

Review Comments 11-Jan_2022

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Dear Dr. Seok:

Manuscript ID etrij-2021-0320 entitled "Nonlinear Optimization Algorithm Using Monotonically Increasing Quantization Resolution" which you submitted to ETRI Journal, has been reviewed. The comments of the reviewer(s) are included at the bottom of this letter.

The reviewer(s) have recommended some revisions to your manuscript. Therefore, I invite you to respond to the reviewer(s)' comments and revise your manuscript.

There are two ways to submit your revised manuscript. You may use the link below to submit your revision online with no need to enter log in details:

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You will be unable to make your revisions on the originally submitted version of the manuscript. Instead, revise your manuscript using a word processing program and save it on your computer. Please also highlight the changes to your manuscript within the document by using bold or colored text.

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When submitting your revised manuscript, you will be able to respond to the comments made by the reviewer(s) in the space provided. You can use this space to document any changes you make to the original manuscript. In order to expedite the processing of the revised manuscript, please be as specific as possible in your response to the reviewer(s).

IMPORTANT: Your original files are available to you when you upload your revised manuscript. Please delete any redundant files before completing the submission.

Because we are trying to facilitate timely publication of manuscripts submitted to ETRI Journal, your revised manuscript should be uploaded by 23-Feb-2022. If it is not possible for you to submit your revision in a reasonable amount of time, we may have to consider your paper as a new submission. If you feel that you will be unable to submit your revision within the time allowed please contact the Editorial Office (etrij@etri.re.kr) to discuss the possibility of extending the revision time.

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Once again, thank you for submitting your manuscript to ETRI Journal and I look forward to receiving your revision.

Sincerely, Editor, ETRI Journal

Editor Comments to Author:

Section Editor: 1

Comments to the Author: (There are no comments.)

Editor: 2

Comments to the Author: This manuscript obtained diverse scores. Reviewer 1 appreciated the contributions of the manuscript. However, all reviewers pointed out that the proposed method needs to be compared with recent state-of-the-art methods and the manuscript needs to contain the discussions of recent works.

The structure of the manuscript needs to be revised and the contribution needs to be more strengthened.

Answer to the Editor

In my opinion, reviewer-1 read all pages of the manuscript and reviewed it concretely. He/she point out the core contents of the manuscript (global optimization) and appropriate suggestion about the manuscript.

This theoretical manuscript deals with global optimization. Therefore, I think that the review point is the consistency of the mathematical logic and performance of the proposed algorithm representing global optimization.

However, reviewer-2 took issue with the structure of the manuscript and the number of references.

For 25 years after receiving Ph.D. degree, writing about a hundred papers to international journals and conferences, it is the first time to receive such a review.

All panels in other international journals and conferences such as IEEE, ICML, NeurIPS, and ICLR didn't point out the structure of the paper written by me or the number of references but argued fiercely about the equations provided by me, one by one.

I guess that reviewer-2 only read the final page of the manuscript and write a review report so that he/she suggests IMRD to me. I have never written a paper including this manuscript that violates the IMRD structure. This manuscript follows IMRD structure very concretely as follows:

IMRD Item	The manuscript
Introduction	Introduction
Method	Definition and Analysis of quantization/ Decision scheme of quantization parameter
Results	Numerical Experiments
Discussiion	Conclusion.

I think editors should give clear attention to reviewers for such poor reviews. I convince posting reviewer-2's review about this manuscript on the open-review site will become an international issue.

I, one of the authors of the revised manuscript, answer the asking from the reviewers as follows:

Reviewer(s)' Comments to Author:

Reviewer: 1

Comments to the Author In general, the contribution of this manuscript is very good that the proposed quantize gradient search algorithm can achieve global optimization by monotonically reducing the quantization step value to five fractional part (17 bit) with respect to time when quantization is composed of integer or fixed-point fractional values applied to an optimization algorithm. Therefore, my recommendation is to accept (Major Revision) the manuscript that has ID etrij-2021-0320. My specific comments are: 1- Please, add some of results in the "Abstract" in order to show the effectiveness of the work. 2- Please put reference in each equation that used in the paper. 3- Add figures to demonstrate each algorithm in benchmark function against proposed algorithm to show the effectiveness of the work as in table-1.

Reviewer: 2

Comments to the Author The paper does not have knowledge contribution and is not well written considering the uses and habits of scientific academic redaction. For these reasons my recommendation is to reject the paper. Some observations and recommendations for the authors are the following:

a. The importance and the knowledge contribution of the study are not sustained. b. To review theoretical framework exhaustively. The paper only has 14 references and only 5 references has less than 5 years of antiquity. It is not sufficient for evidencing the originality of the study. c. There are many ideas and paragraphs without the corresponding cites and references. All the ideas of other authors must have the corresponding cites and references. d. The structure of the paper is not clear. The IMRD (Introduction, Method, Results, and Discussion) structure is suggested to the authors. e. Discussion paragraphs are absent. f. Recommendations for future research are absent.

Reply to the Reviewer

to Reviewer-1

Question-1

Please, add some of results in the "Abstract" in order to show the effectiveness of the work.

Answer Abstract의 마지막 문장을 다음과 같이 수정하였다.

수치적 실험 결과, 전역 최적화 제안한 알고리즘은 기존 알고리즘보다 짧은 동작 시간으로 최적의 지점을 찾을 수 있음을 알 수 있다.

제안한 양자화 기반의 전역 최적화 특성으로, 제안한 최적화 알고리즘은 기존 알고리즘보다 각 단계별 탐색 공간위에서 적절한 최적화가 가능하다. 이로 인해, 수치적 실험은 제안한 알고리즘이 기존 알고리즘보다 적은 Iteration으로 더 높은 성공률로 benchmark function의 전역 최적화를 수행하게 됨을 보여준다.

By following the reviewer's suggestion, We modify the final sentence in the abstract as follows:

The provided quantization-based global optimization property makes the proposed algorithm show better optimization performance on a search space to each iteration in comparison to the conventional algorithm. Consequently, numerical experiments show that the optimization performance of the proposed algorithm is superior to the conventional algorithm with a higher success rate and fewer iterations.

Question-2

Please put reference in each equation that used in the paper.

Answer 본 논문에서 사용된 거의 모든 주요 방정식은 본인이 직접 유도한 것이다. 정의와 가정에서 사용된 일부 방정식의 경우는 가장 기본적인 방정식이므로, 굳이 reference를 놓을 필요가 없다. 그러므로, 각 방정식에 대한 추가적인 reference를 놓을 필요가 없다. 유도된 모든 방정식은 독자적으로 만들어진 것이다.

Almost all the equations used in this paper were derived by the author. Some equations used in definitions and assumptions are the most basic equations, so it is unnecessary to put a reference. Therefore, there is no need to place additional references to each equation. All major equations in the manuscript are originally developed by the author.

Question-3

Add figures to demonstrate each algorithm in benchmark function against proposed algorithm to show the effectiveness of the work as in table-1.

Answer Reviewer-1의 제안대로 1페이지 절반에 걸쳐 각 benchmark function에 대한 searching trace를 그림 2와 같이 추가 하였다.

As suggested by Reviewer, the diagram about searching trace for each benchmark function was added over one and a half pages as shown in Figure 2.

to Reviewer-2

Question-1

The importance and the knowledge contribution of the study are not sustained.

Answer 도저히 이해할 수 없는 review이다. 본 논문은 양자화 연산이 Global optimization을 위한 방법론으로서 가능성을 보인 것이다. Global optimization의 중요성등이 sustain 되지 않는다는 견해에 전혀 동의할 수 없다. 수 없이 많은 연구와 논문들이 global optimization을 추구하지만, 결국 Local Convexity 가정을 도입하는 반면, 본 논문에서 제안한 방법론은 오직, Lipschitz continuous 가정만을 도입하여 최적해를 찾을 수 있음을 증명하였다. 이것의 중요성을 sustain 되지 않았다면, Reviewer는 원고를 읽지 않은 것이다.

This is an incomprehensible review. This manuscript shows that computation based on quantization is possible as a methodology for global optimization. Therefore, I do not agree at all with the review's opinion that the importance and the knowledge contribution of the study are not sustained. Numerous studies pursue global optimization, but in the end, all those efforts involve the local convexity assumption, whereas the methodology proposed in the manuscript only introduces the Lipschitz continuous assumption and proves that the optimal solution can be found. If the reviewer insists that the importance and knowledge in the manuscript is not sustained, the reviewer has not read the manuscript.

Question-2

To review theoretical framework exhaustively. The paper only has 14 references and only 5 references has less than 5 years of antiquity. It is not sufficient for evidencing the originality of the study.

Answer Theoretical frame은 절대 reference의 수로 결정되는 것이 아니다. 이는 학부 학생이나, 대학원 석사 초급 학생들이 흔히 생각하는 부분이다. 이론적인 Framework은 정의, 가정, 그리고 논문에서 제안하는 정리와 증명의 수학적 정합성에 있는 것이지, Reference의 수에 있는 것이 아니다. 또한, 가장 최신 논문을 인용하는 것만이, 논문의 질을 결정하는 것도 아니다. 특히 Global Optimization을 다루는 경우, 수십년동안 참고가 가능할 결정적인 이론적 연구 결과는 극히 적은 편이다. A.I. 분야의 이론적 토대 자체는 60년전의 Local convex optimality에 근거하는 것이며 대다수 연구는 여기에서 벗어나지 못하고 있음을 리뷰어는 상기해야 한다. 리뷰어가 본 논문의 Theoretical frame에 대해 비판하고 싶다면, NeurIPS, ICML and ICLR의 리뷰어들과 마찬가지로 본 논문의 방정식 하나 하나에 대하여 질문하라. 저자는 언제든지 대답해 주겠다.

The theoretical frame is never determined by the number of references. This is a common misconception among undergraduate students and graduate students in beginner courses. An appropriate definition, assumption, proposition, and the consistency of proof about the theorems in the paper determines the theoretical frame, not the number of references. Moreover, citing the most recent papers does not determine the quality of the paper. In particular, on global optimization, the citable crucial results of the theoretical studies are very few for decades. The reviewer should be reminded that the theoretical foundation of artificial intelligence is based on the study of local convex optimality, which is established 60 years ago, and so many researchers did not deal with global optimization appropriately. If a reviewer wants to criticize the theoretical frame of this manuscript, like the reviewers of NeurIPS, ICML, and ICLR, ask about each equation of this paper. The author is always ready to answer.

Question-3

There are many ideas and paragraphs without the corresponding cites and references. All the ideas of other authors must have the corresponding cites and references.

Answer 본 논문의 거의 대부분의 idea와 수식은 저자가 직접 만든 것이다. 따라서, 도입되는 가정과 일부 cited proposition을 제외하고는 관련 Reference는 존재하지 않는다.

Almost all ideas and equations in the manuscript are originally constructed and made by authors. Thus, there are no references with respect to the equations except early represented equations used in assumptions and the cited proposition.

Question-4

The structure of the paper is not clear. The IMRD (Introduction, Method, Results, and Discussion) structure is suggested to the authors.

Answer 25년동안, 100여편의 저널 및 국제학회 논문을 써오면서 논문의 구조에 관한 Review를 받아본 것은 이번이 처음이다. Reviewer는 본 논문을 제대로 읽지 않고, 마지막 페이지만 보고 리뷰를 작성했는가? 최근 A.I. 및 전기전자, 컴퓨터 분야 논문들 중 이론적, 수학적 논문들의 경우, 논문의 주요 내용인 각종 정리들의 증명을 Conclusion 다음의 부록으로 놓는다. 본 논문도 리딩 엣지 논문들의 구조를 따라, 같은 논문 구조를 이루고 있다. 고로 맨 마지막 페이지가 아닌 수정 본 5 페이지에 Conclusion이 있으며 여기에 다음 질문들인 Discussion 및 Future Research에 대한 내용들이 있다.

저자에게 IMRD 구조를 제안하기 전에 먼저 원고를 처음 부터 끝까지 읽어야 한다. 본 논문은 이미 IMRD 구조를 다음과 같이 따르고 있다. 각각 Introduction-Introduction, Method - Definition and Analysis of quantization/ Decision scheme of quantization parameter, Results- Numerical Experiments, Discussion-Conclusion.

Over the past 25 years, writing over 100 papers to international journals and conferences, this is the first time that I have received such a review about the structure of a paper. Did the reviewer not read this manuscript properly and wrote a review after only looking at the last page? Recently, so many authors in EE and CS put the proof of theorems and propositions, which is the main contents in the proposed papers at the end of the manuscript as an appendix, when they write a paper about a theoretical or mathematical study. Therefore, the submitted manuscript also has been written with the same structure as academic leading-edge papers, which have an appendix. In the manuscript, there is the conclusion paragraph on the 5-th page, and there are contents about the issue of discussion and future research. Before suggesting the IMRD structure to authors, the reviewers should read the manuscript carefully from cover to cover. The submitted manuscript already follows the IMRD structure as follows:

IMRD Item	The manuscript
Introduction	Introduction
Method	Definition and Analysis of quantization/ Decision scheme of quantization parameter
Results	Numerical Experiments
Discussion	Conclusion.

Question-5

Discussion paragraphs are absent.

Answer It is already written in the conclusion

Question-6

Recommendations for future research are absent.

Answer It is already written in the conclusion, too.