

# VFX Project 1

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## 0. Team Members

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- R07944007 林良翰
- R07922100 楊力權

## 1. Program Usage

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### 1.1. Quick Usage

- Input directory

```
[input_directory]/
├─[image1]
└─...
└─shutter_times.txt
```

- Example of shutter\_times.txt

```
32
16
8
4
2
1
1/2
1/4
1/8
1/16
1/32
1/64
1/128
1/256
1/512
1/1024
```

- Run

```
python3 hdr.py [input_directory] --savedir [output_directory]
```

## 1.2. Advanced Usage

- Please check the program document.

```
python3 hdr.py --help
```

## 2. Code Works

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### 2.1. Image Alignment

- MTB Algorithm

Instead of using median threshold bitmap, we used gradient magnitude to compare the differences.

### 2.2. HDR Reconstruction

- Debevec's Method
- Robertson's Method

### 2.3. Tone Mapping

- Photographic

- Global Operator
- Local Operator

- Bilateral

We implemented opencv bilateral filtering to complete this algorithm.

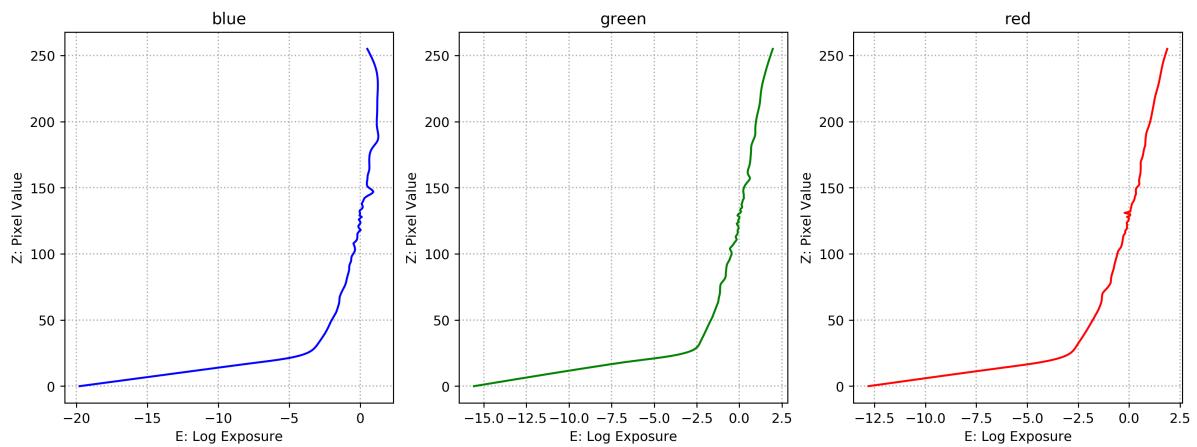
## 3. Comparison

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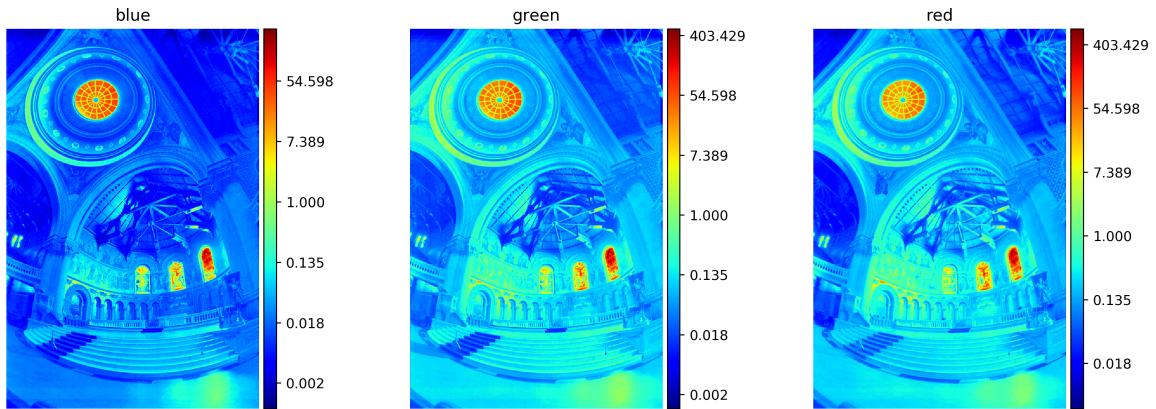
- Input Images - `data/memorial`

### 3.1.Debevec's Method

- Response Curve



- Radiance

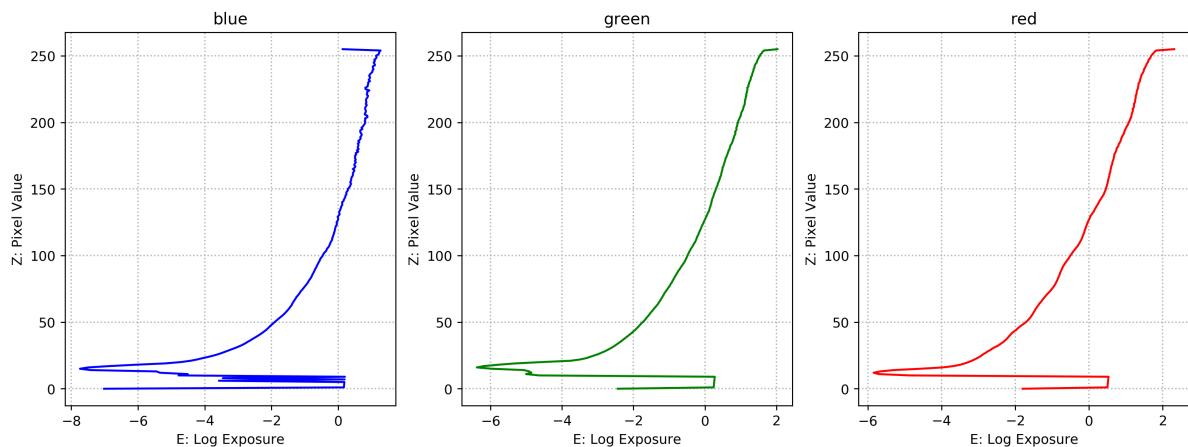


- Tonemapping

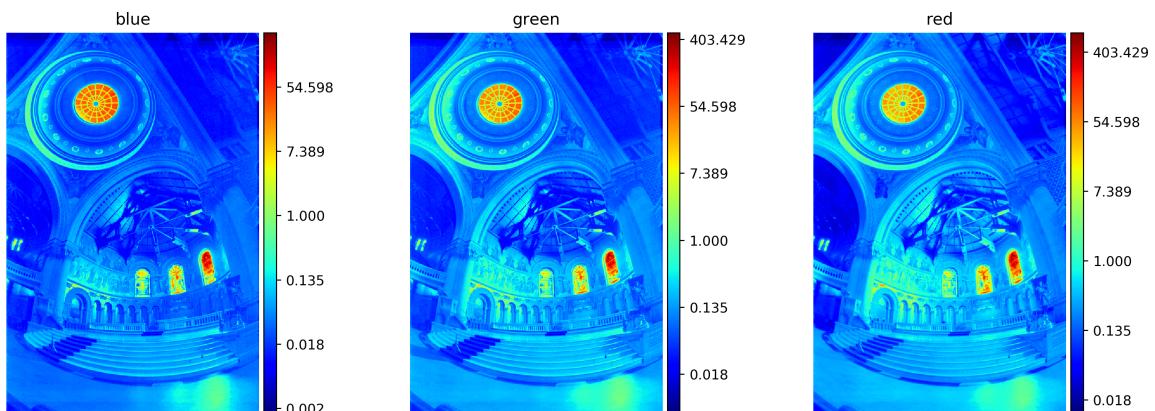
Photographic Global Operator	Photographic Local Operator	Bilateral

## 3.2. Robertson's Method

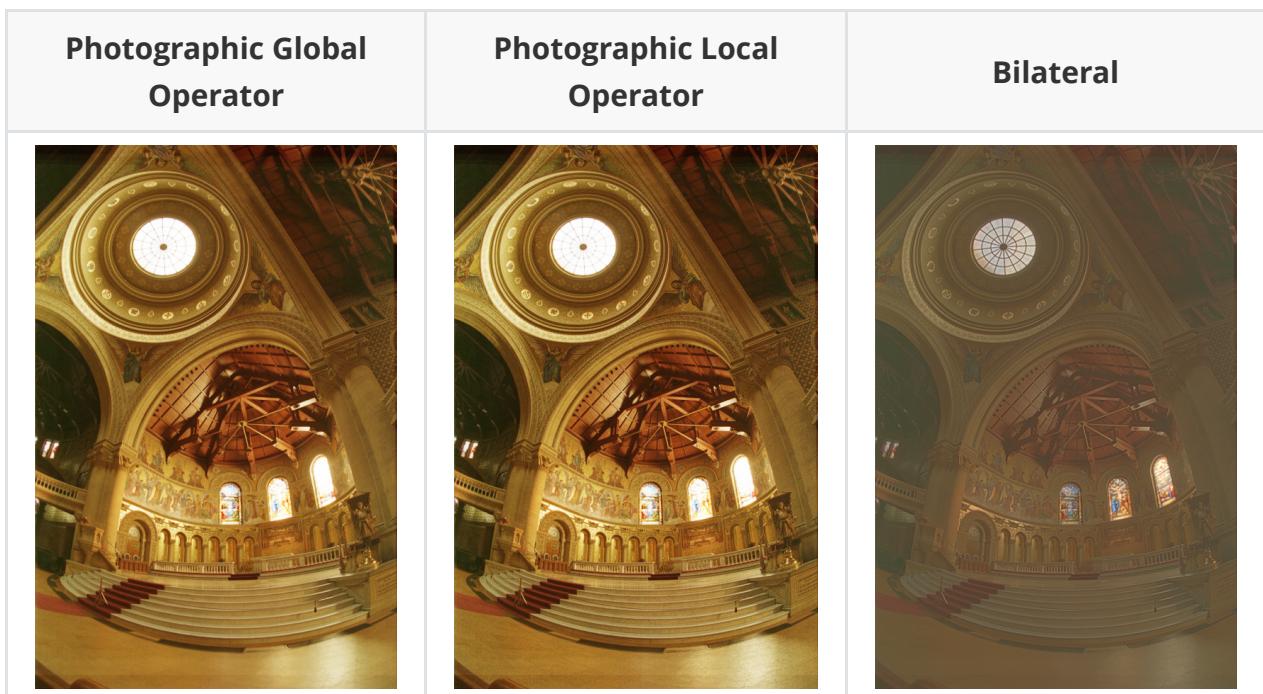
- Response Curve



- Radiance



- Tonemapping



## 4. Our HDR Photo

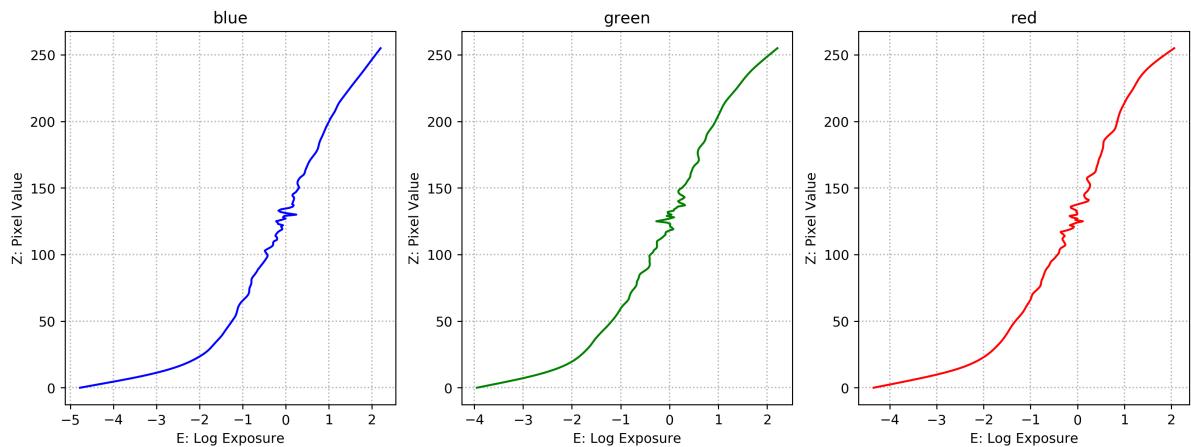
- Input Images - `data/ntu-library`

## 4.1. Parameter

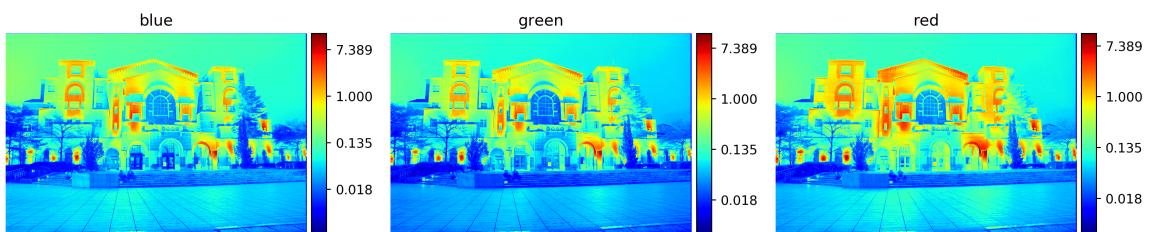
- Image Alignment
  - depth = 5
- Debevec's Method
  - $\lambda = 10$
- Photographic Local Operator
  - $a = 0.25$
  - $\delta = 10^{-6}$

## 4.2. Result

- Response Curve - [data/ntu-library/res/debevec/response\\_curve.png](#)



- Radiance - [data/ntu-library/res/debevec/radiance.hdr](#)



- Tonemapping - [data/ntu-library/res/debevec/tonemap\\_local.png](#)

