Infrared Image Colorization Using a S-shape Network
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Motivation

Advantages of NIR images:
• Obtain more spectral information: The wavelength of NIR is larger than the maximum of visible light (700nm).
• Illuminate the scene in low light conditions, such as fog day. Improve the safety of diving in bad condition.

Existed Works problems:
• Easy to blur.
• Lack high frequency scene in detail.

S-shape Network (SNet)

SNet architecture

ColorNet
• Encoder:
  Input: NIR image
  Output: Latent feature maps
• Decoder:
  Input: Latent feature maps
  Output: RGB image
• Symmetrical skip connection to keep detail information and clear edges.

EdgeNet
• Enhance edges.
• Stabilize color regions.
• Become the most suitable ‘loss function’ of ColorNet.

ColorNet + EdgeNet = S-shape Network (SNet)

Competition Results

Results for our Hibikino Dataset:

Results for other Datasets:

• L Suárez et. [2] published on CVPRW 2017 used a triplet DCGAN architecture to colorize NIR images in dataset of Brown et. [7].
• The Qayynm et. [3] published on IBCAST 2018 used a deep encoder-decoder CNN architecture to colorize thermal images in dataset of J.Davis et. [6].

Conclusion

• We proposed a novel architecture, SNet, for the colorization of NIR image, which consists of ColorNet and EdgeNet.
• It is a novel way to use the EdgeNet in SNet to only enhance the edges but also stabilize color regions.
• We can see from the results that the SNet is able to obtain colorful and clear RGB images from the given NIR image.

References