Is double too high of a precision for pixel values?

Line 60 to 80 look very useless?

Some blur iterations look useless?

Line 205 and 206 look useless?

Pass size directly rather than saving it somewhere?

Can all color channels not be treated together?

Why are we putting imageaccurate 2 which is used as an output image to convert to accurate image, it can just be declared?

Should we try changing the algorithm?

**ORIGINALLY:**

53.28user 0.33system 0:54.05elapsed 99%CPU

Samples: 54K of event 'cpu-clock:pppH', Event count (approx.): 54581581527

Children Self Command Shared Object Symbol

+ 99.90% 0.00% image\_processin libc-2.31.so [.] \_\_libc\_start\_main

+ 99.90% 0.00% image\_processin image\_processing\_c [.] main

+ 98.96% 98.82% image\_processin image\_processing\_c [.] blurIteration

+ 0.70% 0.19% image\_processin image\_processing\_c [.] convertToAccurate

+ 0.54% 0.00% image\_processin [kernel.kallsyms] [k] page\_fault

+ 0.54% 0.00% image\_processin [kernel.kallsyms] [k] do\_page\_fault

+ 0.54% 0.00% image\_processin [kernel.kallsyms] [k] \_\_do\_page\_fault

0.53% 0.08% image\_processin [kernel.kallsyms] [k] do\_user\_addr\_faul

0.45% 0.01% image\_processin [kernel.kallsyms] [k] handle\_mm\_fault

0.45% 0.01% image\_processin [kernel.kallsyms] [k] \_\_handle\_mm\_fault

0.43% 0.00% image\_processin [kernel.kallsyms] [k] do\_anonymous\_page

0.39% 0.01% image\_processin [kernel.kallsyms] [k] \_\_alloc\_pages\_nod

0.39% 0.00% image\_processin [kernel.kallsyms] [k] get\_page\_from\_fre

0.38% 0.00% image\_processin [kernel.kallsyms] [k] alloc\_pages\_vma

0.32% 0.32% image\_processin [kernel.kallsyms] [k] clear\_page\_orig

0.24% 0.22% image\_processin image\_processing\_c [.] imageDifference

0.11% 0.00% image\_processin [kernel.kallsyms] [k] irq\_exit

0.11% 0.05% image\_processin [kernel.kallsyms] [k] \_\_softirqentry\_te

0.10% 0.00% image\_processin [kernel.kallsyms] [k] entry\_SYSCALL\_64\_

0.10% 0.00% image\_processin [kernel.kallsyms] [k] do\_syscall\_64

0.06% 0.00% image\_processin [kernel.kallsyms] [k] ret\_from\_intr

**CHNAGED LOOPS SO THAT Y IS OUTSIDE AND X IS INSIDE: (CACHE OPTIMIZATION)**

44.54user 0.29system 0:45.18elapsed 99%CPU

Samples: 44K of event 'cpu-clock:pppH', Event count (approx.): 44964964920

Children Self Command Shared Object Symbol

+ 99.89% 0.00% image\_processin libc-2.31.so [.] \_\_libc\_start\_main

+ 99.88% 0.00% image\_processin image\_processing\_c [.] main

+ 98.93% 98.81% image\_processin image\_processing\_c [.] blurIteration

0.65% 0.21% image\_processin image\_processing\_c [.] convertToAccurateImage

0.47% 0.00% image\_processin [kernel.kallsyms] [k] page\_fault

0.47% 0.00% image\_processin [kernel.kallsyms] [k] do\_page\_fault

0.47% 0.00% image\_processin [kernel.kallsyms] [k] \_\_do\_page\_fault

0.47% 0.10% image\_processin [kernel.kallsyms] [k] do\_user\_addr\_fault

0.37% 0.00% image\_processin [kernel.kallsyms] [k] handle\_mm\_fault

0.36% 0.01% image\_processin [kernel.kallsyms] [k] \_\_handle\_mm\_fault

0.34% 0.01% image\_processin [kernel.kallsyms] [k] do\_anonymous\_page

0.30% 0.27% image\_processin image\_processing\_c [.] imageDifference

0.29% 0.01% image\_processin [kernel.kallsyms] [k] \_\_alloc\_pages\_nodemask

0.27% 0.00% image\_processin [kernel.kallsyms] [k] alloc\_pages\_vma

0.27% 0.00% image\_processin [kernel.kallsyms] [k] get\_page\_from\_freelist

0.23% 0.23% image\_processin [kernel.kallsyms] [k] clear\_page\_orig

0.11% 0.00% image\_processin [kernel.kallsyms] [k] entry\_SYSCALL\_64\_after\_hwframe

0.11% 0.00% image\_processin [kernel.kallsyms] [k] do\_syscall\_64

0.10% 0.00% image\_processin [kernel.kallsyms] [k] irq\_exit

0.10% 0.04% image\_processin [kernel.kallsyms] [k] \_\_softirqentry\_text\_start

0.07% 0.00% image\_processin [kernel.kallsyms] [k] apic\_timer\_interrupt

0.07% 0.00% image\_processin [kernel.kallsyms] [k] smp\_apic\_timer\_interrupt

0.06% 0.06% image\_processin [kernel.kallsyms] [k] \_\_lock\_text\_start

0.05% 0.00% image\_processin [kernel.kallsyms] [k] \_\_x64\_sys\_exit\_group

0.05% 0.00% image\_processin [kernel.kallsyms] [k] do\_group\_exit

0.05% 0.00% image\_processin [kernel.kallsyms] [k] do\_exit

0.05% 0.00% image\_processin [kernel.kallsyms] [k] mmput

0.05% 0.00% image\_processin [kernel.kallsyms] [k] exit\_mmap

0.05% 0.01% image\_processin [kernel.kallsyms] [k] zap\_pte\_range.isra.0

0.05% 0.00% image\_processin [kernel.kallsyms] [k] unmap\_vmas

0.05% 0.00% image\_processin [kernel.kallsyms] [k] unmap\_single\_vma

0.05% 0.00% image\_processin [kernel.kallsyms] [k] unmap\_page\_range

0.04% 0.00% image\_processin [kernel.kallsyms] [k] \_\_lru\_cache\_add

0.04% 0.00% image\_processin libc-2.31.so [.] write

0.04% 0.00% image\_processin [kernel.kallsyms] [k] \_\_x64\_sys\_write

0.04% 0.00% image\_processin [kernel.kallsyms] [k] ksys\_write

0.04% 0.00% image\_processin [kernel.kallsyms] [k] vfs\_write

0.04% 0.00% image\_processin [kernel.kallsyms] [k] \_\_vfs\_write

0.04% 0.00% image\_processin [kernel.kallsyms] [k] new\_sync\_write

0.04% 0.00% image\_processin [nfs] [k] nfs\_file\_write

0.04% 0.00% image\_processin [kernel.kallsyms] [k] generic\_perform\_write

0.04% 0.00% image\_processin [kernel.kallsyms] [k] ret\_from\_intr

0.04% 0.00% image\_processin [unknown] [k] 0000000000000000

0.04% 0.00% image\_processin [kernel.kallsyms] [k] do\_IRQ

0.04% 0.00% image\_processin [kernel.kallsyms] [k] release\_pages

0.04% 0.00% image\_processin [kernel.kallsyms] [k] pagevec\_lru\_move\_fn

Cannot load tips.txt file, please install perf!

**CHANGED THE BLUR\_ITERATION FUNCTION TO DO THE JOB FOR ALL 3 COLORS AT THE SAME TIME TO BE ABLE TO REMOVE THE FOR LOOPS IN THE MAIN AND JUST CALL EACH SET ONCE (USELESS CODE)**

11.93user 0.33system 0:12.49elapsed 98%CPU

Samples: 12K of event 'cpu-clock:pppH', Event count (approx.): 12231231219

Children Self Command Shared Object Symbol

+ 99.58% 0.00% image\_processin libc-2.31.so [.] \_\_libc\_start\_main

+ 99.58% 0.00% image\_processin image\_processing\_c [.] main

+ 96.43% 96.36% image\_processin image\_processing\_c [.] blurIteration

+ 2.13% 0.79% image\_processin image\_processing\_c [.] convertToAccurateImage

+ 1.44% 0.00% image\_processin [kernel.kallsyms] [k] page\_fault

+ 1.44% 0.00% image\_processin [kernel.kallsyms] [k] do\_page\_fault

+ 1.44% 0.00% image\_processin [kernel.kallsyms] [k] \_\_do\_page\_fault

+ 1.44% 0.43% image\_processin [kernel.kallsyms] [k] do\_user\_addr\_fault

+ 1.02% 0.93% image\_processin image\_processing\_c [.] imageDifference

+ 1.00% 0.02% image\_processin [kernel.kallsyms] [k] handle\_mm\_fault

+ 0.97% 0.07% image\_processin [kernel.kallsyms] [k] \_\_handle\_mm\_fault

+ 0.88% 0.01% image\_processin [kernel.kallsyms] [k] do\_anonymous\_page

+ 0.76% 0.01% image\_processin [kernel.kallsyms] [k] \_\_alloc\_pages\_nodemask

+ 0.75% 0.01% image\_processin [kernel.kallsyms] [k] get\_page\_from\_freelist

+ 0.67% 0.00% image\_processin [kernel.kallsyms] [k] alloc\_pages\_vma

0.58% 0.56% image\_processin [kernel.kallsyms] [k] clear\_page\_orig

0.42% 0.00% image\_processin [kernel.kallsyms] [k] entry\_SYSCALL\_64\_after\_hwframe

0.42% 0.00% image\_processin [kernel.kallsyms] [k] do\_syscall\_64

0.18% 0.00% image\_processin [kernel.kallsyms] [k] \_\_x64\_sys\_exit\_group

0.18% 0.00% image\_processin [kernel.kallsyms] [k] do\_group\_exit

0.18% 0.00% image\_processin [kernel.kallsyms] [k] do\_exit

0.18% 0.00% image\_processin [kernel.kallsyms] [k] mmput

0.18% 0.00% image\_processin [kernel.kallsyms] [k] exit\_mmap

0.17% 0.00% image\_processin [kernel.kallsyms] [k] unmap\_vmas

0.17% 0.00% image\_processin [kernel.kallsyms] [k] unmap\_single\_vma

0.17% 0.00% image\_processin [kernel.kallsyms] [k] unmap\_page\_range

0.17% 0.03% image\_processin [kernel.kallsyms] [k] zap\_pte\_range.isra.0

0.16% 0.00% image\_processin libc-2.31.so [.] \_\_GI\_\_\_libc\_write

0.16% 0.00% image\_processin [kernel.kallsyms] [k] \_\_x64\_sys\_write

0.16% 0.00% image\_processin [kernel.kallsyms] [k] ksys\_write

0.16% 0.00% image\_processin [kernel.kallsyms] [k] vfs\_write

0.16% 0.00% image\_processin [kernel.kallsyms] [k] \_\_vfs\_write

0.16% 0.00% image\_processin [kernel.kallsyms] [k] new\_sync\_write

0.16% 0.00% image\_processin [nfs] [k] nfs\_file\_write

0.16% 0.00% image\_processin [kernel.kallsyms] [k] generic\_perform\_write

0.15% 0.01% image\_processin [kernel.kallsyms] [k] release\_pages

0.13% 0.00% image\_processin [unknown] [k] 0000000000000000

0.13% 0.13% image\_processin [kernel.kallsyms] [k] rmqueue

0.13% 0.13% image\_processin [kernel.kallsyms] [k] \_\_lock\_text\_start

0.13% 0.00% image\_processin [kernel.kallsyms] [k] tlb\_flush\_mmu

**CHANGED THE ALGORITHM OF IMAGE CONVOLUTION FOR BLURRING TO CHANGE THE COMPLEXITY LEVEL FROM O(NR^2) TO O(NR) (THE WIKIPEDIA LINK ABOUT BOX BLUR)**

2.47user 0.90system 0:04.00elapsed 84%CPU

Samples: 3K of event 'cpu-clock:pppH', Event count (approx.): 3374374371

Children Self Command Shared Object Symbol

+ 97.57% 0.00% image\_processin libc-2.31.so [.] \_\_libc\_start\_main

+ 97.57% 0.00% image\_processin image\_processing\_c [.] main

+ 83.83% 59.06% image\_processin image\_processing\_c [.] blurIteration

+ 34.77% 10.41% image\_processin image\_processing\_c [.] convertToAccurateImage

+ 24.80% 0.00% image\_processin [kernel.kallsyms] [k] page\_fault

+ 24.80% 0.03% image\_processin [kernel.kallsyms] [k] do\_page\_fault

+ 24.77% 0.06% image\_processin [kernel.kallsyms] [k] \_\_do\_page\_fault

+ 24.71% 4.00% image\_processin [kernel.kallsyms] [k] do\_user\_addr\_fault

+ 20.56% 0.39% image\_processin [kernel.kallsyms] [k] handle\_mm\_fault

+ 20.17% 0.86% image\_processin [kernel.kallsyms] [k] \_\_handle\_mm\_fault

+ 19.16% 0.18% image\_processin [kernel.kallsyms] [k] do\_anonymous\_page

+ 16.58% 0.47% image\_processin [kernel.kallsyms] [k] \_\_alloc\_pages\_nodemask

+ 16.32% 0.09% image\_processin [kernel.kallsyms] [k] alloc\_pages\_vma

+ 16.02% 0.18% image\_processin [kernel.kallsyms] [k] get\_page\_from\_freelist

+ 14.09% 14.09% image\_processin [kernel.kallsyms] [k] clear\_page\_orig

+ 3.59% 3.26% image\_processin image\_processing\_c [.] imageDifference

+ 2.43% 0.00% image\_processin [kernel.kallsyms] [k] entry\_SYSCALL\_64\_after\_hwframe

+ 2.43% 0.00% image\_processin [kernel.kallsyms] [k] do\_syscall\_64

+ 1.63% 0.00% image\_processin [kernel.kallsyms] [k] \_\_x64\_sys\_exit\_group

+ 1.63% 0.00% image\_processin [kernel.kallsyms] [k] do\_group\_exit

+ 1.63% 0.00% image\_processin [kernel.kallsyms] [k] do\_exit

+ 1.63% 0.00% image\_processin [kernel.kallsyms] [k] mmput

+ 1.63% 0.00% image\_processin [kernel.kallsyms] [k] exit\_mmap

+ 1.60% 0.18% image\_processin [kernel.kallsyms] [k] zap\_pte\_range.isra.0

+ 1.60% 0.00% image\_processin [kernel.kallsyms] [k] unmap\_vmas

+ 1.60% 0.00% image\_processin [kernel.kallsyms] [k] unmap\_single\_vma

+ 1.60% 0.00% image\_processin [kernel.kallsyms] [k] unmap\_page\_range

+ 1.39% 0.12% image\_processin [kernel.kallsyms] [k] mem\_cgroup\_try\_charge\_delay

+ 1.33% 1.33% image\_processin [kernel.kallsyms] [k] rmqueue

+ 1.22% 0.15% image\_processin [kernel.kallsyms] [k] free\_pages\_and\_swap\_cache

+ 1.22% 0.00% image\_processin [kernel.kallsyms] [k] tlb\_flush\_mmu

+ 1.13% 0.06% image\_processin [kernel.kallsyms] [k] release\_pages

0.80% 0.80% image\_processin [kernel.kallsyms] [k] \_\_lock\_text\_start

+ 0.77% 0.15% image\_processin [kernel.kallsyms] [k] mem\_cgroup\_try\_charge

+ 0.62% 0.00% image\_processin [unknown] [k] 0000000000000000

+ 0.56% 0.53% image\_processin [kernel.kallsyms] [k] free\_unref\_page\_list

+ 0.56% 0.06% image\_processin [kernel.kallsyms] [k] \_\_lru\_cache\_add

0.50% 0.03% image\_processin [kernel.kallsyms] [k] pagevec\_lru\_move\_fn

+ 0.50% 0.00% image\_processin [kernel.kallsyms] [k] lru\_cache\_add\_active\_or\_unevict

0.44% 0.00% image\_processin libc-2.31.so [.] \_\_GI\_\_\_libc\_write

**REMOVING SOME EXTRA PARTS OF THE CODE ( TWO BRANCHES)**

2.33user 0.77system 0:03.40elapsed 91%CPU

Samples: 3K of event 'cpu-clock:pppH', Event count (approx.): 3195195192

Children Self Command Shared Object Symbol

+ 97.46% 0.00% image\_processin libc-2.31.so [.] \_\_libc\_start\_main

+ 97.46% 0.00% image\_processin image\_processing\_c [.] main

+ 84.15% 61.50% image\_processin image\_processing\_c [.] blurIteration

+ 32.27% 9.68% image\_processin image\_processing\_c [.] convertToAccurateImage

+ 23.18% 0.03% image\_processin [kernel.kallsyms] [k] page\_fault

+ 23.18% 0.03% image\_processin [kernel.kallsyms] [k] do\_page\_fault

+ 23.15% 0.03% image\_processin [kernel.kallsyms] [k] \_\_do\_page\_fault

+ 23.06% 4.54% image\_processin [kernel.kallsyms] [k] do\_user\_addr\_fault

+ 18.14% 0.41% image\_processin [kernel.kallsyms] [k] handle\_mm\_fault

+ 17.70% 0.88% image\_processin [kernel.kallsyms] [k] \_\_handle\_mm\_fault

+ 16.67% 0.28% image\_processin [kernel.kallsyms] [k] do\_anonymous\_page

+ 13.31% 0.44% image\_processin [kernel.kallsyms] [k] \_\_alloc\_pages\_nodemask

+ 13.22% 0.16% image\_processin [kernel.kallsyms] [k] alloc\_pages\_vma

+ 12.88% 0.06% image\_processin [kernel.kallsyms] [k] get\_page\_from\_freelist

+ 11.15% 11.12% image\_processin [kernel.kallsyms] [k] clear\_page\_orig

+ 3.70% 3.26% image\_processin image\_processing\_c [.] imageDifference

+ 2.51% 0.00% image\_processin [kernel.kallsyms] [k] entry\_SYSCALL\_64\_after\_hwframe

+ 2.51% 0.00% image\_processin [kernel.kallsyms] [k] do\_syscall\_64

+ 1.60% 0.00% image\_processin [kernel.kallsyms] [k] \_\_x64\_sys\_exit\_group

+ 1.60% 0.00% image\_processin [kernel.kallsyms] [k] do\_group\_exit

+ 1.60% 0.00% image\_processin [kernel.kallsyms] [k] do\_exit

+ 1.60% 0.00% image\_processin [kernel.kallsyms] [k] mmput

+ 1.60% 0.00% image\_processin [kernel.kallsyms] [k] exit\_mmap

+ 1.57% 0.00% image\_processin [kernel.kallsyms] [k] unmap\_vmas

+ 1.57% 0.00% image\_processin [kernel.kallsyms] [k] unmap\_single\_vma

+ 1.57% 0.00% image\_processin [kernel.kallsyms] [k] unmap\_page\_range

+ 1.50% 0.16% image\_processin [kernel.kallsyms] [k] zap\_pte\_range.isra.0

+ 1.44% 1.44% image\_processin [kernel.kallsyms] [k] \_\_lock\_text\_start

+ 1.38% 0.00% image\_processin [kernel.kallsyms] [k] mem\_cgroup\_try\_charge\_delay

+ 1.32% 0.09% image\_processin [kernel.kallsyms] [k] release\_pages

+ 1.25% 1.25% image\_processin [kernel.kallsyms] [k] rmqueue

+ 1.22% 0.06% image\_processin [kernel.kallsyms] [k] free\_pages\_and\_swap\_cache

+ 1.22% 0.00% image\_processin [kernel.kallsyms] [k] tlb\_flush\_mmu

+ 1.16% 0.09% image\_processin [kernel.kallsyms] [k] \_\_lru\_cache\_add

+ 1.10% 0.03% image\_processin [kernel.kallsyms] [k] lru\_cache\_add\_active\_or\_unevictable

+ 1.07% 0.00% image\_processin [kernel.kallsyms] [k] pagevec\_lru\_move\_fn

+ 0.78% 0.16% image\_processin [kernel.kallsyms] [k] mem\_cgroup\_try\_charge

+ 0.63% 0.00% image\_processin [unknown] [k] 0000000000000000

+ 0.56% 0.53% image\_processin [kernel.kallsyms] [k] free\_unref\_page\_list

0.41% 0.41% image\_processin [kernel.kallsyms] [k] mem\_cgroup\_commit\_charge

0.38% 0.00% image\_processin libc-2.31.so [.] read

0.38% 0.00% image\_processin [kernel.kallsyms] [k] \_\_x64\_sys\_read