

# 影像處理 Term Project Proposal

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## Problem Description

### *Background and Motivation*

When taking photos in poor lighting conditions, we may need to increase the sensitivity (ISO) to reduce exposure time. However, high ISO may make the image noisy. On the other hand, if we want to reduce the noise, we may need to decrease ISO and increase exposure time, which causes motion-blur.

What we want to do is to combine these images and get a high-quality image which is less noisy and less blurry.

### *Previous Work*

See [Image Deblurring with Blurred/Noisy Image Pairs \(by Lu Yuan, Jian Sun, Long Quan, Heung-Yeung Shum\)](#).

## Methods

### *Assumption*

Assume one of the images doesn't have any motion-blur but is noisy, and another one has little noise but is blurry.

### *Steps*

1. Take photos with the same camera but different settings as described above.
2. Smooth the noisy images.
3. Use these images to estimate the blur kernel.
4. Deblur the images according to the blur kernel.
5. Post-process the images if necessary.

## Possible Results

According to the references, after deblurring the images, we may see some ringing effects, so we may get an image with ringing effects (or a good image with low noise and no motion-blur, ideally).

## References

[Image Deblurring with Blurred/Noisy Image Pairs \(by Lu Yuan, Jian Sun, Long Quan, Heung-Yeung Shum\)](#)