Description>
      <rdf:Description rdf:about="#Trusting_in_Him">
        <rdfs:subClassOf rdf:resource="#Monotheism"/>
        <rdf:type
rdf:resource="http://www.w3.org/2002/07/owl#Class"/>
      </rdf:Description>
    </rdf:RDF>
    <!-- Created with Protege (with OWL Plugin 3.4,
Build 126)  http://protege.stanford.edu -->
```

Figure AI_2 RDF/XML file of a prototype for the Quran Ontology

```
    import sys
    sys.path.append("c://python25//lib//rdflib-2.4.0")
    sys.path.append("c://sparta0.81")
    from sparta import ThingFactory
    from rdflib.Graph import Graph

    store = Graph()
    store.bind("xsd",
"http://www.w3.org/2001/XMLSchema#")
    store.bind("owl", "http://www.w3.org/2002/07/owl#")
    store.bind("rdfs",    "http://www.w3.org/2000/01/rdf-
schema#")
    store.bind("rdf",  "http://www.w3.org/1999/02/22-rdf-
syntax-ns#")
    store.bind("Monotheism",
"http://www.w3.org/2002/07/owl#Class")
    store.bind("His_Pleasure",
"http://www.w3.org/2002/07/owl#Class")
    store.bind("His_Passion",
"http://www.w3.org/2002/07/owl#Class")
    store.bind("Trusting_in_Him",
"http://www.w3.org/2002/07/owl#Class")
    Thing = ThingFactory(store)
    His_Pleasure = Thing("Monotheism_His_Pleasure")
    His_Passion= Thing("Monotheism_His_Passion")
    Peace = Thing("Monotheism_Trusting_in_Him")
    C058V010     =   Thing("His_Pleasure_C058V010")     #,
rdf_range = [Thing("rdf_List")])
     Verses = Thing("His_Pleasure_C058V008_Verses")
```

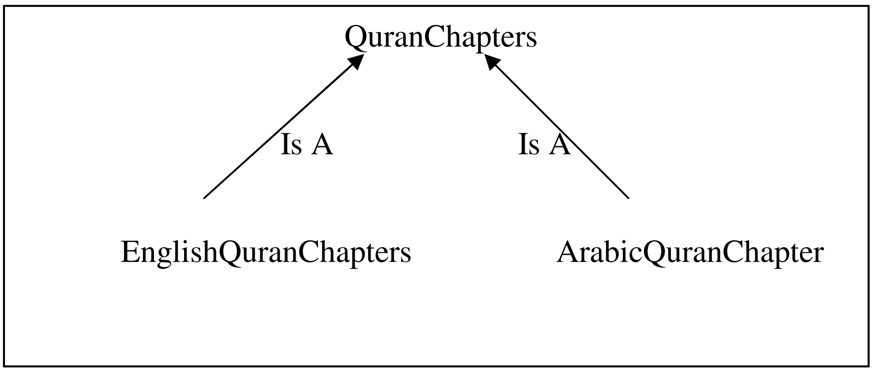
Figure AI_3 A sample Python code that uses the Sparta API

Appendix II

Quran Corpus Design Details:

Design:

There is one super class **QuranChapters** that contains all the basic structures and functions needed by any Quran chapter whether it is English or Arabic or any other language(in case of expanding this module to search using other languages). Hence, the **EnglishQuranChapter** class and the **ArabicQuranChapter** class inherit from it.



class QuranChapters:

```
ALFATIHA = 7
ALBAQARA = 286
ALEMRAN = 200
```

Named Constants for Chapter

```
    QuranNameList   =   ['Al-Fatiha',   'Al-Baqra',   'Al-
Emran',…etc.]
     VersesCount   =   [ALFATIHA   ,            ALBAQARA,
ALEMRAN,…etc.]


       def __init__(self):
            self.name = ""
            self.IndexOfChosenChapter = 0
            self.AllQuran  =  False          #A  flag  to
signify if the search will be carried out on
```

```
     # all the Quran chapters or on a specific chapter
only


        def ShowVerse(self, QuranDict, VerseNo):
            # Get Quran Verse, its verse no., chapter
details to be formatted in order to be    ready for
displaying


        def SearchChapter(self, word):
            #Searches the current loaded Quran chapter
for a specific word


        def LoadAllChapters(self):
            #Loads Quran Chapters. In case of Arabic
Quran, it will load a copy of
           # the original Arabic Quran along with the
tokenized copy, and in the case
           #of the English Quran, it will load a copy of
the tagged English
           #translations, and a copy of the Stemmed and
Tokenized copy as well.
```

```
    class
EnglishQuranChapters(QuranChapters.QuranChapters):


     LoadedTaggedChapterDict= {}     # A dictionary to
store the tagged Quran
       LoadedStemTokChapterDict = {} # A dictionary to
store the

# stemmed/tokenized Quran


    def  __init__(self):
     self.Translators =
     ['Khan', 'Maulana', 'Pickthal', 'Rashad','Sawar',
'Shakir', 'Sherali', 'YusefAli']


    def  __OpenEnglishTaggedChapterFile(self, count):
```

```
    #opens a text file that contains tagged Quran
verses. The ‘count’ is used as
    #in index (in the ‘QuranNameList’ inherited from the
QuranChapters super
    #  class) to the name of the file to be opened.


    def  __OpenEnglishStemTokChapterFile(self, count):
    #opens a text file that contains stemmed/tokenized
Quran verses. The
     #‘count’ is used as in index (in the
‘QuranNameList’ inherited from the
    #  QuranChapters super  class) to the name of the
file to be opened.


    def __LoadEnglishTaggedChapter(self, f ,count):
    #f is the file handler
    #count is the number of verses in the Chapter


    A sample of the first verse in the file
‘TagAbasa.txt’ (chapter no. 80) is shown below.


080:001/CD Khan/NN (The/NN Prophet/NN (Peace/NN be/BE
upon/IN him))/NN
                              frowned/VBN          and/CC
turned/VBD away,/NN
080:001/CD  Maulana/NN  He/PPS  frowned/VBD  and/CC
turned/VBD away,/NN
080:001/CD  Pickthal/NN  He/PPS  frowned/VBD  and/CC
turned/VBD away/RB
080:001/CD Rashad/NN He/PPS (Muhammad)/NN frowned/VBD
and/CC
                                    turned/VBD away./NN
080:001/CD Sarwar/NN He/PPS frowned/VBD and/CC then/RB
turned/VBD


away/RB
080:001/CD  Shakir/NN  He/PPS  frowned/VBD  and/CC
turned/VBD (his)/NN


back,/NN
080:001/CD  Sherali/NN  He/PPS  frowned/VBD  and/CC
turned/VBD aside,/NN
```

```
080:001/CD Yusufali/NN (The/NN Prophet)/NN frowned/VBD and/CC

turned/VBD away,/NN
```

For each line in the file, do the following:

1. Split the line using the white spaces delimiter
2. Use the NLTK Tag library to store each word and its tag in a tuple
3. Append the tuples to a temporary list
4. Obtain the chapter number and the verse number from the first item in the list
5. For each tuple in the list, store the verse word and skip the tag .
6. Store all the verses in one dictionary.

```
def __LoadEnglishStemTokChapter(self, g,count):
#g is the file handler
#count is the number of verses in the Chappter
```

A sample of the first verse in the file ‘StemTokAbasa.txt’ (chapter no. 80) is shown below:

```
080:001 Khan ( the prophet ( peac be upon him )) frown and turn away ,
080:001 Maulana he frown and turn away ,
080:001 Pickthal he frown and turn away
080:001 Rashad he ( muhammad ) frown and turn away .
080:001 Sarwar he frown and then turn away
080:001 Shakir he frown and turn ( his ) back ,
080:001 Sherali he frown and turn asid ,
080:001 Yusufali ( the prophet ) frown and turn away ,
```

For each line in the file, do the following:

1. Split the line using the white spaces delimiter
2. Obtain the chapter number and the verse number
3. Get the Verse text.
4. Store all the verses in one dictionary.

```
    def LoadAllChapters(self):
    #uses all the private methods above to load the
tagged Quran and the
    #   stemmed/tokenized Quran


    def ShowVerse(self, QuranDict, VerseNo):
    #Formats the Chapter name, translator names, verse
number to be displayed


    def __SearchForWord(self, TempDict,TempStemTokDict,
word,
                                              StemTokWord):
     #TempDict: a copy of the 1 English translation for a
verse (obtained from the
    #tagged Quran).
    #TempStemTokDict:  a copy of the 1 English
translation for a verse after
    #being stemmed and tokenized.
    #word: word to be searched for.
    #StemTokWord:  'word'  after  being  stemmed  and
tokenized.
     If 'StemTokWord' exists in the 'TempStemTokDict'
    a. Make a copy of the 'TempDict'
    b. For each word in the 'TempDict' do the following:
             1. Tokenize it and convert it to lower
case.
             2. If the 'StemTokWord' is a lemma of this
word:
                         a. Get the index of this word and
convert it into an
                            upper case word. Store it in
a new tuple (to avoid
                            changing    the    original
'TempDict'), then append it to
                            the copy of the 'TempDict' to
be used in displaying
                            the results of the keyword
search.

    def __SearchVerse(self,i, TempDict, TempStemTokDict,
word,
                                                  StemTokWord):
    #TempDict: a copy of the 8 English translations for
a verse (obtained from the
    tagged  Quran).
    #TempStemTokDict:    a  copy  of  the  8  English
translations for a verse after
    #being stemmed and tokenized.
    #word: word to be searched for.
    #StemTokWord:  'word'  after  being  stemmed  and
tokenized.
    For each translation or line:
    Self.__SearchForWord(TempDict[line],
TempStemTokDict[line]
    ,word, StemTokWord):
    def __CopyVersesToList(self,i,LoadedDict):
     # This function copies the verses to a temporary
list to protect the original
      # chapter from being changed. I copy the verses to
a tuple and then to another
       # list. In Python, if you copy the contents of a
list to a second list, and then
       # try to change the contents of the second list,
the first list gets changed as
        #well. One way of dealing with this problem is
to copy the contents to a
        #tuple and then copy the contents of the tuple
to a new list.


    def SearchChapter(self, word, StemTokWord):
      In this function, I use all the above private
methods to search each chapter for
      the keyword given.
    For each verse in the Chapter:
    1. Make a copy of the Tagged Quran Verse(to protect
the original
          dictionary from being altered).
    2.      Info      =      self.__SearchVerse(i,
TempDict,TempStemTokDict,
          word, StemTokWord)
    3. If there is a match, return the verses that
contain the keyword.
```

```
    class
ArabicQuranChapters(QuranChapters.QuranChapters):


    ArabicName = ""
    LoadedArabicDict= {}
    LoadedArabicTokDict= {}
    ArabicQuranNameList = [u'الفاتحة', u'البقرة', u' آل
عمران',…etc]

    def __OpenArabicChapterFile(self, count):
    #opens one original Arabic Chapter file using the
'count' variable as an index
    #to the name of the file in the 'QuranNameList'

    def __OpenArabicTokChapterFile(self, count):
    #opens one Tokenized Arabic chapter file using the
'count' variable as an
    # index to the name of the file in the
'QuranNameList'

    def __LoadArabicChapter(self, f ,count):
    #Loads one Arabic Quran Chapter
    #f: file handler
    #count: the number of verses in the Chapter
    For each line in the file:
    1. Encode the line in to UTF-8 Format
    2. Append the Verse text to 'LoadedArabicDict'
dictionary

    def __LoadArabicTokChapter(self, f ,count):
      #Loads one Tokenized Arabic Quran Chapter
      #f: file handler
       #count: the number of verses in the Chapter
    For each line in the file:
    1. Encode the line in to UTF-8 Format
    2. Append the Verse text to 'LoadedArabicTokDict'
dictionary
    def __LoadAllOriginalArabicChapters(self):
    #Use the above private methods to load all the
     original Quran Chapters

    def __LoadAllArabicTokChapters(self):
    #Use the above private methods to load all the
     Tokenized Quran Chapters

    def LoadAllChapters(self):
    #Load Original and Tokenized copies of the Arabic
     Quran using the above
    # private methods

    def ShowVerse(self, QuranDict, VerseNo):
    #Formats the verses, the chapter name and the verse
     no. into a displayable
    #format adding new lines where necessary.

     def SearchChapter(self, word):
    #searches the Tokenzied Arabic Quran Chapter for the
     occurrence of the
    # 'word'.
```

The index.html file code

```
    <!DOCTYPE   HTML   PUBLIC   "-//W3C//DTD   HTML   4.01
Frameset//EN"
"http://www.w3.org/TR/xhtml4/DTD/xhtml4-frameset.dtd">
    <html>
        <head>
            <meta               http-equiv="Content-Type"
content="text/html; charset=utf-8">
            <title>Qurany Concepts</title>
      </head>
      <frameset rows = "120,*"  >
<frame   name   =   "header"   src="./Frames/header.html"
scrolling="no"
          noresize marginheight = "0" marginwidth = "0">
     <frameset   cols="300,*">
          <frame                              name="left"
src="./Frames/TreeFrame.html" scrolling="yes">
         <frame                               name="right"
src="./Frames/VersesFrame1.html" scrolling="yes">
        <noframes>Your browser does not support
                                      frames!</noframes>
         </frameset>
     </frameset>
    </html>
```

Class KeywordSearchRPCHandler Code

```
    class
KeywordSearchRPCHandler(webapp.RequestHandler):
        """  Allows  the  functions  defined  in  the
RPCMethods class to be RPCed."""
        def __init__(self):
            webapp.RequestHandler.__init__(self)
            self.methods = RPCMethods()
        def get(self):
            func = None
            action = self.request.get('action')
            if action:
                if action[0] == '_':
                    self.error(403) # access denied
                    return
                else:
                    func = getattr(self.methods, action,
                                                   None)
            if not func:
                self.error(404) # file not found
                return
            else :
                args = ()
                while True:
                    key = 'arg%d' % len(args)
                    val = self.request.get(key)
                    if val:
                        args = (simplejson.loads(val),)
                    else:
                        break
                result = func(*args)


self.response.out.write(simplejson.dumps(result))
    class ContactusMethods:
        def Contactus(self, *args):

            FName = str( args[0][0])
            LName = str( args[0][1])
            Email = str( args[0][2])
            MessageBody = str( args[0][3])

            message = mail.EmailMessage(sender=FName + "
     "+ LName + "  < "+ Email+"
                            >", subject="Qurany Website")
            message.to = "<noorhanabbas@yahoo.co.uk>"
            message.body = MessageBody
            message.send()
```

Function CreateTree() Code

```
    function CreateTree(){
            YAHOO.namespace("yuibook.tree");
     var tree = new YAHOO.widget.TreeView("treeDiv");
            tree.setDynamicLoad(loadNodeData);
             var root = tree.getRoot()
        //add child nodes for tree; our top level
                                                  nodes
             //create dummy data for root
      var MainConcepts = new Array();
      MainConcepts[0] = "أركان الإسلام</br>Pillars of
                                                     Islam";
       MainConcepts[1] = "الإيمان</br>Faith";
       MainConcepts[2] = "الدعوة إلى الله</br>The Call for
                                                     Allah";
        MainConcepts[3] = "القرآن الكريم</br>The Holy
     Quran";
     MainConcepts[4] = "الجهاد</br>Jihad";
     MainConcepts[5] = "العمل</br>Action(Work)";
     MainConcepts[6] = "الإنسان والعلاقات الأخلاقية</br>Man
                             and The Moral Relations";
     MainConcepts[7] = "الإنسان والعلاقات الاجتماعية</br>Man
                            and The Social Relations";
     MainConcepts[8] = " تنظيم العلاقات
     المالية</br>Organizing Financial Relationships";
     MainConcepts[9] = " التجارة و الزراعة و الصناعة و
   الصيد</br>Trade, Agriculture,         Industry and
                                                   Hunting";
     MainConcepts[10] = "العلاقات القضائية</br>Judicial
     Relationships";
     MainConcepts[11] = "العلاقات السياسية والعامة
     </br>General and Political   Relationships";
     MainConcepts[12] = "العلوم والفنون</br>Science and
                                                       Art";
     MainConcepts[13] = "الديانات</br>Religions";
     MainConcepts[14] = "القصص والتاريخ</br>The Stories
                                          and the History";
      for (i = 0; i < MainConcepts.length; i++) {
              var        tmpNode        =        new
YAHOO.widget.TextNode({
               label: MainConcepts[i],
                customData:  MainConcepts[i]   +   "-
metadata"                          }, root, false);

 tmpNode.isLeaf = false;

 }//end of for


         tree.draw();
```

```
           tree.subscribe("labelClick",
function(node){
                 if (node.isLeaf == true) {

doAddVerses(node.data.label);
                }
            }); //end of subscribtion
      tree.subscribe("collapse", function(node) {
    tree.removeChildren(node);

        });
     function loadNodeData(node, fnLoadComplete){
         //Retrieved  children  nodes  using  the  AJAX
technique
       //and adds them to the tree
    }
      }//end of CreateTree()

    function loadNodeData(node, fnLoadComplete)  {
 //We'll create child nodes based on what we get back
 //when we use Connection Manager to pass the text
 //label of the expanding node to the Yahoo!
 //Search "related suggestions" API.  Here, we're at
 //the first part of the request -- we'll make the
 //request to the server.  In our Connection Manager
 // success handler, we'll build our new
 //children and then return fnLoadComplete back to the
 // tree.

     ConceptParentNode  =  node.getAncestor(0);  //gets
the parent node at the
                                     //specified depth
              var i = 0;
              if ( ConceptParentNode == null){
              for (k = 0; k < MainConcepts.length;
                                            k++) {
                  if (node.data.label ==
                                     MainConcepts[k]){
                        i = k+1;
```

```
                     }//end of if
                }//end of for
             }//end of if
            else {
                    i = ConceptParentNode.index;
                    }


             var query = 'action=' +
encodeURIComponent('Add');
             NodeInformation =  new Array();
             NodeInformation[0] = node.data.label;
             NodeInformation[1] = i;    //index of the
parent node at the root level
             var val =
JSON.stringify(NodeInformation);
             query += '&' + 'arg'+ 0 + '=' +
encodeURIComponent(val);
             query += '&time=' + new Date().getTime();
             //prepare our callback object
              var callback = {
//if our XHR call is successful, we want to make use
//of the returned data and create child nodes.
    success: function(oResponse) {
    var oResults = eval("(" + oResponse.responseText +
         ")");
    for (var i=0, j=oResults.length; i<j; i++) {
     var tempNode = new
     YAHOO.widget.TextNode(oResults[i], node, false);
    i += 1;
    if (oResults[i] == "Y")
           {tempNode.isLeaf = true;}
     else {
            tempNode.isLeaf = false;
             }
         }//end of for


      //When we're done creating child nodes, we
execute the node's
     //loadComplete callback method which comes in via
     // the argument
    //in the response object (we could also access it
    // at node.loadComplete,if necessary):
    oResponse.argument.fnLoadComplete();
         }, //end of success
       //if our XHR call is not successful, we want to
      //fire the TreeView callback and let the Tree
      //proceed with its business.
      failure: function(oResponse) {

 alert("Failed to process XHR transaction.");

 oResponse.argument.fnLoadComplete();
                 },
//our handlers for the XHR response will need the same
//argument information we got to loadNodeData, so
    //we'll pass those along:
      argument: {
                  "node": node,
                   "fnLoadComplete": fnLoadComplete
                },

//timeout -- if more than 7 seconds go by, we'll abort
//the transaction and assume there are no children:
     timeout: 7000
      };
    //With our callback object ready, it's now time to
     //make our XHR call using Connection Manager's
     //asyncRequest method:
     YAHOO.util.Connect.asyncRequest('GET', '/rpc?' +
                                   query,  callback);

    }
```

Server Side:

The RPCHandler class will route the URL(/rpc) to the ConceptsRPCMethods class. The method that should be invoked here is the

'Add' method. The 'Add' method will use the **No** for the main concept sent by the client to locate the children of the label of the parent (sent also by the client browser) in the file 'TreeConcepts.py'. Consequently, the children node labels are sent back to the client browser and the tree of concepts is updated. The 'TreeConcepts.py' file contains a dictionary of the fifteen main concepts. Each main concept has a dictionary of all the labels related to that concept where the key is the parent label and the values for that key are the children labels.

Class ConceptsRPCMethods

```
    class ConceptsRPCMethods:

        def Add(self, *args):
            No = str(args[0][1])
            if(args[0][0] in
                  TreeLabels.MainConceptNoDict[No] ):
                  y = TreeLabels.MainConceptNoDict[No]
                                          [args[0][0]]
            else:
                 y = null

            return ((y))

    function RequestVerses(function_name, opt_argv) {
                 if (!opt_argv)
                     opt_argv = new Array();
// Find if the last arg is a callback function; save
//it
                 var len = opt_argv.length;
                 if (len > 0 && typeof opt_argv[len-1]
== 'function') {
                     callback = opt_argv[len-1];
                     opt_argv.length--;
                     }
                 var async = (callback != null);
                 // Encode the arguments in to a URI
                 var query = 'action=' +
encodeURIComponent('AddVerses');
```

```
                 var val = JSON.stringify(opt_argv);
                 query += '&' + 'arg'+ 0 + '=' +
encodeURIComponent(val);
                 query += '&time=' + new
Date().getTime();
    // IE cache workaround
    // Create an XMLHttpRequest 'GET' request w/ an
optional callback
     //handler
     var req = new XMLHttpRequest();
      req.open('GET', '/rpc?' + query, async);  //null
could be replaced by the

//variable async
       if (async) {
         req.onreadystatechange = function() {
           if(req.readyState == 4 && req.status ==
                                                200) {
                   var response = null;
                    try {
                         response =
                         JSON.parse(req.responseText);
                        } catch (e) {
                          response = req.responseText;
                                     }
                             callback(response);
                             }
                         }
                     }
                 // Make the actual request
                 req.send(null);
                 }
    var server = {};
    function InstallFunction2(obj, functionName) {
                obj[functionName] = function() {
    RequestVerses(functionName, arguments); }
                }
// Insert 'AddVerses' as the name of a callable method
    InstallFunction2(server, 'AddVerses');
```

```
  function doAddVerses(nodelabel) {
               server.AddVerses(nodelabel,
                           onAddVersesSuccess);
               }
  // Callback for after a successful doAddVerses
  function onAddVersesSuccess(response) {

#Display the verses

}
```

Server Side:

The RPCHandler class will route the URL(/rpc) to the **ConceptsRPCMethods** class. This time, the method that should be invoked is **‘AddVerses’**. The ‘AddVerses’ method will call the GetConceptList() function which will find the corresponding list of verses to the node label sent by the client.

```
class ConceptsRPCMethods:

def Add  (self, *args):
   #fetches node children
def AddVerses(self, *args):
s = “”
s = GetConceptList(Unicode(args[0][0]))
return (s)
```

Qurany Concepts(html Files) Tool

```
#!/usr/local/bin/python
# -*- coding: utf-8 -*-

import re
import codecs
import QClassificationLists

ALFATIHA = 7
ALBAQARA = 286
ALEMRAN = 200
ANNISA = 176
ALMAEDA = 120
ALANAAM = 165
ALARAF = 206
ALANFAL = 75
ALTAWBA = 129
YUNUS = 109
HUD = 123
YUSUF = 111
ALRAD = 43
IBRAHIM = 52
ALHIJR = 99
ANNAHL = 128
ALISRA = 111
ALKAHF = 110
MARYAM = 98
TAHA = 135
ALANBIYA = 112
ALHAJJ = 78
ALMUMENOON = 118
ALNOOR = 64
ALFURQAN = 77
ALSHUARA = 227
ALNAML = 93
ALQASAS = 88
ALANKABOOT = 69
ALROOM = 60
LUQMAN = 34
ASSAJDA = 30
ALAHZAB = 73
SABA = 54
FATIR = 45
YASEEN = 83
```

```
ASSAAFFAT = 182
SAD = 88
AZZUMAR = 75
ALGHAFIR = 85
FUSSILAT = 54
ASHSHURA = 53
AZZUKHRUF = 89
ADDUKHAN = 59
ALJATHIYA = 37
ALAHQAF = 35
MUHAMMAD = 38
ALFATH = 29
ALHUJRAAT = 18
QAF = 45
ADHDHARIYAT = 60
ATTUR = 49
ANNAJM = 62
ALQAMAR = 55
ARRAHMAN = 78
ALWAQIA = 96
ALHADID = 29
ALMUJADILA = 22
ALHASHR = 24
ALMUMTAHINA = 13
ASSAFF = 14
ALJUMUA = 11
ALMUNAFIQOON = 11
ATTAGHABUN = 18
ATTALAQ = 12
ALTAHRIM = 12
ALMULK = 30
ALQALAM = 52
ALHAAQA = 52
ALMAARIJ = 44
NOOH = 28
ALJINN = 28
ALMUZZAMMIL = 20
ALMUDDATHTHIR = 56
```

```
ALQIYAMA = 40
ALINSAN = 31
ALMURSALAT = 50
ANNABA= 40
ANNAZIAT = 46
ABASA = 42
ATTAKWIR = 29
ALINFITAR = 19
ALMUTAFFIFIN = 36
ALINSHIQAQ = 25
ALBUROOJ = 22
ATTARIQ = 17
ALALA = 19
ALGHASHIYA = 26
ALFAJR = 30
ALBALAD = 20
ASHSHAMS = 15
ALLAIL = 21
ALDHUHA = 11
ALSHARAH = 8
ATTIN = 8
ALALAQ = 19
ALQADR = 5
ALBAYYINA = 8
ALZALZALA = 8
ALADIYAT = 11
ALQAREA = 11
ATTAKATHUR = 8
ALASR = 3
ALHUMAZA = 9
ALFIL = 5
ALQURAESH = 4
ALMAUN = 7
ALKOTHAR = 3
ALKAFERON = 6
ANNASR = 3
ALMASAD = 5
ALIKHLAS = 4
```

```
    ALFALAQ = 5
    ANNAS = 6


    QuranNameList = ['Al-Fatiha', 'Al-Baqra', 'Al-
Emran', 'An-Nisa', 'Al-Maeda', 'Al-Anaam', 'Al-Araf',
'Al-Anfal', 'Al-Tawba', 'Yunus', 'Hud','Yusuf','Al-Rad',
'Ibrahim', 'Al-Hijr', 'An-Nahl', 'Al-Isra', 'Al-Kahf',
'Maryam', 'Ta-Ha', 'Al-Anbiya', 'Al-Hajj','Al-Mumenoon',
'Al-Noor', 'Al-Furqan', 'Al-Shuara', 'Al-Naml', 'Al-
Qasas', 'Al-Ankaboot', 'Al-Room', 'Luqman', 'As-Sajda',
'Al-Ahzab', 'Saba', 'Fatir', 'Ya-Seen', 'As-Saaffat',
'Sad', 'Az-Zumar', 'Al-Ghafir', 'Fussilat', 'Ash-Shura',
'Az-Zukhruf', 'Ad-Dukhan', 'Al-Jathiya', 'Al-Ahqaf',
'Muhammad', 'Al-Fath', 'Al-Hujraat', 'Qaf', 'Adh-
Dhariyat', 'At-Tur', 'An-Najm', 'Al-Qamar', 'Ar-Rahman',
'Al-Waqia', 'Al-Hadid', 'Al-Mujadila', 'Al-Hashr', 'Al-
Mumtahina', 'As-Saff', 'Al-Jumua', 'Al-Munafiqoon', 'At-
Taghabun', 'At-Talaq', 'Al-Tahrim', 'Al-Mulk', 'Al-
Qalam', 'Al-Haaqa', 'Al-Maarij', 'Nooh', 'Al-Jinn', 'Al-
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'Al-Mursalat', 'An-Naba', 'An-Naziat', 'Abasa', 'At-
Takwir', 'Al-Infitar', 'Al-Mutaffifin', 'Al-Inshiqaq',
'Al-Burooj', 'At-Tariq', 'Al-Ala', 'Al-Ghashiya', 'Al-
Fajr', 'Al-Balad', 'Ash-Shams', 'Al-Lail', 'Al-Dhuha',
'Al-Sharah', 'At-Tin', 'Al-Alaq', 'Al-Qadr', 'Al-
Bayyina', 'Al-Zalzala', 'Al-Adiyat', 'Al-Qarea', 'At-
Takathur', 'Al-Asr', 'Al-Humaza', 'Al-Fil', 'Al-
Quraesh', 'Al-Maun', 'Al-Kothar', 'Al-Kaferon', 'An-
Nasr', 'Al-Masad', 'Al-Ikhlas', 'Al-Falaq', 'An-nas']

    VersesCount = [ALFATIHA , ALBAQARA, ALEMRAN,
ANNISA, ALMAEDA, ALANAAM, ALARAF, ALANFAL,
ALTAWBA, YUNUS, HUD, YUSUF, ALRAD, IBRAHIM,
ALHIJR, ANNAHL, ALISRA, ALKAHF, MARYAM,
TAHA, ALANBIYA, ALHAJJ, ALMUMENOON, ALNOOR,
ALFURQAN, ALSHUARA, ALNAML, ALQASAS,
ALANKABOOT, ALROOM, LUQMAN, ASSAJDA, ALAHZAB,
SABA, FATIR, YASEEN, ASSAAFFAT, SAD,
AZZUMAR, ALGHAFIR, FUSSILAT, ASHSHURA,
AZZUKHRUF, ADDUKHAN, ALJATHIYA, ALAHQAF,
MUHAMMAD, ALFATH, ALHUJRAAT, QAF, ADHDHARIYAT,
ATTUR, ANNAJM, ALQAMAR, ARRAHMAN, ALWAQIA,
ALHADID, ALMUJADILA , ALHASHR , ALMUMTAHINA ,
ASSAFF , ALJUMUA , ALMUNAFIQOON , ATTAGHABUN ,
ATTALAQ , ALTAHRIM , ALMULK , ALQALAM , ALHAAQA
, ALMAARIJ , NOOH , ALJINN , ALMUZZAMMIL ,
ALMUDDATHTHIR , ALQIYAMA , ALINSAN , ALMURSALAT ,
ANNABA, ANNAZIAT, ABASA , ATTAKWIR , ALINFITAR
, ALMUTAFFIFIN , ALINSHIQAQ , ALBUROOJ , ATTARIQ
, ALALA , ALGHASHIYA, ALFAJR, ALBALAD ,
ASHSHAMS , ALLAIL , ALDHUHA , ALSHARAH, ATTIN,
ALALAQ , ALQADR , ALBAYYINA , ALZALZALA ,
ALADIYAT , ALQAREA , ATTAKATHUR , ALASR ,
ALHUMAZA , ALFIL , ALQURAESH , ALMAUN , ALKOTHAR
```

```
,    ALKAFERON  ,    ANNASR  ,    ALMASAD  ,    ALIKHLAS  ,
ALFALAQ ,   ANNAS ]
    def OpenArabicChapterFile(count):
        Dir = 'c:/Python25/ArabicQuran/'
        Ext = '.txt'
        FileName = Dir + QuranNameList[count] + Ext
        g = codecs.open(FileName , 'rU', "utf-8")
        if not g:
            print "Unable to open file"
        return ( g)

    def OpenEnglishChapterFile(count):
        Dir = 'c:/Python25/EnglishQuran/'
        Ext = '.txt'
        FileName = Dir + QuranNameList[count] + Ext
        p = open (FileName , 'rU')
        if not p:
            print "Unable to open file"
        return (p)

    def FirstPartFileWriter():
            count = 0
            ChapterIndex = 1
            for verses in VersesCount:
                V_No = 1
                g = OpenArabicChapterFile(count)
                p = OpenEnglishChapterFile(count)

                for j in range(0, verses):
                    Dir = "c:/python25/HTMLFiles/"
                    filename   =   str(ChapterIndex)+"-"+
str(V_No)+".html"
                    f  =  codecs.open  (Dir  +  filename  ,
'w', "utf-8")
                    Arabicline = g.readline()
                    Arabicline1 = unicode(Arabicline)

                    f.writelines("<!DOCTYPE          HTML
PUBLIC"+'    "-//W3C//DTD    HTML    4.01    Frameset//EN"
```

```
"http://www.w3.org/TR/xhtml4/DTD/xhtml4-frameset.dtd"'+
">\n")
                    #f.writelines("<html
xmlns=http://www.w3.org/1999/xhtml>\n")
                    f.writelines("<html>\n")
                    f.writelines("<head>\n")
                    f.writelines("\t<meta   http-equiv="+
'"Content-Type"'+"  content="+'"text/html;  charset=utf-
8"'+" />\n")
                    f.writelines("\t<title>"+"Quran
Chapter    "+    str(QuranNameList[count])+     "("     +
str(ChapterIndex)    +"),    VerseNo.    ("+    str(V_No)
+")</title>\n")
                    f.writelines("\t<meta
name="+'"author"'+"content  =  "+'"Noorhan  Abbas  &  Eric
Atwell"'+ " />\n")


                    f.writelines("\t<style        type="+
'"text/css"'+">\n")
                    f.writelines("\t\t.style1 {\n")
                    f.writelines("\t\t\theight:
25px;\n")
                    f.writelines("\t\t}\n")
                    f.writelines("\t</style>\n")
                    f.writelines("</head>\n")
                    f.writelines("<body>\n")
                    f.writelines("\t<p>\n")
                    f.writelines("\t\t<center><h2>The
University of Leeds: Qurany Tool</h2></center>\n")
                    #f.writelines("\t\t<center><h1>The
Qurany Tool</h1></center>\n")

#f.writelines("\t\t<center><h1>By</h1></center>\n")
                    f.writelines("\t\t<center><h3><a
href ="+ '"http://www.comp.leeds.ac.uk/nlp"'+ " target =
"+'"_self"'+">    Noorhan    Abbas        &    Dr.    Eric
Atwell</a></h3></center></br>\n")
                    f.writelines("\t\t<font
color="+'"#1645ae"'+"   size="+'"6"'+">   <strong>Chapter
Name:"+   str(QuranNameList[count])+   "   Verse   No:"+
str(V_No)+"</strong></br></br></font>\n")
                    f.writelines("\t\t<font
size="+'"5"'+">\n")
```

```
                    f.writelines("\t\t"+      Arabiccline1
+"</br></font>\n")
                    f.writelines("\t\t<table
width="+'"100%"'+        "        border="+'"0"'+        "
cellspacing="+'"0"'+ " cellpadding="+ '"0"'+"  >\n")
                    f.writelines("\t\t\t<tr>\n")
                    f.writelines("\t\t\t\t<td
class="+'"style1"'+"></td>\n")
                    f.writelines("\t\t\t\t<td
class="+'"style1"'+"></td>\n")
                    f.writelines("\t\t\t\t<td
class="+'"style1"'+"></td>\n")
                    f.writelines("\t\t\t</tr>\n")


                    for i in range(0,8):
                        Englishline = p.readline()
                        ChapterNoVerseNo                 =
Englishline[0:7]
                        v = Englishline[8:]
                        Verse= re.split('\s',v )    #list
of translator and verse text
                        Translator = Verse[0]
                        VerseText = ' '.join(Verse[1:])
                        f.writelines("\t\t\t<tr>\n")
                        f.writelines("\t\t\t\t<td   width
=    "+    '"150"'+"    height="+    '"25"'+    ">    "+
str(ChapterNoVerseNo)+"    <font    color="+'"#1645ae"'+"
size="+'"4"'+"> "+str(Translator)+" </td>\n")
                        f.writelines("\t\t\t\t<td><div
align="+'"center"'+ ">:</div></td>\n")
                        f.writelines("\t\t\t\t<td><Font
size="+'"4"'+">"+ str(VerseText)+"</td></font>\n")
                        f.writelines("\t\t\t</tr>\n")
                        f.writelines("\t\t\t<tr>\n")
                        f.writelines("\t\t\t\t<td
class="+'"style1"'+"></td>\n")
                        f.writelines("\t\t\t\t<td
class="+'"style1"'+"></td>\n")
                        f.writelines("\t\t\t\t<td
class="+'"style1"'+"></td>\n")
                        f.writelines("\t\t\t</tr>\n")
                    f.writelines("\t\t</table>\n")
                    f.writelines("\t</p>\n")
                    f.writelines("\t<p>\n")
                    f.writelines("\t\t<font
color="+'"#1645ae"'+        "        size="+         '"6"'+
"><strong>Concepts/Themes
Covered:</strong></font></br></br>\n")
                    f.writelines("\t\t<font
size="+'"4"'+">\n")
                    f.close()
                    V_No += 1



                ChapterIndex += 1
                count +=1
                p.close()
                g.close()
    #--------------------------------------------------------
----------------------------------


    def SecondPartFileWriter():
        QuranTopicList                                        =
QClassificationLists.QuranClassificationLists()
        ListOfConceptsLists  =  [  QuranTopicList.L111_1,
QuranTopicList.L111_2,            QuranTopicList.L111_3,
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                QuranTopicList.L15_30,
QuranTopicList.L15_31,            QuranTopicList.L15_32,
QuranTopicList.L15_33,  QuranTopicList.L15_34_2,


QuranTopicList.L15_34_3,QuranTopicList.L15_34_4,
QuranTopicList.L15_34_5, QuranTopicList.L15_34_6
                  ]



        g                                              =
codecs.open("c:/Python25/HtmlTreeParses.txt",       'rU',
"utf-8")

        #ListCount = 0

        #VersesCount = 0

        for item in ListOfConceptsLists:

            #ListCount += 1
            line1 = g.readline()
            line2 = g.readline()
            for conceptfile in item:
                #VersesCount += 1
                s = str(conceptfile).split(':')
                filename = s[0] + '-' + s[1] + ".html"
                Dir = "c:/python25/HTMLFiles/"
                f = codecs.open (Dir + filename , 'a',
"utf-8")
                f.writelines("\t\t"+ unicode(line1)
+"</br>"+'\n')
                f.writelines("\t\t"+ line2
+"</br></br>"+'\n')
                f.close()
        g.close()
        #print 'ListCount= ', ListCount, '  VersesCount=
', VersesCount


    def ThirdPartFileWriter():
        count = 0
        ChapterIndex = 1


        for verses in VersesCount:
            V_No = 1
            for j in range(0, verses):
                Dir = "c:/Python25/HTMLFiles/"
                filename = str(ChapterIndex)+"-"+
str(V_No)+".html"
                f = codecs.open(Dir+filename , 'a',
"utf-8")
                f.writelines("\t\t</font>\n")
                f.writelines("\t</p>\n")
                f.writelines("\t<p align = "+'"right"'+
"><Font size="+ '"5"'+">\n")
                #f.writelines("\t\t<a
href="+'"http://www.comp.leeds.ac.uk/nora/html/home.html
"' + " target = "+'"_self"'+" >Home </a> \n")
                #f.writelines("\t\t<a
href="+'"http://www.comp.leeds.ac.uk/nora/html/'+
str(ChapterIndex)+ "-"+ str(V_No - 1)+ '.html'+'"' + "
target = "+'"_self"'+" >   Prev </a> \n")
```

```
                #f.writelines("\t\t<a
href="+'"http://www.comp.leeds.ac.uk/nora/html/'+
str(ChapterIndex)+ "-"+ str(V_No + 1)+ '.html'+'"' + "
target = "+'"_self"'+" >   Next </a> \n")

                f.writelines("\t\t<a
href="+'"home.html"' + " target = "+'"_self"'+" >Home
</a> \n")

                f.writelines("\t\t<a          href="+'"'+
str(ChapterIndex)+ "-"+ str(V_No - 1)+ '.html'+'"' + "
target = "+'"_self"'+" >   Prev </a> \n")

                f.writelines("\t\t<a          href="+'"'+
str(ChapterIndex)+ "-"+ str(V_No + 1)+ '.html'+'"' + "
target = "+'"_self"'+" >   Next </a> \n")


                f.writelines("\t</Font></p>\n")

                f.writelines("\t<p>\n")

                f.writelines("\t\t<font
color="+'"#007D08"'+       "       size="+       '"4"'+
"><strong></br>\n")

                f.writelines("\t\tThis  tool  uses  eight
English  parallel  translations  for  the  Holy  Quran
imported                    from                    <a
href="+'"http://www.clay.smith.name/Parallel_Quran.htm"'
+" target="+'"_top"'+">Mr. Clay Smith.</a>\n")

                f.writelines("\t\tYou can also visit "+"
<a   href   ="+'"http://quranytopics.appspot.com/"'+   "
target = "+'"_top"'+" >Qurany Concepts</a> for browsing
the Quran themes or topics.</br>\n")

                f.writelines("\t\tIf  you  want  to  search
the Holy Quran for keywords, please visit "+" <a href
="+'"http://quranykeywords.appspot.com/"'+  "  target  =
"+'"_top"'+" >Qurany Keywords.</a></br>\n")

                f.writelines("\t</strong></font></p>\n")

                f.writelines("</body>\n")

                f.writelines("</html>\n")

                V_No += 1

                f.close()

            ChapterIndex += 1

    #---------------------------------------------------
--------------------------------

    def WriteIndexFile():

        count = 0

        ChapterIndex = 1

        f  =  open(  "c:/Python25/HTMLFiles/home.html"  ,
'w')
```

```
        f.writelines("<!DOCTYPE html PUBLIC -//W3C//DTD
XHTML 1.0 Transitional//EN
http://www.w3.org/TR/xhtml1/DTD/xhtml1-
transitional.dtd>\n")

        f.writelines("<html
xmlns=http://www.w3.org/1999/xhtml>\n")

        f.writelines("<head>\n")

        f.writelines("\t<title>Qurany Search
Tool</title>\n")

        f.writelines("\t<meta name="+'"author"'+"content
= "+'"Noorhan Abbas & Eric Atwell"'+ " />\n")

        f.writelines("\t<meta http-equiv="+ '"Content-
Type"'+" content="+'"text/html; charset=utf-8"'+" />\n")

        f.writelines("</head>\n")

        f.writelines("<body>\n")

        f.writelines("\t<p>\n")

        f.writelines("\t\t<center><h1>The University of
Leeds</h1></center></br>\n")

        f.writelines("\t\t<center><h1>The Qurany
Concepts Tool</h1></center></br>\n")


f.writelines("\t\t<center><h1>By</h1></center></br>\n")

        f.writelines("\t\t<center><h1>Noorhan Abbas &
Dr.Eric Atwell</h1></center></br>\n")

        f.writelines("\t</p>\n")

        f.writelines("\t<p><font size = "+ '"4"'+">\n")

        f.writelines("\t\tQurany (meaning 'my Quran' in
Arabic) incorporates novel features to improve recall
and precision when compared against other tools for
searching\n")

        f.writelines("\t\t for concepts in the Quran.
The underlying corpus includes 8 variant English
translations as well as the Arabic original.\n")

        f.writelines("\t\t Each verse is saved in an
html file along with the concepts or themes that the
verse covers.  These themes were imported from
'Mushaf\n")

        f.writelines("\t\t Al Tajweed'.  'Mushaf Al
Tajweed', compiled by Dr. Mohamed Habash, Director of
the Islamic Studies Centre in Damascus, published by Dar
Al-Maarifah in Syria\n")

        f.writelines("\t\tand authenticated by the Al-
Azhar Islamic Research Academy in Egypt.\n")

        f.writelines("\t</font></p>\n")
        for verses in VersesCount:
            V_No = 1
            for j in range(0, verses):

                filename = str(ChapterIndex)+"-"+
str(V_No)+".html"
                f.writelines("\t<a href =" +'"' +
filename +'"'+ " target = "+'"QuranTool"'+" >"+ filename
+"</a></br>   \n")
                V_No += 1

            ChapterIndex += 1
        f.writelines("\t<p>\n")
        f.writelines("\t\t<font color="+'"#007D08"'+ "
size="+ '"4"'+ "><strong></br>\n")
        f.writelines("\t\tThis tool uses eight English
parallel translations for the Holy Quran imported from
<a
href="+'"http://www.clay.smith.name/Parallel_Quran.htm"'
+" target="+'"_top"'+">Mr. Clay Smith.</a>\n")
        f.writelines("\t\tYou can also visit "+" <a href
="+'"http://quranytopics.appspot.com/"'+ " target =
"+'"_top"'+" >Qurany Concepts</a> for browsing the Quran
themes or topics.</br>\n")
        f.writelines("\t\tIf you want to search the Holy
Quran for keywords, please visit "+" <a href
="+'"http://quranykeywords.appspot.com/"'+ " target =
"+'"_top"'+" >Qurany Keywords</a></br>\n")

        f.writelines("\t</strong></font></p>\n")

        f.writelines("</body>\n")
        f.writelines("</html>\n")

        f.close()

    #----------------------------------------------------
--------------------------------
    #FirstPartFileWriter()
    #SecondPartFileWriter()
    #ThirdPartFileWriter()

    WriteIndexFile()

    #<meta                                  name="verify-v1"
content="zHS51BkENebsKARQ4WKW5WzNHDZVm7nwTferzpCEMNg="
/>
```

Appendix III

Permission to use the eight parallel English Translations file:

As-Salam Alaykom wa-Rahmatullaahi wa-Barakaatuhu
Peace be upon you and the Mercy of God and His Blessing!

How lovely to hear from you. Al-HamduLillah!

For a work like you are doing, there is little need for a preamble. Please be at liberty to simply use a bibliography reference without preamble.

I put the high water mark on the preamble to help manage the unmanageable internet copying, when linking will do just fine.

If you end up having a soft copy of you thesis, then I would love to have a copy to read.

May God guide us to do Good Deeds!
Clay Chip Smith -- www.Clay.Smith.name
Clay@ClayChipSmith.com

----- Original Message -----

From: Noorhan Abbas

To: Clay@Smith.name

Sent: Monday, January 07, 2008 1:35 PM

Subject: The Parallel Quran file.

Dear Mr.Clay,

I would like to thank you very much for for making the parallel Quran file available on the net. It definitly is a huge effort and a great help to many scholars like me.

I am writing to you to ask you if you kindly can let me use this file. I am a student in The University in Leeds doing an MSc by Research on the Quran. My aim is to build a complete ontology for the Quran in my Ph.D. work. I am currently invistigating building a dictionary for the Quran.

I need to divide your file into 114 files for every chapter as I need to be able to search each chapter independently for possible main themes(to build my ontology). I will definitly include the paragraph at the beginning of your file in my thesis and I will make it clear that I got the file from you.

I will not use it until you give me the permission to do so. I can ask my supervisor to write to you if it is needed.

Thank you very much,

Looking very much forward to hearing from you,

Mrs.Noorhan Abbas.

Dr. Edward Loper email on using the NLTK

On Tue, Jul 8, 2008 at 10:15 AM, Noorhan Abbas <noorhanabbas@yahoo.co.uk> wrote:

> Thank you very much for your prompt reply....much appreciated. Well, I
> copied the NLTK files to a my website directory(I thought I don't really
> need to copy NLTK data), this is how the Google appengine itself is
> referencing its API's but it still didn't accept to import the NLTk.

I think that to figure out why it's not working, you'd need to read
the google appengine docs some more, or ask on an irc channel or
mailing list devoted to appengine.

> Is it
> possible to use the tokenizer files without importing the whole nltk? or is
> this not legal?

It should be possible for you to make a pared-down version of nltk
that just includes the functionality you want. This shouldn't be an

issue from a legal point of view, as far as i know (but I'm not a lawyer). NLTK is distributed under the GPL. So if you make modifications to nltk, *and* you distribute them, then those modifications must also be released under the GPL. But there shouldn't be any legal or licensing requirements on any code you write that just imports/uses nltk.

> Another thing is the Stemmer. I used the Lancaster stemmer but I
> think this one is a bit difficult to be used on its own as it calls a lot of
> the other API's as well...am I right?

It doesn't look like this file depends on much else. In fact, I think you could get away with just deleting the line that says "from API import *" and changing the class declaration from:

```
class LancasterStemmer(StemmerI):
```

to:

```
class LancasterStemmer(object):
```

-Edward