Image Processing using Similarity Assessment

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Abstract. This paper studies spatial domain upsampling method. The purpose of the method is to perform high-quality upsampled results while consuming reasonable computational complexity. Experimental results prove that the proposed approach can outperform conventional methods.

Keywords: Similarity assessment, image deinterlacing, upsampling.

1 Introduction

Fig. 1. Illustration of a localized 7-by-7 window, $W_{ij}$. We consider 22 pixels in $W_{ij}$ along with 11 edge lines.
In this paper, we investigated directional edge detection method to calculate edge pixels and their corresponding orientations. All edges are classified into eleven directions, where each direction has two pixels. All twenty-two pixels in a window are categorized into five areas, according to the distance from the center pixel.

The missing pixel is reconstructed by a weighted average method of the intensities in a certain window. The combined filter provides higher weights to pixels with spatially near pixels to the center location and similar intensity pixels with tentative intensity value introduced in this paper.

By implementing directional interpolation method, we can perform high-quality deinterlaced images with acceptable computational time.

2 Proposed Method

Figure 1 show an illustration of a localized 7-by-7 window. We considered 22 pixels in a window along with 11 edge lines. Figure 2 shows an illustration of area classification. The distance, $R$, is calculated in Fig. 2.

![Illustration of area classification. The distance, $R$, between $x_{i,j}$ and pixels in $A_1$, $A_2$, $A_3$, $A_4$, and $A_5$ are 1, $\sqrt{2}$, $\sqrt{5}$, $\sqrt{10}$, and $\sqrt{20}$, respectively.](image)

Fig. 2. Illustration of area classification. The distance, $R$, between $x_{i,j}$ and pixels in $A_1$, $A_2$, $A_3$, $A_4$, and $A_5$ are 1, $\sqrt{2}$, $\sqrt{5}$, $\sqrt{10}$, and $\sqrt{20}$, respectively.
3 Simulation Results

The proposed method is tested in News sequence. Results are shown in Fig. 3.

![Simulation Results](image)

**Fig. 3.** Subjective performance comparison: (a) original image, (b) MELA, (c) FDD, (d) LCID, (e) AWSD, (f) FDIF, and (g) proposed approach.

4 Conclusions

We presented an intra field deinterlacing method. After the implementation, subjective performance was assessed.
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References