Journal of University of Babylon for Pure and Applied Sciences, Vol. (28), No. (1): 2020
Online ISSN: 2312-8135, Print ISSN: 1992-0652
The First International Scientific Conference for Pure and Human Studies, University of AL-HAMDANIYA, 20-21 November 2019

AEIS: An Enhanced Approach for Extracting Useful Objects in Image Streams

Ammar Thaher Yaseen Al Abd Alazeez[1]

1. *Computer Science Department, Computer Science and Mathmatics College, Mosul University, Mosul-Iraq*

ammarthaher@yahoo.com

Article Information
Submission date: 5 /11 / 2019
Acceptance date: 21 /5/ 2020
Publication date: 31/ 5 / 2020

Abstract

Data stream clustering alludes to the way toward gathering persistently arriving new information pieces into consistently changing gatherings to empower dynamic examination of division designs. Be that as it may, the fundamental consideration of research on clustering techniques till now has been worried about modification of the strategies refreshed for static datasets and changes of the accessible adjusted techniques. This paper shows a novel clustering (AEIS) method that distinguish stationary articles in online stage and gatherings in disconnected stage from information stream. A tale way to deal with discovery of stationary objects in the information streams is introduced. Stationary objects are these isolated from the static foundation, yet staying unmoving for a drawn out time. Extraction of stationary objects from images is helpful in programmed location of numerous applications, for example, unattended baggage, following an article like creatures, rockets, or reflected waves. The proposed method depends on discovery of image districts containing forefront picture pixels having stable qualities in time and checking their correspondence with the distinguished showing up/vanishing objects. In the primary phase of the method, steadiness of individual pixels having a place with items is tried utilizing a built model. Next, groups of pixels with stable shading (black) are separated from the image. Along these lines, stationary objects are recognized. The consequences of the calculation might be examined further by the classifier, isolating explicit objects (like baggage, creatures, rockets) from different objects, and the choice framework for unattended items identification. The primary focal point of the paper is on the method for extraction of stable image areas. Notwithstanding, a total structure for unattended objects location is likewise exhibited so as to demonstrate that the proposed methodology gives information to fruitful occasion identification. The aftereffects of tests wherein the proposed method was approved utilizing synthesised dataset are exhibited and talked about.

Keywords: Data Stream Clustering Algorithms, Image analysis, Object detection, Video surveillance, Automatic event detection

Journal of University of Babylon for Pure and Applied Sciences, Vol. (28), No. (1): 2020
Online ISSN: 2312-8135, Print ISSN: 1992-0652
The First International Scientific Conference for Pure and Human Studies, University of AL-HAMDANIYA, 20-21 November 2019

1. Introduction

Programmed recognition of significant security dangers by methods for an unsupervised analysis of image streams from the observation cameras is the ebb and flow string in current checking frameworks and in logical research [1] [2] [3]. A standout amongst the most widely recognized occasions speaking to a potential security danger are leaving unattended gear in open spaces, for example in airplane terminal corridors. Security staffs at the air terminals show an extraordinary requirement for programmed location of unattended gear in genuine conditions. In spite of the fact that this issue has been a subject of logical research for a long time, despite everything it has not achieved a state where the greater part of the cutting edge business frameworks would have a solid execution of such a finder accessible for the clients. Most of the current arrangements are constrained to basic scenes and don't adapt to location in territories with escalated object development, for example, airplane terminals.

Clustering stream information is portrayed as the social affair of data in light of a great part of the time arriving new data in pieces for expanding perception about fundamental get-together examples that may change after some time in the stream information [4].

Recognizing approaching groups from information streams may well have genuine applications, for example, client conduct checking, financial exchange value profiling, and so forth. Giving fitting consideration to this recently characterized part of research, helps structure self-learning and versatile information stream clustering that could contribute incredibly to consolidating AI and computerized reasoning into this region and its exponentially developing rundown of uses. Numerous applications could take favorable circumstances from planning this framework in stream information records. Act following of certain applications like long range interpersonal communication, vehicles, rockets and creatures following from video recordings, wrongdoing controlling utilizing CCTV camera in finding inquisitive substances, for example, unforeseen cars/luggage, and patient counsel in medicinal services are some of potential cases.

There is no one technique is sensible for a wide scope of information records, nor all strategies reasonable for all issues. Traditional clustering techniques have clearly gotten shortcomings, for instance, dependence on the hidden state, get together to close-by optima, overall courses of action of tremendous issues can't have exist with reasonable proportion of estimation effort, etc.

Strategies for grouping information streams present arrangement of grouping sees occasionally (incremental learning methodologies) [5] or rely upon client question point (two-stage learning approaches) [6]. On account of the dynamic idea of information streams, it is infeasible to totally modify the whole grouping model each time when some new perceptions are gotten and when a few information get obsolete. Hence, the learning calculations for grouping information streams must be incremental in nature [7]. Such a gradual learning calculation must probably refresh as opposed to re-construct the current grouping model with regards to the recently arrived information perceptions just as the obsolete information.

https://www.journalofbabylon.com/index.php/JUBPAS, info@journalofbabylon.com, jub@itnet.uobabylon.edu.iq
+9647823331373 (Viber and Telegram)

Journal of University of Babylon for Pure and Applied Sciences, Vol. (28), No. (1): 2020
Online ISSN: 2312-8135, Print ISSN: 1992-0652
The First International Scientific Conference for Pure and Human Studies, University of AL-HAMDANIYA, 20-21 November 2019

In information stream grouping methods, the information lump could be evolved after some time, for example some old groups may vanish, and some new groups may rise (group evolution and concept drift [8][9]). Our goal in grouping information stream is that we as of now have various adaptations of clusterings relying upon question indicates and the point is find the groups that stay moderately fixed.

This paper exhibits a novel (AEIS) method that recognizes objects (clusters) in an incremental learning scheme contingent upon the client request from streaming information. The strategy was evaluated on a chosen synthetic dataset using various capabilities. The yield test express that the recommended strategy upgrades gathering precision. The framework of the technique is made to be adaptable for more improvements of further alterations and parallelise the strategy.

This paper makes two fundamental contributions. To begin with, it introduces a novel calculation for identification of stable districts, representing to stationary objects, for example, gear, in a stream images. The proposed methodology is theoretically simple, it can perform internet preparing, it handles momentary impediments and it is isolated from the foundation subtraction strategy.

Second, the paper demonstrates that the proposed method gives information that might be utilized for the assignment of unattended baggage location in a particular, multi-stage image examination framework [10]. The primary focal point of the paper is to introduce the method for identification of stationary items, yet so as to exhibit that this method gives helpful information to effective unattended baggage location, a working framework, wherein the proposed method is enhanced with the characterization and choice modules (actualized in a disentangled manner for assessment intentions) is displayed and talked about. It ought to be noticed that this paper does not endeavor to take care of the mind boggling issue of decision making in the unattended gear identifier, which merits a different research and its total arrangement is out of the extent of this paper. Nonetheless, the proposed method gives the information to any, possibly progressively explained, choice module, and the assessment framework displayed here can identify unattended baggage with acceptable exactness, utilizing rearranged choice criteria. We accept that there are no overlap images and the image colors are black and white.

The remain of this paper is delegated pursues. Section 2 expresses the related work on grouping picture stream strategies. Section 3 shows two existing information stream calculations EINCKM and EDDS. Section 4 depicts the issue in more subtleties. Section 5 expresses the proposed AEIS strategy. Section 6 clarifies the help of the viability of the strategy and down to the tests using a chose dataset. Segment 7 abridges the examination and states the future musings of this work.

2. **Related Work**

An effective discovery of unattended objects requires a multi-stage analysis. All the present clustering methods have their own characteristics, yet furthermore stay flawed [11]. Spengler and Schiele [12] characterized a relinquished object as a non-human foreground which keeps still over a specific timeframe and without people being close by. In this way, frontal objects protests that don't move (stationary objects) must be

https://www.journalofbabylon.com/index.php/JUBPAS, info@journalofbabylon.com, jub@itnet.uobabylon.edu.iq
+9647823331373 (Viber and Telegram)

Journal of University of Babylon for Pure and Applied Sciences, Vol. (28), No. (1): 2020
Online ISSN: 2312-8135, Print ISSN: 1992-0652
The First International Scientific Conference for Pure and Human Studies, University of AL-HAMDANIYA, 20-21 November 2019

recognized, at that point these objects must be distinguished as gear lastly, nearness of people (ideally, the baggage proprietor) in their neighborhood must be tried [13].

Some portion of the INDECT scientific project [14], in which the author took part, was identified with improvement of a multi-stage structure for video content investigation and programmed danger location [10]. This intricate, measured framework performs video investigation from the low-level pixel-based image examination to the elucidation of video substance and decision making.

Joining of the unattended objects location into this system required that: (a) the locator fits into the investigation scheme, (b) it uses consequences of the low-level examination (for example background subtraction) utilized additionally by different modules, so as to keep away from repetition in preparing, lastly (c) it can play out an online image stream analysis without presenting critical postponements in the handled stream. It was discovered that a large portion of the best in class calculations give great precision of location, yet they don't satisfy at least one of the previously mentioned conditions, as a rule either not having the option to fit effectively into the handling plan or performing too serious preparing because of their unpredictability (hence not accomplishing an exhibition level required for online frameworks).

There are likewise elective methodologies that attempt to legitimately perceive objects in images, for example Zheng et al.[15] utilize a histogram of arranged slopes (HoG) prepared with instances of luggage, yet such a methodology is excessively computationally escalated to be executed in an online framework.

3. Existing Data Stream Clustering Algorithms EINCKM and EDDS

- **EINCKM Algorithm**

EINCKM [16] is an incremental strategy for clustering model of information streams. It relies upon a nonexclusive structure for information stream grouping that includes three fundamental particular advances [16] [17] Build Clusters (BC), Merge, and Prune (Fig. 1). Build Clusters incorporates the grouping method that used to discover the groups from info information lump, Merge (stage 2) is utilized to coordinate the new and existing arrangement of groups, and Prune (stage 3) is to recognize anomalies and check the blurring procedure. The strategy utilizes a heuristic way to deal with foresee the K (number of clusters), a sweep count to join covered groups and a change way to deal with distinguish the irregularities. The technique is adaptable and prepared for further improvement. In any case, the strategy created to display arched shape groups. As it were, it doesn't distinguish right groups in the event that they framed discretionary shapes.

- **EDDS Algorithm**

EDDS [17] is incremental density-based technique for clustering data streams. It seeks after a comparative structure for data stream clustering that incorporates three standard advances [16][17] Build Clusters (BC), Merge, and Prune (Fig. 1). The strategy recognizes gatherings and peculiarities in a moving toward data piece. It balanced the traditional DBSCAN technique to consolidate each cluster with respect to a ton of surface-cores information records. The strategy execute the density-reachable thought of DBSCAN as its consolidating procedure and prunes within focus using a heuristic game plan. The strategy similarly removes the old cores and peculiarities depending upon a

https://www.journalofbabylon.com/index.php/JUBPAS, info@journalofbabylon.com, jub@itnet.uobabylon.edu.iq
+9647823331373 (Viber and Telegram)

Journal of University of Babylon for Pure and Applied Sciences, Vol. (28), No. (1): 2020
Online ISSN: 2312-8135, Print ISSN: 1992-0652
The First International Scientific Conference for Pure and Human Studies, University of AL-HAMDANIYA, 20-21 November 2019

fading procedure. Notwithstanding, this method has high calculation time contrasting and EINCKM. Additionally, it doesn't separate the yield shape groups, for example it doesn't recognize raised or non-curved shape groups.

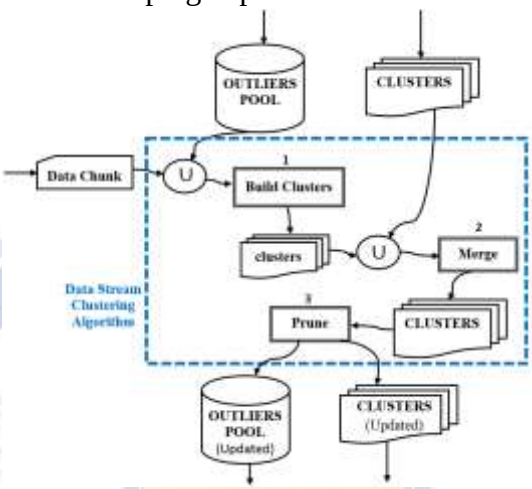


Fig. 1. The general framework of Data Stream Clustering Algorithms [16][17].

4.Problem description

In this work, we are attempting to recognize various sorts of objects/clusters, for example diverse shape groups after some time in the image stream. The essential thought is this;

1. Get the stream images and spare them in a buffer.
2. Do "Pre-handling" to expel the noise from image.
3. Subtract frontal area from foundation for each image.
4. Identify stable objects/clusters and place them in a database (e.g. see Fig. 2).
5. If there is an inquiry from the client about the particular/entire objects/clusters we will recover the information from the database.

https://www.journalofbabylon.com/index.php/JUBPAS, info@journalofbabylon.com, jub@itnet.uobabylon.edu.iq
+9647823331373 (Viber and Telegram)

Journal of University of Babylon for Pure and Applied Sciences, Vol. (28), No. (1): 2020
Online ISSN: 2312-8135, Print ISSN: 1992-0652
The First International Scientific Conference for Pure and Human Studies, University of AL-HAMDANIYA, 20-21 November 2019

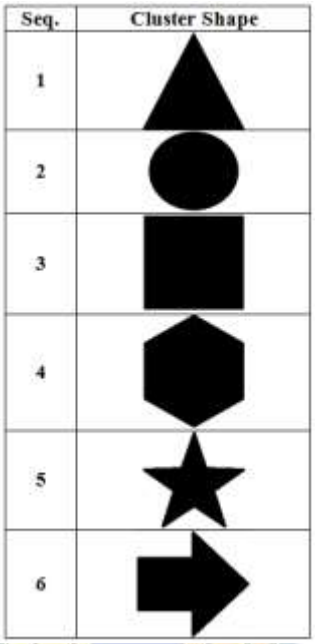


Fig. 2. The database of data stream clustering

5. Aeis algorithm

Recently, numerous analysts have been proposed methods utilizing image processing scheme to take care of the information steam grouping issue. This examination is associated with structure grouping models that consolidate the upsides of grouping methods and image handling strategies named AEIS.

Before authoritatively explaining the AEIS method level structure, we might want to acquaint some primer learning with better encourage its understandability (see Fig. 3).

1. Background subtraction (BS): all image pixels are broke down, closer view pixels having a place with the objects are found.
2. Detection of stable pixels: frontal area pixels are investigated, dependability of their qualities in time is assessed, pixels with qualities inside the characterized range during the perception time frame are set apart as the steady ones.
3. Detection of stable objects: associated segments are framed from the steady pixels; if a part has an adequate region, a steady image locale is recognized.
4. Detection of stationary objects: the distinguished stable locales are contrasted and the shapes of past objects removed from the BS results; forms adequately secured by stable areas are meant as stationary (already moving) objects.
5. Classification: stationary objects are analyzed by a classifier so as to test whether they identify existing objects.

https://www.journalofbabylon.com/index.php/JUBPAS, info@journalofbabylon.com, jub@itnet.uobabylon.edu.iq
+9647823331373 (Viber and Telegram)

Journal of University of Babylon for Pure and Applied Sciences, Vol. (28), No. (1): 2020
Online ISSN: 2312-8135, Print ISSN: 1992-0652
The First International Scientific Conference for Pure and Human Studies, University of AL-HAMDANIYA, 20-21 November 2019

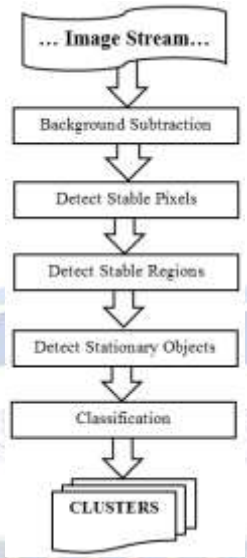


Fig. 3. The algorithm steps

A. *Image pre-processing*

The presented method for identification of stable image districts gets a stream of images from the resource place them in a support and expels the commotion to get ready for next stage, for example binary images that signify closer view and foundation pixels with non-zero and zero qualities, individually.

B. *Identification of stable foreground pixels*

Shapes of all objects in the present image might be extricated from the BS result, however with the end goal of stable locales recognition it is important to discover which of these objects stay stationary for a characterized time. So as to achieve this, data on repeatability (strength) of pixel esteems inside each form is required. The proposed method uses a two-arrange approach: the examination is performed first on the pixel level and after that on the locale level.

C. *Extraction of stable image regions*

The following phase of investigation discovers image locales made out of stable pixels and sets up their association with the recognized objects.

D. *Maintenance of the models of stable regions and pixels*

Over the time of the image stream handling, both the steady pixels model and the steady districts model gather all the recognized units, which results in consistent increment of their size and the examination time. Every one of those models are kept up in a database.

E. *Classification*

So as to demonstrate that this method gives information that might be utilized for effective location of unattended objects in reasonable circumstances, the method was enhanced with modules for article arrangement and decision making. The classification

https://www.journalofbabylon.com/index.php/JUBPAS, info@journalofbabylon.com, jub@itnet.uobabylon.edu.iq
+9647823331373 (Viber and Telegram)

Journal of University of Babylon for Pure and Applied Sciences, Vol. (28), No. (1): 2020
Online ISSN: 2312-8135, Print ISSN: 1992-0652
The First International Scientific Conference for Pure and Human Studies, University of AL-HAMDANIYA, 20-21 November 2019

module is vital so as to separate objects identifying to question from other stationary objects. Different methodologies might be used for this assignment, running from straightforward classifiers dependent on object size and extents [18], to complex models prepared with image features [19].

Subsequent to presenting the primary starter ventures of the approach, we are going to show the recommended Method. Fig. 4 outlines the code illustration of the fundamental AEIS technique. The input is a stream images and the output is K clusters.

AEIS Algorithm:

Inputs:

- Image Stream.

Outputs:

- *K* Clusters;

Algorithm Steps:

- Repeat for each image

1. *Do Pre – processing for the image*
2. *Divide the image into group of objects*
3. *Check if there are new objects then add them into the database otherwise ignore*
4. *If there is a query for clusters then*
   Retrive the available objects from the database

end

Fig. 4. Code of the method.

6.Evaluation of the Suggested Algorithm

Here, we will assess the adequacy of the proposed algorithm from the accuracy and efficiency aspects of the methodology. Right off the bat, we will present some rightness criteria (Sec. 6.A). At that point, we will introduce the synthesized dataset that will use for testing (Sec. 6.B). From that point forward, clarify the assessment structure (Sec. 6.C). At long last, we will present the test results and discourse (Sec. 6.D).

F. Evaluation Criteria

Correctness of the grouping techniques can be assessed through shifts approaches which found in the literature [20]. This exploration choses the outer (administered) techniques to evaluate the precision of the proposed strategy. We manufacture an synthesized datasets which contain referred to groups as the ground truth for testing the "closeness" of the industrious grouping results created by the method to the ground truth. The closer the subsequent steady clusters to the known groups, the more precise is. Those criteria including entropy, purity, and the sum of squared errors (SSE).

Purity was used in [21], entropy in [22], and SSE in [6]. Purity insinuates the degree of the data coordinates having a spot toward an alluded to cluster that are designated as object from a decided grouping by the technique. The higher the degree of purity ([0, 1]) is, the more sure that the technique has found the main grouping and the better the strategy is [23]. Entropy reflects the amount of the data centers from different known gatherings in the first dataset that are doled out to a decided grouping by the technique. The estimation of this measure is [0, $Log_2 N$] where N is the amount of acknowledged groups included.

https://www.journalofbabylon.com/index.php/JUBPAS, info@journalofbabylon.com, jub@itnet.uobabylon.edu.iq
+9647823331373 (Viber and Telegram)

Journal of University of Babylon for Pure and Applied Sciences, Vol. (28), No. (1): 2020
Online ISSN: 2312-8135, Print ISSN: 1992-0652
The First International Scientific Conference for Pure and Human Studies, University of AL-HAMDANIYA, 20-21 November 2019

The more diminutive estimation of the entropy is, the less object from the acknowledged gatherings are mixed in the decided gatherings found by the technique, and the better the gathering strategy is [7]. SSE is a normally used grouping quality measure. It surveys the conservativeness of the ensuing continuing on clusters. Low scores of SSE shows better continuing on cluster results as the groups contain less inside assortments [23].

The profitability of a technique was evaluated by the proportion of time in seconds taken for the strategy in completing the grouping task. In this manner, we directed every one of the investigations with an accumulation of synthesized dataset.

G. *Dataset Used*

Every one of the tests have finished with a synthesized dataset. The equivalent dataset is non-consistently dispersed over various nodes. In subtleties, we made a synthesized dataset (DS) of 800000 information records for 2D. The DS incorporate 6 groups; triangle, circle, rectangular, pentagonal, star, and an arrow. Clusters in DS have different information records. Fig. 5 shows the scatterplot of the dataset. We concurred that there are a few downsides of the chose dataset. It doesn't have numerous highlights that the genuine datasets have. In future work, this method will assessed on progressively entangled datasets.

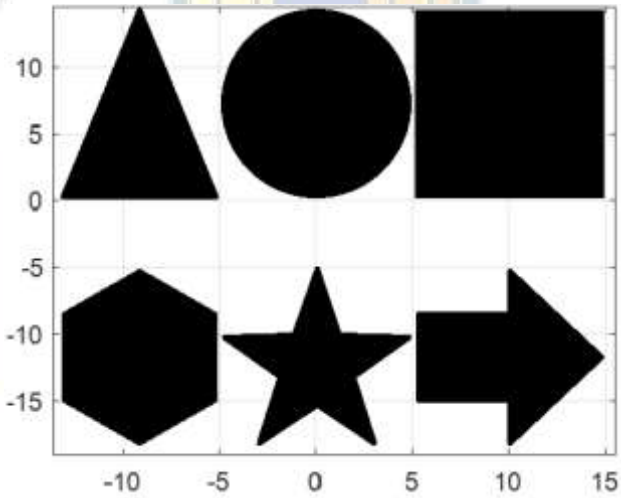


Fig. 5. Scatterplot of DS

H. *Empirical Evaluation Protocol*

To test the exhibition of the suggested method and contrast and the two existing algorithms, we separated a dataset into a few images: the underlying image that as of now exists and recently arriving images. This is on the grounds that the current methods treat the information image stream along these lines. Despite the fact that the proposed method does not treat the underlying dataset and later arrived lumps in an unexpected way, for reasonableness we have made the proposed method to be tried utilizing a similar protocol.

Our examinations reproduce two scenarios. In the first scenario, we expect that the information focuses in the underlying dataset represent to the grouping designs in the domain space of the dataset of just one object on a time, yet in the along these lines arrived

https://www.journalofbabylon.com/index.php/JUBPAS, info@journalofbabylon.com, jub@itnet.uobabylon.edu.iq
+9647823331373 (Viber and Telegram)

Journal of University of Babylon for Pure and Applied Sciences, Vol. (28), No. (1): 2020
Online ISSN: 2312-8135, Print ISSN: 1992-0652
The First International Scientific Conference for Pure and Human Studies, University of AL-HAMDANIYA, 20-21 November 2019

information images, information can emerge out of any area of the domain space. To set up the dataset, for the main situation, we intentionally structure an underlying dataset by leading an inspecting of information focuses from each object/group in the dataset. Fig. 6 delineates this scenario.

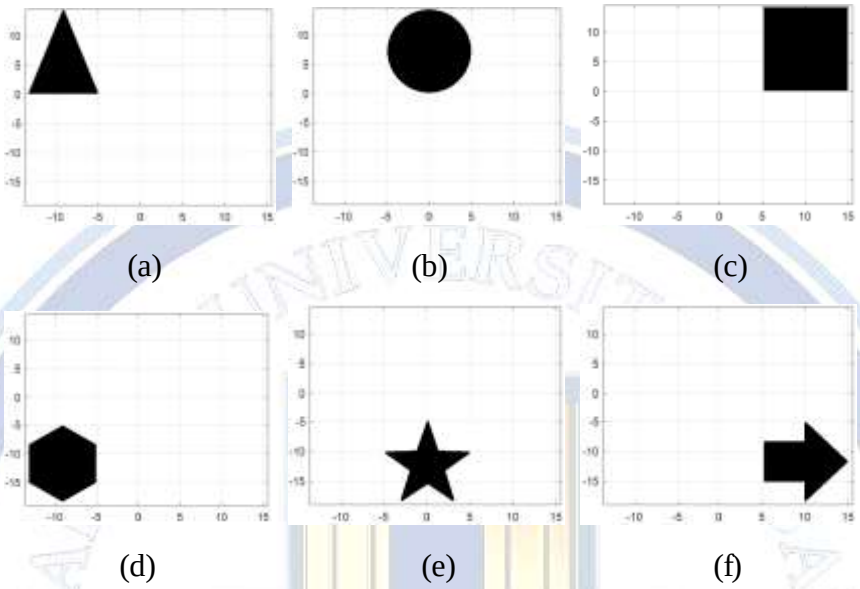
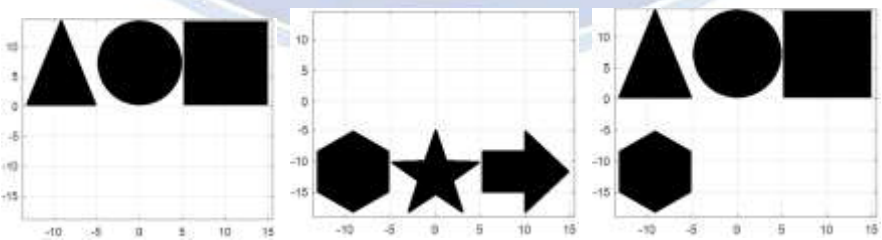


Fig. 6. First scenario of DS

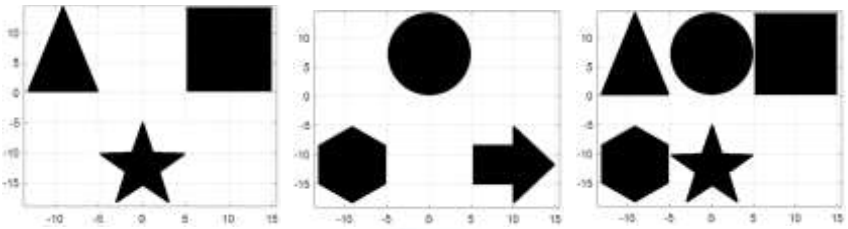
In the second scenario, we don't expect that the underlying dataset contains the grouping examples of just one object/group. At the end of the day, tests could contain more than one object. Like the consequent information lumps, information may originate from any piece of the domain space. Fig. 7 delineates this scenario.

The purpose for the plan of the two scenarios is that we have confidence in a genuine information stream circumstance, information can come haphazardly from anyplace of the information domain space and consequently we endeavor to explore the conduct of the methods when there is no control on the arrangement of arriving information focuses with respect to which cluster they originate from.



https://www.journalofbabylon.com/index.php/JUBPAS, info@journalofbabylon.com, jub@itnet.uobabylon.edu.iq
+9647823331373 (Viber and Telegram)

Journal of University of Babylon for Pure and Applied Sciences, Vol. (28), No. (1): 2020
Online ISSN: 2312-8135, Print ISSN: 1992-0652
The First International Scientific Conference for Pure and Human Studies, University of AL-HAMDANIYA, 20-21 November 2019



(d) (e) (f)

Fig. 7. Second scenario of DS

We repeat the test in every situation for the dataset for 100 times and after that determined the average of the exhibition estimations. This is to decrease the impact of arbitrarily chosen information focuses. Such conventions as depicted above are pursued for all tests for assessing various parts of the method execution.

I. Experimental Results

MATLAB 2016 was used to collect an execution of the AEIS algorithm and the examination structure. The suggested method does not manage the principal image of the dataset and later arrived images in a startling manner, and thusly an unfilled course of action of existing gatherings and an empty game plan of oddities were acknowledged as info when the essential piece is dealt with. The idea behind the unpredictable decision of the data demonstrates is investigate the direct of the technique when there is no control on the plan of data centers, for instance we didn't pick express data centers from unequivocal gatherings in the ground truth dataset. No supposition that was concurred that the primary data piece relate to the entire domain space. In order to restrain the effect of the sporadic choice of data centers, the examinations were reiterated on different occasions, and the normal is resolved.

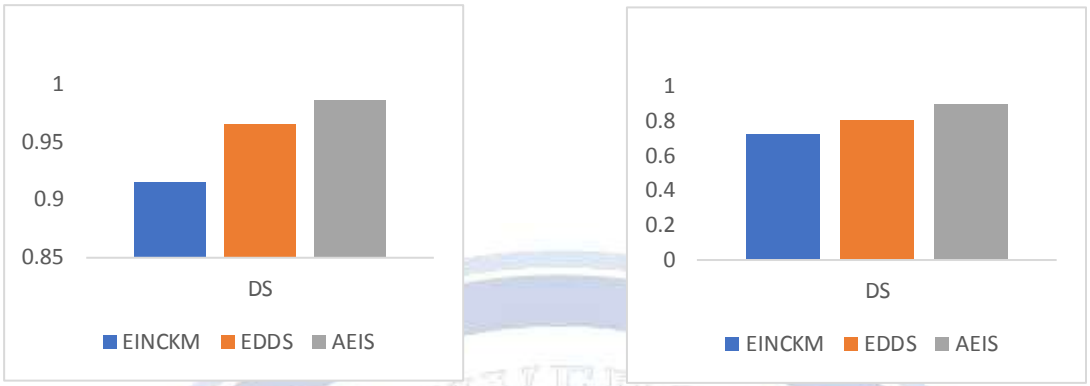
All of the examinations were continued running on a machine outfitted with 2.30 GHz 4 centers Intel(R) Core(TM) i5-4590 CPU and 16 GB memory. The working structure was Windows7. Every one of the projects procedure were created utilizing MATLAB.

- ***Purity***

Fig. 8 exhibits the nuances of examination results between the known clusters and the yield groups from EINCKM, EDDS, and AEIS strategies independently. AEIS has the most significant purity. This is in light of the fact that it keeps all the agent data centers and stringent procedure. EDDS in like manner has a respectable immaculateness by pruning and saving the surface-cores information objects, anyway this strategy dismisses non-raised shape clusters. EINCKM has a fair immaculateness additionally and slights a lot of center information records which may not impact the last groups.

https://www.journalofbabylon.com/index.php/JUBPAS, info@journalofbabylon.com, jub@itnet.uobabylon.edu.iq
+9647823331373 (Viber and Telegram)

Journal of University of Babylon for Pure and Applied Sciences, Vol. (28), No. (1): 2020
Online ISSN: 2312-8135, Print ISSN: 1992-0652
The First International Scientific Conference for Pure and Human Studies, University of AL-HAMDANIYA, 20-21 November 2019

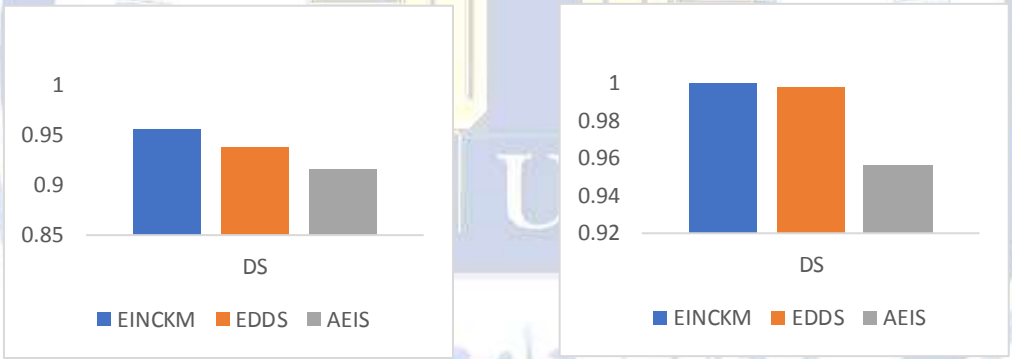


(a) Scenario_1 **(b) Scenario_2**

Fig. 8. The purity measurement.

- ***Entropy***

As showed up in Fig. 9, AEIS has the minimum entropy. EDDS has increasingly raised measure of entropy. EINCKM has the most strange measure of entropy among the three strategies. The results demonstrate that the pruning interior center information focuses influences group precision. Nevertheless, this result ought to be examined together with the purity estimation results to have a reasonable view on clustering precision.



(a) Scenario_1 **(b) Scenario_2**

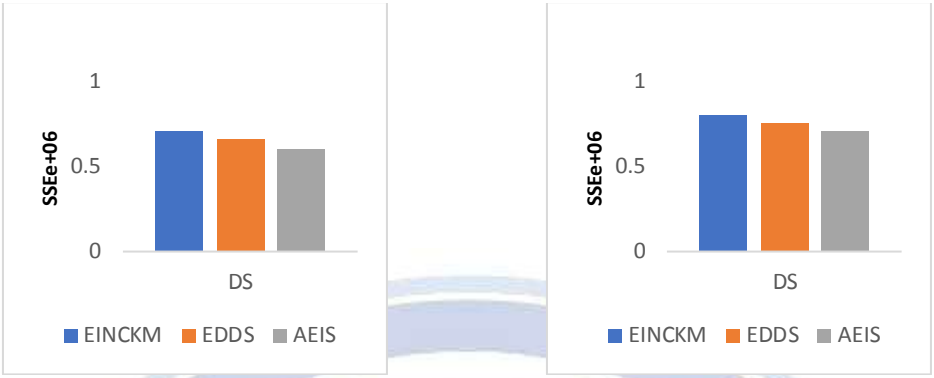
Fig. 9. The entropy measurement.

- ***Sum of Square Error (SSE)***

As showed up in Fig. 10, AEIS has the most negligible SSE, trailed by EDDS which in this way is trailed by EINCKM, again exhibiting the cost of pruning interior center information cores. Then again, EDDS EINCKM still have the most exceedingly low SSE score, demonstrating that mixing inaccurately data centers into discovered clusters does in like manner impact group quality. It ought to be referenced that SSE may not be the ideal evaluator for nature of non-raised shape groups.

https://www.journalofbabylon.com/index.php/JUBPAS, info@journalofbabylon.com, jub@itnet.uobabylon.edu.iq
+9647823331373 (Viber and Telegram)

Journal of University of Babylon for Pure and Applied Sciences, Vol. (28), No. (1): 2020
Online ISSN: 2312-8135, Print ISSN: 1992-0652
The First International Scientific Conference for Pure and Human Studies, University of AL-HAMDANIYA, 20-21 November 2019



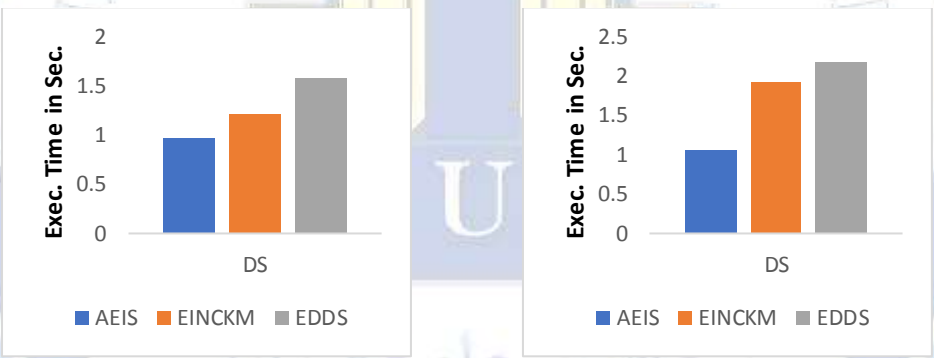
(a) Scenario_1 **(b) Scenario_2**

Fig. 10. The SSE measurement.

Efficiency Evaluation

- ***Execution Time***

Execution time is the extent of the proportion of time in seconds that continue for the technique in completing the clustering task. Concerning usage time, the AEIS technique has the base execution time sought after by EINCKM, by then EDDS (see Fig. 11).



(a) Scenario_1 **(b) Scenario_2**

Fig. 11. The efficiency measurement

Subsequent to getting these yield results we could support that AEIS algorithm is quicker than EINCKM and EDDS.

As appeared in the past figures (Fig. 8-11), the viability measures and execution time example are scenario free.

J. Discussion

In a genuine framework usage, tracking the objects is vital. Despite the fact that the proposed method does not perform such examination, it can give the important information. A methodology like the one proposed by Bhargava et al. [19] might be utilized by returning so as to the minute the object was brought into the scene, finding the object representing to the object owner and following its development. Since the creation

https://www.journalofbabylon.com/index.php/JUBPAS, info@journalofbabylon.com, jub@itnet.uobabylon.edu.iq
+9647823331373 (Viber and Telegram)

time is put away in the vectors inside the steady pixels model, it is conceivable to decide the time the left object was first watched and to follow the owner utilizing a different module, or on the other hand, test if the object close to the object owner the proprietor layout. The got outcomes demonstrate that exhibition of the proposed method under the depicted conditions is tasteful, in spite of the improved choice criteria.

The joined aftereffects of all examinations demonstrate that the proposed method gives information on stationary objects in the image stream which, in the wake of utilizing the arrangement, prompts fruitful identification objects. Contrasted with other ongoing methods with stable districts discovery, for example [24] [25] [26] [27], the method introduced in this paper is moderately basic, both reasonably and computationally. It doesn't require complex calculations, for example, online learning, probabilistic models, behavior modelling, and so on. The method utilizes essential numerical activities for demonstrating the pixel and locale dependability and the required number of calculations relies upon image content. Along these lines, this method is easy to execute in a working framework, for instance in an inserted framework inside the observation camera. Regarding computational unpredictability, the most tedious stages are the BS and (to a smaller degree) testing the pixel stability.

The significant guarantee of the AEIS method is the ease and high adaptable structure. This comprise of the fundamental elements of the technique: pre-prcessing image, distinguish stable foundation, recognize stable closer view, and save objects in a database. All procedure were distributed as functions which means we could simultaniosly upgrade each function separated without changing the general fundamental structure of the technique.

There were propostions of more improvements of each task inside the method. Right off the bat, we realize that using separate functions influence moderate procedure to deside clusters. Consequently, we could supplant those procedures by one function, for example, utilizing computational topology to distinguish the cluster shape. AI systems and fluffy based approches could be consider to deliver more effecint functions to create blended last objects.

7.Conclusion and future work

Extraction of image regions representing to stationary objects is a significant advance during the time spent unattended objects recognition. Such objects must be recognized in the image streams with high accuracy so as to give fundamental information to the choice module. The proposed method takes care of the issue of stationary objects identification by testing the solidness of pixel esteems and separating stable locales from the image. This method was planned such that makes it simple to actualize it in the system for online occasion recognition, working on live image streams from the observation cameras.

Likewise, there is no compelling reason to follow development of every individual object, which is exceptionally dangerous in the genuine applications with a high number of at the same time moving objects. The decision module was intentionally disentangled with the end goal of the tests, some significant viewpoints, (for example, tracking the object owner) were overlooked so as to concentrate the analyses on discovery of stationary objects.

https://www.journalofbabylon.com/index.php/JUBPAS, info@journalofbabylon.com, jub@itnet.uobabylon.edu.iq
+9647823331373 (Viber and Telegram)

Future work will focus on updating the algorithm. As a result of the technique is adaptable, those updating considerations can manages the real elements of the algorithm. Firstly, we will examine the topology calculation to introduce progressively advanced rendition of the pre-processing step. Also, we will examine hybridizing distinctive grouping calculation, similar to chart based, various clustering methods, like graph-based, hierarchal-based, and model-based algorithms to test the measured quality of AEIS method. Thirdly, we will examine using learning technique as criticism to improve the pre-processing step and improve grouping methods that have been utilized. Finally, distributed methods may have epitomized to create progressively precise, right, and real new type of the AEIS method.

Conflict of Interests.
There are non-conflicts of interest

8. References

[1] L. Wed, "Video Surveillance," *Intech, Rijka, Croat.*, 2011.
[2] M. M, "SUBITO (Surveillance of Unattended Baggage and the Identification and Tracking of the Owner)," *SUBITO Deliv. D100.2 Final Rep.*, 2012.
[3] G. Szwoch, "Extraction of stable foreground image regions for unattended lugga ge detection," *Multimed. Tools Appl.*, no. 10.1007/s11042-014-2324-4, pp. 761–786, 2016.
[4] Yogita and D. Toshniwal, "Clustering Techniques for Streaming Data – A Survey," *3rd IEEE Int. Adv. Comput. Conf.*, pp. 951–956, 2012.
[5] S. Guha, N. Mishra, R. Motwani, and L. O'Callaghan, "Clustering Data Streams," *IEEE FOCS Conf.*, pp. 359–366, 2000.
[6] C. Aggarwal, J. Han, J. Wang, and P. Yu, "A Framework for Clustering Evolving Data Streams," *Proc. 29th VLDB Conf. Ger.*, 2003.
[7] H. L. Nguyen, Y. K. Woon, and W. K. Ng, "A survey on data stream clustering and classification," *Knowl. Inf. Syst. Springer*, pp. 535–569, 2015.
[8] A. Bifet, A. Carvalho, and J. Gama, "BigData Stream Mining," Lecture Note-Telecom ParisTech, 75634 Paris Cedex 13, FRANCE, 2017.
[9] P. Chaovalit, "Clustering Transient Data Streams By Example And By Variable," Thesis, University of Maryland, Department of Information Systems, 2009.
[10] C. A, S. G, and D. P, "Multi-stage video analysis framework. In: Lin W (ed) Video Surveillance," *Intech, Rijeka, Croat.*, pp. 147–172, 2011.
[11] H. Jiang, J. Li, S. Yi, X. Wang, and X. Hu, "A new hybrid method based on partitioning-based DBSCAN and ant clustering," *Expert Syst. Appl.*, vol. 38, no. 8, pp. 9373–9381, 2011.
[12] S. M and S. B, "Automatic detection and tracking of abandoned objects," *Proc. VS-PETS 2003, Nice, Fr.*, 2003.
[13] T. D, L. L, and T. J, "Overview of the PETS2006 Challenge," *Proc PETS 2006, New York*, pp. 47–50, 2006.
[14] Http://www.indect-project.eu/, "INDECT Project," *http://www.indect-project.eu/*, 2016. [Online]. Available: http://www.indect-project.eu/.

https://www.journalofbabylon.com/index.php/JUBPAS, info@journalofbabylon.com, jub@itnet.uobabylon.edu.iq
+9647823331373 (Viber and Telegram)

[15] Z. W, G. S, and X. T, "Quantifying and transferring contextual information in object detection," *IEEE Trans Pattern Anal Mach Intell*, vol. 34, no. 4, pp. 762–777, 2012.

[16] A. Al Abd Alazeez, S. Jassim, and H. Du, "EINCKM: An Enhanced Prototype-based Method for Clustering Evolving Data Streams in Big Data," *Proc. 6th Int. Conf. Pattern Recognit. Appl. Methods*, no. Icpram, pp. 173–183, 2017.

[17] A. Al Abd Alazeez, S. Jassim, and H. Du, "EDDS: An Enhanced Density-Based Method for Clustering Data Streams," *2017 46th Int. Conf. Parallel Process. Work.*, pp. 103–112, 2017.

[18] K. N, T. P, S. TA, and P. R, "Multi-view detection and tracking of travelers and luggage in mass transit environments," *Proc. PETS 2006, New York*, pp. 67–74, 2006.

[19] B. M, C. CC, R. MS, and A. JK, "Detection of object abandonment using temporal logic," *Mach Vis Appl*, vol. 20, pp. 271–281, 2009.

[20] H. Kremer, P. Kranen, T. Jansen, T. Seidl, A. Bifet, G. Holmes, and B. Pfahringer, "An effective evaluation measure for clustering on evolving data streams," *Proc. 17th ACM SIGKDD Int. Conf. Knowl. Discov. Data Min. - KDD '11*, pp. 868–876, 2011.

[21] F. Cao, M. Ester, W. Qian, and A. Zhou, "Density-based clustering over an evolving data stream with noise," *Proc. Sixth SIAM Int. Conf. Data Min.*, vol. 2006, pp. 328–339, 2006.

[22] Y. Zhao and G. Karypis, "Technical Report Criterion Functions for Document Clustering: Experiments and Analysis," *Univ. Minnesota, Dep. Comput. Sci. / Army HPC Res. Center/ Tech. Rep.*, pp. 1–30, 2001.

[23] J. Silva, E. Faria, R. Barros, E. Hruschka, and A. Carvalho, "Data Stream Clustering : A Survey," *ACM Comput. Surv.*, pp. 1–37, 2013.

[24] C. L, Z. H, Z. S, and M. YH, "Robust abandoned object detection and analysis based on online learning," *IEEE Int Conf Robot Biomim*, pp. 940–945, 2013.

[25] G. S, S. JA, and P. IH, "Stationary objects in multiple object tracking," *Proc. AVSS 2007*, pp. 248–253, 2007.

[26] L. S, Z. J, and F. DD, "Detecting unattended packages through human activity recognition and object association," *Pattern Recognit.*, vol. 40, pp. 2173–2184, 2007.

[27] M. L and P. A, "Stopped object detection by learning foreground model in videos," *IEEE Trans Neural Networks Learn. Syst.*, vol. 24, no. 5, pp. 723–735, 2013.

https://www.journalofbabylon.com/index.php/JUBPAS, info@journalofbabylon.com, jub@itnet.uobabylon.edu.iq
+9647823331373 (Viber and Telegram)

Journal of University of Babylon for Pure and Applied Sciences, Vol. (28), No. (1): 2020
Online ISSN: 2312-8135, Print ISSN: 1992-0652
The First International Scientific Conference for Pure and Human Studies, University of AL-HAMDANIYA, 20-21 November 2019

الخلاصة

المصطلح عنقدة البيانات المستمرة يشير الى عملية توزيع مستمرة للبيانات الجديدة والمتولدة بشكل مستمر الى مجاميع قابلة للتغيير بشكل مستمر لتمكين عملية التحليل المتزامنة للانماط الجديدة. على اية حال، توجه البحوث في مجال خوارزميات العنقدة الى وقتنا هذا متركزة على تحديث هذه الخوارزميات والتي تعمل مع البيانات الثابتة الى بيئة البيانات المستمرة او تطوير خوارزميات البيانات المستمرة. هذا البحث يقدم خوارزمية تجميع جديدة تدعى AEIS والتي تميز التواجدات الثابتة في الطور المباشر وكذلك تميز العناقيد في الطور غير المباشر للصور المستمرة. في هذا البحث، تم تقديم طريقة جديدة لايجاد وتحديد التواجدات المتمثلة بالصور المرسلة من المصدر سواء اكان كامرا او متحسس. التواجدات المستمرة هي تلك التواجدات التي من الممكن ان يتم فصلها عن خلفية الصورة المرسلة وتبقى بدون تغيير لفترة طويلة. استخلاص التواجدات الثابتة من الصور المرسلة له اهمية كبيرة في عملية اكتشاف بعض الاشياء المبهمة مثلا مراقبة الحقائب المشبوهه في المطارات والاماكن العامة، متابعة المركبات والصواريخ المرسلة الى الفضاء،متابعة حضائر الحيوانات، وتحليل الموجات المنعكسة من اعماق البحار والمحيطات. الخوارزمية المقترحة تعتمد على تحديد مناطق في الصورة المرسلة بتحديد البكسل التابعة لها ومقارنتها مع ظهور/اختفاء التواجدات. تقوم الخوارزمية في المرحلة الاولى بتحديد مجموعة البكسل التي تعود للتواجدات واختبارها باستخدام نموذج النظام. بعد ذلك، المجاميع من البكسل المميزة باللون الاسود يتم استخلاصها من الصورة. هذه هي طريقة استخلاص وتحديد التواجدات الثابتة. نتائج الخوارزمية المقترحة من الممكن ان يتم تحليلها باستخدام المصنفات، مختلف التواجدات المحددة عن بقية التواجدات، ونظام تحديد القرار لاكتشاف الاشياء غير المتوقعة. التركيز الرئيسي لهذا البحث هو على خوارزميات استخلاص المناطق المميزة من الصورة. على اية حال، الهيكل الكامل لاكتشاف التواجدات غير المتوقعة كذلك تم تقديمه في سبيل ان اكتشاف صحيح وحقيقي للاحداث. هذه الخوارزمية تم فحصها على بيانات افتراضية لغرض معرفة مدى فاعليتها. النتائج النهائية للتجارب وثقت فاعلية وفائدة الخوارزمية المقترحة ومدى فرقها عن سابقاتها.

https://www.journalofbabylon.com/index.php/JUBPAS, info@journalofbabylon.com, jub@itnet.uobabylon.edu.iq
+9647823331373 (Viber and Telegram)