

1163-42-1634

**Wojciech Czaja\*** ([wojtek@math.umd.edu](mailto:wojtek@math.umd.edu)), Norbert Wiener Center, Department of Mathematics, University of Maryland, College Park, MD 20742, and **Weilin Li, Yiran Li and Mike Pekala.**

*MaxFun Pooling - maximal function-inspired pooling operation.*

Convolutional neural networks (CNNs), as a popular type of architecture in deep learning, have shown outstanding performances in various applications. Many examples of CNNs have used pooling as a layer in their networks. Pooling is a dimension reduction technique that divides an image into subregions and returns only one pixel value as the representative of each subregion. Max pooling and average pooling are widely used classical pooling strategies which have been popular in many application tasks. Inspired by the Hardy and Littlewood's maximal function from harmonic analysis, we introduce a novel pooling strategy, which we call MaxFun pooling, and we compare it to both max pooling and local averaging. We illustrate the applicability of the new method with an example from convolutional sparse coding. (Received September 15, 2020)