Turiyam Set Based Four Way Mathematical Characterization of Retracted Paper

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Abstract

Recent time retraction analysis is considered as one of the major issues. The retraction is a regular process where some time it is true, some time happen due to conflict, some time due to indescribable parameters or last via self retraction by authors or Editor. It is happening due to pressure on academia and its quality measurement by quantitative publications and citation rather than qualitative. It forces researchers to add the co-authors for increment, promotion, or citation rather than focusing on true research. Some time the retraction happens due to self correction, genuine mistake or conflict of interest with editor. These types of genuine or self retraction happended using Turiyam awareness of authors or editor which can be considered as positive retraction. It is also noted that negative results are also part of the research as equal to positive or noble research. It is difficult to characterize these types of retraction. In this paper author has introduced a mathematical model for precise analysis of retracted paper and its characterization in true (*t*), false(*f*), indeterminant (*i*) and liberal (*l*) region for intellectual measurement. Same time the extension of work for undefined or unknown paramerters of retraction or unretraction is also discussed using the complement of Turiyam operator with an example.

Keywords: Anektavad;Knowledge representation;Retraction; Scopus; Uncertainty; Turiyam set

1. Introduction

Recently several researchers increases interest towards analyzing the retraction and its impact [1-3]. Some of the non-performer researchers weaponized the retraction policy to malign someone reputation. It is also claimed that some of the editorial board utlize the retraction policy fulfilling their ego or revenge based on the given geopolitics. It is possible because Scopus publication it self is noted as baised towards North America, Europe when compared to Asia, Latin America or Russia [4]. However, beyond all these conflicts retraction is nothing but a ethical policy among the research community to penalize the misconduct done by any researchers. It should be noted that the misconduct defined by scientific community changes year by year as per new findings of misconduct [5]. It is nothing but connects the misconduct with negative results many times. The negative result impacts as equal as positive results to research commmunity [6-7]. Sometime it happens when someone delves in mystic of mathematics [8] and its basic proof [9]. Some researchers claims that retraction process is biased towards researchers from china [10-11] and India [12-13]. Even though these papers or researchers are highly cited. However, the Editorial committee as distinct opinion about this research statement. The chinese papers [11] retracted due to authentic data [11]. The Indian paper [12] retracted due to compromised review or turiyam addition of editor name for favoring the publication via breaching the Elsevier ethics policy [12]. It is not one of the highlighted case there are many highly cited papers also retracted [14]. It means retraction gave a new dimension to analyze the publication process, citation, journal quality, number of co-authors or editor policy. The reason is that the same *n*-number of co-authors claim equal citation and document count in case of

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promotion and increment whereas in case of retraction they refuse it. It is difficult to analyze the refused or retracted work and its quality as ordering of author breaches the intellectual ordering. It gave a new thrust to measure the intellectual level based on quality of work done in paper rather than *n*-number of journal publication, *n*-number of high impact factor journal publication, *n*-number of citation or n-number of retraction. One of the reason is that retracted paper also cited due to reference for their non-ethical work [15]. It means citation, document publication, retraction has only partial correlation while measuring the intellect level. It is totally based on Turiyam consciousness [16-17] of authors, institute, reviewer or editorial board. In case any one breaches the ethics means the research goes in wrong direction. It is reported that some time it happened when the university forces to publish n-number of document for project, promotion or increment [18-20]. Even the student has pressure to maintain the consistency in the given time period which leads wrong data, wrong result or retraction rather than Nobel work. It can be easily measured via t-index[21] in the given time period. It means publication and its quality has no correlation. Same time the publishers does not matters the quality of papers matters. The retraction can be done for any publishers or any author. The analysis of retraction and its characterization is necessity of the current era. The reason is some authors claimed that the retraction is used as tool to take the revenge, fulfill conduit metaphore, bilateral relationship among two countries or authors rather than just scientific miscounduct. Hence this paper focuses on mathematical characterization of retracted papers and its analysis using Turiyam set.

It is oberseved that the retraction is a regular process in scientific research. The Erratum, corrigendum, Cancel leaf, corrected proof and many more ways exists to correct the mistake. It is mistake or misconduct totally based on conduit metaphore of the authors, reviewer, and editorial board [22]. It happened with Nobel Prize winner Max Planck whose two papers were retracted due to copyright violation [23-24].It means the retraction process is not new for scientific community. It exists before the a platform introduced by Oransky [25]. However recent time the retraction is used to defame someone. It is used to penalize the researchers rather than genuine correction. It will demotivate the new or young researchers. Hence it is indeed requirement to characterize the retracted papers in true, false, Neutro, or Liberal region, independently. In this case Turiyam set can be useful as many time reported scientific misconduct happened in consciousness of authors or editor. It is observed when Max Planck [23-25] papers are retracted. It has impacted the career of Planck as these papers are just cited by five researchers in fear from 1940 to till now. However some time the retracted papers reveals the shortcomings of the given methodology which can be useful also. Even though people does not want to refer those work as his/her career can be targeted. It shows that the citation measurement limited with those academic researchers who praises the work rather than providing negativie result. The scientific community require both to enhance the knowledge of young researchers while deciding the wrong or right path. In this scenario, the academic researchers try to cite those work which cannot spoil his life or carrer rather than sharing the truth in the paper. Even though every researchers knows that citation does not refer any thing about the quality of the paper, its intent or analyzing the conflict of work rather than manipulation. Due to which, author just add anyone name and cite the paper for claiming the document count and citation to fulfill the conduit metaphor using his/her Turiyam consciouness. It fails in case the paper get retracted no one wants to take credit of the work. It shows that the people wants authorship without any responsibility which breaks ethics [26]. It may lead to misconduct [27] or retraction [28]. However the retraction map provides a homomorphism among those authors and miscounduct via mathematically [29-30]. This paper uses the algebra of retraction map [31-32]. To characterize the retraction in four way like true retraction (*t*), false retraction (*f*), indeterminant (*i*) or liberal/Turiyam retraction(*l*) [16-17, 33-38]. It can be considered as one of the significant outcome of the proposed method which will help authors to draw inverse mapping. It will help to count all the affliations in the retracted paper rather than just a corresponding author.

Remaning part of this paper is oraganized as follows: Section 2 provides basic detail about retraction and its mathematical connection with Turiyam conduit metaphore. The proposed method is shown in Section 3 with its demonstration in Section 4. Section 5 provides discussion followed by conclusions, acknowledgements and references.

2. Retracted Paper Data Representation with Turiyam Set

In this section the mathematics behind the retraction and its conduit metaphore is connection with Turiyam set.

Definition 1 (Retraction map) [29-30]: A retraction (*r*) is a mapping from a topological space (*X*) to its subspace (*Y*) $r: X \to Y$such that it provides identity map $r(y)=x$ for all $y \in Y$. In this paper this mapping is used for analysis of retraction of a paper (*x*) published at given journal(*y*) with its charcetrization. It can be observed that the identity map provides the precise paper (*x*) for the retraction based on some parameters mismatch in the Journal (*y*) as $r(y)=x$. It means all the papers in the given journal (*y*) cannot be retracted, some of them can be in under process and some of them can be self retracted by author of the paper(*x*). To understand this concept of retraction one need to utilize expert Turiyam consciousness.

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Definition 2 (Turiyam Set) [16-17] **:** It contain 4-tuple: truth (*t*), Indeterminacy *(I*), falsity (*f*), and liberalization (*l*). Each of the dimensions is independent to each other as: $-4 \leq t + i + f + l \leq 4.$

The Turiyam value 0 represents the universal neutral values, -4 represents universal false or retracted paper case and +4 represent the universal truth or Unretracted paper i.e. $T = \{\langle x : t, i, f, l\rangle : x \in \xi\}$. It means this set provides a way to characterize the true retraction (*t*), False-retraction (*f*), NeutroRetraction (*i*), and a liberalized or Turiyam retraction, independently as. T = {<k; $t_t(k)$,$I_t(k)$, $F_t(k)$, $l_t(k)$>: k∈ξ} where -4$^-$≤ $t(k)$+$I_t(k)$ + $f_t(k)$ + $l_t(k)$≤ 4$^+$. This set can be scaled within [0, 1] in case of dependent or normalized case. The - sign means penalized case whereas +sign means award case. However in research penalized case is not implemented which can be future applications of Turiyam set. In this paper author tried to characterize the paper retraction in Four way for multi-decision purpose.

In this way, the Turiyam set solves the above problem as follows:

1. The paper got retracted truly based on publishing ethics and the COPE guidelines on retractions with its proof shared with author, reviewer and editor. Itcan be considered as truth membership-values (*t*),
2. The mistake done by editorial or reviewer knowingly or unknowingly. These types of retraction happened when new parameters defined as scientific misconduct. In this case the case of retraction still active or under process to retract or not can be considered as indeterminant (*i*),
3. The paper which is retracted due to reviewer mistake, editor mistake, wrong mail id of authors, Posthumous authors, honorary author, rebellion retraction can be considered as false (*f*),
4. The paper which is retracted with honesty by author or editor that the given paper is wrong and need correction can be called as Turiyam retraction (*l*).

In this way, the Turiyam set provides a way to find those papers which cannot be retracted as 1-(*t*+*i*+*f*+*l*) or 4-(*t*+*i*+*f*+*l*). This is one of the major advantages of the Turiyam set while dealing with retraction data analysis.

Definition 3 (Intersection of Turiyam) [16-17]: The intersection of Turiyam set T_1 and T_2 can be computed as follows:

(i) $T_1 \wedge T_2 = ((t_1 \wedge t_2), (i_1 \vee i_2), (f_1 \vee f_2), (l_1 \wedge l_2))$.

(ii) $T_1 \wedge T_2 = (t_1.t_2, i_1 + i_2 - i_1.i_2, f_1 + f_2 - f_1.f_2, l_1.l_2)$.

It will helpful in finding the maximum common parameters among two retracted papers.

Definition 4 (Union of Turiyam) [16-17]: The union of turiyam set T_1 and T_2 can be computed as follows :

(i) $T_1 \vee T_2 = ((t_1 \vee t_2), (i_1 \wedge i_2), (f_1 \wedge f_2), (l_1 \vee l_2))$.

(ii) $T_1 \vee T_2 = (t_1 + t_2 - t_1.t_2, i_1.i_2, f_1.f_2, l_1 + l_2 - l_1.l_2)$.

It will helpful in computing those retraction at agreement of authors and editors.

Definition 5 (Complement of Turiyam) [16-17]: The complement of turiyam set can be computed as follows:

$t' = f$, $i' = 1 - i$, $f' = t$, $l' = 1 - t - i - f$ in case of dependent or $l' = 4 - t - i - f$ in case of independent.

It will be helpful in measuring the refusal degree of retraction based on Editor consciouness. It means the unretracted paper based on given parameters can be computed via the complement operator.

It can be observed that the retraction can be characterized in four way using Turiyam set as true retraction (*t*), false retraction (*f*), uncertain (*i*), and Turiyam retraction (*i*), respectively. This four valued logic [33] is applied in several fields for data analysis [34-35] and processing tasks [36-38].In this paper the author has utilize this method for charcterization of retracted manuscript. To achieve this goal a method is proposed in the next section using the properties of retraction map.

3. A Proposed Method for Four Way Characterization of Retraction

In this section a method is proposed to explore the unknown, undefined, intentional error, inadvertenterror, self correction or other types of dark mistakes comes in light after the retraction of paper in Scopus. It can be analyze using the expert or author Turiyam cognition as given below :

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Step 1. Let us suppose, the document (x) published by some set of authors to the given Journal (y) in a based on given keyword, aim and scope which can be defined via a mapping S: $X \rightarrow Y$ as shown in Table 1.

Table 1: The parameter for the Publication in the Given Journal

A Paper of Authors (x)	Journal (y_1)	Journal (y_2)	…	Journal(y_m)
Paper (x_1)	Aim and Scope	Data set	…	No Discrepancy
Paper (x_2)	Algorithm step	Rogue Editor	…	Fake Review
…			…	
Paper (x_n)	Ghost authorship	Plagiarism	…	True paper

Step 2. The indexing where the paper is published based on author consciousness in Google Scholar, Scopus or Web of Science can be considered as Turiyam space (U) as shown in Fig. 1.

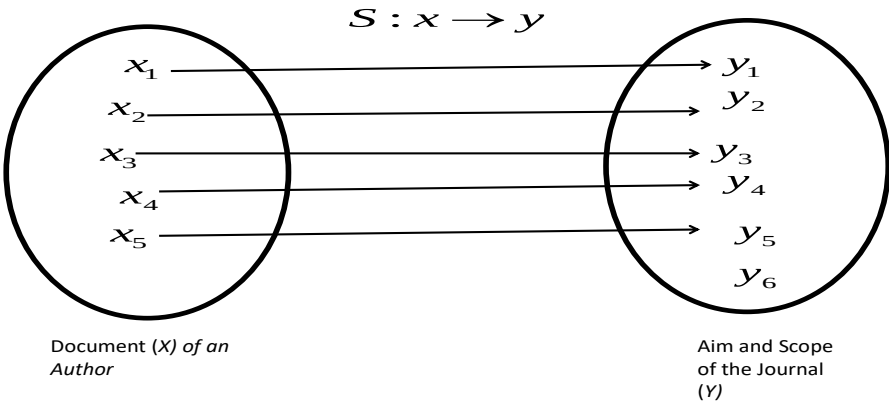


Figure1. The mapping of published paper (x) in the given Journal based on Some parameters (y) as shown in Table1.

Step 3. It can be represented as the paper (x_1) published in journal (y_1) which can be defined as $(x_1 y_1) \in \boldsymbol{S}$.

Step 4. The problem is to define the retraction and its mapping based on given keyword, aim and scope as shown in Table 2.

Table 2: The Four Way Characterization of Publication in the Given Journal

Paper/Retraction	True Retraction (t)	False (f)	NeutroRetraction (i)	Turiyam or Liberal Retraction (l)
Paper (x_1)	Aim and Scope not matching	False Data	…	Self retraction
Paper (x_2)	Wrong algorithm output or fake review	Rebel group	…	Honest mistake
…	Rogue Editor or Rogue author as subject welfare	Wrong mail Id of author	…	Editorial Mistake

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Paper (x_n)	Irrelevant data or lack of IRB/IACUC	Posthumousor Ghost authors	…	Funded Paper

Step 5. The retraction type can be characterize via a defined Turiyam composite operator shown in Table 3as $\circ: X \times X \to P^4(X)$ where$(t, i, f, l) \notin \{(1,0,0,0),\ (0,1,0,0), (0,0,1,0),\ (0,0,0,1)\}$.

Table 3: The Four Way Rating of Retraction

	Irrelevant Data	Irrelevant Code	Wrong mail ID	No Reply
Editor-In-Chief	*t*	*t*	*t*	*t*
Corresponding Author	*f*	*f*	*f*	*f*
Scholars or other Authors	*I*	*I*	*I*	*I*
Other researchers/ Self awareness	*l*	*l*	*l*	*l*

Step 6. The retraction can be defined using a defined Turiyam function as R: $Y \to X$based on given keyword, aim and scope.

Step 7. It can be represented as the paper (x_1) is retracted from the journal (y_1) which can be defined as $(y_1, x_1) \in \boldsymbol{R}$.

Step 8. The paper can be retracted in case the composition of $R(S(x)) = x$ for each paper $x \in X$ as shown in Fig. 3.

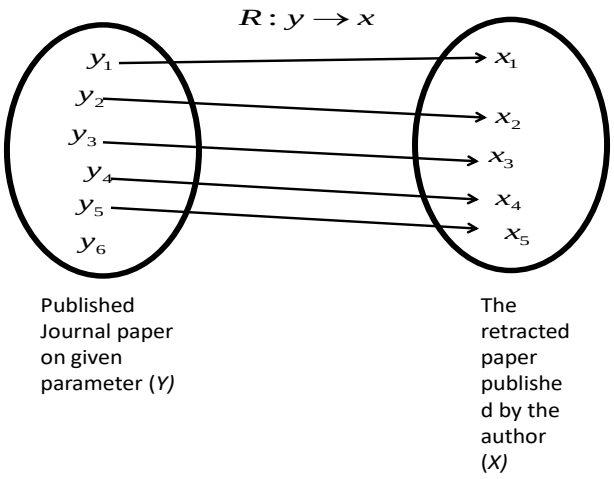


Figure2. The retract mapping of published Journal (y) for the given authors (x)

Step 9. It means the retraction data can be analyzed via left inverse function rather than right inverse function.

Step 10. The retraction type can be characterized as follows:

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(i) Let us suppose,the Turiyam operator applied on $R\circ S\ (x)$ provides a new paper in Turiyam space i.e indexing as Scopus, google Scholar or Web of Science. This paper retraction can be considered as true (1, 0, 0, 1) retraction using the consciousness of Editor or author otherwise (1, 0, 0, 0).

(ii) Let us suppose, the Turiyam operator applied on $R \circ S\ (x)$ provides no paper in Turiyam space i.e indexing like Scopus, google Scholar or Web of Science. This paper retraction can be considered as false (0, 0, 1, 0) in case retraction happened without consciousness of Editor otherwise (0, 0, 1, 1).

(iii) Let us suppose, the Turiyam operator applied on $R \circ S\ (x)$provides some keyword matching, method matching or data matching, figure matching, wrong mail id or affiliations of authors in Turiyam space i.e indexing like Scopus, google Scholar or Web of Science. This paper retraction can be considered as uncertain (0, 1, 0, 0) retraction using the consciousness of Editor.

(iv) Let us suppose, the Turiyam operator applied on $R \circ S\ (x)$provides a paper having honest mistake using the same keyword in Turiyam space i.e indexing like Scopus, google Scholar or Web of Science. The honest mistake done by author or editor can be found using the data. These types of self paper retraction can be considered as Turiyam retraction in case of self retraction by the author or editor which can be represented as (*t, i, f, l*). The paper which are unknown and not retracted which can be focused for the retraction based on Author or Editor consciousness can be explored using the Turiyam cognition.

(v) **Step 10.** The infimum and supremum true, false, uncertain and Turiyam parameters among the two retracted papers can be computed as follows:

(a) $T_1 \wedge T_2 = ((t_1 \wedge t_2), (i_1 \vee i_2), (f_1 \vee f_2), (l_1 \wedge l_2))$.

(b) $T_1 \vee T_2 = ((t_1 \vee t_2), (i_1 \wedge i_2), (f_1 \wedge f_2), (l_1 \vee l_2))$.

Step 11. In case the data cannot be characterized then its complement can be defined to analyze via Anti-Turiyam : $t' = f$, $i' = 1-i$, $f' = t$, $l' = 1-t-i-f$ in case of dependent or $l' = 4-t-i-f$ in case of independent.

Complexity: The time complexity to characterize the data with retracted paper is totally based on defined Turiyam function and its inverse which may take O(n^3) time complexity. In the next section another method is proposed to characterize the undefined, impossible, unknown objects using complement operator.

4. Illustrations

In this section both of the proposed method is illustrated with an example.

Example 1: (Retraction with Intention or targeted):

(i) Intentional Error: The author did the misconduct with its intention to get the paper count. In this case the author copies someone paper, someone data without permission, or cited some irrelevant papers. The author knows that used data is fake or wrong. Sometime the author submit same paper at two places as duplicacy. The untrue authorship is another concern for the retraction. This can be called as True retraction which is done intentionally using the author consciousness. In this type of retraction both author and Editor agreed for the retraction. It can be represented as True characterization of Turiyam retraction as (1, 0, 0, 1).

(ii) Unintentional Error : These types of error can be arises due to unintention. Sometime the software changes or new update comes. The code provides different result. Same time author forget that code to perform. Some time the scholar writes the author mail id wrongly to defame. Some error arises due to intentional way which cannot be proved. These types of retraction can be considered as false or rebel retraction done by Editor. It can be represented as (0, 0, 1, 0) in case the paper retracted without intention of Editor otherwise (0, 0, 1, 1).

(iii) Neutro or inadvertent retraction : Some time the irrelevant paper cited in paper due to reviewer comments. The paper style changed based on the reviewer and editor comments. It may happen that the eroor arises from publishers side. The scholar or co-author arises dispute to defame someone. It is not where related to authors like wrong mail ID, wrong signature of guide or corresponding authors, contributors forced signature, the paper is purchased etc. These types of retraction is totally unclear which done without intention of Editor. It can be represented as (0, 1, 0, 0)

(iv) Turiyam retraction: It is called as self retraction, the honest mistake, the unethical issues done by author or rogue editor side accepted with honesty. These are genuine mistake done by author as per current research ethics rather than old ethics. Some time the paper retracted without any reason. This type of self retraction which processed by author or forge editor side can be considered as Turiyam retraction. It require more parameters to explore the retracted paper and its causes. The uncited paper of top Journal or top author can

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be also considered as one of the liberal or Turiyam retraction. These types of retraction can be considered as positive retraction or positive correction. It says clear message that author can correct themselves. It can be represented as (*t, i, f, l*).

Example 2. (Retraction Conflict Analysis):The precise analysis of conflict among two or more researchers can be characterized via expert Turiyam cognition rather than immediate decision. The conflict arises among two researchers due to authorship or similar types of work. It can be characterized as follows:

(i) True Conflict (1, 0, 0, 1): This is the case when there is conflict of interest arises among two authors as per defined parameters by Scientific community. It can be resolved via forensic scientrometric analysis using the corresponding author or supervisor/Guide mail. In case any mail ID written wrongly in the paper. The Editor-in-Chief can easily decide that one of the author did scientific miscoundct. It will help to take decision on the paper. Same time the data, revision of the paper submitted by whom can be observed in the journal website, draft of the paper or many scientific ways to find the true conflict. The bibliometric analysis can be considered as one of the other way to resolve the true conflict.

(ii) Anti-Conflict (0, 0, 1, 1): In case two authors are working on same research domain. One author influenced by the other or stole the data. In this case both authors have no conflict among them. The series of work with time line, self citation, or time based reference analysis can solve the issue as Anti-Conflict.

(iii) Neutro-conflict (0, 1, 0, 0): These types of conflict arises due to misconduct done by any author, leaving the lab in between for the job, IRB, IAUCC approval case, data downloading issues and manipulation of erticle. This type of conflict some time arises due to funding agreement or issue also. It can be called as partial agreement and disagreement case. Some time the the conflict arises due to changes in author ordering and addition of new ghost author. This is the case where paper work done with honesty but some mischief case happened as uncertain or unavoidable reasons. It may happened when author is on early career research or does not know the research ethics. It can be characterized as NeutroConflict.

(iv) Turiyam Conflict Retraction (*t, i, f, l*): This conflict arises due to multiple authors in the paper. Someone claims that the paper belongs to me. Some author got less credibility because of less payment. Some time one author came to know that the wrong idea given in the paper. I need to retract. Hence self retraction case can be considered as Turiyam conflict retract. Same time the editor or guest editor knows about the paper that the review is manipulated. The self retraction of the paper from Rogue Editor due to manipulated review. Some time the early career researcher or young researcher purposefully intentionally create conflict to defame or demean the guide. Due to support from rebel group. He just does these things to get political stunt. These type of author write conflict on somewhere at altemetrics like Linkedin, social media or other places. The editor can easily find those conflict and its hidden consciousness using the Turiyam cognition. This type of act is totally happened in awareness can be characterized by Turiyam. It also happened due to some financial or funded project issues. Some people paid the money and try to force others to keep his name. Just to get document count without knowing the work. This type of conflict can be characterized via Turiyam conflict.

Example 3. (Retraction via Question and Answer) :Let us suppose any paper is under processing of retraction can be mapped with the given authors. It can be undertand easily by responsible or authentic answer by the author about the work can resolved the problem. This type of mapping can be solved using the Turiyam cognition of the Editor in Chief as follows:

(i) True Answer (1, 0, 0, 0): The author gave true answer, true data and its review comment. It means the author has did the work and taken responsibility for answering the questions.,

(ii) False Answer (0, 0, 1, 0): The author unable to answet the question, the author wrote any author mail ID as wrong, the author unable to reply the proper question. Author unable to take responsibility. These types of false answer can lead to consider something flaw towards retraction,

(iii) Neutro Answer (0, 1, 0, 0): The author answer something uncertain about the paper. In case any answers are partially wrong or only partially correct. Same time the time line of paper and its submission mismatch. These types of Neutroanswer given by the author can keep in the paper under screening,

(iv) Turiyam Answer (*t, i, f, l*): The author knows each question, each things about the paper from zero to till acceptance. The author knows self consciousness that the paper is done by him or others. The self consciousness answer of author reflects the truth about paper. Same time the truth about editor also knows

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the fact about the paper. The self consciousness and self awareness by corresponding author or editor extend the paper for the self retraction can be considered as Turiyam answer.

It can be observed that the retraction of paper is done based on defined parameters by publishing ethics and the COPE guidelines on retractions. It is reflected at each Journal website. Many times the retraction done for guest editorial issues or author miscounduct. Some time the author retracted their paper as self correction which is considered as good retraction. Some of the potential parameters for the retractions are: (i) Discrepancies in scope, (ii) Discrepancies in the description of the researchreported, (iii) Discrepancies between the availability of data andthe research described, (iv) Inappropriate citations, (v) Incoherent, meaningless and/or irrelevant contentincluded in the article, (vi) Manipulated or compromised peer review,(vii) inappropriate or irrelevant references, (viii) containing nonstandard phrases or not being in scope of the journal, (ix) Scientific miscounduct, (x) Guest editor misuses. These all reported misconduct either author or editor knows as per the retraction. It might possible some of the error will be unknown whereas some of the error done in consciousness. Hence the retraction can be characterized via Turiyam set. This paper tried to characterize the retracted paper based on Turiyam set. In the next paper the author will try to analyze the paper based on some data sets and its metric.

5. Conclusion

This paper proposes a method for characterization of retraction datain true (*t*), false (*f*), neutro (*i*) and Liberal region (*l*), independently as shown in Section 3. The proposed method take $O(n^3)$ time complexity due to inverse mapping. However the proposed method does not measure the level of retraction via any metric. In near future the author work will focus on retraction analysis and its comparative study via several metric.

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Data Availability Statements: Data is collected from Scopus and retraction website.

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