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Investigation of Academic Research in Mathematics from Kerala State, India

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Abstract - *In this article some of the research works in Mathematics from Mahatma Gandhi University, Cochin University, and NIT Calicut in Kerala State , India are studied. Some flaws and contradictions are discovered. The requirements of Pre PhD publications in various universities are scrutinized. The relaxations in regulations and loopholes to outwit the university are observed.*

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I. INTRODUCTION

The requirement of Pre PhD publications of a research scholar in various universities under UGC in India is not unique. For example [9,10,11,12], in Mahatma Gandhi University Kottayam, the requirement of Pre PhD Publication is-"A research scholar shall publish atleast one research paper in a refereed journal before the submission of the thesis for evaluation ,and shall forward a copy of the research paper (or acceptance letter) through the supervising teacher" . In this requirement the "refereed" is not specified properly. Here there is more loopholes and so research supervisor can easily outwit the university. But in same period, the requirement in Bharathidasan university , Tiruchirappalli ,Tamilnadu is –" All the PhD candidate (both full time and part time) shall be permitted to submit their synopsis provided they had published atleast two research papers (relevant to their area of research) in the refereed Journals in the UGC website /SCI/SSCI/Scopus/Web of Science. This clear cut specification of requirement shows there is no loop holes that help the supervisors to outwit the university. In this article, some of the research works in Mathematics from Mahatma Gandhi University ,Cochin University and NIT Calicut, Kerala are studied. It is noticed some flaws and contradictions. This study opens the necessity to bring a unique Pre PhD requirement in all universities under UGC to assure same quality.

II. CASE STUDIES

2.1: Case Study 1 [1].

Supervisor- Prof. Dr. Sourier Sebastian, St Alberts College,Ernakulam under MahatmaGandhi University,Kerala.

The claims in PhD Thesis of Dr. James Philip, St Domanic College Kanjirappillycannot be accepted due to the following reasons.

The research is multi-disciplinary. So that was required the review by a medical practitioner and his recommendation was needed before awarding the phd.

Observations

In the case of diseases, the elimination of a disease due to slight variation in symptom is not a good objective. So D3, in the thesis cannot be eliminated. Symptoms can be divided into positive and negative. Positive symptoms are the ones observed in persons with a disease or other abnormal condition, but normally not observed in average healthy persons. A negative symptom is absence of a function or feeling normally present in an average person.Some symptoms can be misleading to the patient or the medical practitioner caring for them. For example, inflammation of the gallbladder often gives rise to pain in the right shoulder, which may understandably lead the patient to attribute the pain to a non-abdominal cause such as muscle strain.In the discussed particular example, the previous method showed same membership grades for P2 in all the threediseases, showing this similarity, the argument of the authors that "the method fails" is not acceptable. In the new method introduced by Dr.Sourier Sebastian and Dr. James Philip,also for some particular examples, Pi can get same membership in all the three.

So the arguments of authors cannot be accepted. The modification was not apt and so the previous method was the successful.

2..2: Case Study 2 [2].

Supervisor- Prof. Dr. Sourier Sebastian, St Alberts College,Ernakulam under MahatmaGandhi University,Kerala.

PhD Thesis of Dr. Sasigopalan, Cochin University of Science and Technology,Kerala does not consist the important part -the programming designed to apply Modified Fuzzy Basis Function (A Fuzzy Filter that averaging distances) introduced by them.The images used with less clarity (blur) and high quality (clear) in the thesis seems it is generated by using a mobile phone than the modified fuzzy filter as they claim.They claimed that after applying the fuzzy filter introduced by them, the clear image is obtained. But using a good mobile phone noise can be created on a picture to show that it has noise.Without writing the codes of programming in the thesis, their claim cannot be accepted. Noise Process Control is a random Process, so that should be considered in filter designing. That part also is missing in PhD Thesis.

2.3: Case Study 3[4].

Supervisor- Prof. Dr.T. Thrivikraman ,CUSAT.

PhD Thesis of Dr.Vinodkumar, Rajagiri School of Engineering and Technology consists the following flaws.

1. The notation Pf(X) is not predefined in the thesis before using it in a proof of a result.There are so many typing errors such as Ofi(xi) in the proof of chapter 2 and x (denotes an element) is used in the place of X (A set) in important definition.
2. The definition of Expansive Chaotic function (EC)shows that it is copied from Devaney's Chaotic function (DC) with minor change.
3. Though the authors included definitions of other Chaotic functions 2.1.10 (TC), 1.1.1 (LYC),2.2.1 (SC),2.2.5(AYC),2.2.6 (GC),2.2.7(BC),2.2.8(KC), they deliberately avoided to write DC as a clear cut definition and in thesis DC is roughly specified as "It has transitivity, dense periodic points and sensitivity".
4. They initially wrote EC does not imply any other chaotic functions.
5. Expansive Chaotic function (the invention in the thesis) f is defined as(i) f is sensitive , (ii) Closure of Pf(X) =X (i.e, f has dense periodic points in X) and (iii) f is expansive. The only change from DC is the third condition "f is expansive".Then the authors described an immediate result 2.2.10 "If f is expansive then f is sensitive. "Now look at the definitions of expansive function 2.2.9 and sensitive function 1.1.6.From the definitions ,it is clear that sensitive includes some restriction on x and y and expansive avoids the restrictions on x and y.So EC can be viewed as DC without restrictions on x and y .The authors specified their motive to introduce EC was“in reference [14] of the thesis, it has been proved that there are redundancies in Devaney’s definition. Also they claimed that in their definition “ There are no such redundancies.This claim is fake since EC is DC without restrictions on x and y . So EC is a superset of DC and all the redundancies of subset DC in reference [14] is applicable to EC also.

2.4: Case Study 4[3,7].

Supervisor- Prof. Dr. Vijayakumar, CUSAT.

In the PhD Thesis of Dr. M S Sunitha ,NIT Calicut the definition 1.29 is not fit to all fuzzy graphs since it avoids the possibilityof intersecting links. In the Chapter 5, Some operations of Fuzzy Graphs, the authors tried to modify the definition of complement of fuzzy graphs defined by Mordeson. The definition of Mordeson has its own practical importance and so whenever Dr. A Vijayakumar and Dr.Sunitha modified the definition, they were supposed to use another name for the complement- modified complement (say). Now the definition introduced by A Vijayakumar and Sunitha is also known as complement of a fuzzy graph. This brings some confusion among researchers.

2.5: Case Study 5[5,6,7].

Supervisor- Prof. Dr.Shery Fernandez , CUSAT.

Mordeson defined complement of a fuzzy graph on 1994 .M S Sunitha and A Vijayakumar developed a complement for fuzzy graphs by modifying the definition of Mordeson [3]. The main reason to bring a new definition is that the definition of Mordeson fails to hold law of double complementation. The Complement introduced in [2] doesnot satisfy the law of double complementation.

Proof:

In example *II.9* [6] the vertices and edges of G are labeled as follows A[0.1,0.5], B [0.3,0.9] and the edge AB [0.001,0.5]
Using the new definition introduced by the authors, in complement of G, the vertices and edges are labeled as follows

1. A[0.1,0.5], B [0.3,0.9] and the edge AB [0,0]
2. Now as per their definition, if we take ,we get the following labeling
3. A[0.1,0.5], B [0.3,0.9] and the edge AB [0.1,0.5]
4. Now it is clear *G* and complement of *G* are not equal. Hence the proof.

The already existing definition by Talebi and Rashmanlou satisfies law of double complementation.While A Vijayakumar andM S Sunitha argued the importance of law of double complementation in definition of a complement, Dr.Shery Fernandez from the same university comes with a modified definition that fails to keep law of double complementation. This shows thecontradiction in Research works in CUSAT, Kerala.

2.6 : Case Study 6 [8].

Supervisor- Prof. Dr. Sunitha M S, NIT,Calicut.

In the PhD Thesis of Dr. Sameena Kalathodi, MES College Mampad,the assumption of the authors on fuzzy neuron is notaccurate though they claim it simulates actual neuron.

Observations

Axons ends in synaptic button which serves as the interface with dendrites of other neurons. The electrical impulse of the axon in most cases is converted into a chemical reaction which causes a chemical release of a neurotransmitter. This neurotransmitter release is sensed by the receptors on dendrites that activates electrical impulses. The receiving neuron then adds the impulses from all the incoming dendrites (both excitatory/positive impulses and negative/inhibitory impulses). If the resultant change in the voltage of the cells meets a certain threshold - then the cell fires axon potential down its axon - which then goes down that axon to the synapses and then on to the dendrites of the next axon.

1. The proposed model assumes that between two axons communication is not possible.This assumption is wrong. Synapses can be axo-dendritic (from axon to dendrite - most common type), axoaxonic (from one axon to another), axo-somatic (from axon directly to soma/cell body) or dendrodendritic (between two dendrites).
2. The proposed model assumes that between two dendrites communication is not possible.This assumption is wrong. Although uncommon, dendro-dendritic synapses do exist.
3. The proposed model assumes100% capability to all axons.This is wrong .It is not guaranteed that the dendrite is capable to accept 100% of communication that transmitted from the corresponding axon. In neuromuscular junction (axon connecting to muscle) for example - Many synapses have usually what is called safety factor - where the amount of transmission from the axon to the muscle is more than what the muscle needs to activate. That way the body ensures that when the axon tells the muscle to activate, it will activate. The axon in that instance releases 10 times more neurotransmitter than what is needed to activate the muscle fiber. If this safety factor is lost it can lead to muscle note activating with every single axon impulse - leading to muscle weakness. Eg. a disease known as myasthenia graves.But in axodendritic synapses, there is often what is known as a graded potential (while neuromuscular synapses have action potentials and not graded potentials) . The amplitude of the graded potential responses will depend on the input signal - the higher the “strength” of the signal, the more neurotransmitter is released and the higher the post synaptic potential in the dendrites. So dendrites might sometimes be activated at 10% and sometimes at 100% depending on the neurotransmitter input from the axon. And often the relationship between strength of signal at the axon and activation of the dendrite follows a logarithmic function (double log Hill equation). But certainly every single chemical molecule released by the axon will not reach the dendrite. So there is some loss due to the stochastic nature of the neurotransmitter molecule traveling through the synapse and randomly stumbling upon and binding to the receptors dendrites. So there is a certain loss there. But the axon releases neurotransmitter in many cases in such a way that the intended signal strength is transmitted.
4. The proposed model assumes same capacity to axons. This is wrong.All axons and all dendrites in a neural network may not have same capacity. Every axon and dendrite is different. How much and how fast an axon or dendrite gets activated depends on multiple factors - such as membrane resistance, membrane capacitance, axial resistance (which depends on axon or dendrite thickness)

The above observations show that the simulation of fuzzy neuron by the authors using a sum function has more flaws.

CONCLUSION

This study opens that the loopholes in requirement of Pre PhD publications has been utilized by research supervisors in Kerala State and so there are more flaws in research. This study opens the necessity to bring a unique Pre PhD requirement in all universities under UGC to assure same quality.

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