

# AI Classification of Linguistic Expression Between The Quran, The Hadith, and Pre-Islamic Poems Using an LSTM Deep Learning Model

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## ABSTRACT

The Quran is God's (Allah *subhanah*) universal and final message to humanity through his prophet Muhammad peace and blessings be upon him (PBUH). This research aims to prove the distinct and separate nature of the linguistic style of expression used in the Quran vs. the Hadith vs. Pre-Islamic Poetry in Mecca during the prophet's era, known as the "Ten Hanging Poems". While all these sources were all in Arabic language, we demonstrate that they are each distinct in their style of expression and belong to separate authoritative sources. The prophet's (PBUH) style of natural language expression is transmitted verbatim through his Hadith via each Hadith's trusted chain of narrations. While the Quran is authored by Allah *subhanah* and transmitted to his prophet Muhammad PBUH through the angle Jibreel (Gabrael) PBUH. This research will demonstrate the distinct and separate source of authorship between the Quran, Hadith, and Pre-Islamic Poetry using an Artificial Intelligence deep learning model of Long Short-Term Memory (LSTM) network. The Quran has **6236** verses, and we extracted Prophet's words (PBUH) through **5181** Hadiths from Sahih Bukhari's book with verified trusted chain of narrations, as well as used **858** lines of Pre-Islamic Poetry. For the Hadiths processed, we purposefully avoided text not expressed by the prophet, including narration chain, expression by others, or quotes of Quran verses.. We trained three different models **Net21**, **Net20**, **Net19** on **25%**, **20%**, and **15%**, respectively, of total **6236** Quran verses with randomized order of the verses so as to avoid bias of model due to verse length. Similarly we trained the three models on the same percentage of available text from the Hadiths, and Poems, and then tested each of the models on the residual **75%**, **80%**, and **85%**, respectively, of Quran verses, Hadiths, and Poems. Accurate classification of the three LSTM Models of testing Quran verses was **98.58%**, **98.95%**, and **83.47%** respectively. Accurate Hadith's classification accuracy of the three LSTM Models **98.97%**, **99.73%**, and **99.59%** respectively. Accurate classification of the three LSTM Models for the Poems was **100%**, **100%**, **100%** respectively.

These results demonstrate the distinct nature of the expression style of authorship between the Quran, the Hadith, and the Pre-Islamic Poetry leading to the conclusion that they are indeed from different sources of authorship. This research results provides objective scientific proof that the Quran is not the creation of the Prophet Muhammad (PBUH) but is from a divine source (Allah *subhanah*). It also demonstrates that the Prophet's style of expression in his speech in the verified trusted Hadith was not influenced by the Quran. It further demonstrates that the Prophet's style of expression was not influenced by the Poetry style that was common in his era in Mecca where he grew. Finally, this research demonstrates that the Quran did not follow the poetic style of expression common in the era of Pre-Islamic Mecca, but rather was distinguished in its own class of expression style that fascinated and attracted people to it as it was different from what they heard before in poetry.

These facts are also mentioned in the following 7 Quran verses that the Quran is not the creation of the prophet Muhammad (PBUH) as falsely claimed by some people. It is also mentioned that the Prophet was "not a poet" in 3 Quran verses.

Sura Chapter	Verse	
10	38	أَمْ يَقُولُونَ افْتَرَيْنَاهُ قُلْ فَأْتُوا بِسُورَةٍ مِّثْلِهِ وَادْعُوا مَنِ اسْتَلَطَعْتُمْ مِّنْ دُونِ اللَّهِ إِنْ كُنْتُمْ صَادِقِينَ

11	13	أَمْ يَقُولُونَ افْتَرَاهُ قُلْ فَاتُوا بَعْشَرَ سُوْرٍ مِّثْلَهُ مُفْتَرِيَاتٍ وَاذْعُوا مَنِ اسْتَطَعْتُمْ مِّنْ دُونِ اللّٰهِ اِنْ كُنْتُمْ صٰدِقِيْنَ
11	35	أَمْ يَقُولُونَ افْتَرَاهُ قُلْ اِنْ افْتَرَيْتُهُ فَعَلَىٰ اِجْرَامِي وَاَنَا بَرِيءٌ مِّمَّا تُجْرِمُوْنَ
25	4	وَقَالَ الَّذِيْنَ كَفَرُوْا اِنْ هٰذَا اِلَّا اِفْكٌ افْتَرَاهُ وَاَعَانَهُ عَلَيْهِ قَوْمٌ ءَاخَرُوْنَ فَقَدْ جَآءُوْا ظُلْمًا وَّزُوْرًا
32	3	أَمْ يَقُولُونَ افْتَرَاهُ بَلْ هُوَ الْحَقُّ مِنْ رَبِّكَ لِتُنذِرَ قَوْمًا مَّا اَتَتْهُمْ مِنْ نَّذِيْرٍ مِّنْ قَبْلِكَ لَعَلَّهُمْ يَهْتَدُوْنَ
40	8	أَمْ يَقُولُونَ افْتَرَاهُ قُلْ اِنْ افْتَرَيْتُهُ فَلَا تَمْلِكُوْنَ لِيْ مِنْ اللّٰهِ شَيْئًا هُوَ اَعْلَمُ بِمَا تُفِيضُوْنَ فِيْهِ كَفٰى بِهٖ شٰهِيْدًا بَيْنِيْ وَبَيْنَكُمْ وَهُوَ الْغَفُوْرُ الرَّحِيْمُ
21	5	بَلْ قَالُوْا اَضَعَتْ اَحْلَمُ بَلْ افْتَرَاهُ بَلْ هُوَ شٰعِرٌ فَلْيٰتِنَا بِآيَةٍ كَمَا اُرْسِلَ الْاَوَّلُوْنَ
52	30	أَمْ يَقُولُونَ شٰعِرٌ نَّتْرَبُّصُ بِهٖ رَبِيْبَ الْمُنُوْنِ
69	41	وَمَا هُوَ بِقَوْلِ شٰعِرٍ قَلِيْلًا مَّا تُؤْمِنُوْنَ

Table 1

Deep learning LSTM network models are suitable for this application of text comparison because of their ability to hold memory states of text sequences and because they adapt well extracting key features for classification via its state memory structure even in the presence of scarcity of input training data. In this paper we will overview the structural properties of LSTM deep learning models, and the pre-processing of Arabic language text into a numeric form accepted by the model for training and testing, and finally we will demonstrate the results of the model application and review conclusions.

**Keywords:** Long Short-Term Memory Network, LSTM, Deep Learning Model, Quran, Hadith, Text Classification.

## 1. Introduction

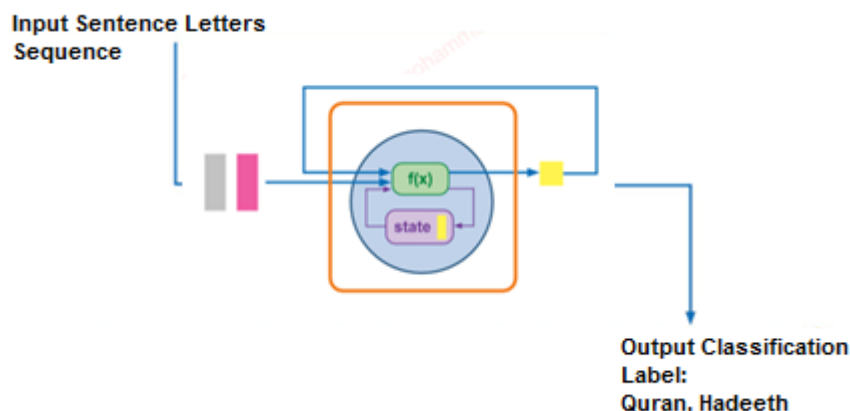
AI Deep Learning models are considered the most advanced algorithms for applications requiring classification problems. They are adapted to process vast amount of multi-dimensional datasets, and can extract features that are extremely difficult for humans to identify, in order to use these features for classification of input data series into multiple output classes. These models belong to supervised training classification where the model is iteratively adapted to reduce an estimation error cost function by providing training datasets at the input data layer, and adjusting the hidden (inner) network layers weights to minimize the classification error on the output layer.

Deep learning models are objective and unbiased, they do not readily understand Arabic language nor know the meaning of the words they are being presented with. Words presented at input of the deep learning network are a sequence (time series) of letter strings that are converted into a sequence of numeric values. Deep learning models examine the sequence of letters presented in each word as well as the sequence of words in each input sentence which embodies the style of expression of the author.

LSTM Networks are designed for applications where the input is an ordered sequence or time-series of data. LSTM networks maintain state memory of previous inputs where information from earlier data in the sequence may be important to the information that follows, often the case in waveform signals or text time-series data. This is a prediction problem where given a sequence of letters, it provides context to predict the following sequence of letters. LSTMs can be used to identify the authors of a text by learning their style of expression of language during a **training phase**, and then evaluating during a **testing phase** new unknown test sequences (sentences) to identify who the author is.

## 2. Research Method: Approaches, Analysis and Results

LSTM is used for Sequence Classification. LSTM is a type of a recurrent network, that reuses the output from a previous step as an input for the next step. The node performs a calculation using the input and returns an output value. This output is then used along with the next element as the input for the next step. In LSTM, the nodes are recurrent but they also have an internal state as a working memory space where information is stored and retrieved over many time steps. The input value, previous output, and internal state are all used in the node calculation for outputs, and to update the state.



**Fig. 2**

**Sequence Classification:** We used LSTM to predict which author wrote a given sequence of text. A single output class (author) for the whole input sequence (verse or sentence or line) The LSTM will take a sequence as an input and calculate an output for each input element. Only the last output is used to make a prediction (sequence to label classification).

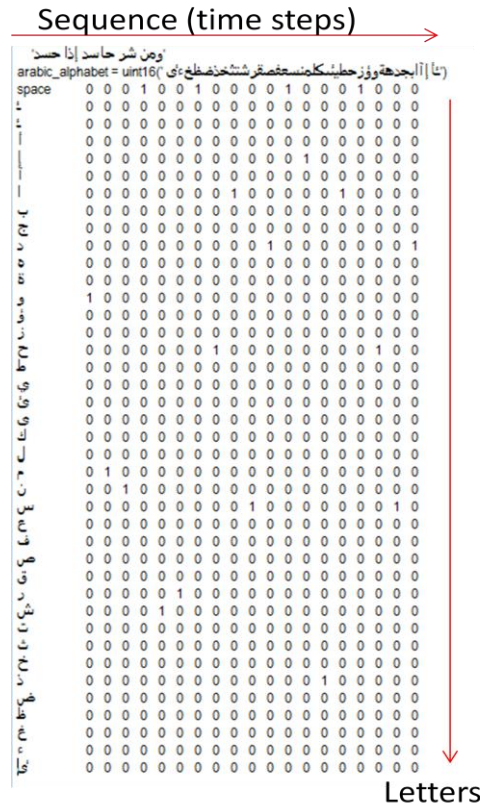
Forty forms of Arabic alphabets were converted to numeric sequences to represent the verse or sentence as a time-series (sequence) of numbers. The number 1 represents the presence of the letter and 0 represents the absence of it.

All models training and inference was performed using Matlab Deep Learning Toolkit from MathWorks, Inc (Natick, MA, USA) version 2022a. All models, source code, input data, and output results can be downloaded from the following URL:

[https://drive.google.com/file/d/192CzTb-fVq5K-79AhdR\\_EXLYwB2srlkx/view?usp=sharing](https://drive.google.com/file/d/192CzTb-fVq5K-79AhdR_EXLYwB2srlkx/view?usp=sharing)

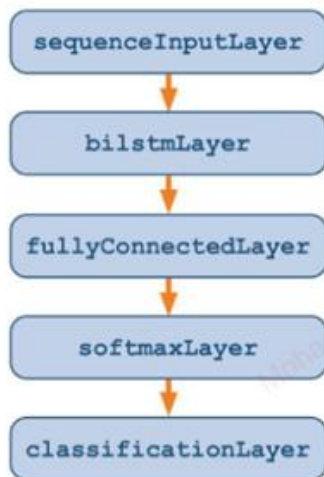
To Convert Arabic text to numeric sequences

- Combine Training set of Quran verses, Hadiths prophet's expressions, and Poem lines sequences. The training set is comprised using a pre-determined percentage of the total available text of 6236 Quran verses, 5181 Hadiths, and 858 Poem lines. The training set is randomized for the order of sequences presentation to LSTM.
- Perform training of LSTM until convergence and error reduction.
- Combine Testing set of residual Quran verses, residual Hadith sequences, and residual Poem lines, then randomize the order of sequence presentation to LSTM.
- Perform testing using trained LSTM model and produce classification results as either Quran or Hadith or Poem classes.
- Compare results with the truth table to produce a result confusion map and %Accuracy.



**Fig. 3** Each Arabic alphabet is given a 1 if present of 0 if not in the sequential order of letters in the words, and words in the sentence being converted.

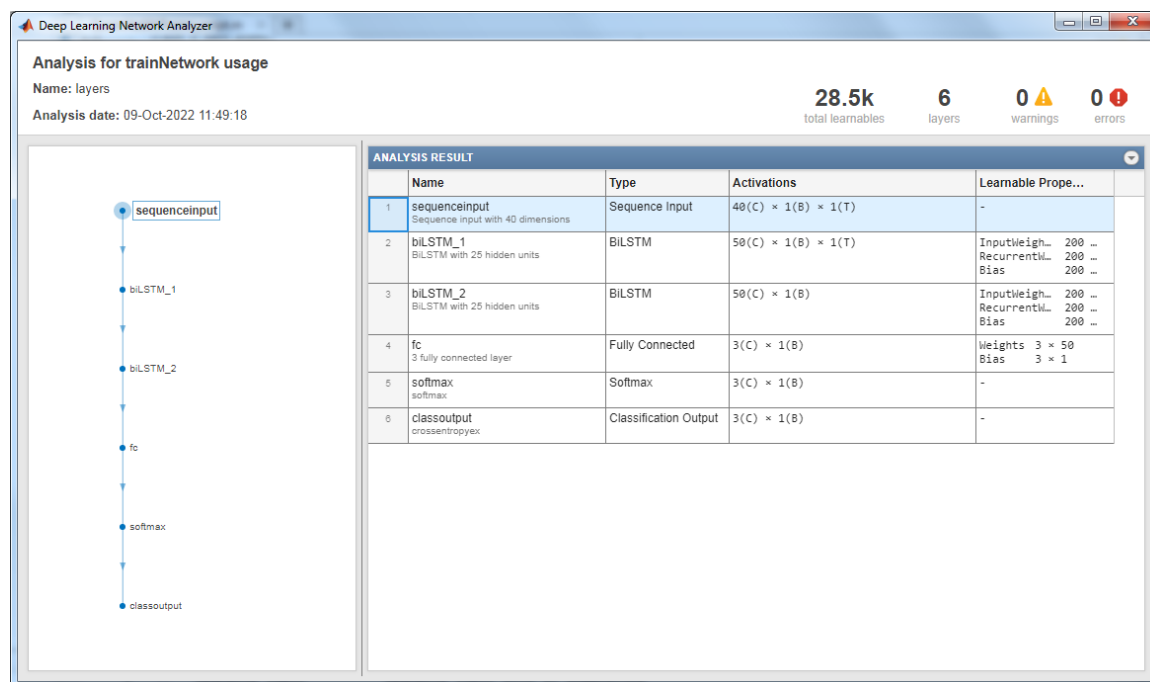
### Layers of the Bi-Lateral LSTM Network:



```

layers =
6x1 Layer array with layers:
  1 '' Sequence Input Sequence input with 40 dimensions
  2 '' BiLSTM BiLSTM with 25 hidden units
  3 '' BiLSTM BiLSTM with 25 hidden units
  4 '' Fully Connected 2 fully connected layer
  5 '' Softmax softmax
  6 '' Classification Output crossentropyex
    
```

**Fig. 4**



**Fig. 5 Network Layers Structure**

For training and testing the model, we used **6236** Quran verses (Hafs narration), **858** lines of poems, and **5181** Hadith text processed from Sahih Bukhari's book with verified trusted chain of narrations, extracting only the words expressed directly by the prophet PBUH for use for the purpose of this research. For the Hadiths processed, we purposefully avoided text not expressed by the prophet, including narration chain, expression by others, or some quotes of Quran verses.

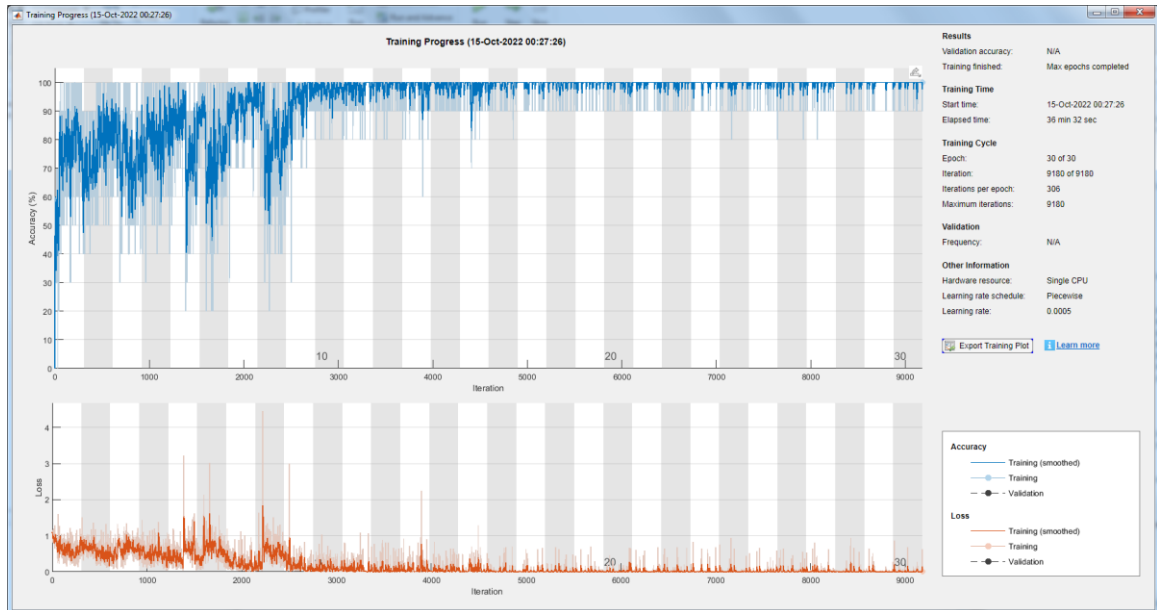
Each group of Quran and Hadith were each randomized in order, this is so we can avoid bias of results with dominantly long strings at the beginning and dominantly short strings at the end of the dataset.

We trained three different models **Net21**, **Net20**, **Net19** on **25%**, **20%**, and **15%**, respectively, of total 6236 Quran verses with randomized order of the verses so as to avoid bias of model due to verse length. Similarly we trained the three models on the same percentage of available text from the Hadiths, and Poems, and then tested each of the models on the residual **75%**, **80%**, and **85%**, respectively, of Quran verses, Hadiths, and Poems. Accurate classification of the three LSTM Models of testing Quran verses was **98.58%**, **98.95%**, and **83.47%** respectively. Accurate Hadith's classification accuracy of the three LSTM Models **98.97%**, **99.73%**, and **99.59%** respectively. Accurate classification of the three LSTM Models for the Poems was **100%**, **100%**, **100%** respectively

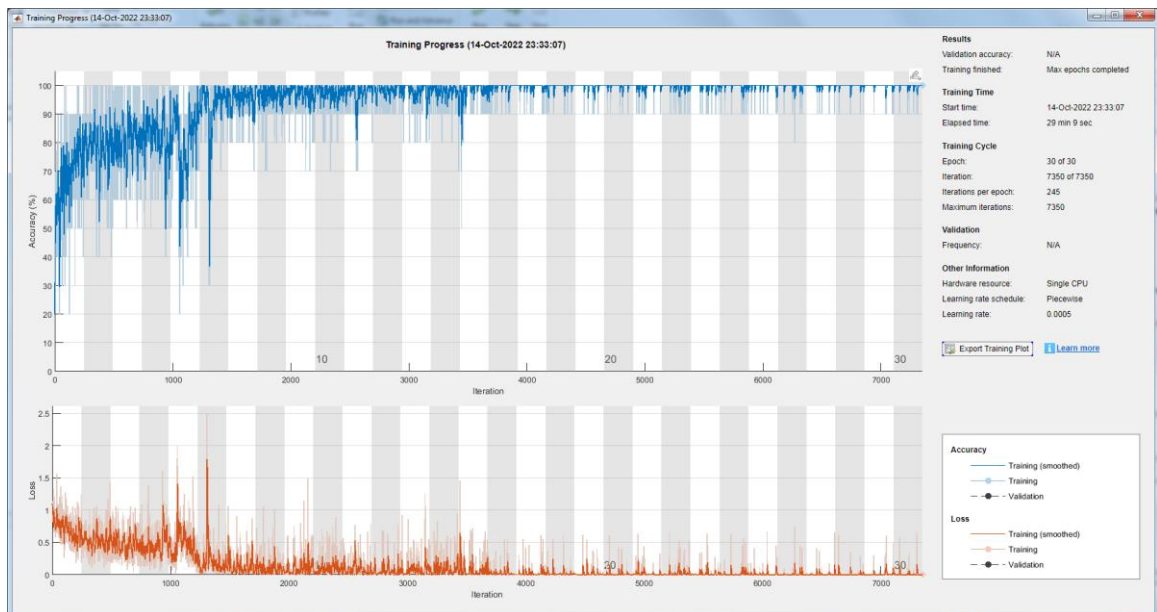
Model Version	% of Quran & Hadith & Poems used for Training	% of Quran & Hadith & Poems used for Testing	Quran Classification % Accuracy	Hadith Classification % Accuracy	Poems Classification % Accuracy	Number of Quran Verses Training	Number of Hadith Training	Number of Poem lines Training	Number of Quran Verses Testing	Number of Hadith Testing	Number of Poem lines Testing
<b>Net 21</b>	25%	75%	98.58%	98.97%	100%	1559	1295	214	4677	3906	644
<b>Net 20</b>	20%	80%	98.95%	99.73%	100%	1247	1036	171	4989	4145	687
<b>Net 19</b>	15%	85%	83.47%	99.59%	100%	935	777	128	5301	4404	730

**Table 2**

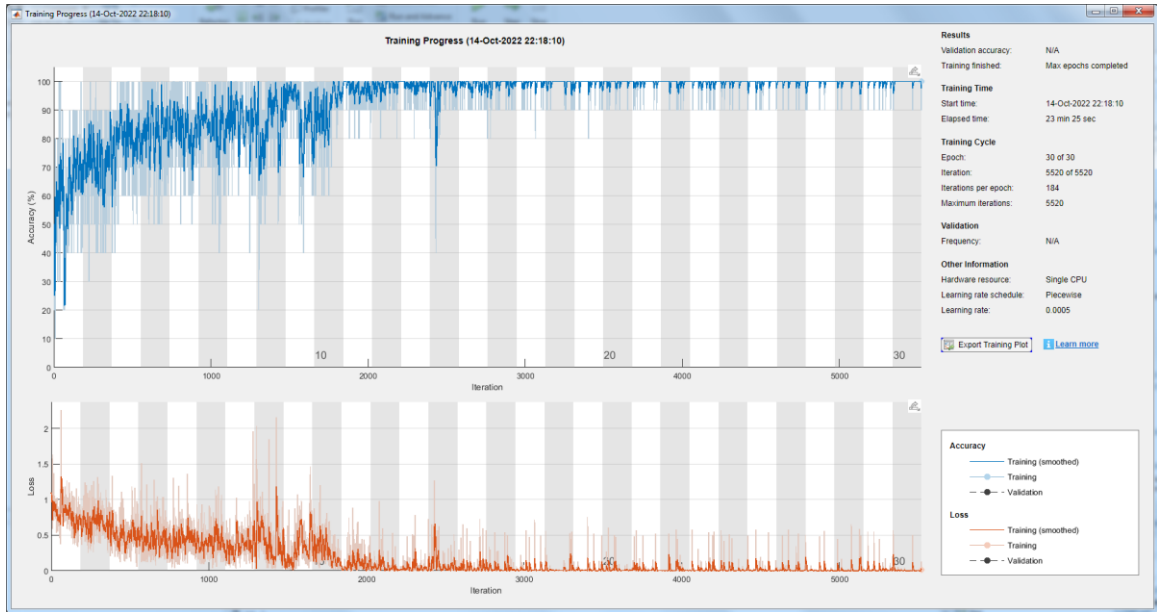
The following demonstrates the training adaptation of the LSTM network with reduction of error and improvement of classification up to 100% training accuracy and reduction of the error loss cost function.



**Fig.6 Net21: Training on 25% of the Quran 6236 verses and Bukhari 5181 Hadith & Hanging Poems 858 lines - reached 100% goal in training validation**



**Fig.7 Net20: Training on 20% of the Quran 6236 verses and Bukhari 5181 Hadith & Hanging Poems 858 lines - reached 100% goal in training validation**



**Fig.8 Net19: Training on 15% of the Quran 6236 verses of Bukhari 5181 Hadith & Hanging Poems 858 lines - reached 100% goal in training validation**

**Results:**

Training: 25%

Quran 99.93% Accuracy, N=1559

Hadith 99.92% Accuracy, N=1295

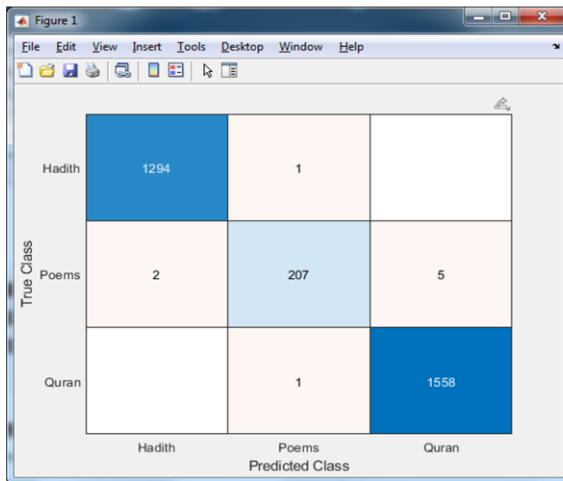
Poems 96.73% Accuracy, N=214

Testing: 75%

Quran 98.58% Accuracy, N=4677

Hadith 98.97% Accuracy, N=3906

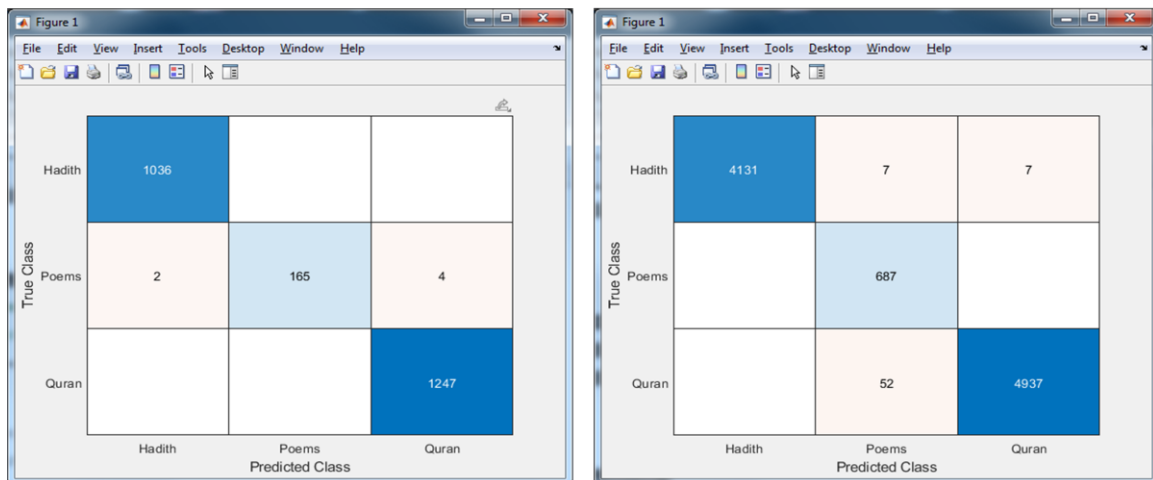
Poems 100% Accuracy, N=644



**Fig. 9 Net21 Training and Testing Results AI Confusion Matrix**

Training: 20%  
 Quran 100% Accuracy, N=1247  
 Hadith 100% Accuracy, N=1036  
 Poems 96.49% Accuracy, N=171

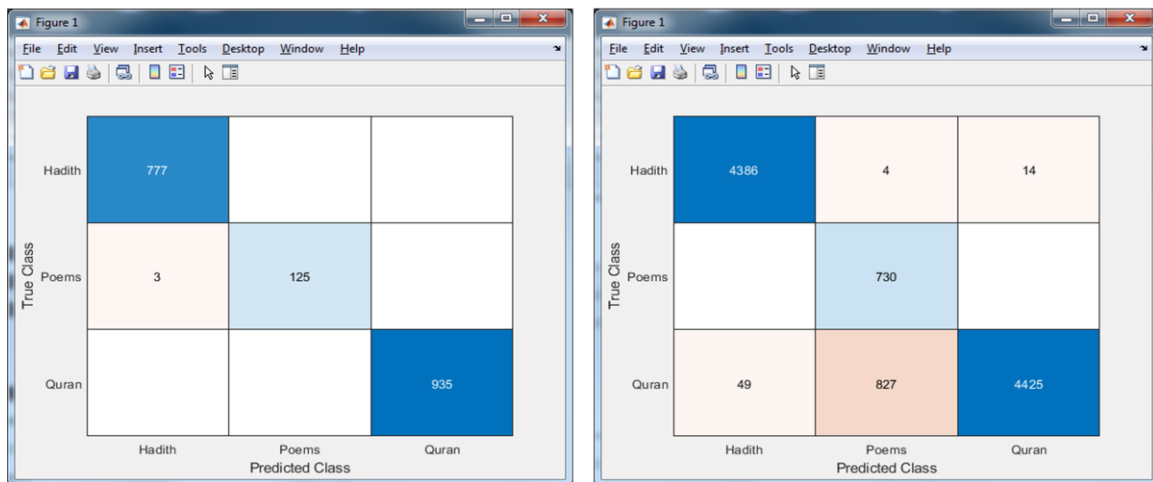
Testing: 80%  
 Quran 98.95% Accuracy, N=4989  
 Hadith 99.73% Accuracy, N=4145  
 Poems 100% Accuracy, N=687



**Fig. 10 Net20 Training and Testing Results AI Confusion Matrix**

Training: 15%  
 Quran 100% Accuracy, N=935  
 Hadith 100% Accuracy, N=777  
 Poems 97.65% Accuracy, N=128

Testing: 85%  
 Quran 83.47% Accuracy, N=5301  
 Hadith 99.59% Accuracy, N=4404  
 Poems 100% Accuracy, N=730



**Fig. 11 Net19 Training and Testing Results AI Confusion Matrix**

**Quran / Hadith / Poem confusion results text table can be found in this file link:**  
[https://drive.google.com/file/d/1kxNOlhPcNKBA1u4s6wvZdBSrVQP2Z\\_iS/view?usp=sharing](https://drive.google.com/file/d/1kxNOlhPcNKBA1u4s6wvZdBSrVQP2Z_iS/view?usp=sharing)

### 3. Conclusions

AI deep learning models are typically data hungry requiring large amounts of data for training with wide diversity in the input data and unbiased grouping to ensure fair representation of the input data during training so they can perform adequately during testing. Typically 70-80% of the data is used for training and 20-30% is used for testing. In this research we started with using only 25% of the data used for training and the residual 75% used for testing. Model classification accuracy results were ~99%. Further reduction of training data volume down to 20% did not affect the results accuracy significantly which demonstrates the robustness of the model against information scarcity. However,



reduction of training data volume down to **15%** starts to demonstrate some sensitivity to training information scarcity, given 3 classes of classification at the output layer: Quran, Hadith, and Poem.

The results also demonstrate the distinct expression style used in poems during the prophet's era in Mecca vs. that of the Quran and vs. the Prophet's Hadith. The poems were identified with **100%** classification accuracy, while the Hadith's classification accuracy was  $\geq 99\%$  and the Quran's classification accuracy was  $\geq 83\%-99\%$ .

Hadiths in the confusion text of net21, net20, and net19 models are a result of shared vocabulary content common in the Quran. Some of the Quran confusion text was a result of Nourani letters characterized by very short sequences of letters and a single word verses. These words resulted in confusion text due to their very short length that is not sufficient to characterize well during classification, and due to the randomized training data set did not including their example during the training phase.

These results demonstrate the distinct nature of the expression style of authorship between the Quran, the Hadith, and the Pre-Islamic Poetry leading to the conclusion that they are indeed from uniquely different sources of authorship. *This research results provides objective scientific proof that concludes the Quran is not the creation of the Prophet Muhammad (PBUH) but is from a different source, that is the divine source (Allah subhanah).*

It also demonstrates that the Prophet's style of expression in his speech in the verified trusted Hadith was not influenced by the Quran. It further demonstrates that the Prophet's style of expression was not influenced by the Poetry style that was common in his era in Mecca where he grew for indeed *he is not a poet!*.

Poetry was identified with strong **100%** classification accuracy in the three models, which demonstrate its unique differentiation from the Quran and the Hadith. This research demonstrates that the Quran did not follow the poetic style of expression common in the era of Pre-Islamic Mecca, but rather was distinguished in its own class of expression style that fascinated and attracted people to it as it was different from what they heard before in poetry.

## Acknowledgements

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## References

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[2] <https://www.mathworks.com/help/deeplearning/ug/long-short-term-memory-networks.html>

[3] <https://shamela.ws/book/151017>

The ten hanging Pre-Islamic Poems:

الكتاب: فتح الكبير المتعال إعراب المعلقات العشر الطوال  
المؤلف: محمد علي طه الدرة  
الناشر: مكتبة السوادي جدة - السعودية  
الطبعة: الثانية، ١٤٠٩ هـ - ١٩٨٩ م

[4] <https://amss.ahlamontada.com/t73-topic>  
Qis-Bin-Saada 's poem

خطبة قس بن سعادة

[5] Sahih Al-Bukhari of Prophet's Hadith

## Author's Biography:



Mohammad Khair is a medical device Engineer & Director with a Bachelor (1989) and Masters of Science (1991) in Biomedical Engineering from Marquette University, and an Executive MBA from University of Illinois Urbana-Champaign (2007). Also participated in graduate studies towards a PhD (ABD) in Electrical Engineering at Illinois Institute of Technology. Mohammad's research interests are in medical device technologies and algorithms for novel and reliable health diagnostics and therapeutics. Mohammad is currently a Principal Engineer at General Electric Healthcare, with 35+ years experience in his field with top medical device global companies. In addition, Mohammad's interests include development of Quran analytical databases and applications that are enabling for discovery of numeric structures reflecting the precision within the Quran verses. Furthermore, linking of knowledge elements within the Quran and Hadith to enable an improved understanding and insights that complements the linguistic aspects of their content. Also building databases that enables development of applications in Artificial Intelligence, and Arabic natural language processing applications for automating user's ability for Quran recitation and memorization. Mohammad has over 60+ patents and patent applications, and 5 scientific journal publications

## Abstract in Arabic

### المخلص

عادةً ما تكون نماذج التعلم العميق للذكاء الاصطناعي متعطشة للمعلومات، وتتطلب كميات كبيرة من البيانات للتدريب مع تنوع كبير في بيانات الإدخال، وتجميع معلوماتي غير متحيز لضمان التمثيل العادل لبيانات الإدخال أثناء التدريب حتى تتمكن الشبكات من أداء التصنيف للمعلومات بشكل مناسب أثناء الاختبار أو الفحص، وعادةً ما يتم استخدام 70-80% من البيانات للتدريب، و 20-30% للاختبار، وفي هذا البحث بدأنا باستخدام 25% فقط من البيانات المستخدمة للتدريب في النموذج الشبكة net21؛ ولفحص مدى حساسية النموذج، واعتماده على كمية المعلومات المتوفرة بالتدريب قمنا بتقليص المعلومات المتاحة للتدريب إلى 20% فقط بالنموذج الشبكة net20، ثم كررنا تقليص المعلومات للتدريب بالنموذج الشبكة net19 إلى 15% فقط، وقد أظهرت النتائج أن هذا النوع من النماذج LSTM تتعامل بمرونة مع قلة المعلومات، ونلاحظ أن نتائج الاختبار لم تتأثر بشكل كبير.

تبين نتائج التصنيف عند فحص النصوص أنه تم التعرف على الشعر بدقة 100% والتعرف على الحديث بدقة 99% والتعرف على النص القرآني بدقة 83%-99%. من الأخطاء في تصنيف الحديث كانت نتيجة لأنها تتضمن مفردات مشتركة شائعة في القرآن، ومن الأخطاء في تصنيف الآيات للقرآن كانت نتيجة الحروف النورانية (الحروف المقطعة) التي تتميز بتسلسلات قصيرة جداً من الأحرف، وآيات من كلمة واحدة، ونتج عن هذه الكلمات خطأ بالتصنيف؛ بسبب طولها القصير جداً من حرفين، أو ثلاثة الذي لا يكفي للتصنيف الجيد، أو بسبب عدم وجود أمثالها في مجموعة بيانات التدريب أثناء مرحلة التدريب.

نستنتج بشكل موضوعي أن هناك اختلافات قوية، وكبيرة في أسلوب التعبير بين القرآن، والحديث النبوي؛ والتي تثبت أن أسلوب التعبير فريد من نوعه ومختلف لهذه النصوص لإختلاف المصدر للنص بين القرآن (من الله سبحانه وتعالى)، والحديث النبوي (من الرسول محمد صلى الله عليه وسلم)، والشعر الجاهلي (من شعراء المعلقات العشر). الإختلاف في هذا التصنيف للفئات الثلاثة يتجلى في إختلاف الأسلوب اللغوي في التعبير. وثبتت هذه النتائج البارزة في تطبيق الذكاء الاصطناعي للتعلم العميق بنماذج LSTM بدليل موضوعي قوي أن القرآن ليس من تأليف النبي محمد - صلى الله عليه وسلم- لأن القرآن مميز بشكل فريد في أسلوبه في التعبير عن أسلوب النبي نفسه في التعبير المقتبس من خلال روايات خطابه في الحديث الصحيح الموثوق الرواية. كما أنه تثبت النتائج أن أسلوب النبي في التعبير لم يتأثر بالأسلوب اللغوي للتعبير في القرآن الكريم. قال الله تعالى " أَمْ يَقُولُونَ افْتَرَاهُ ".

وتمكنت النماذج الثلاثة من التعرف على نصوص الشعر بنسبة 100%، مما يؤكد تميز الشعر في أسلوبه عن نصوص القرآن والحديث. فعند مقارنة النص القرآني بالشعر الجاهلي نرى أنهما متميزان عن بعضهما البعض؛ فالقرآن لا يقلد أسلوب التعبير في الشعر الجاهلي المكّي بنفس الحقة الزمنية التي أنزل بها القرآن بمكة المكرمة. لذلك جذب جماله التعبيري باللغة العربية إهتمام الناس وإعجابهم بما تميز وإختلف به عن ما كانوا يتداولون من لغة وشعر. وكذلك يتبين أن الشعر الجاهلي يختلف تماماً عن أسلوب الرسول محمد - صلى الله عليه وسلم- في التعبير؛ حيث إنه لم يتأثر بأسلوب الشعراء في الكلام في حقة زمنه في مكة. ونستنتج من مقارنة القرآن بالشعر والحديث بالشعر دليلاً يثبت ما قاله الله تعالى:- " وَمَا هُوَ بِقَوْلِ شَاعِرٍ ".