Deopout designs of deep learning

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Dropout is used in deep learning. It is a method of learning by invalidating nodes with randomly for each layer in the multi-layer neural network. And it deletes a random sample of activations (nodes) to zero during the training process. A random sample of nodes cause more irregular frequency of dropout edges. We proposed a combinatorial design of dropout nodes from each partite which balances frequency of edges.

Let $V_1, \ldots, V_n$ be mutually distinct point sets, and $C = \{(C_1; C_2; \ldots; C_n) | C_i \subset V_i, C_i \neq \emptyset, 1 \leq i \leq n\}$. Each $C_i$ is called a subblock. Put each block set $B_i = \{(C_i; C_{i+1}; \ldots; C_{i+t-1})\}$ consisting of successive $t$ subblocks for $1 \leq i \leq n - (t - 1)$. If, for any $d_i$ points from $V_i$, $1 \leq i \leq t$, the points are contained exactly $\lambda_i$ blocks of $B_i$, then $((V_1, \ldots, V_n), C)$ is called a dropout design of type $(d_1, d_2, \ldots, d_t)$.

In this talk, I will introduce the design and show the construction for dropout design of circulant type by using finite geometry.

Keywords: deep learning, dropout, split-block design, dropout design