Can we make my Neural Network a little more comprehensible and biologically plausible?

Nikhil R Pal
Indian Statistical Institute
Calcutta, India

In the recent past there have been several success stories of AI systems, often beating human performance. In many cases, neural networks, in particular deep neural networks, are the main pillars of such systems. But are these systems comprehensible and/or biologically plausible? In most cases, they are not! In my view, comprehensibility of a system depends, at least, on the following: simplicity, transparency, explainability, trustworthiness, and the biological plausibility of such systems. Ideally, we should strive for realizing all these attributes in any intelligent system, but this is very difficult. So I shall follow an easier path to describe how these attributes may be realized separately. I shall illustrate each case with examples.

Bio:

Nikhil R. Pal is a Professor in the Electronics and Communication Sciences Unit of the Indian Statistical Institute. His current research interest includes brain science, computational intelligence, machine learning and data mining.

He was the Editor-in-Chief of the IEEE Transactions on Fuzzy Systems for the period January 2005-December 2010. He has served/been serving on the editorial /advisory board/ steering committee of several journals including the International Journal of Approximate Reasoning, Applied Soft Computing, International Journal of Neural Systems, Fuzzy Sets and Systems, *IEEE Transactions on Fuzzy Systems* and the *IEEE Transactions on Cybernetics.*

He is a recipient of the 2015 IEEE Computational Intelligence Society (CIS) Fuzzy Systems Pioneer Award, He has given many plenary/keynote speeches in different premier international conferences in the area of computational intelligence. He has served as the General Chair, Program Chair, and co-Program chair of several conferences. He is a Distinguished Lecturer of the IEEE CIS (2010-2012, 2016-2018.) and was a member of the Administrative Committee of the IEEE CIS (2010-2012). He has served as the Vice-President for Publications of the IEEE CIS (2013-2016). He is serving as the President of the IEEE CIS (2018-2019).

He is a Fellow of the National Academy of Sciences, India, Indian National Academy of Engineering, Indian National Science Academy, International Fuzzy Systems Association (IFSA), The World Academy of Sciences, and a Fellow of the IEEE, USA. (www.isical.ac.in/~nikhil)