Developing a novel Text mining Model for Exploring Knowledge from an Arabic text: Al-Hadeeth Al-shareef as case study

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Abstract
Stemming is an attempt to reduce word to its root form. It is a pre-processingstep in Text Mining Applications as well as a prevalent need thing of Natural Language Processing (NLP) filed, Information Retrieval systems and text classifiers. Many research focusing on extracting Arabic root to reduce different grammatical forms of words like its nouns, verbs, and adjectives. In this study we developed a new Text Mining model consist of two algorithms, the first is a stemming algorithm which process the word and match it with the suitable diacritics or vocalize word pattern as (فَعَلَ) f-à-l and (فَاعِلٌ) faeil then extract root without using root file. When we applied our Stemmer algorithm on (Sahih Al-Bukhari) textbook, which is one of seven primary books in Al-hadith Al-Sharif in Prophet's Sunnah beside Muslim and others textbook, we achieved 95.8% accuracy of root extraction and 96.4% inflection accuracy. The second algorithm is concerned to mining the knowledge by detecting the entities as verb time (Past, Present, and Imperative), noun and proper noun.

Key words:
Stemming, root, Text Mining, NLP.

1. Introduction

Stemming is an attempt to remove the extra letters from a word, to reduce each word to its root form by using different techniques such as light stemming, lookup tables, rule-based and root file. The Arabic language characteristic is entirely different from the English language. [26]

The Arabic text is written in vocalization (diacritics) or without diacritics. Each Arabic words letter has a sign call (haraka), which literally means 'motions' it can be Fathah (ً), Kasrah (ٍ), Dammah(ٌ), Sukun(ْ), Shadddah(ّ) and Tanween(ٌ, ٍ ,ً), and there is no diacritics on the vowel letter (ا,و ,ي) [28][10].

Our model improves the accuracy of extracting the Arabic word root and classifies it into a state of verb time. We apply our model to one of the Sunnah text called Sahih Al-Bukhari book; it is one of the Kutub al-Sittah of Sunni Islam. The Muslim scholar Muhammad Al-Bukhari collected these prophetic traditions or Hadith.

The Prophet's Hadith or Sunnah is what the Prophet Mohamed Bin Abdul Allah Peace be upon him said or done or report. It is the second source of sources of Islamic legislation after the Quran. The prophetic Hadith is everything that the Prophet Mohammed - may God bless him and grant him peace said, it is mean everything that came from him in terms of saying, deed, report, moral characteristic, moral characteristic, or biography received from him, whether it was before or after the mission.

Throughout the ages, the scientists gives to Hadith collection and codification, study and explanation, and developed around various sciences as science wound

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alteration Hadith and science, and that was the primary goal of keeping modern and pushing lying about the Prophet and accepted explanation and feedback from him. This Hadith Sciences influence spread in different areas such as history and relation to the biography and translations science classes, in addition to its effect on Arabic language and interpretation and jurisprudence.

We prepare a new text mining model approach with a new technique that extract the Arabic word root from an input Hadith diacritics text after putting the word in an appropriate pattern, then removes suffix and prefix and applies rules to extract the root with any length.

Our study aims to build a text mining model relied on the Arabic diacritics text to extract the proper root and its inflection for each word with high accuracy to exploring the knowledge by determining the entities as verb time (Past, Present, and Imperative), noun and proper noun with high performance. We gain 95.8% accuracy for extracting the root and 96.4% inflection accuracy.

2. Related Work

Stemming algorithm using different techniques to extract the root or stem from words. Most researchers had proposed algorithms to stem and normalize Arabic words and work on al Hadith al Sharif as classification only. In this section, we will show the previous research in this field.

Khoja, S. Garside, R. [1999] developed a fast and high accuracy stemmer algorithm for Arabic words; it is the most famous stemming algorithm. He improved stemming for Arabic information retrieval light stemming and co-occurrence analysis by using root dictionary file. [4]

Al Kabi M. et al [2015] present light and heavy Arabic stemmer to extract the trilateral Arabic root and compare the output with two stemmers. It performs 75% accuracy. [16]

Momani M., Faraj J. [2007] display a stemmer to extract tri-literal Arabic roots by removing suffix and prefixes and implement some step until arranging the remaining letters according to their order in the original word, its accuracy about 73% [8]

Taghva K., El Khoury R, Combs J., [2005] implements light Arabic stemmer to extract root similar to Khoja stemmer but without using root dictionary and perform equivalent performance [6]

Yaseen Q., Hamedi I. [2014] present Word Substring Stemming algorithm (WSS) which extract an Arabic root from word that consist of three and four letters only. It extracts all substrings of a word then uses an Arabic root file and pattern file. [15]

Al Kabi M., [2013] improve khoja stemmer by adding (Pattern, forms,"الاوزان") and identify more pattern not use in Khoja stemmer so that he improve the accuracy to 5% improvement. [12]

Al Shalabi [2005] Pattern Based stemmer for finding Arabic root algorithm extract tripartite Arabic root by removing suffix and prefix from the word then matched it with the pattern. [5]

Krea A., Ahmed S.,Kababna K., [2014] present Arabic Words Stemming Approach Using Arabic Wordnet use two methods which is light stemmer and look in tables, it uses an Arabic word net table after removing the affixes better. [14]

Rostam N. A. P., Malim N. H. A. H. [2019] propose a method to classify three selected categories Hajj, Prayer, and Zakat, then determine the interrelation between them in the Islamic resources Quran and Hadiths. Three methods of classification were done to make a comparison. [23]

Najib S. R. M., Abd Rahman N., Ismail N. K., Nor Z. M., Alias M. N. [2017] explain how Machine Learning techniques classify Malay translated Hadith document based on sanad. They used SVM, NB and k-NN to identify and evaluate the performance of their works. [20]

ABDELAAL H. M. and YOUNESS H. A. [2019] identify the Hadith Sanad (chain of narrators) and hadith references using the information gain technique to judge the validity of the Hadith, and build a classifier model. They used Supervised Learning algorithms to assign the Hadith automatically into one of some predetermined categories, using Decision Trees (DT) and Na¨ıve Bayes (NB) classifiers. The Results showed that DT and NB Classifiers achieved high accuracy. [22]

Mahmood A., Khan H. U., Rehman Z. U., Khan W. [2017] build a model to search and analyze Hadith level using the Naïve Bayes (NB) algorithm and the Decision Tree algorithm (C4.5). They compare the two algorithms and the evaluation results found that the Decision Tree Algorithm (C4.5) has a higher accuracy rate of 7.81% of the Naïve Bayes Classifier Algorithm. [19]

Harrag F. and Cherif A. H., [2007] proposed an authenticity system in the French language which provide a list of prophetic traditions "60 Hadiths" classified according to their degrees of similarity based on a given query. Among the other implemented classic text mining methods in authenticity are TFIDF Weight and cosine measure. [7]

Harrag F., El-Qawasmah E. [2009] use 453 various Hadiths from the Encyclopedia of Nine Books for the Honorable

Prophetic. They classify Arabic documents by applying ANN (Artificial Neural Network) model and use SVD (Singular Value Decomposition) to select the relevant features for classification. The experimental results achieve 88.33% compare to basic ANN on Arabic document classification, which is yields 85.75%. [9]

Harrag F., Alothaim A., Abanmy A., Alomaigan F., Alsalehi S. [2013] use all Hadiths in Sahih Al-Bukhari they concerned with the use of association rules to extract the ontology of prophetic narrations (Hadith), by computing correspondence relations using the suitable algorithm. In particular. [11]

Saloot M. A., et al [2016] Use 3150 Hadiths from Sahih Al Bukhari they analyze all academic journal and conference publications that using Hadith classification and mining methods of artificial intelligence. The Hadith classification by neural networks achieved 94 %, and when the Hadith mining method join the vector space model, the accuracy result achieved is 88 %. [17]

Harrag F. [2014] used 7563 Hadiths from Sahih Al-Bukhari (in the Urdu language). He proposes a knowledge extraction model to extract Named entities from Sahih Al-Bukhari Urdu translation. The proposed model based on finite-state transducer system to extract entities and process the Hadith content using Part of Speech (POS) tagging. Conditional Random Field, an ensemble-based algorithm, processes the extracted nouns for NER and classification [13]

Boudchiche M., et al. [2017] illustrate AlKhalil2. It is a morph syntactic analyzer of Arabic words, it is the second version of Alkhalil analyzer1 (Boudlal et al., 2010) with error correction and enrichment data base to be more accurate, fast analysis, ability to displays all the possible words that satisfy root and index every word. [18]

As we noted in the previous works, some papers focus on extracting root as Khoja, S. Garside, R. [1999], Taghva K., El Khoury R, Combs J., [2005] by using different techniques.

Some research extract trilateral Arabic root only like Al kabi M. et al [2015] and Momani M., Faraj J., [2007]

Boudchiche M., et al. [2017] extracting root, analyses and display all the possible inflection for words and all works in al hadith al Sharif such as Saloot M. A., et al [2016] and Harrag F., [2014] concern with classification only.

There is no work based on parsing words in the Arabic text, building a model to extract the Arabic pattern, and extract verbs of imperative, past and present tense from Arabic text. We develop a text-mining model with a novel concept for extracting root and its inflection from Arabic diacritics text to gain high level of accuracy and other feature selection technique to determine verb types, nouns and stop word with high performance.

3. Research Model

In this research, we developed a text-mining model, which consist of two algorithms the first one for extracting Arabic root from diacritics texts and its inflection. The second algorithm determines the entities as verb type, formal noun, proper noun and stop word for text mining purpose. We applied our model to (Sahih Al-Bukhari) textbook [30], one of seven primary books in Al-hadith Al-Sharif in Prophet's Sunnah besides Muslim and other textbooks. The Hadith consists of two-part Assign (إسناد) and Board (متن) [28] the Assign is the narrator chain of people, and the Board is the body of Hadith. Figure 1 illustrates the structure of the Hadith

3.1 The proposed model

In the research, we will develop a new text-mining model for dealing with unstructured data as Hadith text; figure 2 illustrates our proposed model.

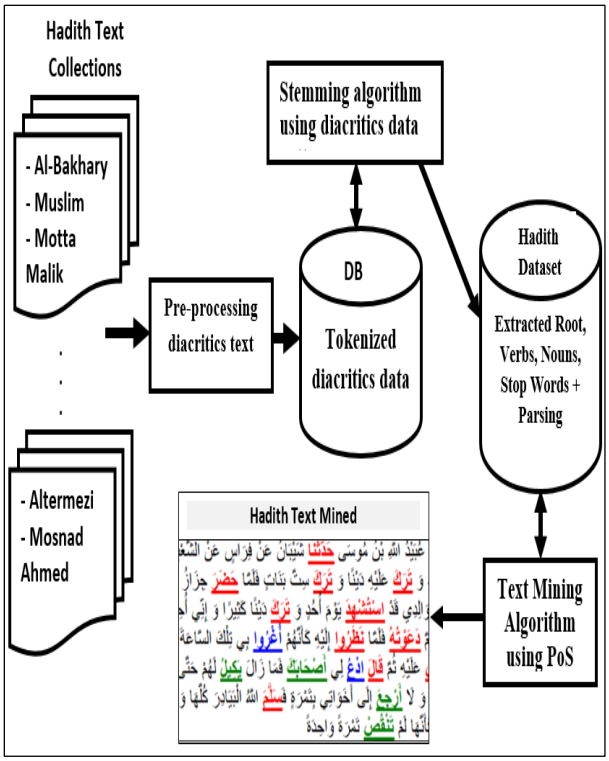


Fig. 2 The proposed model

The first step beginning with collect the Hadith text, then preprocessing and storing it as structured data in a suitable database; after that, we will apply the first algorithm called stemming algorithm to construct the Hadith dataset, then we will apply the second called text-mining algorithm to serve the end-user inquiry. Therefore, a research model designed for processing, analyzing and exploring knowledge from Hadith text. The following steps explain how our proposed model work:

1. Prepare authenticated resources.
2. Design databases.
3. Firstly, apply stemming algorithm
   - 3.1. Extract word root.
   - 3.2. Find the inflection.
   - 3.3. Construct the Hadith dataset.
4. Secondly, apply a text-mining algorithm.
   - 4.1. Specify the entities in the Hadith text as:
     - 4.1.1. Verbs time (Past, Present, and Imperative).
     - 4.1.2. Nouns and proper nouns.
5. Inquiry

3.2 Model Concept

Morphology is a branch of linguistics that studies the structure of words. It is classified as derivation, inflection, and agglutination. [29]

Derivation attaches affixes to words creating new word but inflection study the word grammar and agglutination means that the word may be attached a set of affixes. [29] There are two types of inflection, the first type is (Inflectional: مُـعْرَب), and the second type is (Non-inflectional: مَـبْنِيًا) Word morphology is useful to disambiguation of word sense, using a dictionary very well, and acquiring linguistic information.

3.2.1 Arabic verbs:

The verb indicates two things together: a state and tense associated with them, conditions of verb state may include syntax, tense, pattern, voice, Gender all these expressions as shown in Table 1. [29]

Table 1: Conditions Verb action

Formula	past action(فعل ماضي), present action(فعل مضارع), Imperatives action(فعل امر)
Tense	Past(ماضي), present(مضارع), future(مستقبل)
Pattern	Triple(مجرد ثلاثي), more triangular(مزيد ثلاثي), quadrilateral(مجرد رباعي), more quadrilateral(مزيد رباعي)
Voice	Active (مبني للمعلوم) and passive(مبني للمجهول)
Gender	Feminine (المؤنث) and Masculine (المذكر)

3.2.2 Arabic verb cases

Most Arabic stemmers are designed to extract root from Arabic text without diacritics (Tashkil), but our algorithm deal with diacritics text using word pattern

Table 2: Arabic verb types and patterns [3]

Verb State (حالة الفعل)	**(Abstract Triple: مجرد ثلاثي)**	فَعَلَ ، فَعُلَ ، فَعِلَ	أَكَلَ ، يَسُرَ، يَئِسَ
	(Extra triangular : مزيد ثلاثي)	فَعَّلَ ، فاعَلَ ، افْعَلَ ، تَفَعَّلَ ، تَفاعَلَ انْفَعَلَ ، اِفْتَعَلَ ، اِفْعَلَّ ، اِسْتَفْعَلَ افْعَوْعَلَ ، افْعَوَّلَ ، افْعالَّ	قَرَّرَ، لَاعَبَ، أَوْصَى، انْتَحَرَ، اسْتَيْقَظَ، اِحْوَالَّ
	(Abstract quadrilateral : مجرد رباعي)	فَعْلَلَ	سَيْطَرَ
	(Extra quadrilateral : مزيد رباعي)	تَفَعْلَلَ ، اِفْعَنْلَلَ ، اِفْعَلَلَّ	تَرَعْرَعَ، اِحْوَنْصَلَ، اِطْمَأَنَّ

Table 3: Nouns Arabic patterns [25]

Noun State (حالة الاسم)	**(Abstract Triple: مجرد ثلاثي)**	فَعْل، فَعَل، فَعِل، فَعُل، فِعْل، فِعَل، فِعِل، فُعْل، فُعَل، فُعُل	سَهْم، قَمَر، كَتِف، عَضُد، جِمْل، عِنَب، إبِل، حُلْو، حُطَم، عُنُق،
	(Abstract quadrilateral : مجرد رباعي)	فَعْلَل،فِعْلِل،فُعْلُل،فِعَلّ،فِعْلَل	جَعْفَر، زِبْرِج، بُرْثُن، قِمَطْر، دِرْهَم
	(Abstract quadrilateral : مجرد خماسي)	فَعَلَّل،فَعْلَلِلّ،فِعْلَلّ،فُعَلِّل	سَفَرْجَلْ، جَحْمَرِش، قِرْطعب، قُذَعْمِل
	مزيد ثلاثي ، مزيد رباعي، مزيد خماسي	مَفْعِلْ، فَعْلُوتْ، فَعْلِيلْ	مَسْجِدْ، عَنْكَبُوتْ، زَنْجَبِيلْ

Table 4: Common Verbs and Nouns Arabic patterns

Grammar Pattern	Inflection	Noun	Verb
فَعْلْ	اسم + فعل امر	قَوْلْ	أَوْكْ
فَعْ	اسم + فعل امر	أَمْ	ضُمْ
نَفْعَلُ	مضارع مجرد ثلاثي علي وزن فعل مبنى للمعلوم + اسم على وزن مَفْعَلْ	مَسْمَعْ	نَسْمَعُ
أَفْعَل	اسم و هو ايضا ميزان للفعل	أَتْقَى	أَعْطَى

	الماضي		
فَعَالَ	اسم و هو ايضا ميزان للفعل الماضي	رَجَاءَ	أَرَادَ

3.2.3 Pronouns and their corresponding patterns

Pronouns are divided into three types: (ضمير الغائب: 1st Person), (ضمير المخاطب: 2nd Person) and (ضمير المتكلم: 3rd Person). [3] All pronouns and their corresponding patterns are shown in Table 5

Table 5: Pronouns and patterns

(The Pronouns : الضمائر)				Grammar Pattern (الميزان الصرفي)
1st Person : المتكلم	(masculine : مذكر) (feminine : مؤنث)	(singular : مفرد)	(I am : أنا)	أَفْعَلَ
		(plural : جمع)	(We : نحن)	نَفْعَلَ
2nd Person : المخاطب	(masculine : مذكر)	(singular : مفرد)	(You : أنت)	تَفْعَلَ
	(feminine : مؤنث)		(You : أنتِ)	تَفْعَلِي
	(masculine : مذكر)	(Dual : مثنى)	(You : أنتما)	تَفْعَلَا
	(feminine : مؤنث)			تَفْعَلَا
	(masculine : مذكر)	(plural : جمع)	(You : أنتم)	تَفْعَلُوا
	(feminine : مؤنث)		(You : أنتن)	تَفْعَلْنَ
3rd Person : الغائب	(masculine : مذكر)	(singular : مفرد)	(He : هو)	يَفْعَلَ
	(feminine : مؤنث)		(She : هي)	تَفْعَلَ
	(masculine : مذكر)	(Dual : مثنى)	(They : هما)	يَفْعَلَا
	(feminine : مؤنث)		(They :هما)	تَفْعَلَا
	(masculine : مذكر)	(plural : جمع)	(They : هم)	يَفْعَلُوا
	(feminine : مؤنث)		(They : هن)	يَفْعَلْنَ

3.3 Implementation: The Proposed Text Mining Model (stemming and exploration knowledge)

Our proposed model contains two algorithms; the first algorithm is concerned with the parsing and stemming process of extracting word root using the appropriate word selection pattern. The second algorithm uses the output of the first algorithm to determine the entities in the text, such as verb types and nouns, to exploration for knowledge.

3.3.1 Proposed Stemmer algorithm:

The objective of this stage is to prepare the document for the next phase. The first step is the preprocessing step, which includes the following operations:

Tokenization

This is the process of dividing the text into words separated by white spaces.

Table 6: Prefix, Infix and suffix

Prefix	Infix	Suffix
بِ، فَ، نَ، تُ، تَ، بَ، يَ، يُ، لِ، لَ، أَ، أُ، أَ، إِ، نُ	أ،أَ،أُ،إِ،يَ،يُ،ي،يِ،ي،وَ،وُ،و،وِ،آ	نَاهُمْ، هُمَا، هُنَّ، كُنَّ، تُمَا، تَانِ، تِينْ، مُوهُ، انّ، انَّ، وا، هُمْ، هَا، كُمْ، تَا، ونَ، وَنْ، انِ، مَا، نِي، نَا، تُمْ، ينْ، ينَ، تُمْ، يَا، اتِ، اتَ، نِي، نّ، نَّ، كَ، كِ، ا، هُ، تْ، تُ، نَ، تِ، تَ، هْ، مْ، نّ

Remove the suffixes and prefixes

In this model, a list of prefixes and suffixes [10] is defined

in an array in order to remove it, an example of prefix, infix and suffix shown in Table 6.

Find the appropriate word grammatical pattern

To deal with the diacritics text, we relied on building the formed syntactic pattern from the grammatical references [1], [27] with all pronouns as shown in table No. 5 we have several patterns according to the verbs, nouns as mentioned in tables No 2,3 and common patterns for verbs and nouns as mentioned in table No 4.

Extracting word root and make an inflection

This step in the algorithm extracts the word root and parsing it based on the grammatical pattern. All the above steps were summarized in the following algorithm and its data flow diagram as shown in figures 3, 4:

Input: Diacritics text from Sahih Al-Bukhari book
Output: Word root and inflection

1- Input the diacritics hadeeth text.
2- Search in the database for all records.
3- Separate each record into words to put it in an appropriate pattern.
4- Put the word in an array.
5- Determine the noun
6- Determine the stop words.
7- Remove suffixes.
8- Remove prefixes.
9- Determine word length
10- Find the most appropriate diacritics pattern for the word.
11- Make the inflection for the word according to the chosen diacritics pattern in step 10.
12- Extracting the letters corresponding to (Faa', " ف"), (Ayn, " ع"), and (Lam, " ل") in chosen pattern from the word as root if the root is triple, or (Faa', " ف"), (Ayn, " ع"), (Lam, " ل") and (Lam, " ل"), if the root is quadruple or any root types.

Fig. 3 The developed Stemming Algorithm

3.3.2: Proposed Mining Algorithm:

The exploration algorithm in the text relies on the output of the first algorithm, specifically the partial syntax, as it works to determine the types of the verb and identify nouns in the text as entities in preparation for the exploration of knowledge. After performing the first algorithm, the model will apply the second algorithm to extract the entities of verb times, nouns, and stop words. Stop words are function words like prepositions, conjunctions, articles, etc.; we had created a list of Arabic stop words manually. We apply some rules to set the nouns, also a list of nouns created manually, and it is language specific.

The model will classify the word into verbs and nouns, state of a verb, which is past (فعل ماضي), present (فعل مضارع) or Imperatives (فعل أمر) and determine a noun.

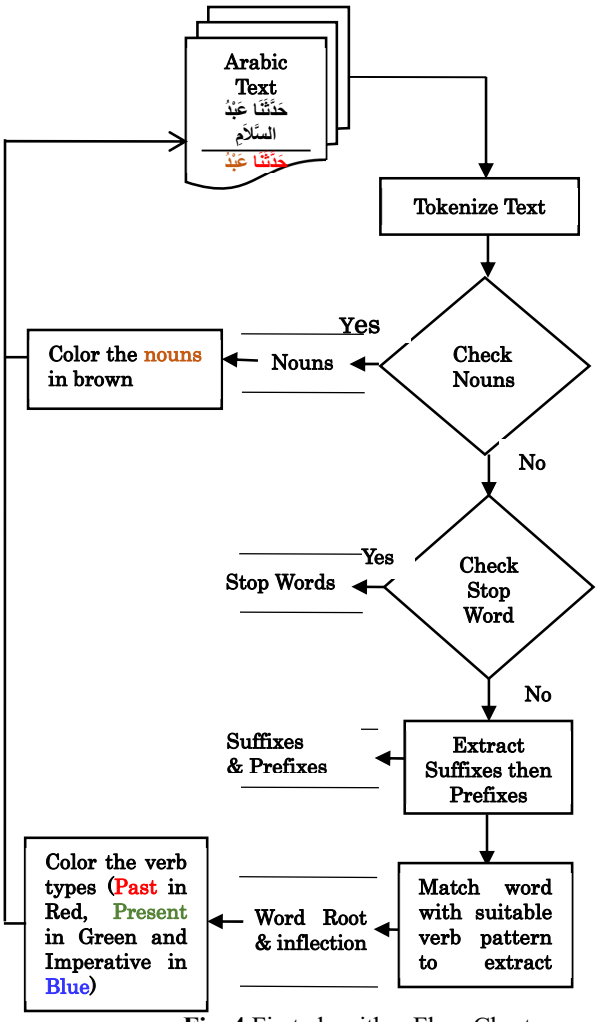


Fig. 4 First algorithm Flow Chart

Mining algorithm
Input: the data set obtained from our stemming algorithm
Output: Pattern as entities

1- Input Inflection Table (Noun, Past Verb, Present Verb, Imperative Verb)
2- Find pattern as entities using Regular Expressions Object
3- If Match is Noun Then

```
        Color in brown
    Else IF Match is Past Verb Then
        Color in Red
    Else IF Match is Present Verb Then
        Color in Green
    Else IF Match is Imperative Verb Then
        Color in Blue
    End IF
```

Fig. 5 Developed Text-mining Algorithm

3.4 Evaluation and Model Accuracy:

To evaluate your job, you should know two essential terms in any measurements, Accuracy, and Precision. They have a different meaning, as we will discuss in the subsequence lines. For our algorithm, accuracy had been calculated in terms of positives and negatives as follows:

Accuracy= (TP+TN) / (TP+TN+FP+FN)

Where, *TP* = True Positives, *TN* = True Negatives, *FP* = False Positives, and *FN* = False Negatives table 7 represent the confusion matrix.

Calculating accuracy for the model that classified 5098 words as roots (the positive class) or names (the negative class):

Table 7: Confusion matrix

True Positive (TP)	False Positive (FP)
Reality: the root of the verb ML model predicted: root. Number of TP results: 1286	Reality: the root of the verb ML model predicted: the wrong root. Number of FP results:63
False Negative (FN)	**True Negative (TN)**
Reality: the name. ML model predicted: the wrong name. Number of FN results: 16	Reality: the root of the name. ML model predicted: root of name Number of TN results: 423

Accuracy= (TP+TN)/ (TP+TN+FP+FN) = (1286+423)/ (1286+423+63+16) =95.57%

Accuracy comes out to 0.958, or 95.8%. That means our algorithm is doing a great job of extracting the root.

Recall (R) Sarhan, I. (2016) [24]: Is the ratio of the number of relevant instances retrieved to the total number of existing relevant instances, defined as:

$$R = \frac{\text{TP}}{TP + FN}$$

$$R = \frac{1286}{1286 + 16}$$

=0.9877
=98.8%

Precision (P) Sarhan, I. (2016) [24]: Is the ratio of the number of relevant instances retrieved to the total number of irrelevant and relevant records retrieved, defined as:

$$P = \frac{\text{TP}}{TP + FP}$$

$$P = \frac{1286}{1286 + 423}$$

= 0.7525
= 75.2%

F-Measure (F) Sarhan, I. (2016)[24]: Is the combination of the precision and recall for penalizing the very large in equalities between
These two measures, defined as 0.742976

$$F = 2 \times \frac{\text{P} \times \text{R}}{\text{P} + \text{R}}$$

$$\textbf{F-Measure} = 2 \times \frac{0.752 * 0.988}{0.752+0.988} \quad \textbf{=0.85}$$

Accuracy (A): Is the fraction of true results against the total number of cases evaluated, defined as:

$$\text{A} = \frac{\text{TP} + \text{TN}}{\text{TP} + \text{TN} + \text{FP} + \text{FN}}$$

Where TP: the number of true positives, FN: the number of false negatives, TN: the number of true negatives, FP: the number
of false positives

$$\text{A} = \frac{1286+423}{1286+423+63+16} \quad =95.57\%$$

Accuracy comes out to 95.8%. That means our Stemmer is doing a great job of extracting roots from Arabic words.

4. Result Discussion

We trained the root extraction algorithm and parsing by applying it to 5147 words found in 79 documents from the Sahih al-Bukhari book, we got a promising accuracy rate for root extraction, which is 95.58%, and we got a good

percentage of parsing, which is 95.51%.

We also tested the root extraction algorithm and parsing by applying it to more than 1,280 words found in 18 documents from Sahih Muslim and Muwatta Malik book [2], and we got an accuracy rate of 95.1 for extracting the root and an accuracy rate of 95.5% in the parsing of the book of Muwatta Malik. 95.4% for extracting the root and 92% accuracy parsing for Sahih Muslim book.

Table 8: Root accuracy in Our Stemmer algorithm

Book name	Sahih Al-Bukhari
Total number of words	5,147
Total number of true root verbs(TP)	1,286
Total number of true root Nouns (TN)	420
Total number of wrong root verbs (FP)	63
Total number of wrong root Nouns (FN)	16
Total number of proper Nouns	1,742
Total number of stop words	1,576
Total number of not processed words	44
Accuracy	95.57%

Table 8: Display the accuracy percentage of inflection in the training phase and it applied to Sahih Al-Bukhari Book for 5147 words.

Table 9: Inflection accuracy in Our Stemmer algorithm

Book name	Sahih Al-Bukhari
Total number of words	5147
Total number of true Inflection verbs(TP)	1285
Total number of true Inflection Nouns (TN)	420
Total number of wrong Inflection verbs (FP)	64
Total number of wrong Inflection Nouns (FN)	16
Total number of proper Nouns	1742
Total number of stop words	1576
Total number of not done words	44
Accuracy	95.51%

Table 9: Display the accuracy percentage of inflection in the training phase, and it applied to Sahih Al-Bukhari Book for 5147 words.

Table 10: Root accuracy

Book name	Sahih Muslim	Moutaa Malik
Total number of words	653	627
Total number of true root verbs(TP)	148	165
Total number of true root Nouns (FP)	57	49
Total number of wrong root verbs (TN)	6	9
Total number of wrong root Nouns (FP)	4	2
Total number of proper Nouns	240	179
Total number of stop words	192	217
Total number of not done words	6	6
Accuracy	95.40%	95.10%

Table 10: shows the accuracy percentage of extracting the root in the testing phase, and it was applied to Sahih Muslim Book and Moutaa Malik Book for more than 600 words.

Table 11: Inflection accuracy

Book name	Sahih Muslim	Moutaa Malik
Total number of words	652	627
Total number of true root verbs (TP)	140	164
Total number of true root Nouns (FP)	58	51
Total number of wrong root verbs (TN)	14	10
Total number of wrong root Nouns (FP)	3	0
Total number of proper Nouns	240	179
Total number of stop words	192	217
Total number of not done words	6	6
Accuracy	92%	95.50%

Table 11: shows the accuracy percentage of inflection in the testing phase, and it was applied to Sahih Muslim book and Moutaa Malik book for more than 600 words.

Table 12: Root and inflection accuracy in the training and testing phase

Phase	Book name	Accuracy	
		Root	Inflection
Training	Sahih Al-Bukhari	95.8%	96.4%
Testing	Sahih Muslim	95.4%	92%
	Moutaa Malik	95.1%	95.5%

Table 10: Shows the accuracy percentage of root extraction

and inflection in both the training and testing phase, and it was applied to Sahih Al-Bukhari in the training phase and Sahih Muslim and Moutaa Malik books in the testing phase.

4.1 Experimental analysis

The algorithm of Alshalabi (2005)[5]; occurs an accuracy of about 92%, as shown in section 2; it normalizes the corpus by remove stop words, prefixes, and suffices, then reducing the inflected word. Yaseen and Hmeidi use Arabic patterns file and set of rules and use Holy Quran dataset and occurs 83.9%, Al-Kabi et al. Improve Khoja Rule-base stemmer in Arabic newspaper and website and occurs 75%, our stemmer extracting root based on pattern and removing affix and applying some rules. Table 11 shows the accuracy between our stemmer Algorithm and three other stemmer Algorithms.

Table 13: Our Stemmer VS. Other stemmer Algorithms

No.	Algorithm	Accuracy	Year
1	Our stemmer algorithm	95.6%	2020
2	Alshalabi	92%	2005
3	Yaseen and Hmeidi	83.9%	2014
4	Al-Kabi et al.	75%	2015

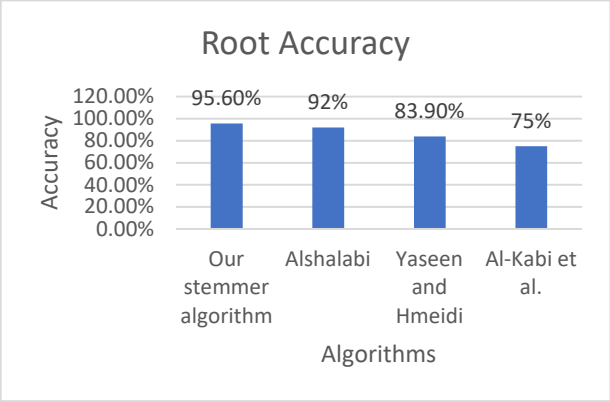


Fig. 6 Root Accuracy Comparison

4.2 Model implementation

As we mentioned in paragraph 11, the model designed for exploration in Arabic texts to discover knowledge consists of the algorithm for extracting the root and parsing, its outputs are considered inputs to the algorithm for determining the entities within the original text.

4.2.1 The first algorithm implementation

The root extraction and parsing algorithm receive the Arabic text of the Hadith of the Prophet as shown in figures 7, 8, 9 respectively had been processed all the words of the Hadith, starting by identifying nouns and stop words, then removing the suffixes and prefixes, and then putting them in the appropriate pattern to extract the word root and then performing the parsing process to determine the verb time as shown below in tables 14,15,16.

Afflictions and the End of the World:كتاب الفتن	
Narrated Abu Maryam `Abdullah bin Ziyad Al-Aasadi: When Talha, AzZubair and `Aisha moved to Basra, `Ali sent `Ammar bin Yasir and Hasan bin `Ali who came to us at Kufa and ascended the pulpit. Al-Hasan bin `Ali was at the top of the pulpit and `Ammar was below Al-Hasan. We all gathered before him. I heard `Ammar saying, "`Aisha has moved to Al-Busra. By Allah! She is the wife of your Prophet in this world and in the Hereafter. But Allah has put you to test whether you obey Him (Allah) or her (`Aisha).	حَدَّثَنَا عَبْدُ اللَّهِ بْنُ مُحَمَّدٍ، حَدَّثَنَا يَحْيَى بْنُ آدَمَ، حَدَّثَنَا أَبُو بَكْرِ بْنُ عَيَّاشٍ، حَدَّثَنَا أَبُو حَصِينٍ، حَدَّثَنَا أَبُو مَرْيَمَ عَبْدُ اللَّهِ بْنُ زِيَادٍ الأَسَدِيُّ، قَالَ لَمَّا سَارَ طَلْحَةُ وَالزُّبَيْرُ وَعَائِشَةُ إِلَى الْبَصْرَةِ بَعَثَ عَلِيٌّ عَمَّارَ بْنَ يَاسِرٍ وَحَسَنَ بْنَ عَلِيٍّ، فَقَدِمَا عَلَيْنَا الْكُوفَةَ فَصَعِدَا الْمِنْبَرَ، فَكَانَ الْحَسَنُ بْنُ عَلِيٍّ فَوْقَ الْمِنْبَرِ فِي أَعْلاَهُ، وَقَامَ عَمَّارٌ أَسْفَلَ مِنَ الْحَسَنِ، فَاجْتَمَعْنَا إِلَيْهِ فَسَمِعْتُ عَمَّارًا يَقُولُ إِنَّ عَائِشَةَ قَدْ سَارَتْ إِلَى الْبَصْرَةِ، وَوَاللَّهِ إِنَّهَا لَزَوْجَةُ نَبِيِّكُمْ صلى الله عليه وسلم فِي الدُّنْيَا وَالآخِرَةِ، وَلَكِنَّ اللَّهَ تَبَارَكَ وَتَعَالَى ابْتَلاَكُمْ، لِيَعْلَمَ إِيَّاهُ تُطِيعُونَ أَمْ هِيَ.
Reference: Sahih al-Bukhari 7100	

Fig. 7 Hadeeth No. 7100

Asking Permission:كتاب الاستئذان باب إِغْلاَقِ الأَبْوَابِ بِاللَّيْلِ: Chapter: To close the doors at night	
Narrated Jabir: Allah s Apostle said, "When you intend going to bed at night, put out the lights, close the doors, tie the mouths of the water skins, and cover your food and drinks." Hamrnam said, "I think he (the other narrator) added, 'even with piece of wood across the utensil.'	حَدَّثَنَا حَسَّانُ بْنُ أَبِي عَبَّادٍ، حَدَّثَنَا هَمَّامٌ، عَنْ عَطَاءٍ، عَنْ جَابِرٍ، قَالَ قَالَ رَسُولُ اللَّهِ صلى الله عليه وسلم " أَطْفِئُوا الْمَصَابِيحَ بِاللَّيْلِ إِذَا رَقَدْتُمْ، وَغَلِّقُوا الأَبْوَابَ، وَأَوْكُوا الأَسْقِيَةَ، وَخَمِّرُوا الطَّعَامَ وَالشَّرَابَ ". ـ قَالَ هَمَّامٌ وَأَحْسِبُهُ قَالَ ـ "وَلَوْ بِعُودٍ يَعْرُضُهُ"
Reference: Sahih al-Bukhari 6296	

Fig. 8 Hadeeth No. 6296

Table 14: Processed Hadeeth words No. 7100

DocNo	HadeethNo	WordNo	Origin Word	Processed Word	Pattern	Inflection	WordTypeAr	Root	Verb Time	Prefix	Suffix
1	7100	1	حَدَّثَنَا	حَدَّثَ	فَعَّلَ	Verb	فعل	حدث	فعل ماضي (past verb)		نَا
1	7100	2	عَبْدُ	عَبْدُ		Stop Word	كلمة توقيف				
1	7100	3	اللَّهِ	اللَّهِ		Noun	إسم				
1	7100	4	بْنُ	بْنُ		Stop Word	كلمة توقيف				
1	7100	5	مُحَمَّدٍ	مُحَمَّدٍ		Noun	إسم				
1	7100	6	يَحْيَى	يَحْيَى		Noun	إسم				
1	7100	7	آدَمَ	آدَمَ		Noun	إسم				
.	.	.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.
1	7100	67	تَبَارَكَ	تَبَارَ	فَعَالَ	Verb	فعل	تبر	فعل ماضي (past verb)		كَ
1	7100	68	تَعَالَى	تَعَالَى		Noun	إسم				
1	7100	69	ابْتَلَاكُمْ	ابْتَلَا	افْتَعَل	Verb	فعل	بلا	فعل ماضي (past verb)		كُمْ
1	7100	70	لِيَعْلَمَ	يَعْلَمَ	يَفْعَلَ	Verb	فعل	علم		لِ	
1	7100	71	إِيَّاهُ	إِيَّاهُ		Stop Word	كلمة توقيف				
1	7100	72	تُطِيعُونَ	تُطِيعُ	تُفِعلُ	Verb	فعل	طيع			ونَ
1	7100	73	أَمْ	أَمْ		Stop Word	كلمة توقيف				
1	7100	74	هِيَ	هِيَ		Stop Word	كلمة توقيف				

Table 15: Processed Hadeeth words No. 6296

Doc No	Hadeeth No	WordNo	Orgin Word	Processed Word	Pattern	WordType Eng	WordType Ar	Root	VerbTime	Preffix	Suffix
8	6296	1	حَدَّثَنَا	حَدَّثَ	فَعَّلَ	Verb	فعل	حدث	فعل ماضي (past verb)		نَا
8	6296	2	حَسَّانُ	حَسَّانُ		Noun	إسم				
8	6296	3	بْنُ	بْنُ		Stop Word	كلمة توقيف				
8	6296	4	أَبِي	أَبِي		Stop Word	كلمة توقيف				
8	6296	5	عَبَّادٍ	عَبَّادٍ		Noun	إسم				
8	6296	6	هَمَّامٌ	هَمَّامٌ		Noun	إسم				
8	6296	7	عَطَاءٌ	عَطَاءٌ		Noun	إسم				
8	6296	8	عَنْ	عَنْ		Stop Word	كلمة توقيف				

8	6296	9	جَابِرٍ	جَابِرٍ		Noun	إسم				
.	.	.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.
8	6296	22	رَقَدْتُمْ	رَقَدْ	فَعَلْ	Verb	فعل	رقد	فعل ماضي (past verb)		ثُمْ
8	6296	23	غَلِّقُوا	غَلِّقْ	فَعِّلْ	Verb	فعل	غلق	فعل أمر (imperative verb)		وا
8	6296	24	الْأَبْوَابَ	الْأَبْوَابَ		Noun	إسم				
8	6296	25	أَوْكُوا	أَوْكِ	فَعْلْ	Verb	فعل	أوك	فعل أمر (imperative verb)		وا
8	6296	26	الْأَسْقِيَةَ	الْأَسْقِيَةَ		Noun	إسم				
8	6296	27	خَمِّرُوا	خَمِّرْ	فَعِّلْ	Verb	فعل	خمر	فعل أمر (imperative verb)		وا
8	6296	28	الطَّعَامَ	الطَّعَامَ		Noun	إسم				
8	6296	29	الشَّرَابَ	الشَّرَابَ		Noun	إسم				
8	6296	30	أَحْسِبُهُ	أَحْسِبْ	أَفْعِلْ	Verb	فعل	حسب			هُ
8	6296	31	لَوْ	لَوْ		Stop Word	كلمة توقيف				
8	6296	32	بِعُودٍ	بِعُودٍ		Noun	إسم				
8	6296	33	يَعْرُضُهُ	يَعْرُضْ	يَفْعُلْ	Verb	فعل	عرض			هُ

Table 16: Processed Hadeeth words No. 6326

Doc No	Hadeeth No	WordNo	Orgin Word	Processed Word	Pattern	WordType Eng	WordType Ar	Root	VerbTime	Preffix	Suffix
78	6326	1	حَدَّثَنَا	حَدَّثَ	فَعَّلَ	Verb	فعل	حدث	فعل ماضي (past verb)		نَا
78	6326	2	عَبْدُ	عَبْدُ		Stop Word	كلمة توقيف				
78	6326	3	اللَّهِ	اللَّهِ		Noun	إسم				
78	6326	4	بْنُ	بْنُ		Stop Word	كلمة توقيف				
78	6326	5	يُوسُفَ	يُوسُفَ		Noun	إسم				
78	6326	6	أَخْبَرَنَا	أَخْبَرَ	أَفْعَلَ	Verb	فعل	خبر	فعل ماضي (past verb)		نَا
.	.	.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.
78	6326	51	ارْحَمْنِي	ارْحَمْ	افْعَلْ	Verb	فعل	رحم	فعل أمر (imperative verb)		نِي
78	6326	52	إِنَّكَ	إِنَّكَ		Stop Word	كلمة توقيف				
78	6326	53	الْغَفُورُ	الْغَفُورُ		Noun	إسم				
78	6326	54	الرَّحِيمُ	الرَّحِيمُ		Noun	إسم				
78	6326	55	عَمْرُو	عَمْرُو		Noun	إسم				
78	6326	56	الْحَارِثِ	الْحَارِثِ		Noun	إسم				
78	6326	57	يَزِيدَ	يَزِيدَ		Noun	إسم				
78	6326	58	إِنَّهُ	إِنَّهُ		Stop Word	كلمة توقيف				
78	6326	59	سَمِعَ	سَمِعَ	فَعِلَ	Verb	فعل	سمع	فعل ماضي (past verb)		
78	6326	60	عَبْدَ	عَبْدَ		Stop Word	كلمة توقيف				
78	6326	61	بْنَ	بْنَ		Stop Word	كلمة توقيف				

78	6326	62	أَبُو	أَبُو		Stop Word	كلمة توقيف				
78	6326	63	سَلَّمَ	سَلَّمَ	فَعَّلَ	Verb	فعل	سلم	فعل ماضي (past verb)		

Fig. 9 Hadeeth No. 6326

Invocations:كتاب الدعوات Chapter: Invocation during the Sala:tباب الدُّعَاءِ فِي الصَّلاَةِ	
Narrated `Abdullah bin `Amr: Abu Bakr As-Siddiq said to the Prophet, "Teach me an invocation with which I may invoke (Allah) in my prayer." The Prophet (ﷺ) said, "Say: Allahumma inni zalamtu nafsi zulman kathiran wala yaghfirudhdhunuba illa anta, Faghfirli maghfiratan min indika war-hamni, innaka antalGhafur-Rahim."	حَدَّثَنَا عَبْدُ اللَّهِ بْنُ يُوسُفَ، أَخْبَرَنَا اللَّيْثُ، قَالَ حَدَّثَنِي يَزِيدُ، عَنْ أَبِي الْخَيْرِ، عَنْ عَبْدِ اللَّهِ بْنِ عَمْرٍو، عَنْ أَبِي بَكْرٍ الصِّدِّيقِ ـ رضى الله عنه ـ أَنَّهُ قَالَ لِلنَّبِيِّ صلى الله عليه وسلم عَلِّمْنِي دُعَاءً أَدْعُو بِهِ فِي صَلاَتِي. قَالَ " قُلِ اللَّهُمَّ إِنِّي ظَلَمْتُ نَفْسِي ظُلْمًا كَثِيرًا، وَلاَ يَغْفِرُ الذُّنُوبَ إِلاَّ أَنْتَ، فَاغْفِرْ لِي مَغْفِرَةً مِنْ عِنْدِكَ، وَارْحَمْنِي، إِنَّكَ أَنْتَ الْغَفُورُ الرَّحِيمُ ". وَقَالَ عَمْرٌو عَنْ يَزِيدَ، عَنْ أَبِي الْخَيْرِ، إِنَّهُ سَمِعَ عَبْدَ اللَّهِ بْنَ عَمْرٍو، قَالَ أَبُو بَكْرٍ ـ رضى الله عنه ـ لِلنَّبِيِّ صلى الله عليه وسلم.
Reference: Sahih al-Bukhari 6326	

4.2.2 The second algorithm implementation

The entity determine algorithm receives the output of the extract root, and parsing algorithm as inputs to specify them as entities in the original Hadith text of nouns and verb tenses.

4.2.3 Knowledge Exploration

Extracting knowledge from Arabic text is considered one of the main topic modeling in the field of Natural Language Processing (NLP). It is a very important task for IR and plays a significant role for researchers who concern about the Arabic language.

Our model can extract Arabic semantic relation that lies between entities (past, present and imperative verbs).

As a result, In figure 10, 11 present that our model capable of detecting nouns and highlighting it with brown color , in figure 12 ,13 The model detect past, present, and imperative verbs and colors them in red, green, and blue, respectively.

If somebody asks: What are the things that the Prophet Muhammad, may God bless him and grant him peace, commanded us? Our model is capable of answering it as shown in figure 14,15.

HadeethNo	BookName	HadeethText
1052	كتاب الكسوف	حَدَّثَنَا عَبْدُ اللَّهِ بْنُ مَسْلَمَةَ عَنْ مَالِكٍ عَنْ زَيْدِ بْنِ أَسْلَمَ عَنْ عَطَاءِ بْنِ يَسَارٍ عَنْ عَبْدِ اللَّهِ بْنِ عَبَّاسٍ قَالَ انْخَسَفَتْ الشَّمْسُ عَلَى عَهْدِ رَسُولِ اللَّهِ صَلَّى اللَّهُ عَلَيْهِ وَسَلَّمَ فَصَلَّى رَسُولُ اللَّهِ صَلَّى اللَّهُ عَلَيْهِ وَسَلَّمَ فَقَامَ قِيَامًا طَوِيلًا نَحْوًا مِنْ قِرَاءَةِ سُورَةِ الْبَقَرَةِ ثُمَّ رَكَعَ رُكُوعًا طَوِيلًا ثُمَّ رَفَعَ فَقَامَ قِيَامًا طَوِيلًا وَهُوَ دُونَ الْقِيَامِ الْأَوَّلِ ثُمَّ رَكَعَ رُكُوعًا طَوِيلًا وَهُوَ دُونَ الرُّكُوعِ الْأَوَّلِ ثُمَّ سَجَدَ ثُمَّ قَامَ قِيَامًا طَوِيلًا وَهُوَ دُونَ الْقِيَامِ الْأَوَّلِ ثُمَّ رَكَعَ رُكُوعًا طَوِيلًا وَهُوَ دُونَ الرُّكُوعِ الْأَوَّلِ ثُمَّ رَفَعَ فَقَامَ قِيَامًا طَوِيلًا وَهُوَ دُونَ الْقِيَامِ الْأَوَّلِ ثُمَّ رَكَعَ رُكُوعًا طَوِيلًا وَهُوَ دُونَ الرُّكُوعِ الْأَوَّلِ ثُمَّ انْصَرَفَ وَقَدْ تَجَلَّتْ الشَّمْسُ فَقَالَ صَلَّى اللَّهُ عَلَيْهِ وَسَلَّمَ إِنَّ الشَّمْسَ وَالْقَمَرَ آيَتَانِ مِنْ آيَاتِ اللَّهِ لَا يَخْسِفَانِ لِمَوْتِ أَحَدٍ وَلَا لِحَيَاتِهِ فَإِذَا رَأَيْتُمْ ذَلِكَ فَادْعُوا اللَّهَ وَكَبِّرُوا وَصَلُّوا وَتَصَدَّقُوا ثُمَّ قَالَ يَا أُمَّةَ مُحَمَّدٍ وَاللَّهِ مَا مِنْ أَحَدٍ أَغْيَرُ مِنْ اللَّهِ أَنْ يَزْنِيَ عَبْدُهُ أَوْ تَزْنِيَ أَمَتُهُ يَا أُمَّةَ مُحَمَّدٍ وَاللَّهِ لَوْ تَعْلَمُونَ مَا أَعْلَمُ لَضَحِكْتُمْ قَلِيلًا وَلَبَكَيْتُمْ كَثِيرًا أَلَا هَلْ بَلَّغْتُ مَرَّتَيْنِ
1069	كتاب سجود القرآن	حَدَّثَنَا سُلَيْمَانُ بْنُ حَرْبٍ وَأَبُو النُّعْمَانِ قَالَا حَدَّثَنَا حَمَّادُ عَنْ أَيُّوبَ عَنْ عِكْرِمَةَ عَنْ ابْنِ عَبَّاسٍ رَضِيَ اللَّهُ عَنْهُمَا قَالَ مِنْ لَيْسَ مِنْ عَزَائِمِ السُّجُودِ وَقَدْ رَأَيْتُ النَّبِيَّ صَلَّى اللَّهُ عَلَيْهِ وَسَلَّمَ يَسْجُدُ فِيهَا بَابُ سَجْدَةِ النَّجْمِ قَالَهُ ابْنُ عَبَّاسٍ رَضِيَ اللَّهُ عَنْهُمَا
1076	كتاب سجود القرآن	حَدَّثَنَا بِشْرُ بْنُ آدَمَ قَالَ حَدَّثَنَا عَلِيُّ بْنُ مُسْهِرٍ قَالَ أَخْبَرَنَا عُبَيْدُ اللَّهِ عَنْ نَافِعٍ عَنْ ابْنِ عُمَرَ قَالَ كَانَ النَّبِيُّ صَلَّى اللَّهُ عَلَيْهِ وَسَلَّمَ يَقْرَأُ السَّجْدَةَ وَنَحْنُ عِنْدَهُ فَيَسْجُدُ وَنَسْجُدُ مَعَهُ فَيَزْدَحِمُ حَتَّى مَا يَجِدُ أَحَدُنَا لِجَبْهَتِهِ مَوْضِعًا يَسْجُدُ عَلَيْهِ بَابُ مَنْ رَأَى أَنَّ اللَّهَ عَزَّ وَجَلَّ لَمْ يُوجِبْ السُّجُودَ وَقِيلَ لِعِمْرَانَ بْنِ حُصَيْنٍ الرَّجُلُ يَسْمَعُ السَّجْدَةَ وَلَمْ يَجْلِسْ لَهَا قَالَ أَرَأَيْتَ لَوْ قَعَدَ لَهَا كَأَنَّهُ لَا يُوجِبُهُ عَلَيْهِ وَقَالَ سُلَيْمَانُ مَا لِهَذَا غَدَوْنَا وَقَالَ عُثْمَانُ رَضِيَ اللَّهُ عَنْهُ إِنَّمَا السَّجْدَةُ عَلَى مَنْ اسْتَمَعَهَا وَقَالَ الزُّهْرِيُّ لَا يَسْجُدُ إِلَّا أَنْ يَكُونَ طَاهِرًا فَإِذَا سَجَدْتَ وَأَنْتَ فِي حَضَرٍ فَاسْتَقْبَلَ الْقِبْلَةَ فَإِنْ كُنْتَ رَاكِبًا فَلَا عَلَيْكَ حَيْثُ كَانَ وَجْهُكَ وَكَانَ السَّائِبُ بْنُ يَزِيدَ لَا يَسْجُدُ لِسُجُودِ الْقَاصِّ
1700	كتاب الحج	حَدَّثَنَا عَبْدُ اللَّهِ بْنُ يُوسُفَ أَخْبَرَنَا مَالِكٌ عَنْ عَبْدِ اللَّهِ بْنِ أَبِي بَكْرِ بْنِ عَمْرِو بْنِ حَزْمٍ عَنْ عَمْرَةَ بِنْتِ عَبْدِ الرَّحْمَنِ أَنَّهَا أَخْبَرَتْهُ أَنَّ زَيْدَ بْنَ أَبِي سُفْيَانَ كَتَبَ إِلَى عَائِشَةَ رَضِيَ اللَّهُ عَنْهَا إِنَّ عَبْدَ اللَّهِ بْنَ عَبَّاسٍ رَضِيَ اللَّهُ عَنْهُمَا قَالَ مَنْ أَهْدَى هَدْيًا حَرُمَ عَلَيْهِ مَا يَحْرُمُ عَلَى الْحَاجِّ حَتَّى يُنْحَرَ هَدْيُهُ قَالَتْ عَمْرَةُ قَالَتْ عَائِشَةُ رَضِيَ اللَّهُ عَنْهَا لَيْسَ كَمَا قَالَ ابْنُ عَبَّاسٍ أَنَا فَتَلْتُ قَلَائِدَ هَدْيِ رَسُولِ اللَّهِ صَلَّى اللَّهُ عَلَيْهِ وَسَلَّمَ بِيَدَيَّ ثُمَّ قَلَّدَهَا رَسُولُ اللَّهِ صَلَّى اللَّهُ عَلَيْهِ وَسَلَّمَ بِيَدَيْهِ ثُمَّ بَعَثَ بِهَا مَعَ أَبِي فَلَمْ يَحْرُمْ عَلَى رَسُولِ اللَّهِ صَلَّى اللَّهُ عَلَيْهِ وَسَلَّمَ شَيْءٌ أَحَلَّهُ اللَّهُ حَتَّى نُحِرَ الْهَدْيُ

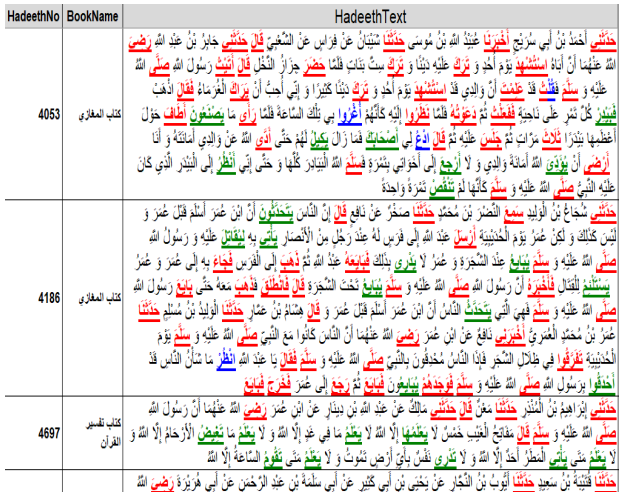
Fig. 10 Detecting the nouns

HadeethNo	BookName	HadeethText
1711	كتاب الحج	حَدَّثَنَا إِبْرَاهِيمُ بْنُ الْمُنْذِرِ حَدَّثَنَا أَنَسُ بْنُ عِيَاضٍ حَدَّثَنَا مُوسَى بْنُ عُقْبَةَ عَنْ نَافِعٍ أَنَّ ابْنَ عُمَرَ رَضِيَ اللَّهُ عَنْهُمَا كَانَ يَنْعَتُ بِهَذِهِ مِنْ جَمْعٍ مِنْ آخِرِ اللَّيْلِ حَتَّى يَدْخُلَ بِهِ مَنْحَرَ النَّبِيِّ صَلَّى اللَّهُ عَلَيْهِ وَسَلَّمَ مَعَ حَجَّاجٍ فِيهِمْ الْحُرُّ وَالْمَمْلُوكُ
1716	كتاب الحج	حَدَّثَنَا مُحَمَّدُ بْنُ شُعَيْبٍ أَخْبَرَنَا سُفْيَانُ قَالَ أَخْبَرَنِي ابْنُ أَبِي نَجِيحٍ عَنْ مُجَاهِدٍ عَنْ عَبْدِ الرَّحْمَنِ بْنِ أَبِي لَيْلَى عَنْ عَلِيٍّ رَضِيَ اللَّهُ عَنْهُ قَالَ بَعَثَنِي النَّبِيُّ صَلَّى اللَّهُ عَلَيْهِ وَسَلَّمَ فَقُمْتُ عَلَى الْبُدْنِ فَأَمَرَنِي فَقَسَمْتُ لُحُومَهَا ثُمَّ أَمَرَنِي فَقَسَمْتُ جِلَالَهَا وَجُلُودَهَا
1720	كتاب الحج	حَدَّثَنَا خَالِدُ بْنُ مَخْلَدٍ حَدَّثَنَا سُلَيْمَانُ بْنُ بِلَالٍ قَالَ حَدَّثَنِي يَحْيَى قَالَ حَدَّثَتْنِي عَمْرَةُ قَالَتْ سَمِعْتُ عَائِشَةَ رَضِيَ اللَّهُ عَنْهَا تَقُولُ خَرَجْنَا مَعَ رَسُولِ اللَّهِ صَلَّى اللَّهُ عَلَيْهِ وَسَلَّمَ لِخَمْسٍ بَقِينَ مِنْ ذِي الْقَعْدَةِ وَلَا نُرَى إِلَّا الْحَجَّ حَتَّى إِذَا دَنَوْنَا مِنْ مَكَّةَ أَمَرَ رَسُولُ اللَّهِ صَلَّى اللَّهُ عَلَيْهِ وَسَلَّمَ مَنْ لَمْ يَكُنْ مَعَهُ هَدْيٌ إِذَا طَافَ بِالْبَيْتِ ثُمَّ يَحِلُّ قَالَتْ عَائِشَةُ رَضِيَ اللَّهُ عَنْهَا فَدَخَلَ عَلَيْنَا يَوْمَ النَّحْرِ بِلَحْمِ بَقَرٍ قُلْتُ مَا هَذَا فَقِيلَ ذَبَحَ النَّبِيُّ صَلَّى اللَّهُ عَلَيْهِ وَسَلَّمَ عَنْ أَزْوَاجِهِ قَالَ يَحْيَى فَذَكَرْتُ هَذَا الْحَدِيثَ لِلْقَاسِمِ فَقَالَ أَتَتْكَ بِالْحَدِيثِ عَلَى وَجْهِهِ
1724	كتاب الحج	حَدَّثَنَا عَيَّاشٌ قَالَ أَخْبَرَنِي أَبِي عَنْ شُعْبَةَ عَنْ قَيْسِ بْنِ مُسْلِمٍ عَنْ طَارِقِ بْنِ شِهَابٍ عَنْ أَبِي مُوسَى رَضِيَ اللَّهُ عَنْهُ قَالَ قَدِمْتُ عَلَى رَسُولِ اللَّهِ صَلَّى اللَّهُ عَلَيْهِ وَسَلَّمَ وَهُوَ بِالْبَطْحَاءِ فَقَالَ أَحَجَجْتَ قُلْتُ نَعَمْ قَالَ بِمَا أَهْلَلْتَ قُلْتُ لَبَّيْكَ بِإِهْلَالٍ كَإِهْلَالِ النَّبِيِّ صَلَّى اللَّهُ عَلَيْهِ وَسَلَّمَ قَالَ أَحْسَنْتَ الطَّوْفَ فَطُفْ بِالْبَيْتِ وَبِالصَّفَا وَالْمَرْوَةِ ثُمَّ ائْتِ امْرَأَةً مِنْ نِسَائِهِ بَنِي قَيْسٍ فَقُلْتُ رَأْسِي ثُمَّ أَهْلَلْتُ بِالْحَجِّ فَكُنْتُ أُفْتِي بِهِ النَّاسَ حَتَّى خِلَافَةِ عُمَرَ رَضِيَ اللَّهُ عَنْهُ فَذَكَرْتُهُ لَهُ فَقَالَ إِنْ نَأْخُذْ بِكِتَابِ اللَّهِ فَإِنَّهُ يَأْمُرُنَا بِالتَّمَامِ وَإِنْ نَأْخُذْ بِسُنَّةِ رَسُولِ اللَّهِ صَلَّى اللَّهُ عَلَيْهِ وَسَلَّمَ فَإِنَّ رَسُولَ اللَّهِ صَلَّى اللَّهُ عَلَيْهِ وَسَلَّمَ لَمْ يَحِلَّ حَتَّى بَلَغَ الْهَدْيُ مَحِلَّهُ
1730	كتاب الحج	حَدَّثَنَا أَبُو عَاصِمٍ عَنْ ابْنِ جُرَيْجٍ عَنْ الْحَسَنِ بْنِ مُسْلِمٍ عَنْ طَاوُسٍ عَنْ ابْنِ عَبَّاسٍ عَنْ مُعَاوِيَةَ رَضِيَ اللَّهُ عَنْهُمْ قَالَ قَصَّرْتُ عَنْ رَسُولِ اللَّهِ صَلَّى اللَّهُ عَلَيْهِ وَسَلَّمَ بِمِشْقَصٍ
1735	كتاب الحج	حَدَّثَنَا عَلِيُّ بْنُ عَبْدِ اللَّهِ حَدَّثَنَا يَزِيدُ بْنُ زُرَيْعٍ حَدَّثَنَا خَالِدٌ عَنْ عِكْرِمَةَ عَنْ ابْنِ عَبَّاسٍ رَضِيَ اللَّهُ عَنْهُمَا قَالَ كَانَ النَّبِيُّ صَلَّى اللَّهُ عَلَيْهِ وَسَلَّمَ يُسْأَلُ يَوْمَ النَّحْرِ بِمِنًى فَيَقُولُ لَا حَرَجَ فَسَأَلَهُ رَجُلٌ فَقَالَ حَلَقْتُ قَبْلَ أَنْ أَذْبَحَ قَالَ اذْبَحْ وَلَا حَرَجَ وَقَالَ رَمَيْتُ بَعْدَ مَا أَمْسَيْتُ فَقَالَ لَا حَرَجَ
1739	كتاب الحج	حَدَّثَنَا عَلِيُّ بْنُ عَبْدِ اللَّهِ حَدَّثَنِي يَحْيَى بْنُ سَعِيدٍ حَدَّثَنَا فُضَيْلُ بْنُ غَزْوَانَ حَدَّثَنَا عِكْرِمَةُ عَنْ ابْنِ عَبَّاسٍ رَضِيَ اللَّهُ عَنْهُمَا أَنَّ رَسُولَ اللَّهِ صَلَّى اللَّهُ عَلَيْهِ وَسَلَّمَ خَطَبَ النَّاسَ يَوْمَ النَّحْرِ فَقَالَ يَا أَيُّهَا النَّاسُ أَيُّ يَوْمٍ هَذَا قَالُوا يَوْمٌ حَرَامٌ قَالَ فَأَيُّ بَلَدٍ هَذَا قَالُوا بَلَدٌ حَرَامٌ قَالَ فَأَيُّ شَهْرٍ هَذَا قَالُوا شَهْرٌ حَرَامٌ قَالَ فَإِنَّ دِمَاءَكُمْ وَأَمْوَالَكُمْ وَأَعْرَاضَكُمْ حَرَامٌ كَحُرْمَةِ يَوْمِكُمْ هَذَا فِي بَلَدِكُمْ هَذَا فِي شَهْرِكُمْ هَذَا فَأَعَادَهَا مِرَارًا ثُمَّ رَفَعَ رَأْسَهُ فَقَالَ اللَّهُمَّ هَلْ بَلَّغْتُ اللَّهُمَّ هَلْ بَلَّغْتُ قَالَ ابْنُ عَبَّاسٍ رَضِيَ اللَّهُ عَنْهُمَا فَوَالَّذِي

Fig. 11 Detecting the nouns

HadeethNo	BookName	HadeethText
4738	كتاب تفسير القرآن	حَدَّثَنَا قُتَيْبَةُ بْنُ سَعِيدٍ حَدَّثَنَا أَيُّوبُ بْنُ النَّجَّارِ عَنْ يَحْيَى بْنِ أَبِي كَثِيرٍ عَنْ أَبِي سَلَمَةَ بْنِ عَبْدِ الرَّحْمَنِ عَنْ أَبِي هُرَيْرَةَ رَضِيَ اللَّهُ عَنْهُ عَنِ النَّبِيِّ صَلَّى اللَّهُ عَلَيْهِ وَ سَلَّمَ قَالَ جَاجَّ مُوسَى آدَمَ فَقَالَ لَهُ أَنْتَ الَّذِي أَخْرَجْتَ النَّاسَ مِنَ الْجَنَّةِ بِذَنْبِكَ وَ أَشْقَيْتَهُمْ قَالَ قَالَ آدَمُ يَا مُوسَى أَنْتَ الَّذِي اصْطَفَاكَ اللَّهُ بِرِسَالَتِهِ وَ بِكَلَامِهِ أَتَلُومُنِي عَلَى أَمْرٍ كَتَبَهُ اللَّهُ عَلَيَّ قَبْلَ أَنْ يَخْلُقَنِي أَوْ قَدَّرَهُ عَلَيَّ قَبْلَ أَنْ يَخْلُقَنِي قَالَ رَسُولُ اللَّهِ صَلَّى اللَّهُ عَلَيْهِ وَ سَلَّمَ فَحَجَّ آدَمُ مُوسَى
5312	كتاب الطلاق	حَدَّثَنَا عَلِيُّ بْنُ عَبْدِ اللَّهِ حَدَّثَنَا سُفْيَانُ قَالَ عَمْرٌو سَمِعْتُ سَعِيدَ بْنَ جُبَيْرٍ قَالَ سَأَلْتُ ابْنَ عُمَرَ عَنْ حَدِيثِ الْمُتَلَاعِنَيْنِ فَقَالَ قَالَ النَّبِيُّ صَلَّى اللَّهُ عَلَيْهِ وَ سَلَّمَ لِلْمُتَلَاعِنَيْنِ حِسَابُكُمَا عَلَى اللَّهِ أَحَدُكُمَا كَاذِبٌ لَا سَبِيلَ لَكَ عَلَيْهَا قَالَ مَالِي قَالَ لَا مَالَ لَكَ إِنْ كُنْتَ صَدَقْتَ عَلَيْهَا فَهُوَ بِمَا اسْتَحْلَلْتَ مِنْ فَرْجِهَا وَ إِنْ كُنْتَ كَذَبْتَ عَلَيْهَا فَذَاكَ أَبْعَدُ لَكَ قَالَ سُفْيَانُ حَفِظْتُهُ مِنْ عَمْرٍو وَ قَالَ أَيُّوبُ سَمِعْتُ سَعِيدَ بْنَ جُبَيْرٍ قَالَ قَالَ ابْنُ عُمَرَ رَجُلٌ لِاعِنٌ امْرَأَتَهُ فَقَالَ بِإِصْبَعَيْهِ وَ فَرَّقَ سُفْيَانُ بَيْنَ إِصْبَعَيْهِ السَّبَّابَةِ وَ الْوُسْطَى فَرَّقَ النَّبِيُّ صَلَّى اللَّهُ عَلَيْهِ وَ سَلَّمَ بَيْنَ أَخَوَيْ بَنِي الْعَجْلَانِ وَ قَالَ اللَّهُ يَعْلَمُ إِنَّ أَحَدَكُمَا كَاذِبٌ فَهَلْ مِنْكُمَا تَائِبٌ ثَلَاثاً مِرَاراً قَالَ سُفْيَانُ حَفِظْتُهُ مِنْ عَمْرٍو وَ أَيُّوبَ كَمَا أَخْبَرْتُكَ
6240	كتاب الاستئذان	حَدَّثَنَا إِسْحَاقُ أَخْبَرَنَا يَعْقُوبُ بْنُ إِبْرَاهِيمَ حَدَّثَنَا أَبِي عَنْ صَالِحٍ عَنِ ابْنِ شِهَابٍ قَالَ أَخْبَرَنِي عُرْوَةُ بْنُ الزُّبَيْرِ أَنَّ عَائِشَةَ رَضِيَ اللَّهُ عَنْهَا زَوْجَ النَّبِيِّ صَلَّى اللَّهُ عَلَيْهِ وَ سَلَّمَ قَالَتْ كَانَ عُمَرُ بْنُ الْخَطَّابِ يَقُولُ لِرَسُولِ اللَّهِ صَلَّى اللَّهُ عَلَيْهِ وَ سَلَّمَ احْجُبْ نِسَاءَكَ قَالَتْ فَلَمْ يَفْعَلْ وَ كَانَ أَزْوَاجُ النَّبِيِّ صَلَّى اللَّهُ عَلَيْهِ وَ سَلَّمَ يَخْرُجْنَ لَيْلًا إِلَى لَيْلِ قِبَلِ الْمَنَاصِعِ فَخَرَجَتْ سَوْدَةُ بِنْتُ زَمْعَةَ وَ كَانَتِ امْرَأَةً طَوِيلَةً فَرَآهَا عُمَرُ بْنُ الْخَطَّابِ وَ هُوَ فِي الْمَجْلِسِ فَقَالَ عَرَفْتُكِ يَا سَوْدَةُ حِرْصاً عَلَى أَنْ يَنْزِلَ الْحِجَابُ قَالَتْ فَأَنْزَلَ اللَّهُ عَزَّ وَ جَلَّ آيَةَ الْحِجَابِ
6310	كتاب الدعوات	حَدَّثَنَا عَبْدُ اللَّهِ بْنُ مُحَمَّدٍ حَدَّثَنَا هِشَامُ بْنُ يُوسُفَ أَخْبَرَنَا مَعْمَرٌ عَنِ الزُّهْرِيِّ عَنْ عُرْوَةَ عَنْ عَائِشَةَ رَضِيَ اللَّهُ عَنْهَا كَانَ النَّبِيُّ صَلَّى اللَّهُ عَلَيْهِ وَ سَلَّمَ يُصَلِّي مِنَ اللَّيْلِ إِحْدَى عَشْرَةَ رَكْعَةً فَإِذَا طَلَعَ الْفَجْرُ صَلَّى رَكْعَتَيْنِ خَفِيفَتَيْنِ ثُمَّ اضْطَجَعَ عَلَى شِقِّهِ الْأَيْمَنِ حَتَّى يَجِيءَ الْمُؤَذِّنُ فَيُؤْذِنَهُ
6326	كتاب الدعوات	حَدَّثَنَا عَبْدُ اللَّهِ بْنُ يُوسُفَ أَخْبَرَنَا اللَّيْثُ قَالَ حَدَّثَنِي يَزِيدُ عَنْ أَبِي الْخَيْرِ عَنْ عَبْدِ اللَّهِ بْنِ عَمْرٍو عَنْ أَبِي بَكْرٍ الصِّدِّيقِ رَضِيَ اللَّهُ عَنْهُ أَنَّهُ قَالَ لِلنَّبِيِّ صَلَّى اللَّهُ عَلَيْهِ وَ سَلَّمَ عَلِّمْنِي دُعَاءً أَدْعُو بِهِ فِي صَلَاتِي قَالَ قُلِ اللَّهُمَّ إِنِّي ظَلَمْتُ نَفْسِي ظُلْماً كَثِيراً وَ لَا يَغْفِرُ الذُّنُوبَ إِلَّا أَنْتَ فَاغْفِرْ لِي مَغْفِرَةً مِنْ عِنْدِكَ وَ ارْحَمْنِي إِنَّكَ أَنْتَ الْغَفُورُ الرَّحِيمُ وَ قَالَ عَمْرُو بْنُ الْحَارِثِ عَنْ يَزِيدَ عَنْ أَبِي الْخَيْرِ إِنَّهُ سَمِعَ عَبْدَ اللَّهِ بْنَ عَمْرٍو قَالَ أَبُو بَكْرٍ رَضِيَ اللَّهُ عَنْهُ لِلنَّبِيِّ صَلَّى اللَّهُ عَلَيْهِ وَ سَلَّمَ
6345	كتاب الدعوات	حَدَّثَنَا مُسْلِمُ بْنُ إِبْرَاهِيمَ حَدَّثَنَا هِشَامٌ حَدَّثَنَا قَتَادَةُ عَنْ أَبِي الْعَالِيَةِ عَنِ ابْنِ عَبَّاسٍ رَضِيَ اللَّهُ عَنْهُمَا قَالَ كَانَ النَّبِيُّ صَلَّى اللَّهُ عَلَيْهِ وَ سَلَّمَ يَدْعُو عِنْدَ الْكَرْبِ يَقُولُ لَا إِلَهَ إِلَّا اللَّهُ الْعَظِيمُ الْحَلِيمُ لَا إِلَهَ إِلَّا اللَّهُ رَبُّ السَّمَوَاتِ وَ الْأَرْضِ وَ رَبُّ الْعَرْشِ الْعَظِيمِ

Fig. 12 Detecting past, present, and imperative verbs



HadeethNo	BookName	HadeethText
4053	كتاب المغازي	حَدَّثَنِي أَحْمَدُ بْنُ أَبِي سُرَيْجٍ أَخْبَرَنَا عُبَيْدُ اللَّهِ بْنُ مُوسَى حَدَّثَنَا مُتَيْبَانُ عَنْ فِرَاسٍ عَنِ الشَّعْبِيِّ قَالَ حَدَّثَنِي جَابِرُ بْنُ عَبْدِ اللَّهِ رَضِيَ اللَّهُ عَنْهُمَا أَنَّ أَبَاهُ اسْتُشْهِدَ يَوْمَ أُحُدٍ وَ تَرَكَ عَلَيْهِ دَيْنًا وَ تَرَكَ سِتَّ بَنَاتٍ فَلَمَّا حَضَرَ جِزَازُ النَّخْلِ قَالَ أَتَيْتُ رَسُولَ اللَّهِ صَلَّى اللَّهُ عَلَيْهِ وَ سَلَّمَ فَقُلْتُ قَدْ عَلِمْتَ أَنَّ وَالِدِي قَدِ اسْتُشْهِدَ يَوْمَ أُحُدٍ وَ تَرَكَ دَيْنًا كَثِيرًا وَ إِنِّي أُحِبُّ أَنْ يَرَاكَ الْغُرَمَاءُ فَقَالَ ادْخُلْ فَبَيْدِرْ كُلَّ تَمْرٍ عَلَى نَاحِيَةٍ فَفَعَلْتُ ثُمَّ دَعَوْتُهُ فَلَمَّا نَظَرُوا إِلَيْهِ كَأَنَّهُمْ أَغْرَوْا بِي تِلْكَ السَّاعَةَ فَلَمَّا رَأَى مَا يَصْنَعُونَ أَطَافَ حَوْلَ أَعْظَمِهِ بَيْدَرًا ثَلَاثَ مَرَّاتٍ ثُمَّ جَلَسَ عَلَيْهِ ثُمَّ قَالَ ادْعُ لِي أَصْحَابَكَ فَمَا زَالَ يَكِيلُ لَهُمْ حَتَّى أَدَّى اللَّهُ عَنْ وَالِدِي أَمَانَتَهُ وَ أَنَا أَرْضَى أَنْ يُؤَدِّيَ اللَّهُ أَمَانَةَ وَالِدِي وَ لَا أَرْجِعَ إِلَى أَخَوَاتِي بِتَمْرَةٍ فَسَلَّمَ اللَّهُ الْبَيَادِرَ كُلَّهَا وَ حَتَّى إِنِّي أَنْظُرُ إِلَى الْبَيْدَرِ الَّذِي كَانَ عَلَيْهِ النَّبِيُّ صَلَّى اللَّهُ عَلَيْهِ وَ سَلَّمَ كَأَنَّهَا لَمْ تَنْقُصْ تَمْرَةً وَاحِدَةً
4186	كتاب المغازي	حَدَّثَنِي مُجَاعُ بْنُ الْوَلِيدِ سَمِعَ النَّضْرَ بْنَ مُحَمَّدٍ حَدَّثَنَا صَخْرٌ عَنْ نَافِعٍ قَالَ إِنَّ النَّاسَ يَتَحَدَّثُونَ أَنَّ ابْنَ عُمَرَ أَسْلَمَ قَبْلَ عُمَرَ وَ لَيْسَ كَذَلِكَ وَ لَكِنَّ عُمَرَ يَوْمَ الْحُدَيْبِيَةِ أَرْسَلَ عِنْدَ اللَّهِ إِلَى فَرَسٍ لَهُ عِنْدَ رَجُلٍ مِنَ الْأَنْصَارِ يَأْتِي بِهِ يُقَاتِلُ عَلَيْهِ وَ رَسُولُ اللَّهِ صَلَّى اللَّهُ عَلَيْهِ وَ سَلَّمَ يُبَايِعُ عِنْدَ الشَّجَرَةِ وَ عُمَرُ لَا يَدْرِي بِذَلِكَ فَبَايَعَهُ عِنْدَ اللَّهِ ثُمَّ ذَهَبَ إِلَى الْفَرَسِ فَجَاءَ بِهِ إِلَى عُمَرَ وَ عُمَرُ يُسَلِّمُ لِلْقَتَالِ فَأَخْبَرَهُ أَنْ رَسُولَ اللَّهِ صَلَّى اللَّهُ عَلَيْهِ وَ سَلَّمَ يُبَايِعُ تَحْتَ الشَّجَرَةِ قَالَ فَانْطَلَقَ فَذَهَبَ مَعَهُ حَتَّى يُبَايِعَ رَسُولَ اللَّهِ صَلَّى اللَّهُ عَلَيْهِ وَ سَلَّمَ فَهِيَ الَّتِي يَتَحَدَّثُ النَّاسُ أَنَّ ابْنَ عُمَرَ أَسْلَمَ قَبْلَ عُمَرَ وَ قَالَ هِشَامُ بْنُ عَمَّارٍ حَدَّثَنَا الْوَلِيدُ بْنُ مُسْلِمٍ حَدَّثَنَا عُمَرُ بْنُ مُحَمَّدٍ الْعُمَرِيُّ أَخْبَرَنِي نَافِعٌ عَنِ ابْنِ عُمَرَ رَضِيَ اللَّهُ عَنْهُمَا أَنَّ النَّاسَ كَانُوا مَعَ النَّبِيِّ صَلَّى اللَّهُ عَلَيْهِ وَ سَلَّمَ يَوْمَ الْحُدَيْبِيَةِ تَفَرَّقُوا فِي ظِلَالِ الشَّجَرِ فَإِذَا النَّاسُ مُحْدِقُونَ بِالنَّبِيِّ صَلَّى اللَّهُ عَلَيْهِ وَ سَلَّمَ فَقَالَ يَا عَبْدَ اللَّهِ انْظُرْ مَا شَأْنُ النَّاسِ قَدْ أَحْدَقُوا بِرَسُولِ اللَّهِ صَلَّى اللَّهُ عَلَيْهِ وَ سَلَّمَ فَوَجَدَهُمْ يُبَايِعُونَ فَبَايَعَ ثُمَّ رَجَعَ إِلَى عُمَرَ فَخَرَجَ فَبَايَعَ
4697	كتاب تفسير القرآن	حَدَّثَنِي إِبْرَاهِيمُ بْنُ الْمُنْذِرِ حَدَّثَنَا مَعْنٌ قَالَ حَدَّثَنِي مَالِكٌ عَنْ عَبْدِ اللَّهِ بْنِ دِينَارٍ عَنِ ابْنِ عُمَرَ رَضِيَ اللَّهُ عَنْهُمَا أَنَّ رَسُولَ اللَّهِ صَلَّى اللَّهُ عَلَيْهِ وَ سَلَّمَ قَالَ مَفَاتِيحُ الْغَيْبِ خَمْسٌ لَا يَعْلَمُهَا إِلَّا اللَّهُ لَا يَعْلَمُ مَا فِي غَدٍ إِلَّا اللَّهُ وَ لَا يَعْلَمُ مَا تَغِيضُ الْأَرْحَامُ إِلَّا اللَّهُ وَ لَا يَعْلَمُ مَتَى يَأْتِي الْمَطَرُ أَحَدٌ إِلَّا اللَّهُ وَ لَا تَدْرِي نَفْسٌ بِأَيِّ أَرْضٍ تَمُوتُ وَ لَا يَعْلَمُ مَتَى تَقُومُ السَّاعَةُ إِلَّا اللَّهُ
4738	كتاب تفسير القرآن	حَدَّثَنَا قُتَيْبَةُ بْنُ سَعِيدٍ حَدَّثَنَا أَيُّوبُ بْنُ النَّجَّارِ عَنْ يَحْيَى بْنِ أَبِي كَثِيرٍ عَنْ أَبِي سَلَمَةَ بْنِ عَبْدِ الرَّحْمَنِ عَنْ أَبِي هُرَيْرَةَ رَضِيَ اللَّهُ عَنْهُ عَنِ النَّبِيِّ صَلَّى اللَّهُ عَلَيْهِ وَ سَلَّمَ قَالَ جَاجَّ مُوسَى آدَمَ فَقَالَ لَهُ أَنْتَ الَّذِي أَخْرَجْتَ النَّاسَ مِنَ الْجَنَّةِ بِذَنْبِكَ وَ أَشْقَيْتَهُمْ قَالَ قَالَ آدَمُ يَا مُوسَى أَنْتَ الَّذِي اصْطَفَاكَ اللَّهُ بِرِسَالَتِهِ وَ بِكَلَامِهِ أَتَلُومُنِي عَلَى أَمْرٍ كَتَبَهُ اللَّهُ عَلَيَّ قَبْلَ أَنْ يَخْلُقَنِي أَوْ قَدَّرَهُ عَلَيَّ قَبْلَ أَنْ يَخْلُقَنِي قَالَ رَسُولُ اللَّهِ صَلَّى اللَّهُ عَلَيْهِ وَ سَلَّمَ فَحَجَّ آدَمُ مُوسَى

Fig. 13 Detecting past, present, and imperative verbs

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1772	كتاب الحج	قَالَ أَبُو عَبْد اللَّهِ وَ زَادَنِي مُحَمَّدٌ حَدَّثَنَا مُحَاضِرٌ حَدَّثَنَا الْأَعْمَشُ عَنْ إِبْرَاهِيمَ عَنْ الْأَسْوَدِ عَنْ عَائِشَةَ رَضِيَ اللَّهُ عَنْهَا قَالَتْ خَرَجْنَا مَعَ رَسُولِ اللَّهِ صَلَّى اللَّهُ عَلَيْهِ وَ سَلَّمَ لَا نَذْكُرُ إِلَّا الْحَجَّ فَلَمَّا قَدِمْنَا أَمَرَنَا أَنْ نَحِلَّ فَلَمَّا كَانَتْ لَيْلَةُ النَّفْرِ حَاضَتْ صَفِيَّةُ بِنْتُ حُيَيٍّ فَقَالَ النَّبِيُّ صَلَّى اللَّهُ عَلَيْهِ وَ سَلَّمَ حَلْقَى عَقْرَى مَا أُرَاهَا إِلَّا حَابِسَتَكُمْ ثُمَّ قَالَ كُنْتِ طُفْتِ يَوْمَ النَّحْرِ قَالَتْ نَعَمْ قَالَ فَانْفِرِي قَالَتْ يَا رَسُولَ اللَّهِ إِنِّي لَمْ أَكُنْ حَلَلْتُ قَالَ فَاعْتَمِرِي مِنَ التَّنْعِيمِ فَخَرَجَ مَعَهَا أَخُوهَا مُتَلَبِّبًا فَقَالَ مَوْعِدُكِ مَكَانَ كَذَا وَ كَذَا
1804	كتاب العمرة	حَدَّثَنَا عَبْدُ اللَّهِ بْنُ مَسْلَمَةَ حَدَّثَنَا مَالِكٌ عَنْ سُمَيٍّ عَنْ أَبِي صَالِحٍ عَنْ أَبِي هُرَيْرَةَ رَضِيَ اللَّهُ عَنْهُ عَنِ النَّبِيِّ صَلَّى اللَّهُ عَلَيْهِ وَ سَلَّمَ قَالَ السَّفَرُ قِطْعَةٌ مِنَ الْعَذَابِ يَمْنَعُ أَحَدَكُمْ طَعَامَهُ وَ شَرَابَهُ وَ نَوْمَهُ فَإِذَا قَضَى نَهْمَتَهُ فَلْيُعَجِّلْ إِلَى أَهْلِهِ
2533	كتاب العتق	حَدَّثَنَا أَبُو الْيَمَانِ أَخْبَرَنَا شُعَيْبٌ عَنِ الزُّهْرِيِّ قَالَ حَدَّثَنِي عُرْوَةُ بْنُ الزُّبَيْرِ أَنَّ عَائِشَةَ رَضِيَ اللَّهُ عَنْهَا قَالَتْ إِنَّ عُتْبَةَ بْنَ أَبِي وَقَّاصٍ عَهِدَ إِلَى أَخِيهِ سَعْدِ بْنِ أَبِي وَقَّاصٍ أَنْ يَقْبِضَ إِلَيْهِ ابْنَ وَلِيدَةِ زَمْعَةَ قَالَ عُتْبَةُ إِنَّهُ ابْنِي فَلَمَّا قَدِمَ رَسُولُ اللَّهِ صَلَّى اللَّهُ عَلَيْهِ وَ سَلَّمَ زَمَنَ الْفَتْحِ أَخَذَ سَعْدٌ ابْنَ وَلِيدَةِ زَمْعَةَ فَأَقْبَلَ بِهِ إِلَى رَسُولِ اللَّهِ صَلَّى اللَّهُ عَلَيْهِ وَ سَلَّمَ وَ أَقْبَلَ مَعَهُ بِعَبْدِ بْنِ زَمْعَةَ فَقَالَ سَعْدٌ يَا رَسُولَ اللَّهِ هَذَا ابْنُ أَخِي عَهِدَ إِلَيَّ أَنَّهُ ابْنُهُ فَقَالَ عَبْدُ بْنُ زَمْعَةَ يَا رَسُولَ اللَّهِ هَذَا أَخِي ابْنُ وَلِيدَةِ زَمْعَةَ وُلِدَ عَلَى فِرَاشِهِ فَنَظَرَ رَسُولُ اللَّهِ صَلَّى اللَّهُ عَلَيْهِ وَ سَلَّمَ إِلَى ابْنِ وَلِيدَةِ زَمْعَةَ فَإِذَا هُوَ أَشْبَهُ النَّاسِ بِهِ فَقَالَ رَسُولُ اللَّهِ صَلَّى اللَّهُ عَلَيْهِ وَ سَلَّمَ هُوَ لَكَ يَا عَبْدُ بْنَ زَمْعَةَ مِنْ أَجْلِ أَنَّهُ وُلِدَ عَلَى فِرَاشِ أَبِيهِ قَالَ رَسُولُ اللَّهِ صَلَّى اللَّهُ عَلَيْهِ وَ سَلَّمَ احْتَجِبِي مِنْهُ يَا سَوْدَةُ بِنْتَ زَمْعَةَ مِمَّا رَأَى مِنْ شَبَهِهِ بِعُتْبَةَ وَ كَانَتْ سَوْدَةُ زَوْجَ النَّبِيِّ صَلَّى اللَّهُ عَلَيْهِ وَ سَلَّمَ
2540	كتاب العتق	حَدَّثَنَا ابْنُ أَبِي مَرْيَمَ قَالَ أَخْبَرَنَا اللَّيْثُ عَنْ عُقَيْلٍ عَنِ ابْنِ شِهَابٍ ذَكَرَ عُرْوَةُ أَنَّ مَرْوَانَ وَ الْمِسْوَرَ بْنَ مَخْرَمَةَ أَخْبَرَاهُ أَنَّ النَّبِيَّ صَلَّى اللَّهُ عَلَيْهِ وَ سَلَّمَ قَامَ حِينَ جَاءَهُ وَفْدُ هَوَازِنَ فَسَأَلُوهُ أَنْ يَرُدَّ إِلَيْهِمْ أَمْوَالَهُمْ وَ سَبْيَهُمْ فَقَالَ إِنَّ مَعِي مَنْ تَرَوْنَ وَ أَحَبُّ الْحَدِيثِ إِلَيَّ أَصْدَقُهُ فَاخْتَارُوا إِحْدَى الطَّائِفَتَيْنِ إِمَّا الْمَالَ وَ إِمَّا السَّبْيَ وَ قَدْ كُنْتُ اسْتَأْنَيْتُ بِهِمْ وَ كَانَ النَّبِيُّ صَلَّى اللَّهُ عَلَيْهِ وَ سَلَّمَ انْتَظَرَهُمْ بِضْعَ عَشْرَةَ لَيْلَةً حِينَ قَفَلَ مِنَ الطَّائِفِ فَلَمَّا تَبَيَّنَ لَهُمْ أَنَّ النَّبِيَّ صَلَّى اللَّهُ عَلَيْهِ وَ سَلَّمَ غَيْرُ رَادٍّ إِلَيْهِمْ إِلَّا إِحْدَى الطَّائِفَتَيْنِ قَالُوا فَإِنَّا نَخْتَارُ سَبْيَنَا فَقَامَ النَّبِيُّ صَلَّى اللَّهُ عَلَيْهِ وَ سَلَّمَ فِي النَّاسِ فَأَثْنَى عَلَى اللَّهِ بِمَا هُوَ أَهْلُهُ ثُمَّ قَالَ أَمَّا بَعْدُ فَإِنَّ إِخْوَانَكُمْ قَدْ جَاءُونَا تَائِبِينَ وَ إِنِّي رَأَيْتُ أَنْ أَرُدَّ إِلَيْهِمْ سَبْيَهُمْ فَمَنْ أَحَبَّ مِنْكُمْ أَنْ يُطَيِّبَ ذَلِكَ فَلْيَفْعَلْ وَ مَنْ أَحَبَّ أَنْ يَكُونَ عَلَى حَظِّهِ حَتَّى نُعْطِيَهُ إِيَّاهُ مِنْ أَوَّلِ مَا يُفِيءُ اللَّهُ عَلَيْنَا فَلْيَفْعَلْ فَقَالَ النَّاسُ طَيَّبْنَا لَكَ ذَلِكَ قَالَ إِنَّا لَا نَدْرِي مَنْ أَذِنَ مِنْكُمْ مِمَّنْ لَمْ يَأْذَنْ فَارْجِعُوا حَتَّى يَرْفَعَ إِلَيْنَا عُرَفَاؤُكُمْ أَمْرَكُمْ فَرَجَعَ النَّاسُ فَكَلَّمَهُمْ عُرَفَاؤُهُمْ ثُمَّ رَجَعُوا إِلَى النَّبِيِّ صَلَّى اللَّهُ عَلَيْهِ وَ سَلَّمَ فَأَخْبَرُوهُ أَنَّهُمْ طَيَّبُوا وَ أَذِنُوا فَهَذَا الَّذِي بَلَغَنَا عَنْ سَبْيِ هَوَازِنَ وَ قَالَ أَنَسٌ قَالَ عَبَّاسٌ لِلنَّبِيِّ صَلَّى اللَّهُ عَلَيْهِ وَ سَلَّمَ فَأَبَيْتُ نَفْسِي وَ فَأَبَيْتُ عَقِيلًا

Fig. 14 Detecting imperative verb

HadeethNo	BookName	HadeethText
1052	كتاب الكسوف	حَدَّثَنَا عَبْدُ اللَّهِ بْنُ مَسْلَمَةَ عَنْ مَالِكٍ عَنْ زَيْدِ بْنِ أَسْلَمَ عَنْ عَطَاءِ بْنِ يَسَارٍ عَنْ عَبْدِ اللَّهِ بْنِ عَبَّاسٍ قَالَ انْخَسَفَتِ الشَّمْسُ عَلَى عَهْدِ رَسُولِ اللَّهِ صَلَّى اللَّهُ عَلَيْهِ وَ سَلَّمَ فَصَلَّى رَسُولُ اللَّهِ صَلَّى اللَّهُ عَلَيْهِ وَ سَلَّمَ فَقَامَ قِيَامًا طَوِيلًا نَحْوًا مِنْ قِرَاءَةِ سُورَةِ الْبَقَرَةِ ثُمَّ رَكَعَ رُكُوعًا طَوِيلًا ثُمَّ رَفَعَ فَقَامَ قِيَامًا طَوِيلًا وَ هُوَ دُونَ الْقِيَامِ الْأَوَّلِ ثُمَّ رَكَعَ رُكُوعًا طَوِيلًا وَ هُوَ دُونَ الرُّكُوعِ الْأَوَّلِ ثُمَّ سَجَدَ ثُمَّ قَامَ قِيَامًا طَوِيلًا وَ هُوَ دُونَ الْقِيَامِ الْأَوَّلِ ثُمَّ رَكَعَ رُكُوعًا طَوِيلًا وَ هُوَ دُونَ الرُّكُوعِ الْأَوَّلِ ثُمَّ رَفَعَ فَقَامَ قِيَامًا طَوِيلًا وَ هُوَ دُونَ الْقِيَامِ الْأَوَّلِ ثُمَّ رَكَعَ رُكُوعًا طَوِيلًا وَ هُوَ دُونَ الرُّكُوعِ الْأَوَّلِ ثُمَّ سَجَدَ ثُمَّ انْصَرَفَ وَ قَدْ تَجَلَّتِ الشَّمْسُ فَقَالَ صَلَّى اللَّهُ عَلَيْهِ وَسَلَّمَ إِنَّ الشَّمْسَ وَ الْقَمَرَ آيَتَانِ مِنْ آيَاتِ اللَّهِ لَا يَخْسِفَانِ لِمَوْتِ أَحَدٍ وَ لَا لِحَيَاتِهِ فَإِذَا رَأَيْتُمْ ذَلِكَ فَاذْكُرُوا اللَّهَ قَالُوا يَا رَسُولَ اللَّهِ رَأَيْنَاكَ تَنَاوَلْتَ شَيْئًا فِي مَقَامِكَ ثُمَّ رَأَيْنَاكَ كَعْكَعْتَ قَالَ صَلَّى اللَّهُ عَلَيْهِ وَ سَلَّمَ إِنِّي رَأَيْتُ الْجَنَّةَ فَتَنَاوَلْتُ عُنْقُودًا وَ لَوْ أَصَبْتُهُ لَأَكَلْتُمْ مِنْهُ مَا بَقِيَتِ الدُّنْيَا وَ أُرِيتُ النَّارَ فَلَمْ أَرَ مَنْظَرًا كَالْيَوْمِ قَطُّ فَلَمْ أَرَ أَفْظَعَ وَ رَأَيْتُ أَكْثَرَ أَهْلِهَا النِّسَاءَ قَالُوا بِمَ يَا رَسُولَ اللَّهِ قَالَ بِكُفْرِهِنَّ قِيلَ يَكْفُرْنَ بِاللَّهِ قَالَ يَكْفُرْنَ الْعَشِيرَ وَ يَكْفُرْنَ الْإِحْسَانَ لَوْ أَحْسَنْتَ إِلَى إِحْدَاهُنَّ الدَّهْرَ كُلَّهُ ثُمَّ رَأَتْ مِنْكَ شَيْئًا قَالَتْ مَا رَأَيْتُ مِنْكَ خَيْرًا قَطُّ
1706	كتاب الحج	حَدَّثَنَا مُحَمَّدٌ هُوَ ابْنُ سَلَّامٍ أَخْبَرَنَا عَبْدُ الْأَعْلَى بْنُ عَبْدِ الْأَعْلَى عَنْ مَعْمَرٍ عَنْ يَحْيَى بْنِ أَبِي كَثِيرٍ عَنْ عِكْرِمَةَ عَنْ أَبِي هُرَيْرَةَ رَضِيَ اللَّهُ عَنْهُ أَنَّ نَبِيَّ اللَّهِ صَلَّى اللَّهُ عَلَيْهِ وَ سَلَّمَ رَأَى رَجُلًا يَسُوقُ بَدَنَةً قَالَ ارْكَبْهَا قَالَ إِنَّهَا بَدَنَةٌ قَالَ ارْكَبْهَا قَالَ فَلَقَدْ رَأَيْتُهُ رَاكِبَهَا يُسَايِرُ النَّبِيَّ صَلَّى اللَّهُ عَلَيْهِ وَ سَلَّمَ وَ النَّعْلُ فِي عُنُقِهَا تَابَعَهُ مُحَمَّدُ بْنُ بَشَّارٍ حَدَّثَنَا عُثْمَانُ بْنُ عُمَرَ أَخْبَرَنَا عَلِيُّ بْنُ الْمُبَارَكِ عَنْ يَحْيَى عَنْ عِكْرِمَةَ عَنْ أَبِي هُرَيْرَةَ رَضِيَ اللَّهُ عَنْهُ عَنِ النَّبِيِّ صَلَّى اللَّهُ عَلَيْهِ وَ سَلَّمَ
1735	كتاب الحج	حَدَّثَنَا عَلِيُّ بْنُ عَبْدِ اللَّهِ حَدَّثَنَا يَزِيدُ بْنُ زُرَيْعٍ حَدَّثَنَا خَالِدٌ عَنْ عِكْرِمَةَ عَنْ ابْنِ عَبَّاسٍ رَضِيَ اللَّهُ عَنْهُمَا قَالَ كَانَ النَّبِيُّ صَلَّى اللَّهُ عَلَيْهِ وَ سَلَّمَ يُسْأَلُ يَوْمَ النَّحْرِ بِمِنًى فَيَقُولُ لَا حَرَجَ فَسَأَلَهُ رَجُلٌ فَقَالَ حَلَقْتُ قَبْلَ أَنْ أَذْبَحَ قَالَ اذْبَحْ وَ لَا حَرَجَ وَ قَالَ رَمَيْتُ بَعْدَ مَا أَمْسَيْتُ فَقَالَ لَا حَرَجَ
1739	كتاب الحج	حَدَّثَنَا عَلِيُّ بْنُ عَبْدِ اللَّهِ حَدَّثَنِي يَحْيَى بْنُ سَعِيدٍ حَدَّثَنَا فُضَيْلُ بْنُ غَزْوَانَ حَدَّثَنَا عِكْرِمَةُ عَنِ ابْنِ عَبَّاسٍ رَضِيَ اللَّهُ عَنْهُمَا أَنَّ رَسُولَ اللَّهِ صَلَّى اللَّهُ عَلَيْهِ وَ سَلَّمَ خَطَبَ النَّاسَ يَوْمَ النَّحْرِ فَقَالَ يَا أَيُّهَا النَّاسُ أَيُّ يَوْمٍ هَذَا قَالُوا يَوْمٌ حَرَامٌ قَالَ فَأَيُّ بَلَدٍ هَذَا قَالُوا بَلَدٌ حَرَامٌ قَالَ فَأَيُّ شَهْرٍ هَذَا قَالُوا شَهْرٌ حَرَامٌ قَالَ فَإِنَّ دِمَاءَكُمْ وَ أَمْوَالَكُمْ وَ أَعْرَاضَكُمْ عَلَيْكُمْ حَرَامٌ كَحُرْمَةِ يَوْمِكُمْ هَذَا فِي بَلَدِكُمْ هَذَا فِي شَهْرِكُمْ هَذَا فَأَعَادَهَا مِرَارًا ثُمَّ رَفَعَ رَأْسَهُ فَقَالَ اللَّهُمَّ هَلْ بَلَّغْتُ اللَّهُمَّ هَلْ بَلَّغْتُ قَالَ ابْنُ عَبَّاسٍ رَضِيَ اللَّهُ عَنْهُمَا فَوَالَّذِي نَفْسِي بِيَدِهِ إِنَّهَا لَوَصِيَّتُهُ إِلَى أُمَّتِهِ فَلْيُبَلِّغِ الشَّاهِدُ الْغَائِبَ لَا تَرْجِعُوا بَعْدِي كُفَّارًا يَضْرِبُ بَعْضُكُمْ رِقَابَ بَعْضٍ

Fig. 15 Detecting imperative verb

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5.Conclusion and recommendation

In this paper, we designed a model capable of analyzing the text and extracting Arabic root and its inflection from Arabic diacritic texts then extract Arabic semantic relation between entities. By applying the stemming algorithm, we achieved accurate results 95.5% for extracting root and 95.4% for inflection, and the text mining algorithm extract Arabic semantic relation that lies between entities (past, present and imperative verbs and nouns).

The presented model was applied to Sahih Al-Bukhari book. This model is a convenient model for dealing with Arabic diacritics texts from Arabic diacritics such as Quran words, and books in Al Hadeeth Al Sharif and Poetry. Our model is capable of answering many questions, such as what are the events included in the Prophet's Sunnah? What did the Prophet Muhammad command us? Is it possible to make the constructed Hadith dataset the source for exploring knowledge to assist us in solving life problems?

Our future work improves stemming algorithm by feeding it with more patterns, adding a rule to treat vowels that are in the middle or end of a word and putting the words into its pattern first, then extracting the suffix and prefix.

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