Log-Polar Coordinates Made Efficient, Simple and Explainable
(Preprint Abstract)

Zilin Song   Xiangjun Peng[‡]

Abstract

This paper describes a methodology to motivate designs of compression methods for Deep Neural Network Models. The key insight is to leverage Log-Polar Coordinates for the rough comparisons among different Deep Neural Network Models. The rationale is straightforward: given the information quantification, every collection of abstracted information can be quantified to a specific point (under the information quantification); and then their behaviors can be examined as an offset angle between a line of reference. Based on the above understanding, this work delivers two new methods, derived from the blind spots of such a methodology. The first is "Succinct Compression", a method to demonstrate the merits for asynchronous existences of both representations and values. The second is "The Crossword Puzzle", a pruning engine to exploit the influences of model "projection", onto magnitude-oriented metric space. These two examples demonstrate the effectiveness of our formalized methodology, which can make the compression and deployments of post-trained Deep Neural Network models simpler, and more efficient. We also cover how our formalization contributes to the understanding of these models; how such a methodology can be generalized; and how such a methodology can be migrated or applied for model training procedure potentially.

---

[*]Note that [‡]refers the affiliation to *The Chinese University of Hong Kong.*