Deep Learning (Partly) Demystified

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Abstract: Successes of deep learning are partly due to appropriate selection of activation function, pooling functions, etc. Most of these choices have been made based on empirical comparison and heuristic ideas. In this paper, we show that many of these choices -- and the surprising success of deep learning in the first place -- can be explained by reasonably simple and natural mathematics.

Biography: *Vladik Kreinovich* received his MS in Mathematics and Computer Science from St. Petersburg University, Russia, in 1974, and PhD from the Institute of Mathematics, Soviet Academy of Sciences, Novosibirsk, in 1979. From 1975 to 1980, he worked with the Soviet Academy of Sciences; during this time, he worked with the Special Astrophysical Observatory (focusing on the representation and processing of uncertainty in radioastronomy). For most of the 1980s, he worked on error estimation and intelligent information processing for the National Institute for Electrical Measuring Instruments, Russia. In 1989, he was a visiting scholar at Stanford University. Since 1990, he has worked in the Department of Computer Science at the University of Texas at El Paso. In addition, he has served as an invited professor in Paris (University of Paris VI), France; Hannover, Germany; Hong Kong; St. Petersburg and Kazan, Russia; and Brazil.

His main interests are the representation and processing of uncertainty, especially interval computations and intelligent control. He has published eight books, 24 edited books, and more than 1,500 papers. Vladik is a member of the editorial board of the international journal "Reliable Computing" (formerly "Interval Computations") and several other journals. In addition, he is the co-maintainer of the international Web site on interval computations http://www.cs.utep.edu/interval-comp/.

Vladik is Vice President of the International Fuzzy Systems Association (IFSA), Vice President of the European Society for Fuzzy Logic and Technology (EUSFLAT), Fellow of International Fuzzy Systems Association (IFSA), Fellow of Mexican Society for Artificial Intelligence (SMIA), Fellow of the Russian Association for Fuzzy Systems and Soft Computing; he served as Vice President for Publications of IEEE Systems, Man, and Cybernetics Society 2015-18, and as President of the North American Fuzzy Information Processing Society 2012-14; is a foreign member of the Russian Academy of Metrological Sciences; was the recipient of the 2003 El Paso Energy Foundation Faculty Achievement Award for Research awarded by the
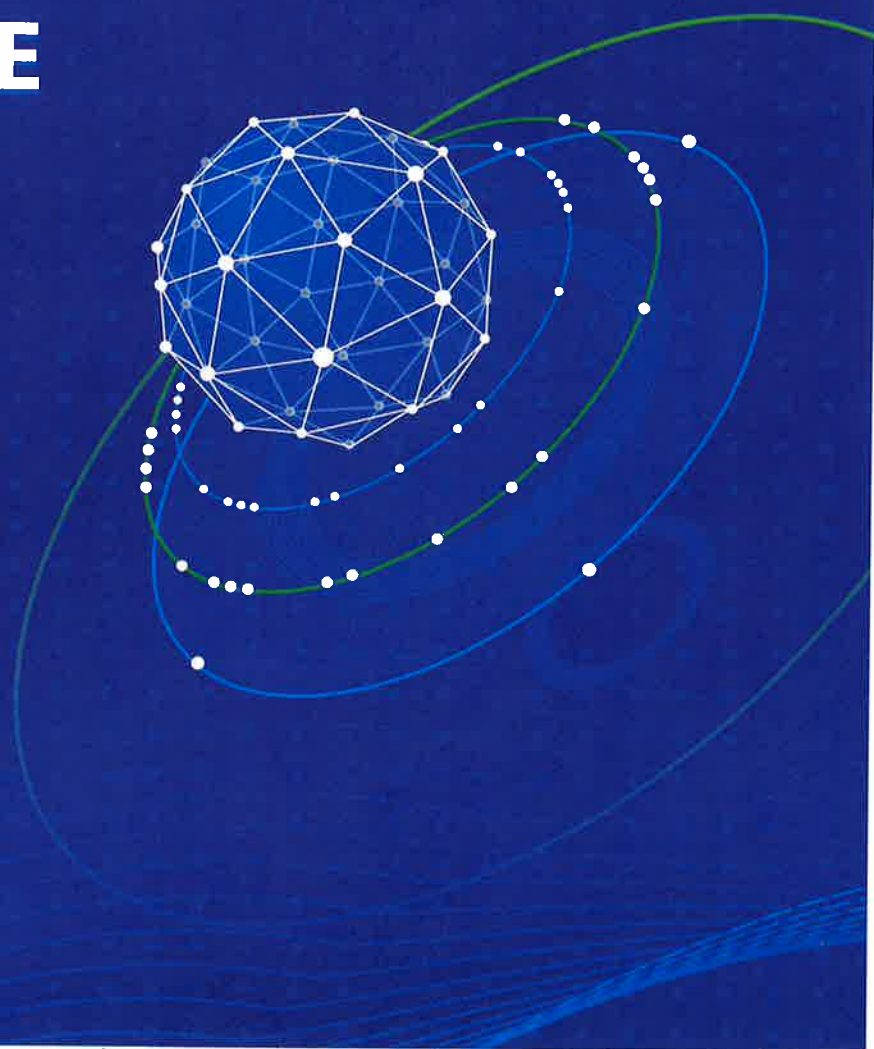
University of Texas at El Paso; and was a co-recipient of the 2005 Star Award from the University of Texas System.

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