DETECTION OF LAYLAT AL-QADR IN RAMADAN USING IQRA' ALGORITHM BASED ON UNIQUE ANOMALY AS LUXLIER DATA DETECTION TO PROVE THE TRUTH SIGNS OF ISLAM

I Cholissodin[1]*, A Shampton[2] and A A Soebroto[1]
[1]Informatics Engineering, Faculty of Computer Science, Universitas Brawijaya Malang, Indonesia
[2]Pondok Pesantren Nurul Huda Salafiyah Syafi'iyah Malang, Indonesia

*Corresponding author: imamcs@ub.ac.id

Abstract- This study is related to the importance of increasing the understanding on the use of advanced technology on the signs of truth from Allah SWT contained in the Qur'an and Hadith so that they can be easily understood by many people, especially those outside Islam, to show that Islam is a very scientific and rahmatan lil 'alamin. Therefore, in this research, a collaboration is carried out between the fields of science and technology from Data Science as the approach of identification the Laylat al-Qadr (LQ) occurrence and why it only occurs one day in the Ramadan using the iQRa' Algorithm as the main research proposal and contribution with Artificial Intelligence (AI), Machine Learning (ML) and implementation code. From the results, it was suggested that the identification of the 2022 LQ day falls on 23 Ramadan 1443 H, which have been tested from 21 cities along 29-30 days data, from the beginning to the end of Ramadan 2022.

Keywords— detection of laylat al-qadr, iqra' algorithm, ramadan, qur'an and hadith.

I. INTRODUCTION

In order to read and understand the meaning of Allah's verses in nature which are interconnected with features in the Qur'an and Hadith regarding the importance of the role, contribution and synergy between science and technology supported by community organizations through NU community organizations and organizations that specialize in the field of Advance Technology, such as the Nahdhotul Ulama Computer Society (CSNU) and other institutions such as the Nahada Lecturer Alliance (ADN) which is always active on every campus and among campuses in Indonesia as an organization that is spiritually solid and strong, and intellectually established as an antibody of the Unitary State of the Republic of Indonesia (NKRI) from notions of radicalism and the spread of Islam in the world of higher education through several breakthroughs, one of which is conducting research across multi-scientific disciplines, so that later the results of the research can be published to the public and to general readers, with the hope that someone who was originally do not know about the Qur'an in depth yet will understand more and be interested in learning further about it, it must be ensured that the publication refers to and examines the Qur'an and Hadith through Ustadz/Ustadzah the blockchain of religious scholarship of whom extend to Rasulullah SAW [1,2].

There are numerous secrets in the form of interesting puzzles in the “Signs of Truth” package contained in the Qur'an, one of which is the riddle of when Laylat al-Qadr (LQ) occurred in QS Al Qadr:1-5, for example from previous studies LQ was analyzed from earthquake data [3], which then raises the question of why LQ only occurs one day in the month of Ramadan and why it only happens once a year, and thankfully in the Hadith, the characteristics of LQ have been described in detail. This puzzle is actually easy and can be solved using applied technology such as scientific Data Science which is assisted by the implementation of algorithms in a certain programming language and on certain devices under the auspices of Advanced Technology, to show the truth and solve the puzzle according to the jargon “let the data do the talking”, so that later no one will say that this is a hoax or without knowledge base. The use of Advanced Technology in this study is called "Deep Mining of LQ". This study is not intended to compare religions or to make religion like a toy for data computing with Artificial Intelligence (AI), Machine Learning (ML), and either. This study is carried out to show the intention and striving to continue learning by always reading and understanding the verses of Allah SWT both the written and unwritten ones in the Qur'an, with the main objective of witnessing and being grateful more for the majesty of Allah SWT, strengthening faith and piety through scientific approach by deep, objective and wise thinking and showing the world that Islam is a rahmatan lil 'alamiin (merciful to the whole creation) religion, Islam is a scientific religion instead of illogical or chirological or dogmatic, Islam is a friendly, embracing, nurturing, healthy, prosperous, tolerant, polite, courteous, harmonious, safe, peaceful, calm and soothing religion, and Islam is a religion that is able to process the data of the past, present and future. In addition, there will be no tools of any sophisticated technology that is capable or can match the scientific method of data processing in Islam [4]. Moreover, one of the peak of the results of the efforts in this research is a computational approach to detect LQ to provide education to

every human being about the best ways to behave as a human being in a group or as a tenacious individual in studying Islamic knowledge as a form of deep awareness within every individual, i.e., as an effort for every human being to try to increase faith and piety (while still being given the opportunity to live by Allah) to find the meanings of life through evidence in Islam as the answer and the solid foundation for embracing Islam so that this religion is easier to continue to be learned and studied scientifically, intelligently, professionally according to the approach of their respective professions or expertise in various case studies from the Qur'an and Hadith. This means that, hopefully, with some of these efforts, it can be stated that what we adhere to is not merely because of an inherited religion, blind belief, or joining in or other dogmatic reasons. Insha Allah, through the results of this research, we are together to find the answer, i.e., Dinul Islam (the religion of Islam).

II. METHODS

2.1 Data Science of Ramadan and Deep Mining of LQ

Laylat al-Qadr is a night (bright-night) which is considered unique because it only occurs once a year and only occurs in the month of Ramadan. Scientific Data of Ramadan is an approach to how our Science recognizes the Signs of Truth from Allah SWT using science from advanced technology to reveal the meaning or identification of the Signs of Truth of an event in the month of Ramadan, one of which is related to performing Deep Mining computation of Laylat al-Qadr. When viewed from the air temperature feature, the air temperature is "not cold and not hot", which as the reference from the Hadith of Rasulullah SAW is in the atmospheric layer closest to the earth, i.e., in the troposphere of the 6 existing layers (0 km to 14/16/ 20 km, which has different upper limit according to several sources), which is visualized in Fig. 1 and Fig. 2.

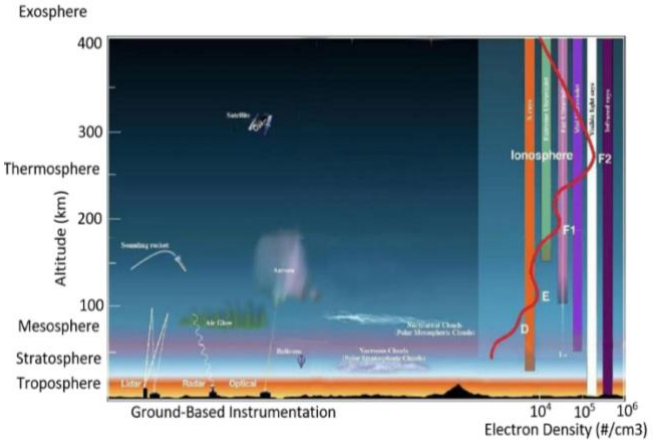


Fig. 1. Earth's Atmospheric Layers NASA

Furthermore, in uncovering the big sign of the Deep Mining of Laylat al-Qadr (LQ), it is necessary to make the effort to have inspiration or ideas in the form of instructions, i.e., by initially praying to Allah SWT to reveal the knowledge to us by praying, dhikr, reading the Qur'an. and other “tirakat” (ascetic acts). The reason why we always have to read the verses of Allah SWT is because we are indeed asked by Allah SWT to always read them (which can be seen in the first revealed letter of the Qur’an, i.e., QS Al-Alaq), and always think starting from studying the Qur'an, understanding, comprehending and having the ability to express them in the form of a deep understanding the big transformation form of which is being grateful for the blessings of guidance and affirming the pure monotheism until it is firmly rooted in the heart and soul and also in the form of morality in every side of life from these signs of truth. This definitely is our endeavor as servants and as caliphs on Earth so that we can strengthen our soul, spirit and body in strengthening our belief in faith and piety and in performing every deed that is always based on knowledge. Al-Qur'an is undoubtedly hudallinnas, a guide for all mankind, which has the certainty that everything in the Qur’an is the ultimate truth in the form of signs of truth that are viewed by humans only limited to the knowledge they have. This is what distinguishes between sign and science. Signs in the Qur'an and Hadith are the ultimate truth, while science is temporal; thus, sometimes it requires a revision or renewal. There are many inspirational stories in the world about how scientists can find the ultimate truth (Truth Sign) according to the knowledge or expertise they have, then they convert to Islam.

This is also among the basis and motivation of the realization of this research. In addition, it is our intention that our knowledge in this world can be used as a charity field to be harvested in the hereafter. Therefore, this research also tries to be directed not only to focus on world success because of the existing knowledge and expertise, but also to be in harmony with the deeds for the hereafter. It is expected that through collaboration and synergy of scientific data with Islamic knowledge from the Qur'an and Hadith from Allah SWT through Prophet Muhammad SAW with the intermediary of Jibril the angel can provide optimal research results as a blessing for all mankind in the world (rahmatan lil ’alamiin). Moreover, it will also show that there is no conflict between the signs in the Qur'an and science in this world as long as the science has been proven to be true. This means that the signs here wrap science, not the other way around. It is like the sign is a measuring tool (a kind of ruler) that has standardized its truth, while science is a material or thing that is tested or made as an object to be examined.

2.2 Dataset Weather as Features LQ based Qur’an and Hadist

The Weather Dataset used in this study was taken by utilizing the Application Programming Interface (API), i.e., api.openweathermap.org which used temperature, humidity, and others values recorded from the list of 21 cities shown in Table 1. The considerations used in determining these cities are related to the time difference for the city of Jakarta, where the data was taken once a day. The data collection was between 20.00 – 20.30 WIB.

Table I. Time diffference between jakarta and cities in the world

No	City Name	Time Difference (Hours)
1	Jakarta	0
2	Los Angeles	−14
3	Chicago	−12
4	New York City	−11
5	Toronto	−11
6	São Paulo	−10
7	Lagos	−6
8	London	−6
9	Johannesburg	−5
10	Kairo	−5
11	Paris	−5
12	Zurich	−5
13	Istanbul	−4
14	Moskwa	−4
15	Dubai	−3
16	Mumbai	−1.5
17	Hong Kong	+1
18	Shanghai	+1
19	Singapura	+1
20	Tokyo	+2
21	Sydney	+4

International reference time guidelines are no longer based on Greenwich Mean Time (GMT), but on Universal Time Coordinated (UTC). UTC +7 means that western Indonesia is seven hours ahead of UTC. For example, 00.00 at UTC is the same as at 07.00 WIB in Jakarta [6].

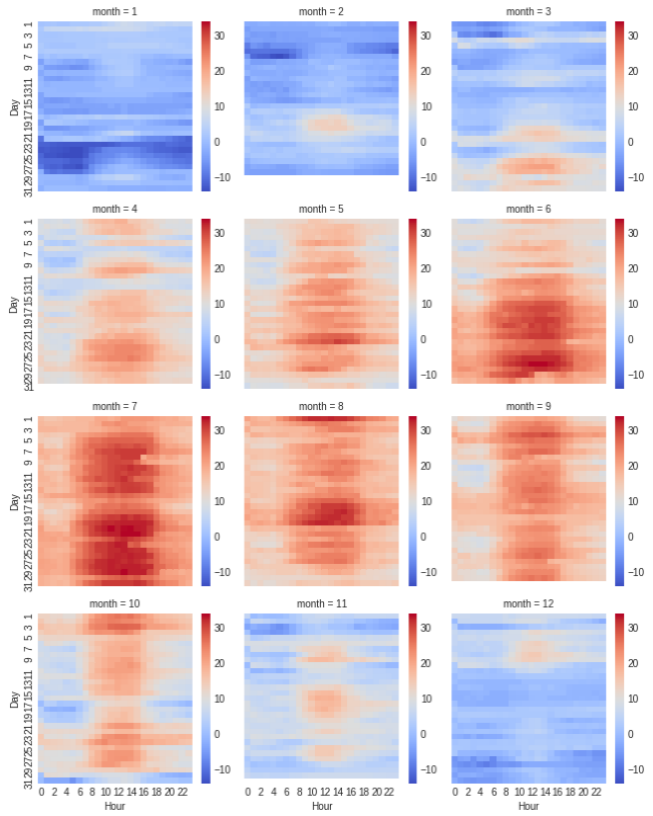


Fig. 2. Illustration of Temperature Visualization (23-Sep-06 until 22-Oct-06) [7,8] 13/12/2023 23:41:00

Allah SWT gives clear and obvious signs, especially on the occurrence of LQ for people who want to pay attention to the signs of its truth and greatness in the heavens and the earth and from the alternation of day and night. This is in accordance with QS Al Baqarah: 164 which means “Verily in the creation of the heavens and the earth, in the alternation of night and day, and in the ships that sail in the ocean carrying the things which are useful to the people and in the water which Allah sends down from the sky, with which He brings the dead earth into life and spreads in it all (kinds of) animals, and the changing of the winds and clouds between the heaven and the earth; indeed (there are) signs (of oneness and greatness of Allah) for people who use their reason.” [4,9]. Regarding the LQ features, in the Hadith [10-16] it has been mentioned that Muslims have been shown the signs of its occurrence and presence [17], which include:

- On that day, the sun does not shine too hot with very cool weather, as the hadith narrated by Imam Muslim.
- At night, the sky looks clean without the sight of the slightest cloud, the atmosphere is calm and quiet, not cold and not hot. This is based on a narration by Imam Ahmad.

In Mu'jam at-Tabari al-Kabir it is stated that the Prophet SAW said: “On the night of Laylat al-Qadr, the sky is clean, the air is not cold or hot, the sky is not cloudy, there is no rain, the stars do not appear and during the day the sun does not shine so hot.”

Fig. 3. Cover of Qur’an and Hadith [18–21]

III. FINDINGS AND DISCUSSION

3.1 Research Novelty: iQRa’ Algorithm to Luxlier Detection of Laylat al-Qadr

The iQRa’ 1.0 algorithm is proposed to identify when the day of Laylat al-Qadr occurs in Ramadan and “1.0” is the version of the algorithm, which we have specially compiled on a few days in the month of Ramadan in which there are several mechanisms that use a combination of 2 kinds of learning techniques (semi-prediction and semi-clustering) in one unit with the following steps.

```
1   import numpy as np
2   data = np.array(mydata)
3   “””
4   Header of data [ date,city, temperature_celsius, precipitation (%), ..
5   array([['01-04-2022 20:03:48', 'Jakarta', '29.22', '-', '70', '3.42'],
6          ['01-04-2022 20:03:48', 'Los Angeles', '11.66', '-', '89', '0'],
7          ['01-04-2022 20:03:48', 'Chicago', '-0.18', '-', '76','3.13'],
8          ...,
9          ['30-04-2022 20:08:12', 'Singapura', '25.85', '-', '94', '0'],
10         ['30-04-2022 20:08:12', 'Tokyo', '12.56', '-', '58', '4.12'],
11         ['30-04-2022 20:08:12', 'Sydney', '13.68', '-', '69', '5.14']],
12  dtype='<U19')
13  “””
14  # create ramadan_date_id (indonesian gov.)
```

```
ramadan_date_id = np.arange(31)

# pre-process for the prepare of calculating the value of mean & var
date_unique = \
np.unique(np.array([filt[:-3] for filt in data[:,0] if filt[:-3 ][-5:]=='20:08']))
n_day = len(date_unique)
sumDataTemp = [], sum_counterDataTemp = []
sumDataHum = [], sumDataWind = []

for i in range(n_day):
  init_sumDataTemp = 0.
  init_counterDataTemp = 0
  init_sumDataHum = 0.
  init_sumDataWind = 0.

  for temp_or_hum_or_wind in data:
    if(temp_or_hum_or_wind[0][:-3]==date_unique[i]):
      init_sumDataTemp += float(temp_or_hum_or_wind[2])
      init_counterDataTemp += 1
      init_sumDataHum += float(temp_or_hum_or_wind[4])
      init_sumDataWind += float(temp_or_hum_or_wind[5])

  sumDataTemp.append(round(init_sumDataTemp,2))
  sum_counterDataTemp.append(init_counterDataTemp)
  sumDataHum.append(round(init_sumDataHum,2))
  sumDataWind.append(round(init_sumDataWind,2))
n_city = sum_counterDataTemp[0]

# get mean value
meanDataTemp = list(np.around(np.array(sumDataTemp)/n_city,2))
meanDataHum = \
list(np.around(np.array(sumDataHum)/n_city,2))
meanDataWind= list(np.around(np.array(sumDataWind)/n_city,2))
# get variance value
varDataTemp = [], sum_counter_varDataTemp = []
varDataHum = [], varDataWind = []
raw_format_dataTemp = []
raw_format_dataHum = []
raw_format_dataWind = []

for i in range(n_day):
  init_varDataTemp = 0,   init_counter_varDataTemp = 0
  init_varDataHum = 0, init_varDataWind = 0
  init_raw_format_dataTemp = [], init_raw_format_dataHum = []
  init_raw_format_dataWind = []
  for temp_or_hum_or_wind in data:
    if(temp_or_hum_or_wind[0][:-3]==date_unique[i]):
      init_varDataTemp += \
      (float(temp_or_hum_or_wind[2]) - meanDataTemp[i])**2
      init_counter_varDataTemp += 1
      init_varDataHum += \
      (float(temp_or_hum_or_wind[4]) - meanDataHum[i])**2
      init_varDataWind += \
      (float(temp_or_hum_or_wind[5]) - meanDataWind[i])**2
      init_raw_format_dataTemp.\
      append(float(temp_or_hum_or_wind[2]))
      init_raw_format_dataHum.\
      append(float(temp_or_hum_or_wind[4]))
      init_raw_format_dataWind.\
      append(float(temp_or_hum_or_wind[5]))
  varDataTemp.append(round(init_varDataTemp/(n_city),2))
  sum_counter_varDataTemp.append(init_counter_varDataTemp)
  varDataHum.\
  append(round(init_varDataHum/(n_city),2))
  varDataWind.\
  append(round(init_varDataWind/(n_city),2))

raw_format_dataTemp.append(init_raw_format_dataTemp)
raw_format_dataHum.\
append(init_raw_format_dataHum)
raw_format_dataWind.append(init_raw_format_dataWind)
raw_format_dataTemp = np.array(raw_format_dataTemp)
raw_format_dataHum = np.array(raw_format_dataHum)
raw_format_dataWind = np.array(raw_format_dataWind)

# candidate of LQ, using first method => based minimum var.
idxCandidate = np.argmin(varDataTemp)
print("This Date as candidate of LQ based minimum var = \
",date_unique[idxCandidate][:-6],"\nor date",ramadan_date_id[idxCandidate], \
"ramadan of indo. gov. with meanTemp = ",meanDataTemp[idxCandidate], " \
and varTemp = ",varDataTemp[idxCandidate])

# candidate of LQ, using second method => based minimum of
abs(mean - temp_not_hot_n_not_cold) value with most high frequency
minTemp = 15
maxTemp = 25
temp_not_hot_n_not_cold = list(np.arange(minTemp,maxTemp+1))
save_idxCandidate = []
for i in temp_not_hot_n_not_cold:
  idxCandidate = np.argmin(np.abs(np.array(meanDataTemp)-i))
  save_idxCandidate.append(idxCandidate)

# inference is based on the save_idxCandidate variable, which is \
the most frequent closeness of all the dates of Ramadan
vals,counts = np.unique(save_idxCandidate, return_counts=True)

idxCandidate_vote = vals[np.argmax(counts)]
idxCandidate = idxCandidate_vote
print("This Date as candidate of LQ based from a minimum of\
abs( mean - temp_not_hot_n_not_cold) = \
",date_unique[idxCandidate][:-6],"\nor date",ramadan_date_id[idxCandidate], \
" ramadan of indo. gov. with meanTemp = ",meanDataTemp[idxCandidate], " \
and varTemp = ",varDataTemp[idxCandidate])
```

Fig. 4. Snippet code to get approach of identification the Laylat al-Qadr (LQ)

Based on Fig. 4, below is describe few steps to get a candidate for LQ using iQRa' Algorithm, start from load the dataset until getting the final result.

- Load Dataset Weather, especially temperature during Ramadan (1 April 2022 – 30 April 2022).
- Calculate the average value (Avg) and variance (Var) of daily temperature data from 21 cities shown in Table 1 [15,16], where $i \in$ index Days in Ramadhan = {1,2, .., 29 or 30).

$$Avg[i] = \frac{\sum_{j=1}^{21} x_j}{21} \quad (1)$$

$$Var[i] = \frac{\sum_{j=1}^{21} (x_j - Avg[i])^2}{21} \quad (2)$$

- First method, by finding the index of date that has the smallest Var value, as a candidate LQ, according to Equation 3.

$$\text{index Day LQ Candidate (1st Method)} = \underset{\forall i \in \text{index Days in Ramadhan}}{\text{ArgMin}} \; (Var[i]) \quad (3)$$

- Second method, by looking for index of a date that has an absolute difference in the value of Avg to the temperature (t) that is not too hot and not too cold, by consider "nearest" and have "most high frequency",

namely with an interval *t* value, for example, taken between tmin = 15º to tmax = 25º Celsius, according to Equation 4-6.

- Initialization of the Frequent variable to save the results of Equation 5.

$$Freq[0, 1, .., nDays\ in\ Ramadan - 1] = 0 \quad (4)$$

- Iterate over *t*, starting from tmin to tmax, to get the init index, which is the index of days in Ramadan based on Equation 5-6.

$$index\ init\ = \text{ArgMin}\{\cup_{i=0}^{nDays\ in\ Ramadan-1}(|Avg[i] - t|)\} \quad (5)$$

$$Freq[index\ init] += 1 \quad (6)$$

Finally, through Equation 7, it can be determined the day index as a candidate for the occurrence of LQ as the final result of second method.

$$index\ Day\ LQ\ Candidate\ (2nd\ Method) = \underset{\forall i \in index\ Days\ in\ Ramadan}{\text{ArgMax}} (Freq[i]) \quad (7)$$

Note:
i: the index of days in Ramadan
Freq[*i*]: the frequency bin of the absolute difference value between Avg[i] and t
t: the approximate static value of 15º - 25º Celsius (not hot and not cold), where the number of dynamic *t* variations given, for example in the interval of [tmin; tmax] = [15;25] with the increment of 1, as an instance

- Additional method, can be used mapping by scaling with weighting value to data (*x_i*) or mapping by kernel function to the high dimensions like ∅(*x_i*=(Avg[*i*],Var[*i*])) or other combinations, for example from 2D to nD with the provisions according to that Equation, to make it easier to create visualizations as shown in Figure 7-8. Complementary to operations on mapping can use Equation 8 as a Kernel function that can be converted into a Polynomial Kernel such as Equation 9, Radial basis function (RBF) Kernel such as Equation 10 [17].

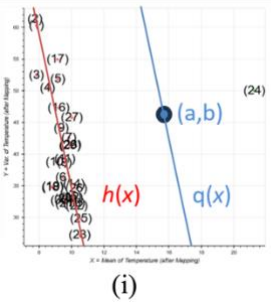
$$K(x_i, x_j) = \emptyset(x_i)\emptyset(x_j) \quad (8)$$

$$K(x_i, x_j) = (x_i \bullet x_j + c)^d \quad (9)$$

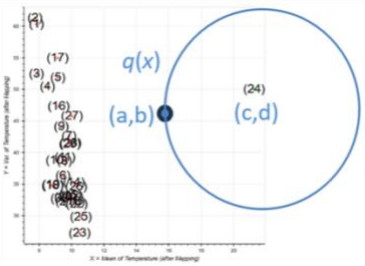
$$K(x_i, x_j) = exp\left(-\frac{\|x_i - x_j\|^2}{2\sigma^2}\right) \quad (10)$$

Note:
• : multiplication of dot product
c : constant of addition
d : degree
σ: standard deviation of the data, usually the value is 1.

- Then, in the IQRa' algorithm, a prototype classifier model is also proposed as an optional continuation scheme based combining semi-prediction and semi-unsupervised learning to Luxier identification through propose several stages toward classification context (supervised learning).
  - Given two class label, namely non-LQ class (contains "nDays in Ramadan-1" data) and LQ class (contains only 1 data) from the results of the First method or Second method above. For example, for the 2D base on Fig. 7 (b), the value of the 1st feature (X_1) is taken from the variable "Mean of Temperature (after mapping)" and the 2nd feature (X_2) is taken from the variable "Var. of Temperature (after mapping)", and the Y target is set with a value for the non-LQ class = -1, and the LQ class = +1.
  - The training process begins by creating boundaries as class splitter, for example based on the data in Fig. 7(b) using the following steps belows.
    - Calculate the distance of all non-LQ data toward LQ data, which can utilize Euclidean distance or Equation 8 with various kernel options as kernel distance scheme.
    - Take the closest point according to the number of p_closest.
      - (Exercise-worker Talent Option (ETO) i & ii) If you choose p_closest = 1, then calculate the midpoint (a, b) to create a boundary equation q(x) base Linear equation, where it's parallel toward the regression line h(x) from the non-LQ data set (red) based on illustration (i), or by create circle boundary based on illustration (ii).



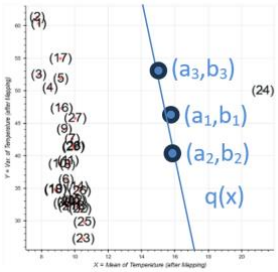
(i)



(ii)

Note that for (i), $h(x)=m_1x+c_1$ is obtained by the regression method, and $q(x)=m_2x+c_2$, where $m_1 = m_2$. So $y-b = m_2(x-a)$, $q(x) = m_1(x-a) + b$.
Then in (ii), (c,d) is the data point LQ which is the center of the circle, so $(x-c)^2 + (y-d)^2 = r^2$, $q(x) = \pm\sqrt{(r^2 - (x-c)^2)} + d$.

- (ETO iii) If you try *p_closest* > 1, you can use or without using dummy data created around the LQ data, then calculate the midpoint $\{(a_1,b_1),(a_2,b_2), .., (a_{p\_closest},b_{p\_closest})\}$, then from the collection of middle points, a boundary equation is created using the regression method as in the illustration (iii).



(iii)

Declaration at the (iii), for example if *p_closest* = 3, then it can solve by equation of straight line become $q(x) = mx + c$.

- ETO iv, v, .., *k*) Other *p_closest*, eg using "kernel distance" is up to additional new as a contribution or etc.

Where index ETO as option starts from i, ii, iii, .., k.

- The testing process with q(x) as a positive subject value, it's can be written like "q(x) + .. = .. " or "q(x) - .. = ..", to identify the class label of test data, for example by using a holdout validation or k-fold cross validation scheme or using some of the data used in the training process or by generating dummy data that is in an area that has been delimited by boundaries. For example, to do testing single data on feature coordinates (*x_test*, *y_test*).
  - Utilize q(x) as the y_test variable value of each various *p_closest* type based on ETO (i), (ii) and (iii), .., (*k*), then determine each local prediction class label, with initialization *counter_LQ* ($cL[t]$) = 0, and *counter_non_LQ* ($cnL[t]$) = 0.
    - (ETO i)
      If $q(x) - m_1(x-a) - b > 0$, or $(y\_test - m_1(x\_test-a) - b) > 0$, then class label of test data in this local prediction = LQ, (cL[1]= 1, cnL[1]=0).
      Else, class = non-LQ (cL[1]=0, cnL[1]=1).
    - (ETO ii)
      If $(x\_test-c)^2 + (y\_test-d)^2 - r^2 \leq 0$, then class = LQ (cL[2]= 1, cnL[2]=0).
      Else, class = non-LQ (cL[2]=0, cnL[2]=1).
    - (ETO iii)
      If $q(x) - mx - c > 0$, or $(y\_test - m(x\_test) - c) > 0$, then class = LQ (cL[3]= 1, cnL[3]=0).
      Else, class = non-LQ (cL[3]=0, cnL[3]=1).
    - …
    - (ETO k)
  - Then vote by giving the weights w_1, w_2, w_3, .. and $w_k \in [0;1]$ to get the final decision class, with Equation 11.

$$index\ final\ class = \underset{\forall i \in \{LQ, non-LQ\}}{\text{ArgMax}} \left(\sum_{t=1}^{k} cL[t] * w_t, \sum_{t=1}^{k} cnL[t] * w_t\right) \quad (11)$$

If index final class = 0, then the class of the test data is LQ, else if index final class = 1, then the class is non-LQ.

The IQRa' algorithm was developed to provide solutions related to detection of luxlier / de-outlier / de-anomaly data not for detection of outlier data (valid data or still considered valid data) even though later on a more in-depth analysis, it is finally concluded that the data is invalid (because the validity of which is not known yet. This includes the indications of anomaly data or "specific or special outlier data" that require further analysis because they indicate hidden information that is more likely to lead to fraud data, fraudulent data, fake data, or fictitious data. However, they are included in outlier data that is far from the Mean and Median, very dynamic or changing data features, and not a singular or more than 1 data outlier. They do not always depend on a certain time interval; Hence, in the end these outlier data should be removed to get the best model) as well as anomaly/noise data (invalid data or fraud data, which are deviant and unexpected, arising from certain processes) [18–20].

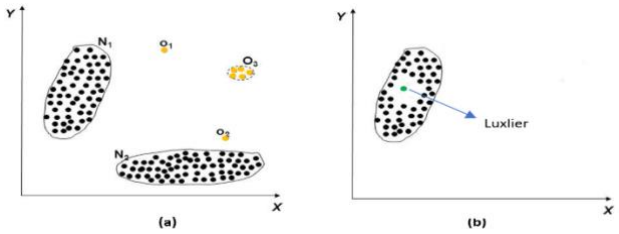


Fig. 5. Data Illustration (a) Anomaly and (b) Luxlier

Luxlier detection is a technique that we developed in this research as a new contribution to science, i.e., to detect a very unique valid data (∃! which means one and only one), very special, very distinctive, very particular and luxurious, the characteristics or patterns or features of which are previously known (the features are constant or standardized and specific for only 1 data, or singular or absolutely unique because there is only 1 data (∃!). It is not an outlier data because the state of the data is in a very ideal and the best condition because the condition of the data is the most comfortable, and not data that is ultimately to be removed) from the data in detail and specifically. Furthermore, the position of the data is always random in certain time intervals or always kept secret at every certain time period (e.g., every 1 year), and it is neither outlier nor anomaly data.

3.2 Results

The results of the implementation have already been written in the form of program code. In order to obtain the link of the complete code of this research, please visit our github webpage at https://github.com/imamcs19/Data-Science-of-Ramadan---Deep-Mining-of-Lailatul-Qadr for the open project. The test scenario carried out in this study refers to the identification of signs mentioned in the Hadith of the Prophet Muhammad regarding the night of Laylat al-Qadr, i.e., on that day the sun does not shine too hot with very cool weather, as the hadith narrated by Imam Muslim.

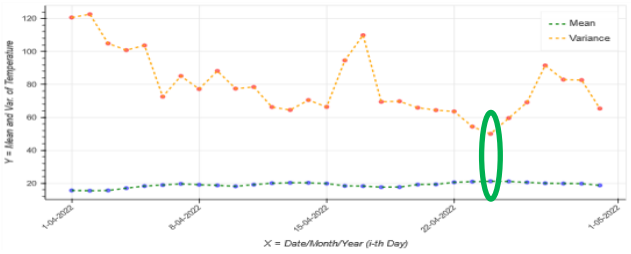


Fig. 6. All Mean and Variance value of Ramadan 2022, and the Minimum Variance in 24 April 2022 is equal 23 Ramadan 1443 H

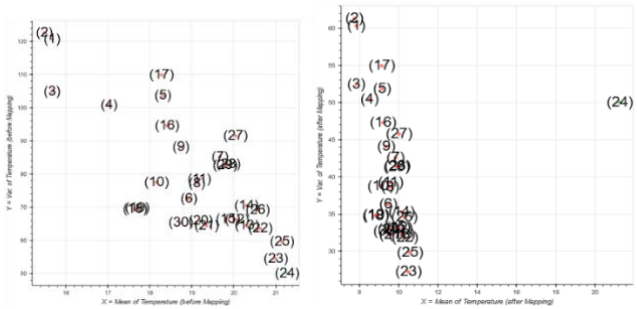


Fig. 7. (a) Before, (b) After, mapping by scaling 2D data of Ramadan (X = Mean, Y = Variance), where 24 April 2022 is equal 23 Ramadan 1443 H

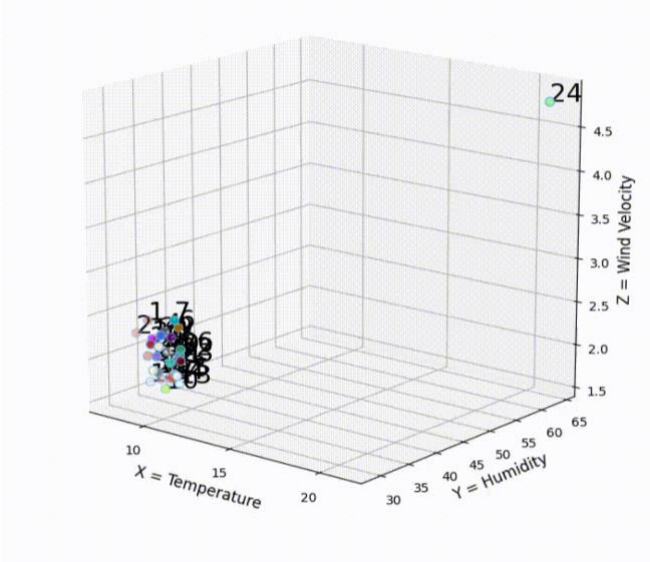


Fig. 8. Visualization results from 3D map data of Ramadan (X = Temperature, Y = Humidity, Z = Wind Velocity) utilize weighted base index candidate LQ with t =[15;25], where 24 April 2022 is equal 23 Ramadan 1443 H

At night, the sky looks clean without the sight of the slightest cloud, the atmosphere is calm and quiet, not cold and not hot. This is based on a narration by Imam Ahmad. From these hadith narrations, we identify one of the key features, i.e., the word "not cold and not hot", which implies that on that day the earth's temperature is very ideal and conducive with a certain magnitude value (for example, we call it the variable t). Thus, in relation to this, an experiment was carried out to obtain the most minimum Diff[i] = abs(Avg[i] – t) and Var[i]value with a highlight green color that is presented in Fig. 6.

In accordance with the results of the tests that have been carried out, the results are shown in Fig. 6 with a pattern of high frequency and low differences (Diff[i]) with t = [15;25] on the 23th day of Ramadan. Then in the next test, a dynamic t value is used in the t = [15;25] list interval to determine day in Ramadan which has the most occurrences with these different t values. The results of the comparison of several variations of the t value in Fig. 7 results in the ideal t value of [15;25], which is very representative for the normal room temperature and also the temperature at the equator area which has a tropical climate and 2 seasons, i.e., rainy and dry, which makes this area at the equator special, i.e., the temperature is not too hot and not too cold [21].

IV. CONCLUSION

Based on the results of several tests, it can be concluded that the use of iQRa' algorithm is able to show and identify LQ, which is predicted to occur on 23 Ramadan 1443 H or 24 April 2022 with a t value in the interval [15:25]. It is expected that the following research will try after mapping process to use a clustering algorithm (eg Kernel K-Means or others) to create two clusters, namely group 1 with LQ class label that consist only 1 data vs Group 2 with non-LQ class label, and because

the labeling process is can be set directly, so it can also consider use classification algorithm (like Support Vector Machine (SVM), Extreme Learning Machine (ELM), Deep Learning and Quantum Algorithms). and use data collection techniques obtained from independent temperature measuring devices such as HTC2, Thermo, also utilize data digital image or video, etc. In addition, they use optimization techniques that use not only temperature features but also others and involve all cities in the world with a closer collection time, for example once in every 30 minutes or every 1 hour so that the value of the ideal conditions of the earth can be obtained, one of which is on the LQ day when the earth's air condition is not too hot and too cold according to the references from the Prophet Muhammad SAW, also using Particle Swarm Optimization (PSO) and Genetic Algorithm (GA) for optimization.

REFERENCES

[1] Mahbib, H. (2016, April 12). Prodi Komputer Perguruan Tinggi NU Bentuk Asosiasi. NU Online. https://www.nu.or.id/nasional/prodi-komputer-perguruan-tinggi-nu-bentuk-asosiasi-7SZlo
[2] unisma193, unisma193. (2019, October 10). Aliansi Dosen NU, Deklarasikan Halau Paham Radikalisme di Unisma. https://unisma.ac.id/aliansi-dosen-nu-deklarasikan-halau-paham-radikalisme-di-unisma/
[3] Rauf, A., Rusli, & Furaida, A. (2020). Interpretation of laylatulqadr time by analyzing earthquake data. IOP Conference Series: Earth and Environmental Science, 456(1), 012085. https://doi.org/10.1088/1755-1315/456/1/012085
[4] Ummar, H. (2014). AL-QURAN - Pergantian malam dan siang (29 ayat). https://sayahafiz.com/index/7/AL-QURAN/3172/Pergantian%20malam%20dan%20siang.html
[5] Zell, H. (2017, August 7). Earth's Atmospheric Layers [Text]. NASA. http://www.nasa.gov/mission_pages/sunearth/science/atmosphere-layers2.html
[6] time.is, time. is. (2022, October 23). Perbedaan waktu dari Jakarta. https://time.is/id/Jakarta#time_zone
[7] maamouri, salma. (2018, December 8). Weather prediction, regression, neural model. https://kaggle.com/code/salmamaamouri/weather-prediction-regression-neural-model
[8] thakur, raja. (2020, April 29). Weatherpredict. https://kaggle.com/code/rajathakur/weatherpredict
[9] Khan, I. (2017). Bright Night (Laylat al-Qadr) and its Signs. https://doi.org/10.13140/RG.2.2.25552.61442
[10] Bukhari, B. (2017). Sahih Al Bukhari Vol. 3 Book of Laylatul Qadr Hadith 2017 (Vol. 3).
[11] Bukhari, B. (n.d.). Sahih Al Bukhari Vol. 1 Book of Faith Hadith 49 (Vol. 1).
[12] Muslim, M. (n.d.-a). Sahih Muslim Vol. 2 Book of Fasting Hadith 2364 (Vol. 2).
[13] Tirmidhi, T. (n.d.). Sunan Al Tirmidhi Book of Fasting Hadith 794.
[14] Bukhari, B. (2020). Sahih Al Bukhari Vol. 3 Book of I'tikaaf Hadith 2020 (Vol. 3).
[15] Muslim, M. (n.d.-b). Sahih Muslim Vol. 2 Book of Fasting Hadith 2621 (Vol. 2).
[16] Bukhari, B. (2015). Sahih Al Bukhari Vol. 3 Book of Laylatul Qadr Hadith 2015 (Vol. 3).
[17] Huda, N. (2008, September 8). Kapan Lailatul Qadar? nu.or.id. https://islam.nu.or.id/ubudiyah/kapan-lailatul-qadar-y4KV7
[18] Abror, M. (2022, April 23). Kembali ke Al-Qur'an dan Sunnah yang Disalahpahami. nu.or.id. https://islam.nu.or.id/syariah/kembali-ke-al-qur-an-dan-sunnah-yang-disalahpahami-FW8mc
[19] Syauqi, M. I. (2018, February 26). Keutamaan "Shahih al-Bukhari" dan "Shahih Muslim." nu.or.id. https://islam.nu.or.id/ilmu-hadits/keutamaan-shahih-al-bukhari-dan-shahih-muslim-L3JDy
[20] Haqiqi, R. (2021, August 24). Takhrij Hadits: Pengertian dan Sejarah. nu.or.id. https://islam.nu.or.id/ilmu-hadits/takhrij-hadits-pengertian-dan-sejarah-QUZwc
[21] Hakim, A. R. (2019, September 16). Kitab Al Jami (Sunan at Tirmidzi) Karya Imam Tirmidzi. Pecihitam.Org. https://pecihitam.org/kitab-al-jami-sunan-at-tirmidzi-karya-imam-tirmidzi/
[22] Lee, J. (2009). Statistics, Descriptive. In R. Kitchin & N. Thrift (Eds.), International Encyclopedia of Human Geography (pp. 422–428). Elsevier. https://doi.org/10.1016/B978-008044910-4.00534-4
[23] V, J., & A n, M. (2022). Importance of statistics to data science. Global Transitions Proceedings, 3(1), 326–331. https://doi.org/10.1016/j.gltp.2022.03.019
[24] Cholissodin, I., & Riyandani, E. (2016). Analisis Big Data.
[25] Eiras-Franco, C., Martínez-Rego, D., Guijarro-Berdiñas, B., Alonso-Betanzos, A., & Bahamonde, A. (2019). Large scale anomaly detection in mixed numerical and categorical input spaces. Information Sciences, 487, 115–127. https://doi.org/10.1016/j.ins.2019.03.013
[26] Hilal, W., Gadsden, S. A., & Yawney, J. (2022). Financial Fraud: A Review of Anomaly Detection Techniques and Recent Advances. Expert Systems with Applications, 193, 116429. https://doi.org/10.1016/j.eswa.2021.116429
[27] Koren, O., Koren, M., & Peretz, O. (2023). A procedure for anomaly detection and analysis. Engineering Applications of Artificial Intelligence, 117, 105503. https://doi.org/10.1016/j.engappai.2022.105503
[28] Rusydi, F. (2007, March 3). Mengapa Ada Perbedaan Musim? http://www.fisikanet.lipi.go.id/utama.cgi?fenomena&1172921349