A Novel Lossless Image Compression Approach "Cooperative Prediction"

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Abstract : Conditional predictive coders (such as LOCO, CALIC, etc.) split the prediction rule into logical cases (channels) and produce prediction residuals for each case. It is a known fact that the distributions of these separate channels usually exhibit sharp, but mean–shifted shapes. If the mean–shift amount for each channel is determined and compensated for, the overall prediction error provides smaller entropy with a sharper distribution. In this work, several prediction rules are tested for obtaining sharp and possibly mean–shifted or skewed individual prediction channel outputs. The overall prediction output was not considered as the optimization criteria. By compensating for the shifts of each channel mean, very sharp and symmetric distributions are sought at each channel, so that the combination of these channels provides an overall sharp prediction error distribution. It is shown that the proposed method provides better compression results than the celebrated LOCO which is the well–known efficient lossless compression algorithm.