

## Review Form 1.6

Journal Name:	<a href="#">Asian Journal of Research in Computer Science</a>
Manuscript Number:	Ms_AJRCOS_81201
Title of the Manuscript:	<b>Artificial Neural Network and Its Application Research Progress in Chemical Process</b>
Type of the Article	The way the manuscript is organized it is apparent that the authors(s) intends to publish this as a review paper

### **General guideline for Peer Review process:**

This journal's peer review policy states that **NO** manuscript should be rejected only on the basis of '**lack of Novelty**', provided the manuscript is scientifically robust and technically sound. To know the complete guideline for Peer Review process, reviewers are requested to visit this link:

(<https://www.journalajrcos.com/index.php/AJRCOS/editorial-policy> )

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### PART 1: Review Comments

	Reviewer's comment	Author's comment (if agreed with reviewer, correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)
<b>Compulsory</b> REVISION comments	<p>The manuscript at its current form does not show any merit for publication unless major revisions are made to bring it up to a standard for publication and to be useful to readers.</p> <p>It appears that the author(s) do not have a clear understanding of ANN (as evidenced from the manuscript) but embarked on publishing a Review Article on ANN and its application research progress in chemical process, just for the sake of publishing something without any regards/understanding how the content of the manuscript could be made useful to the reader.</p> <p>The whole manuscript is full of "bombastic texts" and excerpts from other publications without any regards to the appropriateness of the excerpts/citations.</p> <p>The authors(s) need to show/imply/indicate/substantiate in the manuscript how the materials presented would be helpful to the advancement of knowledge.</p> <p>As indicated in the title, abstract, and the way the manuscript is organised it is apparent that the authors(s) intends to publish this as a review paper, but the author need to fathom, realise a review article demands extensive knowledge on the topic, robustness in the write up and soundness, continuity, coherency in the technical information.</p> <p>My suggestions and comments to improve the manuscript are as follows;</p> <p><b>ABSTRACT</b></p> <ol style="list-style-type: none"><li>Abstract, Lines 5-6. The statement "<i>It's main function is to simulate multiple basic functions of the nervous system of living organisms</i>"  This is a very ambiguous statement without supporting explanation and arguments. Please revise this phrase. In the context of computer science, perhaps it would be more meaningful and objective to the reader if the manuscript could convey and explain how an ANN simulate multiple basic functions of the nervous system of living organisms, subject the author(s) intends to use this phrase.</li><li>Abstract, Lines 8-9. Even though the abstract claims of introducing the basic principles of ANN, in fact Section 2 fails to explain to the reader the basic principles of an ANN. In the context of my comment, I am attaching an article with this review comment which the Editor may convey to the author(s) to read and understand how basic principles can be explained. I hope the attached article is helpful to the author(s). There is no need for any citation to this article.</li><li>Abstract, Lines 9-11. The manuscript claims in abstract and attempts in Section 3.1, 3.2 and 3.3 to review application of ANN in Chemical Process Control, Fault Diagnosis and Process Optimization. However, the review appears to be just citing quotes from different published articles with due reference, but without any relevance, context, and without any appreciation/understanding how the review would be helpful to the reader community.</li></ol>	

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	<p>INTRODUCTION</p> <p>4. Introduction, Lines 8-9. The sentence “<i>However, the traditional control technology has been difficult to meet the requirements</i>” reads wrong, incomplete, poor sentence structure.</p> <p>Perhaps the sentence should read- However, traditional control technology has difficulty in meeting these requirements.</p> <p>5. Introduction, Lines 15-17 are simply repetition of lines 10-11 in the Abstract.</p> <p>The sentence should be rephrased/ revised to avoid repetition. Unnecessary repetition of sentence does not add value to the content, rather reflects carelessness, ignorance and eats up valuable space.</p> <p>SECTION 2</p> <p>6. Section 2, Line 4. In ANN terminology the word “<i>interconnection</i>” seems incomplete.</p> <p>Perhaps it should read “interconnection weights”, as in ANN, adjustments to information flow (ideally errors between output and target) are made/conveyed through updating/modifying the weights, not the interconnections.</p> <p>7. Section 2, Equation 2. The negative sign before the symbol theta (<math>\theta</math>) appears wrong, should it be a positive sign? Please check and verify with the original source of the equation.</p> <p>8. Section 2, Equation 2. The symbol theta (<math>\theta</math>) is defined as a threshold.</p> <p>The manuscript needs to define what does this threshold mean and what does it do in the context of ANN terminology? In simple terms threshold means limit, or margin, or starting point, or minimum. In my understanding it is called “bias”. Please verify</p> <p>9. Section 2, Line 10. The symbol <math>w_{ji}</math> now is defined as connection coefficient. Previously it was mentioned as interconnection.</p> <p>In fact the correct terminology and not to confuse the reader <math>w_{ji}</math> is called the weight. It becomes a matrix for the ANN when compiled for all the nodes.</p> <p>Is the author(s) aware of what the double subscript <math>ji</math> refers to in <math>w_{ji}</math>. The manuscript states (Section 2 Line 14) <math>w_{ji}</math> connects node <math>i</math> and node <math>j</math>. The question is among <math>ji</math> nodes, which node is the source node and which node is the destination node? While the manuscript has an objective to introduce basic principles of ANN, it is therefore an obligation of the manuscript to convey the audience/reader these basic ANN rules.</p> <p>The manuscript may also choose to use a diagram to illustrate to the reader the structure of an ANN and how the variables <math>x_i</math>, <math>y</math>, <math>w_{ji}</math>, <math>\theta_j</math>, etc. are interrelated in an ANN. I am suggesting this on the understanding that the manuscript claims of introducing the basic principles of ANN, yet it fails to convey the reader the</p>	
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	<p>basics of an ANN.</p> <p>The function is sometimes denoted by the letter 'f' (Section 2, Line 11, and Equation 1) and sometimes as "<i>f</i>" (Section 2, Line 15). Avoid using multiple symbols, notations for the same variable and be consistent throughout the manuscript, otherwise it would be confusing to the reader.</p> <p>10. Section 2, Line 16. The phrase "<i>neuron biology model</i>" and its abbreviation "<i>(M-P model)</i>" seem odd. Please check.</p> <p>11. Section 2, Lines 32-33. The sentence "<i>Its fault tolerance is reflected in the loss of a part of the system</i>"</p> <p>The sentence appears to be a widow or orphan sentence. It neither connects to the previous or following sentence. Also the meaning of the sentence is not clear. The sentence needs revision or rephrasing to clarify its meaning/context.</p> <p>12. Section 2, Lines 33-34. The phrase "<i>It will not affect the overall activities [24]</i>"</p> <p>What will not be affected? What overall activities are referred to by the phrase? The manuscript seems to be citing quotes from other publications with due reference, but the quotes are out of context, has no relevance to the content or topic in discussion.</p> <p>13. Section 2 Lines 42-43. The sentence "<i>It has a strong recognition ability to complex molecular states and detect and recognise molecular structures in complex environment.</i>"</p> <p>This sentence is out of context, ambiguous, and irrelevant. Is the author(s) able to explain how an ANN has a strong recognition ability to complex molecular state, and how it detects molecular structure in complex environment?</p> <p>This kind statement (Section 2, Lines 42-43) without proper explanation appears bogus and raises the question, does the author(s) really understand what an ANN is, its basic working rules?. Did the author(s) have done any ANN modelling before attempting a review article on ANN basics?</p> <p>14. Section 2, Lines 46-47. How the author(s) interpret dynamic balance of a feedback neural network?</p> <p>15. Section 2 Line 57. What is "<i>traditional KL distance</i>". The abbreviation KL is not defined in the manuscript.</p> <p>SECTION 3</p> <p>16. Section 3 Lines 2-3. This is again repetition of Abstract, Lines 10, and Section 1, Lines 15-16.</p> <p>17. Section 3 Line 3. Line 3 claims that this article will also review application of ANN in product quality control.</p> <p>I did not find any content in the manuscript that supports this claim/statement for review of product quality control. Am I missing or misinterpreting anything?</p> <p>SECTION 3.1</p> <p>18. Section 3.1 Line 4. The abbreviation "PID", what does it mean? The PDI is defined in Line 11. However, any abbreviation should be defined at its first</p>	
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	<p>occurrence in the body text. That means it should be define at line 4 not at line 11.</p> <p>19. Figure 1. What does the various symbols in Figure 1 represents. Can the author(s) explain how the data flow for depropanizer shown in Figure 1 works?</p> <p>20. Section 3.1 Lines 31-33. The sentence reads "<i>The result show that the developed model is integrated with the model predictive control (MPC) system, which replaces the existing mathematical model and provides stable, fast and accurate control system optimisation result</i>".</p> <p>Can the author(s) explain in the context of Fig 2 and Fig 3 and based on their statement, how MPC provides "fast" control system optimisation. Is the fast optimisation evident from Fig 2 and Fig 3?</p> <p>I presume, the time axis (x-axis) in Fig 2 and 3 refers to Propane mole fraction in the overhead and Tray 4 temperature at different times respectively, it does not show how fast the MPC achieved optimisation.</p> <p>21. What is NARX in Figure 2 and Figure 3 and what is Tray 4? The figures appear to be just taken from reference [51] and plugged in without any adjustments to suit the content of the current discussion.</p> <p>22. Section 3.1, Lines 40. What is BP network? Is this referring to a back-propagation network? If so then define it, the reader does not know yet what is BP as this abbreviation has not been defined in the preceding sections.</p> <p>23. Section 3.1, Lines 47. What is "L-M method" Is the phrase L-M method referring to Levenberg-Marquardt (LM) training algorithm? If so it should be clarified. Otherwise, how the reader would know.</p> <p>24. Section 3.1, Lines 49. The sentence "<i>The prediction performance of the artificial neural network increases with the increase of training data, and the prediction error gradually decreases</i>"</p> <p>This is a general statement with no supporting evidence, arguments, justification and stating the obvious.</p> <p>SECTION 3.2</p> <p>25. Section 3.2, Lines 4. The sentence "<i>Artificial neural network models rely on powerful self-learning and nonlinear mapping capabilities....</i>"</p> <p>Section 2 which is dedicated for principles and development history of ANN, the author(s) failed to demonstrate or explain what is the powerful self-learning capability, what is that nonlinear mapping capability and how ANN performs this, yet cites the phrase above without any justification</p> <p>26. Section 3.2, Lines 5. The phrase and the abbreviation "<i>radial-basis (RBF) networks</i>" seem incorrect. The abbreviation RBF stands for Radial Basis Function. Pl. revise</p> <p>27. Section 3.2, Line 7. The word "<i>ownership value</i>". What is an ownership value in ANN? The author(s) should explain this to the reader.</p> <p>28. Section 3.2, Lines 12. The sentence refers to desorption tower in reference to Figure 4. Can the author(s) identify desorption tower in Figure 4?</p>	
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	<p>29. Figure 4. What are those labels (e.g. FI, PI, TI, LI, A, D, E, C, etc) on Figure 4? Are they relevant? Do they need to be explained?</p> <p>30. Section 3.2, Lines 15. The sentence "<i>Take out 500 set of data to train the neural network and then take 100 sets as test data</i>"</p> <p>The sentence is poorly framed, it reads as if the author(s) is asking the reader to do this, but for what purpose. Consider rephrasing the sentence to reflect what the authors are trying to convey.</p> <p>31. Section 3.2, Lines 17. The sentence "<i>Through Levenberg-Marquardt's back-propagation algorithm for training, BPNN shows high fault recognition ability</i>"</p> <p>Does Figure 4 shows high fault recognition ability of BPNN?</p> <p>The whole section (3.2) is so convoluted, the focus is obscured, it appears the author(s) do not know what they want to convey to the reader.</p> <p>SECTION 3.3</p> <p>32. Section 3.3, Line 4. The phrase "<i>Neural-networks have a typical black box nature</i>"</p> <p>Can the authors explain to the reader how to interpret the term "black box" in ANN terminology? In what way/context an ANN is a black box? Does the author(s) know by themselves what does this mean in ANN. Can the author(s) shed some light if ANN is a black box than how does it perform complex nonlinear mapping? What is the secret?</p> <p>33. Section 3.3, Line 5. The sentence "<i>They can automatically extract reasonable solving rules by learning a set of examples containing correct answers and establishing a mapping relationship between output and input</i>"</p> <p>Can the author(s) explain how an ANN automatically extract reasonable solving rules, and how the ANN establishes a mapping relationship between output and input?. I believe if the author(s) can do so, it would be of more interest and more valuable to the reader than just reading "bombastic texts and excerpts". Please consider explaining to the reader what the sentence means.</p> <p>34. Section 3.3 Line 11. The statement "<i>...and the algorithm can master the calculation ability, through learning, training, and testing of sample data</i>"</p> <p>This is another ambiguous statement. Which algorithm is referred here? Is the author(s) trying to refer to back-propagation network or a specific training algorithm?</p> <p>How does an ANN master the calculation ability? Can the author(s) share this knowledge with the reader? Sounds like if someone tells some object, Okay, from now on you are an ANN, the object turns itself into an ANN, reads the persons mind and does all the things by itself without any direction!</p> <p>35. Section 3.3, Lines 12-13. The sentence "<i>Take voltage, receiving distance and injection speed as three input units, set up four hidden units, and filtering resistance as the output unit</i>"</p> <p>The sentence reads like an operation manual or a lecture note, giving instructions. Please consider revising the sentence to convey clear message.</p>	
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	<p>I am guessing, I might be wrong though, the author(s) wanted to mean, Kang et al [58] developed a BP ANN to optimise filter media performance for polyvinylidene fluoride and polypropylene composite separation in which they [58] used 3 nodes in the input layer (voltage, receiving distance, and injection), four nodes in the hidden layer and a single output node (filtering resistance) in the output layer.</p> <p>36. Section 3.3, Line 14. The sentence "<i>Use the new function to create a network object for pre-feedback training</i>".</p> <p>Which new function is referred to by this statement? and what network object is referred to by the sentence? What is a pre-feedback training?</p> <p>Is the author(s) trying to refer to back-propagation network as a function? A function and a BP network are not the same, an ANN may use different types of functions. The author(s) must not mix up, confuse with functions, training algorithms, etc. related to ANN.</p> <p>CONCLUSION</p> <p>37. Conclusion, Line 1. The statement "<i>The ANN has <u>self-learning function</u> and a <u>typical black-box nature</u></i>"</p> <p>Throughout the manuscript there does not seem to be a single attempt to explain the reader what the ANN self-learning capability/function really is or how does it work, yet the manuscript boast/repeats on multiple occurrences the same phrase and emphasises in the conclusion.</p> <p>The manuscript also concludes ANN to be a typical black-box nature, yet failed to define, educate the reader in what way ANN is of black box nature</p> <p>The conclusions are therefore not supported by material facts, arguments, in the manuscript but merely citations from other publications.</p> <p>38. Conclusion, Lines 2-4. The sentence "<i>It can automatically extract "reasonable" solving rules by learning a set of examples containing correct answers, and establishing a mapping relationship between output and input</i>".</p> <p>This statement is also not supported by material fact, arguments, presented in the manuscript, nor the manuscript explains how this is achieved in an ANN model. Therefore, the conclusion made in this manuscript are unfounded.</p> <p>39. Conclusion, Line 5. This line is again a repetition.</p> <p>40. Conclusion, Line 7. The statement "<i>With the future development of <u>computer technology</u> and the continuous innovation of neural network algorithms, the application of ANNs in the chemical industry will become more extensive</i>"</p> <p>While the statement is not incorrect but is vogue in the context of the manuscript based on the understanding that the manuscript did not show, discuss anything that substantiate that the application of ANN is hindered by computer technology currently existed.</p> <p>Additionally, the notion that the continuous innovation of neural network algorithms will facilitate extensive application of ANN in chemical industry is too general and stating the obvious.</p>	
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	<b>REFERENCES</b>  41. I did not review the list of references as it appeared to me it is not productive at this stage of the manuscript to comment on the reference as the main manuscript is fundamentally flawed and very weak. The manuscript at its current form does not reflect that the author(s) made any effort to write a productive manuscript.	
<b>Minor</b> REVISION comments		
<b>Optional/General</b> comments		

**PART 2:**

	<b>Reviewer's comment</b>	<b>Author's comment</b> (if agreed with reviewer, correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)
<b>Are there ethical issues in this manuscript?</b>	<i>(If yes, Kindly please write down the ethical issues here in details)</i>	

**Reviewer Details:**

Name:	<b>Rezaur Rahman Bhuiyan</b>
Department, University & Country	<b>Canada</b>