1146-68-250   **Hamid Krim*** (`ahk@ncsu.edu`), ECE Dept., PO Box 7911, Raleigh, NC 27695. *Structure v. Scale: A Case for Enhanced Inference.*

High dimensional data exhibit diverse properties, and the challenge is to effectively capture these at a low competitive cost. Given a typically limited number of degrees of freedom of any data, we propose a lower rank structure for the information space relative to its embedding space. We further argue that the self-representative nature of the data favors the flexible structure of union-of-subspaces (UoS) model, as a generalization of a linear subspace model. This proposed structure preserves the simplicity of linear subspace models, with an additional capacity of a piece-wise linear approximation of nonlinear data. We show a sufficient condition to use l1 minimization to reveal this underlying structure, and further propose a bi-sparsity model (RoSure) as an effective strategy, to recover the UoS characterization of non-conforming errors/corruptions. This structural characterization, albeit powerful for many applications, can be shown to be limited in large scale data (images) commonly shared features. This resulting Deep Dictionary Learning approach is based on symbiotically formulating a classification problem regularized by a reconstruction problem. A theoretical rationale is also given to show the improvement over Convolutional Neural Networks. (Received January 24, 2019)