

Prokudin-Gorskii Collection

HW1 | Computer Vision

Submitted By:

Himanshu Jhawar (hj2713)

GitHub Repository:

<https://github.com/hj2713/CV2/tree/main/HW1>



Technical Implementation

Algorithm Pipeline:

1. Load & Preprocess: Images are loaded (checking for 16-bit) and normalized.
2. Channel Splitting: The vertical glass-plate image is split into equal thirds (B, G, R).
3. Feature Extraction: Sobel edges are computed for each channel. This makes the alignment robust to brightness differences between channels.
4. Pyramid Alignment: A 5-level image pyramid is used. Alignment starts at the coarsest level (smallest image) to find approximate offsets, then refines them at each higher resolution.
5. Reconstruction: The Red and Green channels are shifted using the calculated (x, y) offsets to align with the Blue channel.
6. Post-Processing: Borders are auto-cropped (10%) to remove artifacts, and contrast is stretched for better visibility.

Results Gallery (1)



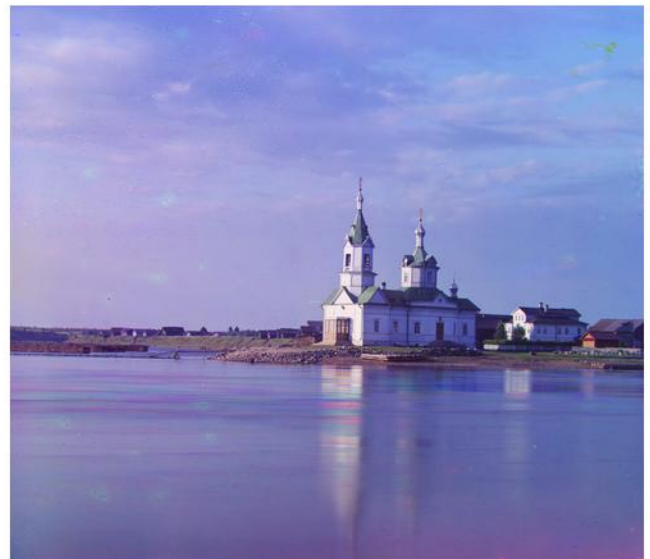
cathedral.jpg
G: (5, 2), R: (12, 3)



monastery.jpg
G: (-3, 2), R: (3, 2)



tobolsk.jpg
G: (3, 3), R: (6, 3)



Church
G: (25, 4), R: (58, -4)

Results Gallery (2)



Emir
G: (49, 24), R: (107, 40)



Harvesters
G: (60, 17), R: (124, 14)



Icon
G: (42, 17), R: (90, 23)



Italil
G: (38, 22), R: (77, 36)

Results Gallery (3)



Lastochikino
G: (-3, -2), R: (76, -8)



Lugano
G: (41, -17), R: (92, -29)



Master-Pnp-Prok-00000-00082A
G: (32, 4), R: (79, 7)



Master-Pnp-Prok-00100-00172A
G: (39, -1), R: (151, -7)

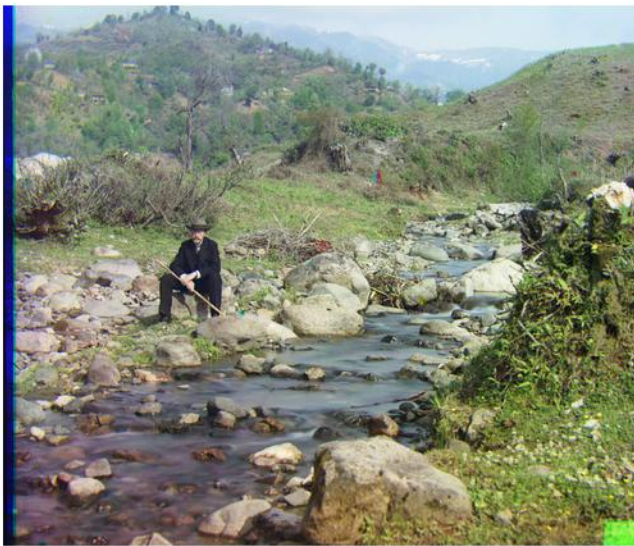
Results Gallery (4)



Master-Pnp-Prok-00100-00187A
G: (33, -11), R: (139, -26)



Melons
G: (80, 10), R: (177, 13)



Self_Portrait
G: (78, 29), R: (176, 37)



Siren
G: (49, -6), R: (96, -24)

Results Gallery (5)



Three_Generations

G: (54, 12), R: (111, 9)