Pacific Graphics 2020
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(Guest Editors)

Volume 39 (2020), Number 7

Colorization of Line Drawings with Empty Pupils Supplemental Material

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1. Colorization Network Architecture

Figure 1 shows the colorization network architecture. The structures of the generator and discriminator of this network are almost the same as those used for the drafting stage [ZLW*18]. Unlike the drafting stage, spectral normalization [MKKY18] is used in the middle layer of our discriminator. In addition, the reference image is transformed into color features using a histogram model [FHOO17]. The color features of the histogram model are the rates of colors in the reference image. Then, the number of colors in the reference image is reduced from 256^3 to 6^3. The color features are input into the middle layer of the network.

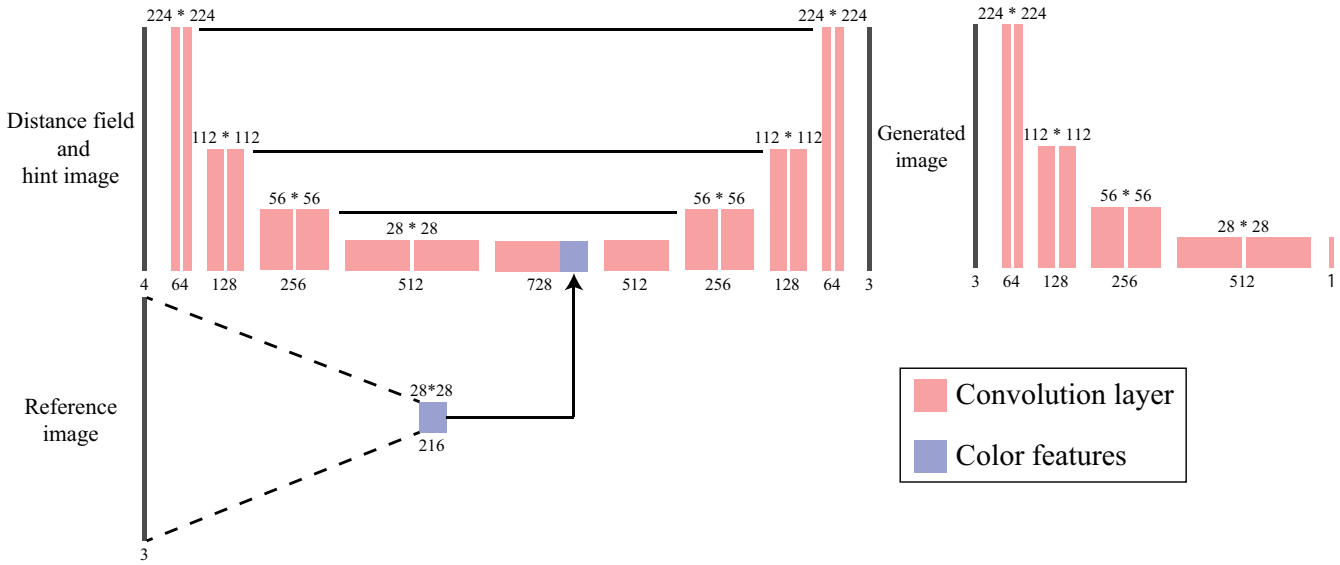

Figure 1: *Network architecture.*

Table 1: *Mean and standard deviation of scores for three methods.*

Categories	Style2Paints	w/o erasing pupils	Ours
Color reproducibility Mean	1.75	3.3	**4.1**
Pupil details Mean	1.26	2.08	**4.28**
Details except for pupils Mean	1.85	3.15	**3.73**
Overall quality Mean	1.64	2.72	**3.77**
Color reproducibility Std.	**0.80**	0.92	1.31
Pupil details Std.	**0.48**	1.10	1.42
Details except for pupils Std.	**0.95**	1.07	1.34
Overall quality Std.	**0.84**	0.98	1.35

Table 2: *Average standard deviation for all participants.*

Categories	Style2Paints	w/o erasing pupils	Ours
Color reproducibility	**0.57**	0.70	0.63
Pupil details	**0.22**	0.74	0.72
Details except for pupils	**0.74**	0.79	0.83
Overall quality	**0.60**	0.76	0.84

2. Analysis of user study

To evaluate our method, we conducted an online questionnaire with 12 participants. Table 1 shows the average score and standard deviation for each method for several evaluation metrics. Figure 2 shows a box chart of the comparison results. The box chart was created from the average score for the 12 participants.

The full method has the highest average scores but also the highest standard deviation for all evaluation metrics. Each participant had different evaluation criteria because visual quality guidelines were not applied. Therefore, the standard deviation for the full method was high. Table 2 shows the average standard deviation for all participants. The standard deviations for the full method and the method without erasing pupils are very different in Table 1 but similar in Table 2. The standard deviation for Style2Paints is the lowest in Tables 1 and 2. Based on the box chart (Fig. 2), we consider the evaluations of each participant to be stable in case of lower score even though visual quality guidelines were not applied.

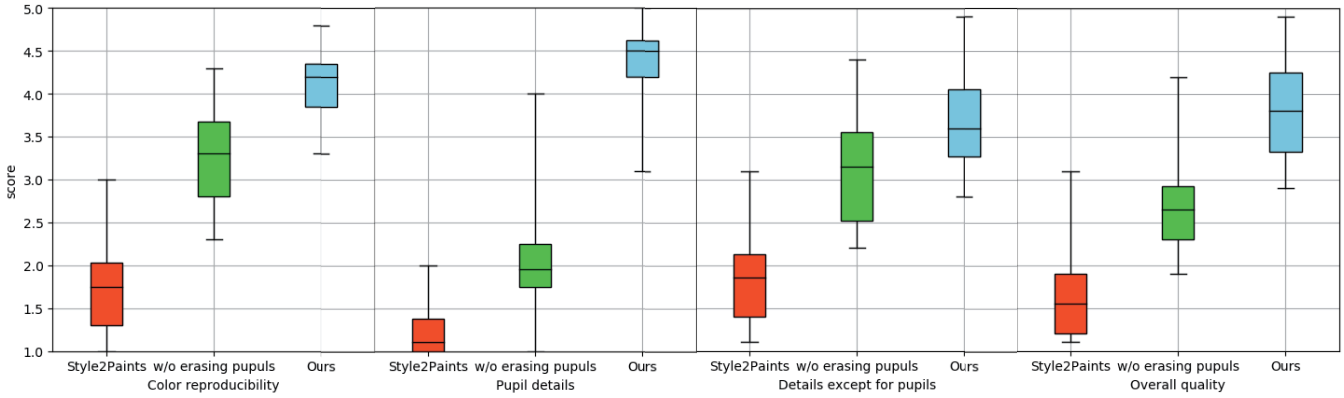

Figure 2: *Box chart of comparison results.*

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