Global Optimization of Neural Network

Chae Young Lee and Yeon Jun Lim*, Taeseon Yoon**

*Department of Natural Science, Hankuk Academy of Foreign Studies, 50, Oedae-ro 54beon-gil, Mohyeon-myeon, Cheoin-gu, Yongin-si, Gyeonggi-do, Republic of Korea *Department of Computer Science and Engineering, Korea University, Seoul, Republic of Korea

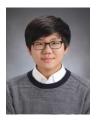
limetree377@hafs.hs.kr, yeonjunlim@hafs.hs.kr, tsyoon@hafs.hs.kr

Abstract— The local optimization problem of cost functions has blocked the advancement of not only the traditional mathematics but also the emerging Neural Network (NN). Since most of the cost functions used in the gradient descent of NN is non-convex, there are high possibilities that the algorithm may converge at the local optimum. In order to eliminate the substantial error caused from this problem, deep learning has been introduced. Yet, standard computing environment cannot possibly power calculation that deep learning requires. The fake alpha algorithm, newly introduced in this paper, shares the same goal with the deep learning algorithm, but can successfully be operated in standard computers. Additionally, the heuristic approach that the fake alpha algorithm takes in the gradient descent process enhances the efficiency of NN.

Keyword—Artificial Neural Network, Fake Alpha Algorithm, Global Optimization



Chae Young Lee was born in Iksan, Korea, in 2000. Since 2016, she has been studying in the Department of International, Hankuk Academy of Foreign Studies. Her research interest is in artificial intelligence and mechanical engineering. She was the recipient of the Best Researcher Award of the Future Scientist Conference, Seoul, Korea, 2017.



Yeon Jun Lim was born in Seoul, Korea, in 2000. Since 2016, he has been studying in the Department of Natural Science, Hankuk Academy of Foreign Studies. His research interest is in artificial intelligence, neuroscience, and biology.



Taeseon Yoon was born in Seoul, Korea, in 1972. He received the Ph.D. candidate degree in computer education from the Korea University, Seoul, Korea, in 2003. From 1998 to 2003, he was with EJB analyst and SCJP. From 2003 to 2004, he joined the Department of Computer Education, University of Korea, as a lecturer and Ansan University, as an adjunct professor. Since December 2004, he has been with the Hankuk Academy of Foreign Studies, where he was a computer science and statistics teacher. He was the recipient of the Best Teacher Award of the Science Conference, Gyeonggi-Do, Korea, 2013.