

## **PQP (PALETTE QUICK PAIRS)**

Description: The image palette of typical images does not typically contain a large number of pairs of close colors. To the contrary, many stego techniques modify the palette by creating pairs, or in general groups, of close colors. Large number of close pairs does not occur naturally and their number can be a useful criterion in deciding about the presence of a secret message.

The colors  $R_1G_1B_1$  and  $R_2G_2B_2$  are close if they differ by at most one level in each color channel:

$$|R_1 - R_2| \leq 1, |G_1 - G_2| \leq 1, \text{ and } |B_1 - B_2| \leq 1.$$

The decision statistics will be the ratio between the number of all possible pairs of colors and the number of close pairs of colors  $C$ :

$$\frac{C}{\binom{P}{2}}.$$

When this ratio exceeds a certain value, we conclude that the image most likely contains a secret message. The threshold was derived from a large database of images containing images with messages of different lengths and images with no messages.