CANet: A Context-Aware Network for Shadow Removal

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Background & problem

CANet: A Context-Aware Network for Shadow Removal
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Input Video

Moving object Detection

Object detection

Without considering shadow

considering shadow

S. Nadimi et al. Physical models for moving shadow and object detection in video. TPAMI, 2004.

R. Cucchiara et al. Improving shadow suppression in moving object detection with hsv color information. ITSP, 2001.
Motivation

There are some paired contextual matching information between shadow and non-shadow areas.
Overview

CANet: A Context-Aware Network for Shadow Removal
Context patch matching module
Context patch matching module
Contextual feature transfer mechanism

\[ F'_{x,y} = \sum_{\Delta x=0}^{n} \sum_{\Delta y=0}^{n} \frac{\varphi(\Delta x, \Delta y)}{\sum_{\Delta x=0}^{n} \sum_{\Delta y=0}^{n} \varphi(\Delta x, \Delta y)} F_{x+\Delta x, y+\Delta y} \]

\[ F = \sum_{i=1}^{k} \frac{w_i}{\sum_{i=1}^{k} w_i} F'_{i} \]
## Experimental results

| Method          | ISTD S | ISTD N | ISTD A | SRD S | SRD N | SRD A |
|-----------------|--------|--------|--------|-------|-------|-------|
| Guo             | 18.95  | 7.46   | 9.3    | 29.89 | 6.47  | 12.60 |
| Zhang           | 13.77  | 7.17   | 8.16   | 9.50  | 6.90  | 7.24  |
| DeshadowNet     | 12.76  | 7.19   | 7.83   | 17.96 | 6.53  | 8.47  |
| ST-CGAN         | 10.33  | 6.93   | 7.47   | 12.65 | 6.37  | 7.83  |
| Mask-shadowGAN  | 10.35  | 7.03   | 7.61   | 10.32 | 6.83  | 7.32  |
| ARGAN           | 9.21   | 6.27   | 6.63   | 8.13  | 6.05  | 6.23  |
| DSC             | 9.22   | 6.39   | 6.67   | 8.22  | 6.01  | 6.21  |
| RIS-GAN         | 9.15   | 6.31   | 6.62   | 8.09  | 6.02  | 6.17  |
| CANet           | 8.86   | 6.07   | 6.15   | 7.82  | 5.88  | 5.98  |
| **CANet w/ TM** | 9.62   | 6.33   | 6.98   | 8.44  | 6.58  | 6.89  |
| **CANet w/ MNet** | 9.16   | 6.20   | 6.52   | 8.17  | 6.21  | 6.35  |
| **CANet w/o CFT** | 10.11  | 6.88   | 7.54   | 9.28  | 6.35  | 6.96  |
| **CANet w/ DRCF** | 9.15   | 6.21   | 6.56   | 8.10  | 6.11  | 6.25  |
| DenseUNet       | 10.22  | 7.02   | 7.58   | 10.44 | 6.71  | 7.28  |
| **CANet**       | **8.86** | **6.07** | **6.15** | **7.82** | **5.88** | **5.98** |
Results on complex real-world images

Input  ST-CGAN  DSC  ARGAN  RIS-GAN  CANet
Paper QR Code:
http://graphvision.whu.edu.cn/papers/chenzipei2021iccv.pdf

Thank You!

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