# Classifications of Hadiths based on Supervised Learning Techniques

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**Summary**
This study aims to build a model is capable of classifying the categories of hadith, according to the reliability of hadith' narrators (sahih, hassan, da'if, maudu) and according to what was attributed to the Prophet Muhammad (saying, doing, describing, reporting ) using the supervised learning algorithms, with a view to discover a relationship between these classifications, based on the outputs of this model, which might be useful to avoid the controversy and useless debate on automatic classifications of hadith, using some of the statistical methods such as chi-square, information gain and association rules. The experimental results showed that there is a relation between these classifications, most of Sahih hadiths are belong to saying class, and most of maudu hadiths are belong to reporting class. Also the best classifier had given high accuracy was MultinomialNB, it achieved higher accuracy reached up to 0.9708 %, for his ability to process high dimensional problems and identifying the most important features that are relevant to target data in training stage. Followed by LinearSVC classifier, reached up to 0.9655, and finally, KNeighborsClassifier reached up to 0.9644.

***Keywords:***
*Text Classification, Chi-square, MultinomialNB, KNeighbors, LinearSVC, Association rules, Hadith*

## 1. Introduction

Data Mining is a process of analyzing a large number of data to find a logical relationship summarizes data in a new way is understandable and useful to the owner of the data [1]. There are two types of data mining: descriptive and predictive data mining. One of the most important techniques related to predictive data mining is the classification process. Prophet's Hadiths are fertile grounds for knowledge Discovery and the tasks of data mining such as the classification, these texts are distinct with the unique linguistic features, and the clear link between the word and its meaning [17] [19]. Therefore, we have applied common learning algorithms in texts classification to identify the best algorithms (classifiers) in hadith classification. In addition to evaluate the accuracy of these algorithms correctly

Text Classification is a task of data mining; it aims to assign automatically selected documents into categories from a pre-defined set of categories [2]. There are two approaches involved in the processing of text classification: The first approach extracts the feature terms which are recognized as effective keywords in the training phase, therefore the text have to be transformed from the full text version to a vector space, with parameters (min_df=10, max_df=0.75, ngram_range= (1, 3)) [49]. This means to ignore all the words that appear in less than 10 of the texts, ignore the words that appear in more than 75% of the texts and the number of words in a sequence is (uni, bi, tri) respectively. The Boolean algebra and TFIDF have been used in this study as term weighting [26]. The second is concerned with the actual classification of the document using these feature terms in the test phase, that has been used before in training phase. In this study, the classification technique is used, based on supervised learning algorithms to classify the hadiths into different categories according to what was attributed to the Prophet Muhammad mainly: Saying, Doing, Describing, and Reporting, additional to finding a relationship between these classifications.

Prophetic hadith is what was added to the Prophet Muhammad, it includes the sayings, actions, reporting, or characteristics of the Prophet, each Hadith consists of three parts: the text known as the Matn, the Sanad (narrators' chain of hadith) [3] and the Taraf (the part, or the beginning sentence of the text that refers to the sayings, characteristics or actions of the Prophet, or his concurrence with others action). In this study, the dataset of hadith is split using the cross-validation method. In this method the dataset of hadith is divided randomly into a number of n blocks, each block of them is held out once to test the classifier and the classifier is trained on the remaining (n-1) to build the classifier [4].

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Then the feature selection technique is used to select the most relevant words in each class. After that, the supervised learning algorithms were used to build a classification model capable of classifying the hadith into different categories according to what was attributed to the Prophet. Table1 shows a sample of hadith belong to Saying and Sahih class. The remainder of this paper is organized as follows: Section 2 shows the related works. The proposed system of this study is shown in Section 3. Section 4 shows the Classification of Hadith. Relationship between these classifications is illustrated in Section 5. The Experimental results are showed in Section 6. Finally, the conclusion is presented in section 7.

Table 1 Example of hadith belong to Saying and Sahih hadith

| | |
|---|---|
| Hadith Arabic | عن أبي هريرة رضي الله عنه، "أن أعرابيا أتى النبي صلى الله عليه وسلم، فقال: دلني على عمل إذا عملته دخلت الجنة، قال: تعبد الله لا تشرك به شيئا، وتقيم الصلاة المكتوبة، وتؤدي الزكاة المفروضة، وتصوم رمضان، قال: والذي نفسي بيده لا أزيد على هذا، فلما ولى قال النبي صلى الله عليه وسلم: من سره أن ينظر إلى رجل من أهل الجنة، فلينظر إلى هذا" |
| Hadith English | Narrated Abu Hurayrah:" A Bedouin came to the Prophet and said, Tell me of such a deed as will make me enter Paradise if I do it. Worship Allah, and worship none along with Him, offer the (five) prescribed compulsory prayers perfectly, pay the obligatory Zakat, and fast the month of Ramadan. The Bedouin said, By Him, in Whose Hands my life is, I will not do more than this. When he (the Bedouin) left, the Prophet said, Whoever likes to see a man of Paradise, and then he may look at this man". |

## 2. Related Works

A few of researches have been studied in prophetic hadith texts, which can be used as a source in knowledge discovery; it is distinct with linguistic features and the clear details between its words. In this section; we present some of the previous studies in the hadith classification as the following.

H M. Abdelaal et al [5] they investigated the classification of Hadith based on its Sanad, because it determines the degree of hadith if Hadith is Sahih, Hasan, Da'if or Maudu, therefore, they set conditions and criteria to achieve this purpose. These conditions as features and criteria have been formulated to a set of features that characterize and determine the hadith classification according to the memory and reliability of the narrators, which represent the dataset of hadith to train the classifier in training stage. In this study, the classifier model is built to classify the hadith into Sahih, Hasan, Da'if and Maudu' according to the reliability and memory of the reporters, and based on the Sanad of hadith (chain of narrators), which interested in studying the status of narrators.

Khitam Jbara [6] study is conducted to classify the hadith to one of the predefined classes (books). In this study, a collection of Hadiths containing about 1300 Hadiths from Thirteen Books of Sahih Bukhari is selected and each Hadith is assigned to one chapter (Kitab). The results show that Stem Expansion Classification (SEC) performed better in classifying Ahadith against existing classifications methods according to the most reliable measurements mainly: recall, precision, and F-Measure) in text classification field.

K. Aldhlan et al [7] in this study the Hadith Classifier were built using the Decision Tree algorithm. A mechanism was employed to handle these missing data; it simulated the Isnad verification methods in Hadith science. These results were compared with the resource books, concurrently with the point of view of the experts in the science of Hadith. The attributes of the instances originally were obtained from the source books. Whilst some attributes were indicated as null values or missing values. The findings of this research showed that the accuracy of the decision tree had a significant effect on missing data detector.

H M. Abdelaal et al [8] in their study, the Hadith model were built using classifier algorithms such as the Decision Tree, Random Forest, and Naïve Bayes, to classify the hadith according to its content or topic. This study also suggested improvement of the classification accuracy by applying Information Gain and Chi-square methods, to the said algorithms, via TF, and TF-IDF.

M. Ghanem et al [9] this study conducted by utilized some techniques to Hadith Authentication into Sahih, Hasan, Da'if and Maudu such as Removing Matn (manually), removing verbs (manually), Names Standardization (manually), Feature extraction (TF-IDF), Document representation (VSM), Classification (LVQ). This research depending on using Vector Space Model to represent the sort of Hadith narrators also its frequency of occurrences in the form of a vector and Learning Vector Quantization used as a classification method. Dataset of Hadith (160) was used in the pre-processing step and resulting 455 narrators (reporters).

One of the most important goals of this study is to reach higher classification accuracy, so there were some differences from the related works and previous studies that would improve the accuracy of the model. The most important of this difference is as follows:

- Data Set Size

Increasing the size of the data provided for the model in the training sample while training the model, It leads to an increase in the number of features that represent the data, which makes the model able to better classify and distinguish the categories of hadith, therefore this model is more generalized and is overcomes the under fitting problem. One of the main reasons for the emergence of the under fitting problem that the data presented for the model

in the training sample is less than data represented that of sample or hypothesis space.

- Data Standardization & Normalization

The features in the data are scaling before applying the classifier. Therefore the data is transformed into the unit scale using some statistical method such as mean, variance and standard division, which is a requirement for the optimal performance of many machine learning algorithms, and reduces the construction time of the model, and reduce the outliers or influence of extreme value the data without removing them from the dataset.

- Domain Expertise (application study)

The application was studied and understood and depending on some Hadith books to facilitate the interpretation and analysis of the results and achieve the most important objectives of the study in a better way as finding a relationship between the classifications of hadith. Also classify the hadith based on the Sanad and the text in addition to building a model using the decision tree depending on a group of the data that is extracted of the conditions and characteristics that distinguish each classification from the others

## 3. The Design of the Proposed Framework

This study focused Discover a relationship between the classifications of hadith, according to what was issued from Prophet Muhammad (Describing, Saying, Reporting and, Doing ), and according to the Reliability and Memory of the Reporters (Sahih, Hassan, Da'if, and Maudu) depending on the output of the model for each classification using some of the statistical methods and association rules mining (ARM), as associate a class with the presence of another class by computing the support count and confidence between these classes to discover dependency rules that will predict the presence of a class in a dataset of hadith based on the presence of other classes, as shown in figure 1, which represents the proposed framework outline, It consists of different stages organized in steps as follows:

1. Hadiths collection and the text pre-processing.
2. Term weighting and feature selection,
3. The learning algorithms (classifier).
4. The classifier evaluation and testing using unseen examples of hadiths.
5. Finding the relationship between these classifications as in Fig. 1.

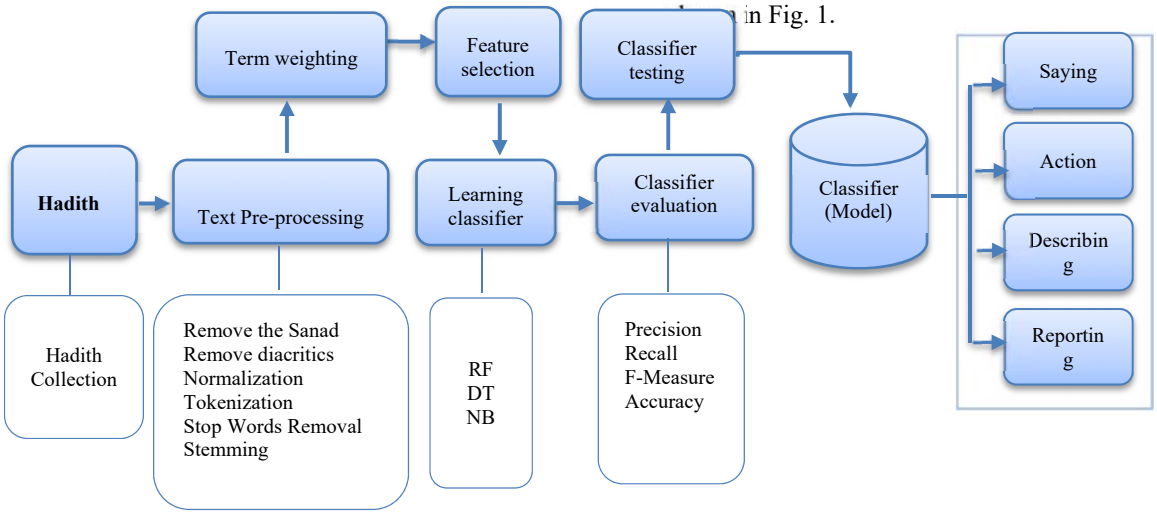


Fig. 1 The proposed framework of the Hadith Classification Process

## 4. HADITH CLASSIFICATIONS

In this Classification, the hadith has been classified into different categories mainly: Describing, Saying, Reporting and Doing according to what was attributed to the Prophet. Hadith consists of two main parts, the most important of which is Sanad and the Matn (Text). In this classification, the hadith has been classified based on the Hadith text only, and the Sanad is ignored, it is irrelevant of hadith categories. Hadith text has been processed as like other Arabic texts rest to convert it to a form that is suitable for classification tasks, through the following phases.

### 4.1 Hadith Collection phase

In this study a number of prophetic hadith was collected from different sources such as Sahih al-Bukhari, Muslim, Tirmidhi and al-Nasaa'i, Ibn Majah, Abu Dawood, in addition to the encyclopedia of hadith al-Shareef, as shown in table 2 as sample of each category, to study the classifications of hadith, which have classified manually into saying, action, describing and reporting, After collected these Hadith, which reached up

to 2685 hadiths, it has split into training and testing set using percentage split, that known as hold out method and the cross-validation method

## 4.2 Hadith Pre-Processing

These pre-processing include linguistic tools such as normalization, tokenization, stop word removal and stemming, to reduce the ambiguity of words and increase the accuracy and effectiveness of the classification. Previous experimental results revealed that pre-processing techniques have a significant impact on the Arabic texts classification accuracy [10] [11]

- **Remove the Sanad:** The Sanad of Hadith (chain of narrators) is removed from the hadith, because this classification does not depend on it, and it has no effect on the accuracy of the classification. Unlike the classification of Hadith according to the Reliability and Memory of the Reporters, it represents the main part of this classification.
- 
- **Normalization:** The word normalization aims to normalize certain letters that have different forms in the same word to one form, such as Replace (إ ,آ ,أ) with (ا), (ى) with (ي), and (ة) with (ه).
- 
- **Tokenization:** Tokenization aims to divide the text into tokens. Words are often separated from each other by blanks such as white space, semicolons, and commas.
- 
- **Stop Word Removal:** Stop word removal aims to eliminate of insignificant words, such as so which appear in the sentences frequently and do not have any meaning or impact about the content, such as, in, on, to, etc.
- 
- **Stemming:** The stemming technique aims to remove all affixes such as prefixes, infixes, and suffixes from the word, to reduce the appearance of different forms for the word that reflects the same meaning, such as learns, learning, learned, and learn us, all these words share the same abstract meaning. Stemming makes the processes less dependent on particular forms of words and reduces the potential size of features, which, in turn, improve the accuracy of the classifier in the text classification [12] [13].

## 4.3 Term weighting phase

Term weighting is one of the pre-processing methods; for representing text documents as a vector or for converting full text into vectors such as index terms, which frequently used in information retrieval, indexing and text classification [14] [15] and used to determine the most important words in a documents collection for classification purpose by calculate the term weighting for each word in a document. There are different methods used to calculate the weight for each word in the document, one of the most common methods is Term Frequency-Inverse Document Frequency (TF-IDF), it is a method statistic aims to reflect how important a word is to text in a dataset, which helps us to determine the important words in a documents collection for classification purposes [16] [17]. The value of TD-IDF increases proportionally to the number of times for word appearance in the text and it is offset by the number of texts in the corpus that contain the word. The frequency of each word in a hadith text is determined according to equation 3 after computing the TF and IDF according to equation 1 and equation 2 respectively.

$$TF_{i,j} = \frac{n_{i,j}}{\sum n_{k,j}} = \frac{f_{w,t}}{\max\{f_{w',t} : w' \varepsilon\, t\}} \quad (1)$$

*(1)*

$n_{i,j}$ : is the number of occurrences of the word (wi) in the text of hadith (tj). $\sum n_{k,j}$ : is the sum of the number of all words (wk) in the text of hadith (tj).

$$IDF\ (w, t) = log\ \frac{N}{n} = log\left(\frac{N}{|\{t\ \varepsilon\ D : w\ \varepsilon t\}|}\right) \quad (2)$$

Where, N is the total number of texts in the dataset of hadith N=|D|. |{t Ɛ D : w Ɛt}|, n is the number of texts where the w appears or contains it, $TF_{i,j} \neq 0$, if the term is not found in the dataset.

$$TD\text{-}IDF = TF_{i,j} * IDF\ (w, t) = \frac{n_{i,j}}{\sum n_{k,j}}\ x\ log\ \frac{N}{|\{t\ \varepsilon\ D : w\ \varepsilon t\}|} \quad (3)$$

Table 2 TF -IDF for sample of Hadith after reprocessing

| TF-IDF | After Pre-processing | Hadith Text |
|---|---|---|
| 0.12690695609092 = اذا<br>0.346076882942 = عطس<br>0.164667193755 = احد<br>0.3556429686342 = حمد<br>0.1815843076780 = الل<br>0.7489506344853 = شمتو<br>0.237228807694 = فان<br>0.1428912509418 = لم<br>0.19983212770594= فلا | اذا عطس احد حمد الل شمتو فان لم حمد الل فلا شمتو | اذا عطس احدكم فحمد الله فشمتوه فان لم يحمد الله فلا تشمتوه<br><br>If anyone of you sneezes, let him say 'Al-hamdu Lillaah', and let his brother or his companion say, 'Yarhamuk Allah', And if he says to him, 'Yarhamuk Allah', let him say, 'Yahdeekum Allaahu wa yusliha baalakum |
| 0.17518561179924183 = يصل<br>0.10519235362509359 =من<br>0.18929529711036155 =ليل<br>0.21850347218 =حدى<br>0.28960438874514116 =ركع | يصل من ليل حدى عشر ركع | يصلي من الليل ثلاث عشرة ركعة<br>He prays thirteen units of prayer at night |
| 0.257904651993 = كلم<br>0.341066815221 = حبب<br>0.142089997310 = الى<br>0.242657567042 = رحم<br>0.248590785139 = خفف<br>0.128977476187 = على<br>0.312933817740 = لسن<br>0.270405386487 =ثقل<br>0.107712215296 = في<br>0.319738225507 = ميز<br>0.493055229887 = سبح<br>0.205710020932 = الل<br>0.201447260112 = حمد<br>0.220842965694 = عظم | كلم حبب الى رحم خفف على لسن ثقل في ميز سبح الل حمد سبح الل عظم | كلمتان حبيبتان إلى الرحمن خفيفتان على اللسان ثقيلتان في الميزان سبحان الله وبحمده سبحان الله العظيم<br><br>Two words Habibtan to Rahman, light them on the tongue and heavy in the balance Hallelujah and praise Hallelujah great |

## 4.4 Feature Selection

After Pre-processing and text representation using term weighting is a feature selection (FS). FS is an effective method to solve high dimensional data problem, by removing undesirable data, which helps us is to select the essential features that are relevant to target data, and ignore the data that is irrelevant to the target data, in additional to enable the learning algorithm to train faster [15][18][22]. There are different methods are used to select the best features, one of the best methods are Latent semantic analysis, Gain Ratio, Chi-Square, Gini Index, Symmetrical uncertainty, probability ratio, odds ratio, Principal Component Analysis, taking into account the following constrains in the selection of feature. Ignore terms that appear in less than 10 of the hadith texts, to avoid the under-fitting problem and ignore terms that appear in more than 75% of the hadith texts to avoid the stop words and over-fitting problem [19].

## 4.5 Classifier Learning

Classifier learning aims to train the classifier to recognize the main features of training dataset for each category and make predictions to predict the category of hadith, as shown in figure 2. The dataset of hadith is 2685 hadith, divided training and testing dataset using cross validation method. In this method the dataset of hadith is divided randomly into a number 10 blocks, each block of them is held out once to test the classifier, and the classifier is trained on the remaining 9 (10-1) to build the classifier [4]. Different algorithms have been used in this study mainly: KNeighborsClassifier, LinearSVC, Random forest, Naïve Bayes and MultinomialNB, to build a model that can classify the category of hadith. In this study, various algorithms have been used to build a model is able to classify the class of hadith.

The parameters that we set to learn these classifiers as the following, in Naïve Bayes classifier we used MultinomialNB (alpha=0.1), K-Neighbors Classifier (leaf_size=30, metric=minkowski, metric_params=none,

n_jobs=1, n_neighbors=5, p=2), Random forest (bootstrap=True, min_samples_leaf=1, min_samples_split=2, min_weight_fraction_leaf=0.0, n_estimators=10, n_jobs=1, oob_score=False), BernoulliNB (alpha=1.0, binarize=0.0, class_prior=None, fit_prior=True).

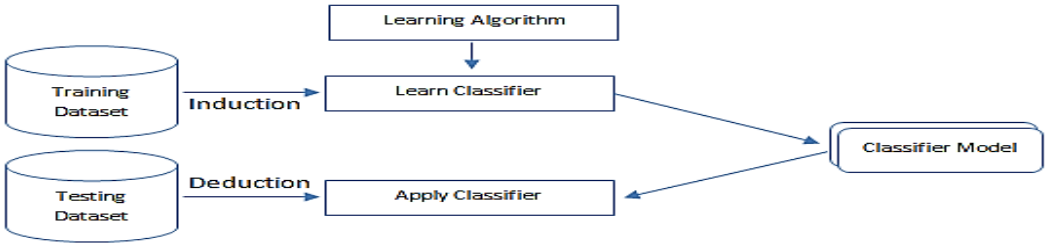


Fig. 2 General approaches for building a classification model

### 4.6 Classifier Evaluation and Testing

There are many measures to evaluate the classifier mainly: Recall, Precision, and F1-measure, after computing the true positives rate (TP), true negatives rate (TN), false negative rate (FN) and false positive rate (FP) [20] [21][23].

TP is TP divided by the total number of positives (TP + FN) $=\frac{TP}{TP+FN}$

FP is FP divided by the total number of negatives (FP + TN) $=\frac{FP}{FP+TN}$.

TP refers to the number of elements which are correctly assigned to a given category. TN refers to the number of elements which are not correctly assigned to a given category. FP refers to the number of elements which are falsely assigned to the category, and FN refers to the number of elements which are not falsely assigned to the category [21].

$$\text{Precision} = \frac{TP}{TP + FP} \tag{4}$$

$$\text{Recall} = \frac{TP}{TP + FN} \tag{5}$$

$$\text{F1} - \text{score} = \text{F} - \text{Measure} = \frac{2(\text{Precision} * \text{Recall})}{\text{Precision} + \text{Recall}} \tag{6}$$

$$\text{Accuracy} = \frac{TP + TN}{TP + TN + FP + FN} \tag{7}$$

After we train the classifier and its evaluating, we used the trained classifier to predict examples of hadith that are unseen data (unlabeled), to test, and measure the accuracy of the classifier in the Ahadith classification that is untrained on them.

## 5. Relation between Classifications

In this study, we try to discover a relationship between the classification of hadith according to what was issued from Prophet Muhammad and according to the Reliability and Memory of the Reporters through hadith classifications using Chi-square test method. A random sample of 400 hadith was selected, which divided into 100 samples per category from the dataset of hadith that belong to the classification of hadith according to the reliability and memory of the reporters. The results summarized in Table 3, where 255 hadith from the samples are classifying as saying which represents 63.7%. The next is Reporting 88 hadith by 22%, followed by Describing and Doing as 8.8% and 5.5%, respectively. These results conclude that the highest percentage of the Sahih hadith (16.8%) is classifying as Saying, followed by Reporting, which represent 5.5%.

Table 3 Relationship between the classifications of hadith

| | | **Class A** | | | | **Total** |
|---|---|---|---|---|---|---|
| **Class B** | | Saying | Reporting | Doing | Describing | |
| | Sahih | 67 (16.8%) | 22 (5.5%) | 2 (0.5%) | 9 (2.3%) | 100 |
| | Hasan | 68 (17%) | 13 (3.3%) | 14 (3.5%) | 5 (1.3%) | 100 |
| | Da'if | 66 (16.5%) | 22 (5.5%) | 3 (0.8%) | 9 (2.3%) | 100 |
| | Maudu | 54 (13.5%) | 31(7.8%) | 3 (0.8%) | 12 (3%) | 100 |
| **Total** | | **255 (63.7%)** | **88 (22%)** | **22 (5.5%)** | **35 (8.8)%** | **400** |

The chi-Square method is used to test whether an association exists between two categorical variables by comparing the observed values of responses to the values that would be expected, based on the following equation:

$$\chi^2 = \sum \frac{(O_i - E_i)^2}{`E_i} \quad (8)$$

Where: $O_i$ = the observed frequency. $E_i$= the expected frequency if $O_i$ a relationship existed between the variables.

Hypotheses:

H0: Class B (Sahih, Hassan, Da'if, and Maudu) is not related to (associated with) Class A (Saying, Reporting, Doing, and Describing).

HA: Class B (Sahih, Hassan, Da'if, and Maudu) is related to (associated with) Class A (Saying, Reporting, Doing, and Describing). *α=0.05.

Table 4 Chi-square tests

| | Value | df | Asymptotic Significance (2-sided) |
|---|---|---|---|
| Pearson Chi-Square | 29.848[a] | 9 | .000 |
| Likelihood Ratio | 27.516 | 9 | .001 |
| N of Valid Cases | 400 | | |

From results shown in Table 4, we found that χ^2 = 29.848 and p < 0.001; which is a minimal probability of the observed data under the null hypothesis of no relationship. So, the null hypothesis is rejected. This concludes that Class A seems to be significantly related to class B at the level of significant α =5%.

## 6. Experimental Results and Discussion

This Experimental Results are implemented by python 3.6.0 program. Different algorithms have used in this study, but we reported the best three algorithms, which have the highest accuracy. In this classification the dataset of hadith is divided randomly into ten parts, each part is held out once to test the classifier, and the classifier is trained on the remaining nine parts to train and test all dataset known as cross validation method [20], figure 3 shows the overall accuracy for each classifier.

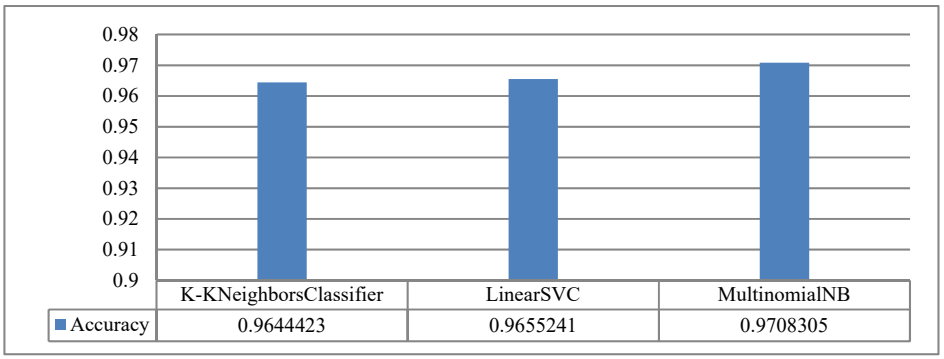


Fig. 3 Overall percentage accuracies for individual classifier

Table 5 and Figure 5 show the Precision, Recall, and F1-measure (F1) for individual category. These categories are Describing, Doing, Reporting, and Saying, according to what was attributed to the Prophet using cross-validation method. In this method, the data set of hadith is split into 10 folds or parts, each fold is hold out once to test the model, while the remaining of the data is used to train the model as shown in figure 4, each fold represent one iteration, in each iteration the accuracy of the model is calculated and the overall accuracy is calculated using the mean, this method is the best to evaluate the performance of the model.

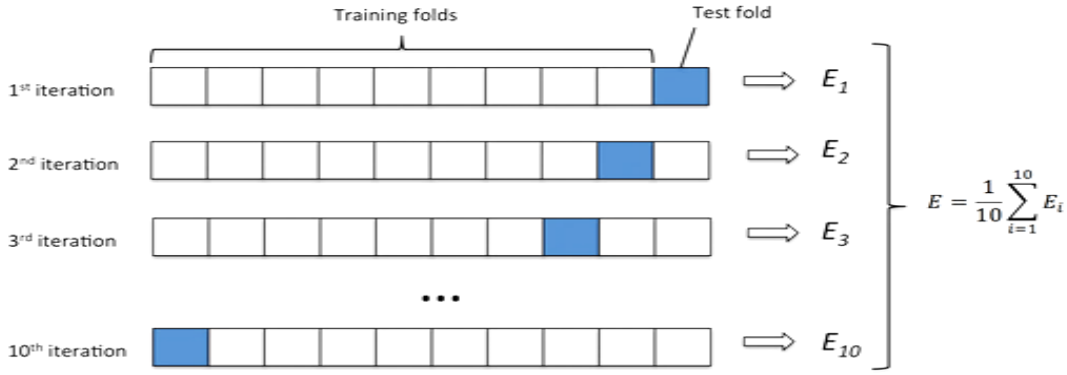


Fig. 4 Cross-validation methods

We note from the values of Precision, Recall, and F1 there no bias between these values, which indicate the efficiency of the classifier for each individual category and the model is more generalization. These values are computed according to equation 4, 6, and 6, respectively.

Table 5 Precision, Recall, and F1-score) for each category using KNeighborsClassifier, LinearSVC, and MultinomialNB

| Classifier | KNeighborsClassifier | | | LinearSVC | | | MultinomialNB | | |
|---|---|---|---|---|---|---|---|---|---|
| Class | Precision | Recall | F1 | Precision | Recall | F1 | Precision | Recall | F1 |
| Describing | 0.94 | 0.98 | 0.96 | 0.92 | 0.99 | 0.95 | 0.98 | 0.99 | 0.98 |
| Doing | 0.97 | 0.99 | 0.98 | 0.99 | 1 | 0.99 | 0.97 | 0.99 | 0.98 |
| Reporting | 0.98 | 0.91 | 0.94 | 0.99 | 0.89 | 0.94 | 0.99 | 0.92 | 0.95 |
| Saying | 1 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.89 | 0.99 | 0.94 |
| Avg | 0.97 | 0.96 | 0.96 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 |

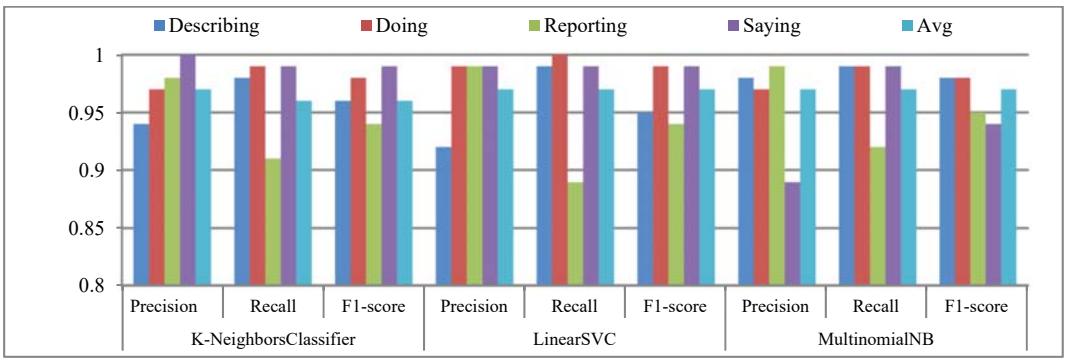


Fig. 5 Precision, Recall, and F1-score for each category using KNeighborsClassifier, LinearSVC, and MultinomialNB

## 7 Conclusion

The Hadith is the second source of Islam after the Qur'an and the fundamental resource of legislation in the Islamic community. This study aims to discover a relationship between Hadith classifications; the experimental results showed that there is a relation between these classifications. Most of Sahih hadiths are belong to saying class, and the maudu hadiths are belong to reporting class. From the experimental results, we note that the accuracy of the classification of hadith according to what was issued from Prophet Muhammad is better than the results of classification of the hadith according to the Reliability and Memory of the Reporters. Therefore there is a relation between the content of hadith text and its class according to what was issued from Prophet Muhammad. This relation makes the classifier is able to recognize and distinguish between the hadith classes. Most of these hadiths that related to Reliability and Memory of the Reporters are classified as saying class, followed by Reporting, then the Describing, and Doing. In addition to

that, the highest percentage of the Sahih hadiths was classifying as Saying, followed by Reporting. Finally, the experimental results showed that the best classifier had given high accuracy was MultinomialNB; it achieved higher accuracy reached up to 0.9708 % followed by LinearSVC, reached up to 0.9655, and finally, KNeighborsClassifier reached up to 0.9644.

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## Conflict Of interest

No potential conflict of interest was reported by the author(s).

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