



Statistical Analysis of the God's Traits in Qur'an Using Data Visualization Technique

Fan Yi, Mohammad Reza Mahmoudi and Shahab S. Band

EasyChair preprints are intended for rapid dissemination of research results and are integrated with the rest of EasyChair.

April 12, 2022

Statistical Analysis of the God's Traits in Qur'an using Data Visualization Technique

Fan Yi

Department of Accounting, Yantai Vocational College, Yantai City, Shandong Province, China

Mohammad Reza Mahmoudi

Institute of Research and Development, Duy Tan University, Da Nang 550000, Vietnam

Shahab S. Band

*Future Technology Research Center, College of Future, National Yunlin University of Science and
Technology 123 University Road, Section 3, Douliou, Yunlin 64002, Taiwan.*

Abstract. In this work we intended to study and compare the traits of God in the Medinan and Meccan Qur'an's Suras, based on statistics and data visualization. The entire verses of Qur'an were considered and the count of each beauty and divine glory trait was calculated, separately in Medinan and Meccan Suras. The frequencies of the divine glory, the beauty and total traits in Meccan, Medinan and total Suras were studied and compared using data visualization technique. The results indicated that for Medinan Suras, in divine glory traits, Hakem and Aziz, in beauty traits, Alim and Rahim, and totally, Alim, Rahim and Hakem had the most uses; for Meccan Suras, in divine glory traits, Aziz and Hakim, in beauty traits, Rahman and Rahim, and totally, Rahman and Rahim had the most uses; and for total Suras, in divine glory traits, Hakem and Aziz, in beauty traits, Rahim, Rahman and Alim, and totally, Rahim, Rahman and Alim had the most uses. Moreover, the rates of using divine glory traits in Medinan and Meccan Suras (16.1% and 17.6%) and the rates of using beauty traits in Medinan and Meccan Suras (83.9% and 82.4%) significantly did not differ.

Keywords: God, Qur'an, Trait, Beauty, Divine Glory, Data Visualization, Statistics, Data Analysis, Text Analysis, Text Mining.

1. Introduction

According to Muslim's opinion, the Qur'an (that may be called the Forghan, al ketab and Moshaf) is the last heavenly book revealed for human guidance. They also believe that the Qur'an is a miracle and a sign of Prophet Muhammad. Moreover, The Qur'an is the main source of revelation in Islam, which is in Arabic. The Qur'an is the most important source of Muslim thought and the criterion of correctness of Islamic ideas. That is, the teachings from other Islamic sources are not valid if they contradict the teachings of the Qur'an. The Quran has influenced every aspect of Muslim's life. The Qur'anic proverbs are found not only in the Arabic language but also in the language of non-Arab Muslims. It should be noted that the Qur'an has been gradually revealed to Muhammad for 23 years. Quran has 114 Suras and more than 6000 verses (a short unit in Quran), and is divided into 30 parts (Juz) and 120 groups (hezb). The verses of the Qur'an during the time of the Prophet were scattered on animal skins, palm trees, paper, and cloth. After the death of the Prophet, verses and Suras of the Quran were compiled by the companions of the Prophet. The content of the Qur'an about God emphasizes his monotheism and oneness. The Qur'an considers God to be closer to man than his neck, considers man's relationship with God unnecessarily mediated, and commands man to submit to the cause of

God. The Qur'an considers natural phenomena as signs for God; it considers religion and truth one and considers the diversity of religions the result of diversity in people. The Qur'an also defines the laws and rights in the Islamic community. In addition to monotheism, it discusses topics such as the Resurrection, the wars of the Prophet, the stories of the prophets, the religious practices of Islam, moral virtues and vices, and the fight against hypocrisy. The Qur'an has a special place in Muslim rituals and art. The greatest expression of the Qur'an in art has been in the fields of calligraphy, gilding, literature and architecture. Non-Muslim scholars have done a great deal of research on the literature, content, and revelation of the Qur'an. Some scholars have called the Qur'an the word of the Prophet of Islam, saying: its content is derived from Jewish and Christian sources and poetry from the age of ignorance. Others, while not calling the Qur'an a revelation, consider it superior to the human word.

The Qur'anic Suras are divided into two parts; the Meccan Suras and the Medinan Suras. One of the important issues of the Quranic sciences is the recognition of the Meccan and the Medinan of the Qur'anic Suras. The necessity of understanding the Meccan and Medinan Suras of the Qur'an is made clear by the clearing of some Meccan and Medinan historical ambiguities or by helping to understand the content of the verses.

Islamic scholars have categorized the attributes and names of God in the Qur'an into two parts: The glorious manifestations of God, which are rooted in the glorious names of God in various forms, express the grandeur and glory of God, and the other the manifestations of God's beauty, which are rooted in God's beautiful names, and display his beauties and kindness. Divine attributes were raised as one of the issues of Islamic theology in the early centuries of Islamic prosperity, and there was much debate. It is very important to know the attributes of God because Muslims practice many of their behaviors based on the teachings of the Qur'an. Divine names

and traits are one of the most used concepts in Persian poetry and mystical texts. Both among ordinary people and in the mystical books there is much debate about how the traits of God in the Qur'an and their importance. In the eyes of the Muslims, knowing God's names and attributes makes people better aware of God, So they strive to find a way to know God by knowing the traits and names of God in order to be salvation and blissful. But unfortunately, so far there has been no clear criterion for identifying God's traits, and people describe God as kind, compassionate, or scary and glorious.

Opponents of Islam and Qur'an claim that unlike the Medinan Suras, the Meccan Suras commonly include divine glory God's traits and are about war. But the Muslims reject this claim and tell that the frequencies of two types of traits are similar in Medinan and Meccan Suras. Undoubtedly understanding what differences or similarities between traits of God in the Meccan and Medinan Suras can help us to better understand Muslim thought.

Therefore, in this work we intend to study and compare the traits of God in the Medinan and Meccan Qur'an's Suras, based on statistics and data visualization. Because only by statistical analysis can one have a proper understanding of the subject, and to avoid any prejudice.

2. Literature

Bell (1953) concluded that there is a lot of rhetoric, repetition and simile in the Qur'an, like the Jewish, Christian, and Hanafa texts. Naji et al. (2005) categorized the verses of Qur'an by designing a classifier. The characteristics of Medinan and Meccan Suras were studied by Bin Dost and Ahmad (2008). They explored some descriptive statistics such as mean, dispersion and shapes of sizes and lengths of the words in Qur'an. Abdul-Baquee and Atwell (2009) investigated a database including the verbs of Qur'an, and compared them with English Frame Net's verbs.

Based on a timeline in which seven groups of crossings successive stages, Sadeghi (2011) endorsed that the Qur'an has just one author. On the contrary, Noldke (2012) considered the Qur'anic Suras, especially those of the Mecca, to be literally miraculous, and likened the Qur'anic verses to the songs of angels that exhorted the lives of believers. He concluded that some verses of the Qur'an are perfectly in line with new scientific discoveries. He also concluded that the Qur'an is of divine origin. Alhawarat et al. (2015) began a collection of researches aimed at serving the Qur'an and providing useful information and accurate knowledge to all humans. They have also developed a framework to produce a "golden dataset" that can be used by researchers in natural Arabic language processing. Their techniques can be applied to statistical analysis about the Arabic texts. The God's traits in Medinan and Meccan Suras have been statistically studied by Liu et al. (2019). They found that the beauty traits had significantly more usage than the divine glory traits in Medinan and Meccan Suras. They concluded that the rates of using divine glory traits in Medinan and Meccan Suras (16.1% and 17.6%) and the rates of using beauty traits in Medinan and Meccan Suras (83.9% and 82.4%) significantly do not differ. Several data analysis techniques such as clustering have been used by Mahmoudi et al. (2018a) and Mahmoudi and Abbasalizadeh [(2018a), (2018b), (2018c), (2018d)] to study the Divans of and Khaghani Moulana, Qur'an and poetries of Sa'adi. Different data analysis techniques have been applied in different fields to extract knowledge [Details can be seen in Haghbin et al. (2011); Mahmoudi and Mahmoudi [(2014a), (2014b)], Mahmoudi et al. (2016), Maleki and Mahmoudi (2017), Jalali et al. (2017), Mahmoudi et al. [(2017a), (2017b)], Bahrami et al. (2017), Maleki et al. (2017), Jalali et al. (2018), Mahmoudi et al. [(2018b), (2018c), (2018d), (2018e)], Jalali et al. (2018), Mahmoudi (2018), Abbasi et al. (2018), Heydari et al. (2018), Yin et al. (2019), Mahmoudi et al. (2019), Ji-jun et al. (2019), Maleki et al. (2019)].

3. Methodology

This section discusses various topics such as data collection and data analysis techniques. The first subsection deals with the characteristics of research's dataset. Then the methods used to analyze the dataset are described.

3.1. Dataset

The dataset of this work contained the entire verses of Qur'an. Then, the count of each God's trait was calculated, separately in Medinan and Meccan Suras. Tables 1 and 2 indicate the different beauty and divine glory traits of God, respectively. Table 3 summarizes the descriptive statistics of the traits of God in Qur'an.

Table 1: Beauty Traits of God

Classical Arabic	Romanization	Classical Arabic	Romanization	Classical Arabic	Romanization
الرَّحْمَنُ	Rahman	الْحَيُّ	Hayy	الْقَيُّومُ	Qayyum
الرَّحِيمُ	Rahim	الْوَارِثُ	Waarith	الْأَوَّلُ	Awwal
السَّلَامُ	Salam	ذُو الْفَضْلِ	Zu-Ifazl	الْآخِرُ	Akhir
الْمُؤْمِنُ	Mu'min			الظَّاهِرُ	Zahir
الْخَالِقُ	Khaliq	النَّصِيرُ	Nasir	الْبَرُّ	Barr
		الْقَيُّومُ	Qayyum	التَّوَّابُ	Tawwab
الْبَارِئُ	Bari	ذِي الطُّوْلِ	Ze-tuol	الْعَفُوُّ	Afu
الْمُصَوِّرُ	Musawwir	رَفِيعُ الدَّرَجَاتِ	Rafe-darajat	الرَّءُوفُ	Ra'uf
الْعَفَّارُ	Qaffar	ذُو الْعَرْشِ	Zu-arsh	ذُو الْجَلَالِ وَالْإِكْرَامِ	Zul-Jalali wal
الْوَهَّابُ	Wahhab	قَابِلُ التَّوْبِ	Ghabel-Altowb		Ikram
الْكَرِيمُ	Karim	الْفَاطِرُ	Fater	الْهَادِي	Hadi

الْمُجِيبُ	Mujib	الرَّزَّاقُ	Razzaq		[Haadi]
الْوَاسِعُ	Wasi‘	الْفَتَّاحُ	Fattah	الْبَدِيعُ	Badi
الْحَكِيمُ	Hakim	الْعَلِيمُ	Alim	الصَّادِقُ	Asdagh
الْوَدُودُ	Wadud	السَّمِيعُ	Sami‘	الْقَرِيبُ	Qarib
الْمَجِيدُ	Majid	الْبَصِيرُ	Basir	الْفَالِقُ	Faleq
الشَّهِيدُ	Shahid	اللطيف	Latif	الشفيع	Shafie
يُجِيرُ	Yojir		Khabir	الكفيئ	Kafiel
الْحَقُّ	Haqq	الْحَلِيمُ	Halim	أَبْقَى	Abgha
الْوَكِيلُ	Wakil	الْعَفُورُ	Qafur	الْمُسْتَعَانُ	Mostaan
الْمَتِينُ	Matin			الْفَاعِلُ	Fael
الْوَالِيُّ	Wali	الشَّكُورُ	Shakur	الْمُنْزَلُ	Monzel
الْحَمِيدُ	Hamid	الْحَفِيفُ	Hafiz		

Table 2: Divine Glory Traits of God

Classical Arabic	Romanization	Classical Arabic	Romanization
الْمَلِكُ	Malik	الْعَظِيمُ	Azim
الْقُدُّوسُ	Quddus	الْعَلِيُّ	Ali
الْمُهَيَّمِنُ	Muhaymin	الْكَبِيرُ	Kabir
الْعَزِيزُ	Aziz		
الْجَبَّارُ	Jabbar	الْحَسِيبُ	Hasib
		الْوَّاحِدُ	Wahid
الْقَهَّارُ	Qahhar	الْأَحَدُ	Ahad
الرَّقِيبُ	Raqib	الصَّمَدُ	Samad

أَلْقَوِي	Qawi	أَلْمُقْتَدِر	Muqtadir
شَدِيدُ الْعِقَابِ	Shadid-al- eghab	أَلْبَاطِنُ	Batin
أَلْمُتَكَبِّرُ	Mutakabbir	أَلْمُنْعَالِي	Muta'ali
شَدِيدُ الْعَذَابِ	Shadid-al-azab	أَلْمُنْتَقِمُ	Muntaqim
سَرِيعُ الْحِسَابِ	Sarie-al-hesab	ذُو أَلْجَلَالِ وَأَلْإِكْرَامِ	Zul-Jalali wal Ikram
أَلْمَاكِرُ	Maker	أَلنَّعِيُّ	Qani
أَلْمُحِيطُ	Mohit	أَلْمُخْزِي	Mokhzey
أَشَدُّ بَأْسًا	Ashada-baasan	أَلْحَاكِمُ	Hakem
أَشَدُّ تَنْكِيلًا	Ashada-tankila	أَلْغَالِبُ	Qaleb
ذُو الْعِقَابِ	Zu-eghab	شَدِيدُ الْمِحَالِ	Shadid-al-mehal
ذُو الْقُوَّةِ	Zu-ghovat	أَلْمُقِيبُ	Muqit
أَلْحَاكِمُ	Hakam		

Table 3: Descriptive statistics for traits of God

		Mean	Standard Deviation
Total (114)	Total Traits	12.28	16.94

	Beauty	10.22	14.15
	Divine Glory	2.06	3.39
	Total Traits	23.74	28.31
Medinan (27)	Beauty	19.56	23.74
	Divine Glory	4.19	5.26
Meccan (87)	Total Traits	8.72	8.99
	Beauty	7.32	7.54
	Divine Glory	1.40	2.21

Table 3 shows that there are 87 and 27 Meccan and Medinan Suras. The averages of beauty and divine glory traits in Medinan Suras were 19.56 and 4.19, respectively. The corresponding average values in Meccan Suras were also 7.32 and 1.40, respectively. As it can be seen, the rates of using divine glory traits in Medinan and Meccan Suras (16.1% and 17.6%) and the rates of using beauty traits in Medinan and Meccan Suras (83.9% and 82.4%) significantly do not differ.

3.2. Methods

The entire verses of Qur'an were considered and the count of each beauty and divine glory trait was calculated, separately in Medinan and Meccan Suras. The collected data were saved as a text file and were analyzed by the statistical *R* software *version 3.6.2*. The frequencies of the divine glory, the beauty and total traits in Meccan, Medinan and total Suras were studied and compared using data visualization technique.

4. Results and Discussion

This section is regarded to the results of data visualization technique to study the different traits of God in Qur'an. Subsection 1 reports the data visualization about the God's traits in

Medinan Suras. The results of the data visualization about the God's traits in Meccan Suras are summarized in Subsection 2. The comparison of the God's traits in Medinan and Meccan Suras are also given in Subsection 3.

4.1. Data Visualization about the Traits of God in Medinan Suras

Figures 1 to 3, respectively, report the data visualization plot about the divine glory traits, the beauty traits and total traits of God in Medinan Suras. The results indicate that in divine glory traits, *Hakem* and *Aziz*, in beauty traits, *Alim* and *Rahim*, and totally, *Alim*, *Rahim* and *Hakem* have the most uses in Medinan Suras.



Figure 1: Data visualization about the divine glory traits in Medinan Suras



Figure 2: Data visualization about the beauty traits in Medinan Suras

glory traits, *Aziz* and *Hakim*, in beauty traits, *Rahman* and *Rahim*, and totally, *Rahman* and *Rahim* have the most uses in Meccan Suras.



Figure 4: Data visualization about the divine glory traits in Meccan Suras

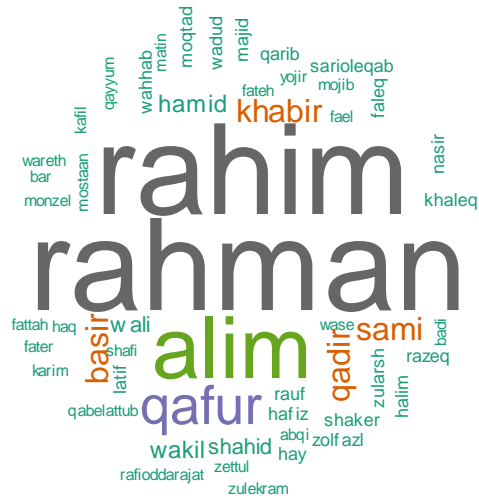


Figure 5: Data visualization about the beauty traits in Meccan Suras

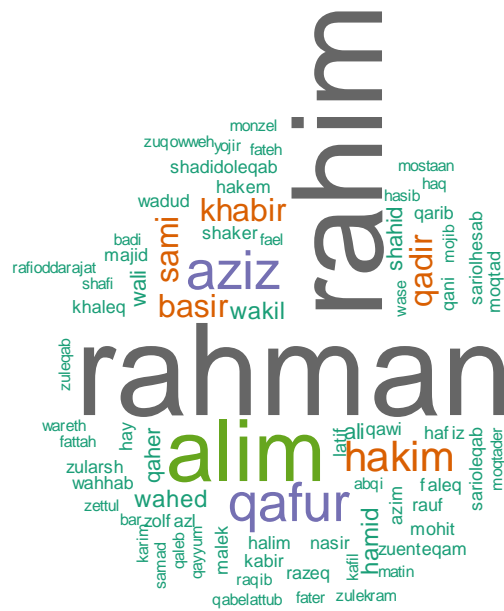


Figure 6: Data visualization about the different traits in Meccan Suras

4.3. Data Visualization about the Traits of God in Total Qur'an's Suras

Figures 7 to 9, respectively, report the data visualization plot about the divine glory traits, the beauty traits and total traits of God in total Qur'an's Suras. The results indicated that in

divine glory traits, *Hakem* and *Aziz*, in beauty traits, *Rahim*, *Rahman* and *Alim*, and totally, *Rahim*, *Rahman* and *Alim* have the most uses in Qur'an's Suras.



Figure 7: Data visualization about the divine glory traits in total Qur'an's Suras

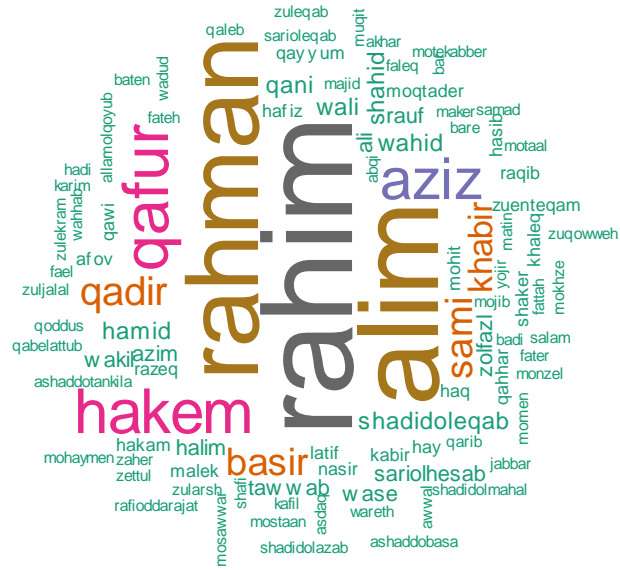


Figure 9: Data visualization about the different traits in total Qur'an's Suras

5. Conclusion

According to Muslim's opinion, the Qur'an is the last heavenly book revealed for human guidance. They also believe that the Qur'an is a miracle and a sign of Prophet Muhammad. Moreover, The Qur'an is the main source of revelation in Islam, which is in Arabic. The Qur'an

is the most important source of Muslim thought and the criterion of correctness of Islamic ideas. The Qur'anic Suras are divided into two parts; the Meccan Suras and the Medinan Suras. Islamic scholars have categorized the attributes and names of God in the Qur'an into two parts: The glorious manifestations of God, which are rooted in the glorious names of God in various forms, express the grandeur and glory of God, and the other the manifestations of God's beauty, which are rooted in God's beautiful names, and display his beauties and kindness. It is very important to know the attributes of God because Muslims practice many of their behaviors based on the teachings of the Qur'an. In the eyes of the Muslims, knowing God's names and attributes makes people better aware of God, So they strive to find a way to know God by knowing the traits and names of God in order to be salvation and blissful. But unfortunately, so far there has been no clear criterion for identifying God's traits, and people describe God as kind, compassionate, or scary and glorious. Opponents of Islam and Qur'an claim that unlike the Medinan Suras, the Meccan Suras commonly include divine glory God's traits and are about war. But the Muslims reject this claim and tell that the frequencies of two types of traits are similar in Medinan and Meccan Suras. Undoubtedly understanding what differences or similarities between traits of God in the Meccan and Medinan Suras can help us to better understand Muslim thought. Therefore, in this work we intended to study and compare the traits of God in the Medinan and Meccan Qur'an's Suras, based on statistics and data visualization. Because only by statistical analysis can one have a proper understanding of the subject, and to avoid any prejudice. The entire verses of Qur'an were considered and the count of each beauty and divine glory trait was calculated, separately in Medinan and Meccan Suras. The collected data were saved as a text file and were analyzed by the statistical *R* software *version 3.6.2*. The frequencies of the divine glory, the beauty and total traits in Meccan, Medinan and total Suras were studied and compared using data

visualization technique. The results indicated that for Medinan Suras, in divine glory traits, *Hakem* and *Aziz*, in beauty traits, *Alim* and *Rahim*, and totally, *Alim*, *Rahim* and *Hakem* had the most uses; for Meccan Suras, in divine glory traits, *Aziz* and *Hakim*, in beauty traits, *Rahman* and *Rahim*, and totally, *Rahman* and *Rahim* had the most uses; and for total Suras, in divine glory traits, *Hakem* and *Aziz*, in beauty traits, *Rahim*, *Rahman* and *Alim*, and totally, *Rahim*, *Rahman* and *Alim* had the most uses. Moreover, the rates of using divine glory traits in Medinan and Meccan Suras (16.1% and 17.6%) and the rates of using beauty traits in Medinan and Meccan Suras (83.9% and 82.4%) significantly did not differ.

References

Abbasi, A. R., Mahmoudi, M. R., Avazzadeh, Z. (2018). Diagnosis and clustering of power transformer winding fault types by cross-correlation and clustering analysis of FRA results, *IET Generation, Transmission & Distribution* **12** (19): 4301-4309.

Abdul-Baqee, S., Atwell, E. S. (2009). Knowledge representation of the Qur'an through frame semantics: a corpus-based approach, in: *Proceedings of the Fifth Corpus. Linguistics Conference*.

Alhawarat, M., Hegazi, M., Hilal, A. (2015). Processing the Text of the Holy Qur'an: a Text Mining (IJACSA) *International Journal of Advanced Computer Science and Applications* **6**(2): 262-267.

Bahrami, M., Amiri, M. J., Mahmoudi, M. R., Koochaki, S. (2017). Modeling caffeine adsorption by multi-walled carbon nanotubes using multiple polynomial regression with interaction effects, *Journal of water and health* **15** (4): 526-535.

Bell, R., (1953). *Introduction to the Qur'an*. Islamic Surveys, Edinburgh University Press.

Bin Dost, M. Kh., Ahmad, M. (2008). Statistical Profile of Holy Qur'an and Symmetry of Makki and Madni Suras, *Pakistan Journal of Commerce and Social Sciences* **1**: 1-16.

Haghbin, H., Mahmoudi, M. R., Shishebor, Z. (2011). Large Sample Inference on the Ratio of Two Independent Binomial Proportions. *Journal of Mathematical Extension* **5(1)**: 87- 95.

Heydari, M. H., Mahmoudi, M. R., Shakiba, A., Avazzadeh, Z. (2018). Chebyshev cardinal wavelets and their application in solving nonlinear stochastic differential equations with fractional Brownian motion, *Communications in Nonlinear Science and Numerical Simulation* **64**: 98-121.

https://en.wikipedia.org/wiki/Names_of_God_in_Islam

Jafar Jalali, S.M., Mahdizadeh, E., Mahmoudi, M.R., Moro, S. (2018). Analytical assessment process of e-learning domain research between 1980 and 2014, *Int. J. Management in Education* **12(1)**: 43–56.

Jalali, S. M., Moro, S., Mahmoudi, M. R., Ghaffary, K. A., Maleki, M., Alidoostan, A. (2017). A comparative analysis of classifiers in cancer prediction using multiple data mining techniques. *International Journal of Business Intelligence and Systems Engineering* **1 (2)**, 166-178.

Ji-jun, P., Mahmoudi, M. R., Baleanu, D., Maleki, M. (2019). On Comparing and Classifying Several Independent Linear and Non-Linear Regression Models with Symmetric Errors. *Symmetry* **11(6)**: 820.

Liu, J., Mahmoudi, M. R., Abbasalizadeh, A. (2019). Statistical analysis about the God's traits in Qur'an. *Digital Scholarship in the Humanities*. In Press.

Mahmoudi, M. R. (2018). On Comparing Two Dependent Linear and Nonlinear Regression Models. *Journal of Testing and Evaluation*. **47 (1)**. DOI: [10.1520/JTE20170461](https://doi.org/10.1520/JTE20170461), In Press.

Mahmoudi, M. R., Abbasalizadeh, A. (2018a). On comparing and clustering the alternatives of love in Saadi's lyric poems (Ghazals), *Digital Scholarship in the Humanities*. DOI:10.1093/llc/fqy024. In Press.

Mahmoudi, M. R., Abbasalizadeh, A. (2018b). Statistical analysis about the order of Qur'an's revelation, *Digital Scholarship in the Humanities*. DOI:10.1093/llc/fqy030. In Press.

Mahmoudi, M. R., Abbasalizadeh, A. (2018c). How Statistics and Text Mining Can be Applied to Literary Studies?, *Digital Scholarship in the Humanities*. In Press.

Mahmoudi, M. R., Abbasalizadeh, A., Rahmati, M. (2018a). An Statistical Approach to Investigate the Alternatives of Love in Moulana's Divan, *International Journal of Business Intelligence and Data Mining*, In Press.

Mahmoudi, M. R., Behboodian, J., Maleki, M. (2017a). Large Sample Inference about the Ratio of Means in Two Independent Populations, *Journal of Statistical Theory and Applications* **16(3)**: 366-374.

Mahmoudi, M. R., Heydari, M. H., Avazzadeh, Z. (2018b). Testing the difference between spectral densities of two independent periodically correlated (cyclostationary) time series models, *Communications in Statistics -- Theory and Methods*, In Press.

Mahmoudi, M. R., Heydari, M. H., Avazzadeh, Z. (2018c). On the asymptotic distribution for the periodograms of almost periodically correlated (cyclostationary) processes, *Digital Signal Processing* **81**: 186-197.

Mahmoudi, M. R., Heydari, M. H., Roohi, R. (2018d). A new method to compare the spectral densities of two independent periodically correlated time series, *Mathematics and Computers in Simulation* **160**: 103-110.

Mahmoudi, M. R., Mahmoodi, M. (2014a). Inference on the Ratio of Variances of Two Independent Populations. *Journal of Mathematical Extension* **7(2)**:83-91.

Mahmoudi, M. R., Mahmoodi, M. (2014b). Inference on the Ratio of Correlations of Two Independent Populations. *Journal of Mathematical Extension* **7(4)**: 71-82.

Mahmoudi, M. R., Mahmoodi, M., Pak, A. (2019). On comparing, classifying and clustering several dependent regression models. *Journal of Statistical Computation and Simulation*. In Press.

Mahmoudi, M. R., Mahmoodi, M., Nahavandi, E. (2016). Testing the Difference between Two Independent Regression Models. *Communications in Statistics -- Theory and Methods* **45(21)**: 6284-6289.

Mahmoudi, M. R., Maleki, M. (2017). A New Method to Detect Periodically Correlated Structure. *Computational Statistics* **32 (4)**: 1569-1581.

- Mahmoudi, M. R., Maleki, M., Pak, A. (2017b). Testing the Difference between Two Independent Time Series Models. *Iranian Journal of Science and Technology: Sciences* **41(3)**: 665-669.
- Mahmoudi, M. R., Maleki, M., Pak, A. (2018e). Testing the Equality of Two Independent Regression Models, *Communications in Statistics-Theory and Methods* **47 (12)**: 2919-2926.
- Maleki, M., Arellano-Valle, R. B., Dey, D. K., Mahmoudi, M. R., Jalali, S. M. J. (2017). A Bayesian approach to robust skewed autoregressive processes. *Calcutta Statistical Association Bulletin* **69 (2)**: 165-182.
- Maleki, M., Contreras-Reyes, J. E., Mahmoudi, M. R. (2019). Robust Mixture Modeling Based on Two-Piece Scale Mixtures of Normal Family. *Axioms* **8 (2)**: 38.
- Maleki, M., Mahmoudi, M. R. (2017). Two-piece location-scale distributions based on scale mixtures of normal family. *Communications in Statistics-Theory and Methods* **46 (24)**: 12356-12369.
- Naji, A., Kanaan, M., Ghassan, N. K., Bani, M., Basal, I. M. (2005). Statistical Classifier of the Holy Qur'an Verses (Fateha and Yaseen chapters), *Journal of Applied Science* **15(3)**: 580-583.
- Sadeghi, B. (2011). The Chronology of the Qurān: A Stylometric Research Program, *Arabica* **58(3-4)**: 210-299.q
- Nöldeke, T., (2012). *The History of the Qur'an*, Leiden: Brill, In Germany.
- Yin, M. M., Mahmoudi, M. R., Abbasalizadeh, A. (2019). Analysis of mystical concepts in Khaghani's Divan. *Digital Scholarship in the Humanities*. In Press.
- Samadianfard, Saeed, et al. "Wind speed prediction using a hybrid model of the multi-layer perceptron and whale optimization algorithm." *Energy Reports* 6 (2020): 1147-1159.
- Taherei Ghazvinei, Pezhman, et al. "Sugarcane growth prediction based on meteorological parameters using extreme learning machine and artificial neural network." *Engineering Applications of Computational Fluid Mechanics* 12.1 (2018): 738-749.
- Qasem, Sultan Noman, et al. "Estimating daily dew point temperature using machine learning algorithms." *Water* 11.3 (2019): 582.

Mosavi, Amir, and Atieh Vaezipour. "Reactive search optimization; application to multiobjective optimization problems." *Applied Mathematics* 3.10A (2012): 1572-1582.

Shabani, Sevda, et al. "Modeling pan evaporation using Gaussian process regression K-nearest neighbors random forest and support vector machines; comparative analysis." *Atmosphere* 11.1 (2020): 66.

Ghalandari, Mohammad, et al. "Aeromechanical optimization of first row compressor test stand blades using a hybrid machine learning model of genetic algorithm, artificial neural networks and design of experiments." *Engineering Applications of Computational Fluid Mechanics* 13.1 (2019): 892-904.

Mosavi, Amir. "Multiple criteria decision-making preprocessing using data mining tools." arXiv preprint arXiv:1004.3258 (2010).

Karballaezadeh, Nader, et al. "Prediction of remaining service life of pavement using an optimized support vector machine (case study of Semnan–Firuzkuh road)." *Engineering Applications of Computational Fluid Mechanics* 13.1 (2019): 188-198.

Asadi, Esmail, et al. "Groundwater quality assessment for sustainable drinking and irrigation." *Sustainability* 12.1 (2019): 177.

Mosavi, Amir, and Abdullah Bahmani. "Energy consumption prediction using machine learning; a review." (2019).

Dineva, Adrienn, et al. "Review of soft computing models in design and control of rotating electrical machines." *Energies* 12.6 (2019): 1049.

Mosavi, Amir, and Timon Rabczuk. "Learning and intelligent optimization for material design innovation." In *International Conference on Learning and Intelligent Optimization*, pp. 358-363. Springer, Cham, 2017.

Torabi, Mehrnoosh, et al. "A hybrid machine learning approach for daily prediction of solar radiation." *International Conference on Global Research and Education*. Springer, Cham, 2018.

Mosavi, Amirhosein, et al. "Comprehensive review of deep reinforcement learning methods and applications in economics." *Mathematics* 8.10 (2020): 1640.

Ahmadi, Mohammad Hossein, et al. "Evaluation of electrical efficiency of photovoltaic thermal solar collector." *Engineering Applications of Computational Fluid Mechanics* 14.1 (2020): 545-565.

Ghalandari, Mohammad, et al. "Flutter speed estimation using presented differential quadrature method formulation." *Engineering Applications of Computational Fluid Mechanics* 13.1 (2019): 804-810.

Ijadi Maghsoodi, Abteen, et al. "Renewable energy technology selection problem using integrated h-swara-multimoora approach." *Sustainability* 10.12 (2018): 4481.

Mohammadzadeh S, Danial, et al. "Prediction of compression index of fine-grained soils using a gene expression programming model." *Infrastructures* 4.2 (2019): 26.

Sadeghzadeh, Milad, et al. "Prediction of thermo-physical properties of TiO₂-Al₂O₃/water nanoparticles by using artificial neural network." *Nanomaterials* 10.4 (2020): 697.

Choubin, Bahram, et al. "Earth fissure hazard prediction using machine learning models." *Environmental research* 179 (2019): 108770.

Emadi, Mostafa, et al. "Predicting and mapping of soil organic carbon using machine learning algorithms in Northern Iran." *Remote Sensing* 12.14 (2020): 2234.

Shamshirband, Shahaboddin, et al. "Developing an ANFIS-PSO model to predict mercury emissions in combustion flue gases." *Mathematics* 7.10 (2019): 965.

Salcedo-Sanz, Sancho, et al. "Machine learning information fusion in Earth observation: A comprehensive review of methods, applications and data sources." *Information Fusion* 63 (2020): 256-272.