LAB #1- CONVOLUTION, SEPARABLE FILTERS AND, SLIDING WINDOWS

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Part 1: 2-D Convolution
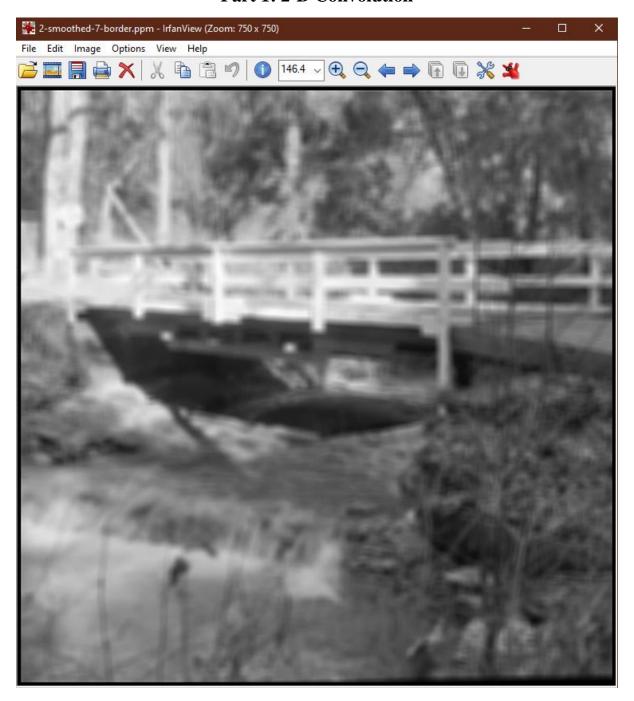

Figure 1 2-D Convolution

Part 2: 1-D Separable

Figure 2 1D Separable

Figure 3 Matches with the 2-D convolution image

Part 3: 1-D Separable Sliding

Figure 4 1D Separable and Sliding

Figure 5 Matches with 2D convolution

Figure 6 1D Separable Matches with 1D Sliding and Separable

Part 4: Time Comparison

	2D Convolution		1D separable		1D sliding
Iteration 1	24395275		9383592		5453402
Iteration 2	23630524		9366458		6324323
Iteration 3	25680890		9511487		6413385
Iteration 4	25029116		9469697		6461634
Iteration 5	23603657		9441433		5260065
Iteration 6	24306666		9356440		6368414
Iteration 7	24329336		9402994		6486417
Iteration 8	24707702		9408927		6397681
Iteration 9	24149162		9396621		6375975
Iteration 10	24298952		9319023		5327719
Average (nanosecs)	24413128		9405667.2		6086901.5
Average (milliseconds)	**24.41**		**9.41**		**6.09**

As is evident, the 1D separable+sliding version executes the fastest. It is nearly 4 times faster than the 2D convolution version.