

Diffusion

```
f = imread(['baby.jpg']);

f = rgb2gray(f);

[size_x,size_y] = size(f);

delta_t = 0.25 ;

temp = zeros(size_x,size_y);
result = zeros(size_x,size_y);

pre_x = 0;
post_x = 0;
pre_y = 0;
post_y = 0;

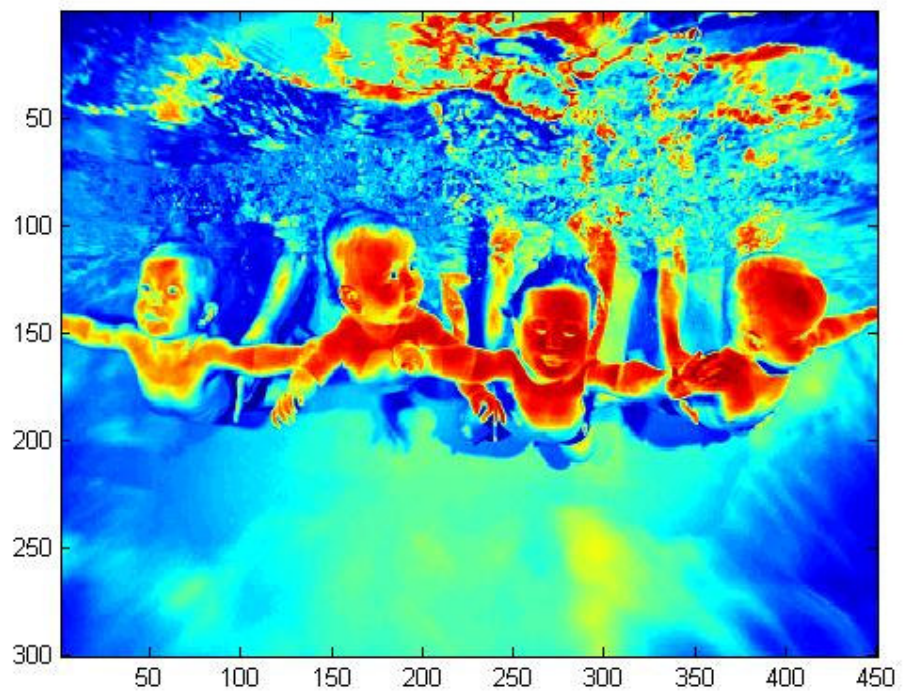
result = f;
for term = 1:50
for y = 1:size_y
    for x = 1:size_x
        if y == 1
            pre_y = result(x,1);
        else
            pre_y = result(x,y-1);
        end
        if x == 1
            pre_x = result(1,y);
        else
            pre_x = result(x-1, y);
        end
        if y == size_y
            post_y = result(x,size_y);
        else
            post_y = result(x, y+1);
        end
        if x == size_x
            post_x = result(size_x,y);
        else
            post_x = result(x+1, y);
        end
        sum = pre_x + post_x + pre_y + post_y - 4 * result(x,y);
        temp(x,y) = result(x,y) + delta_t * (sum);
    end
end
result = temp;
end

imagesc(result)
```

Source Image:

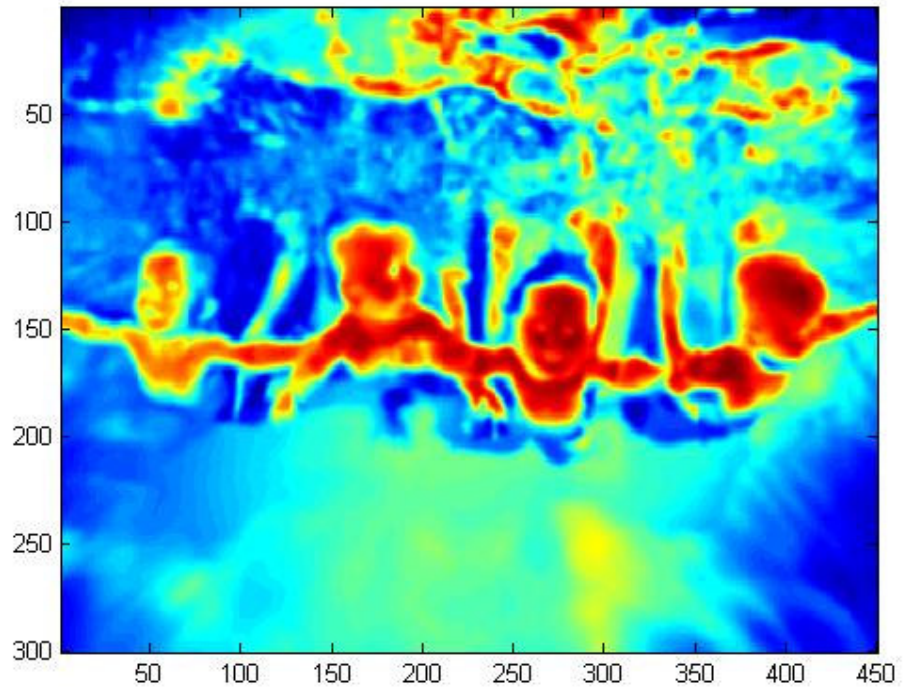


Initial Gray Scale:

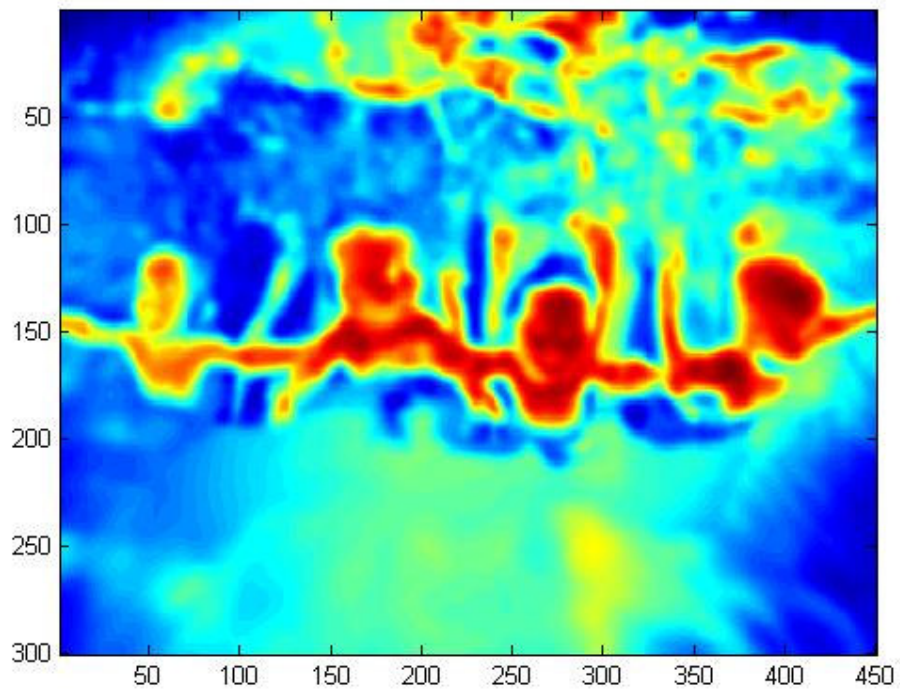


Results:

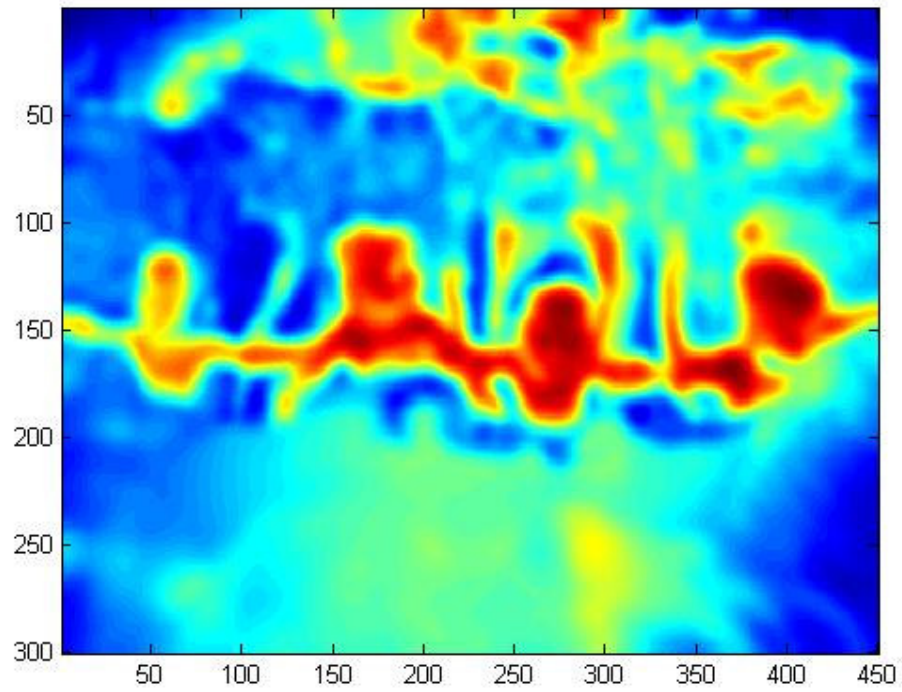
$\Delta t = 0.050$; 30 iteration



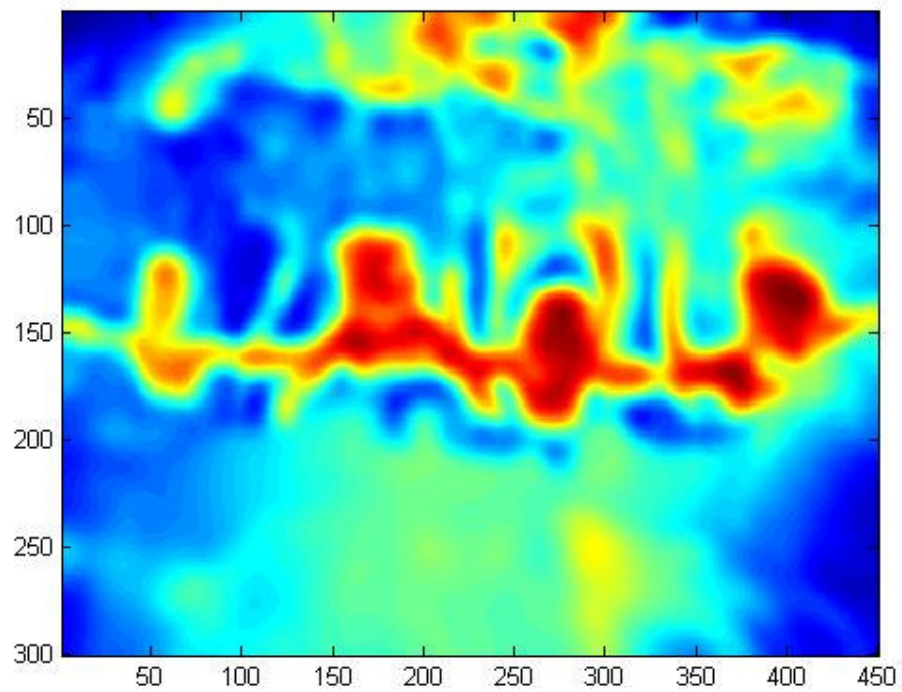
$\Delta t = 0.125$; 30 iteration



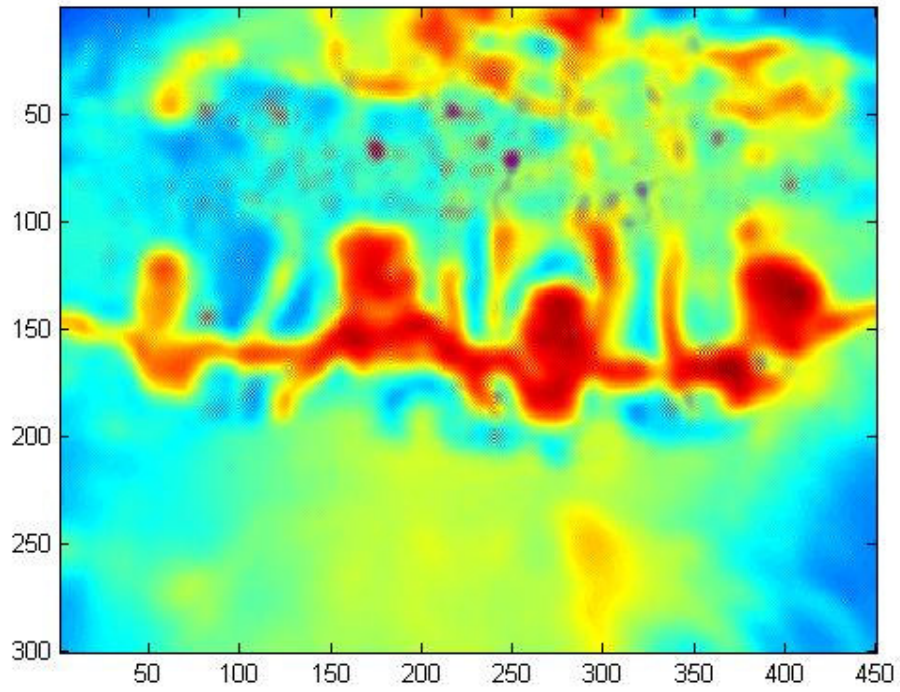
$\Delta t = 0.250$; 30 iteration



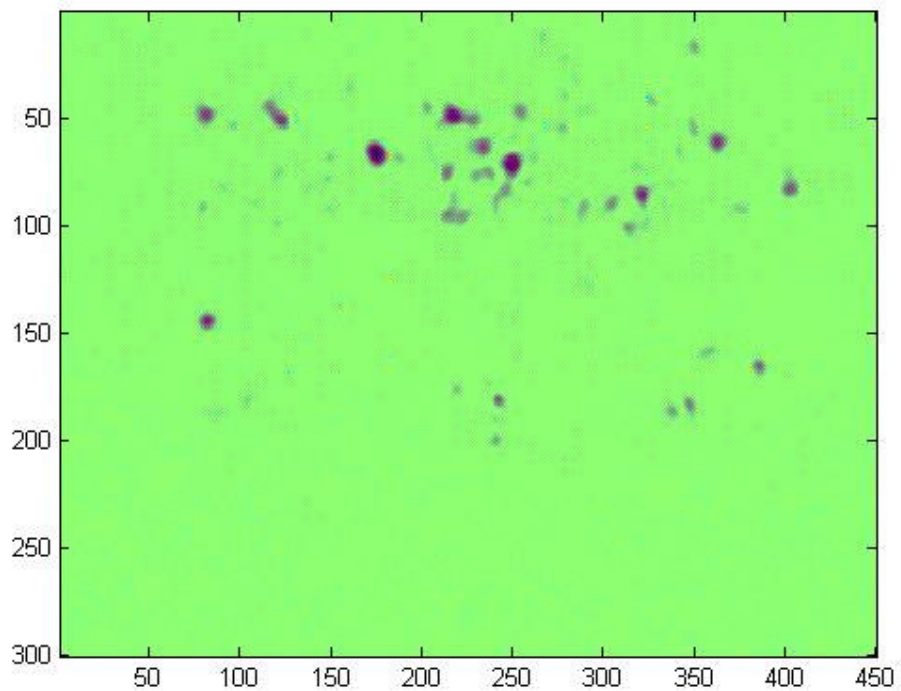
$\Delta t = 0.250$; 50 iteration



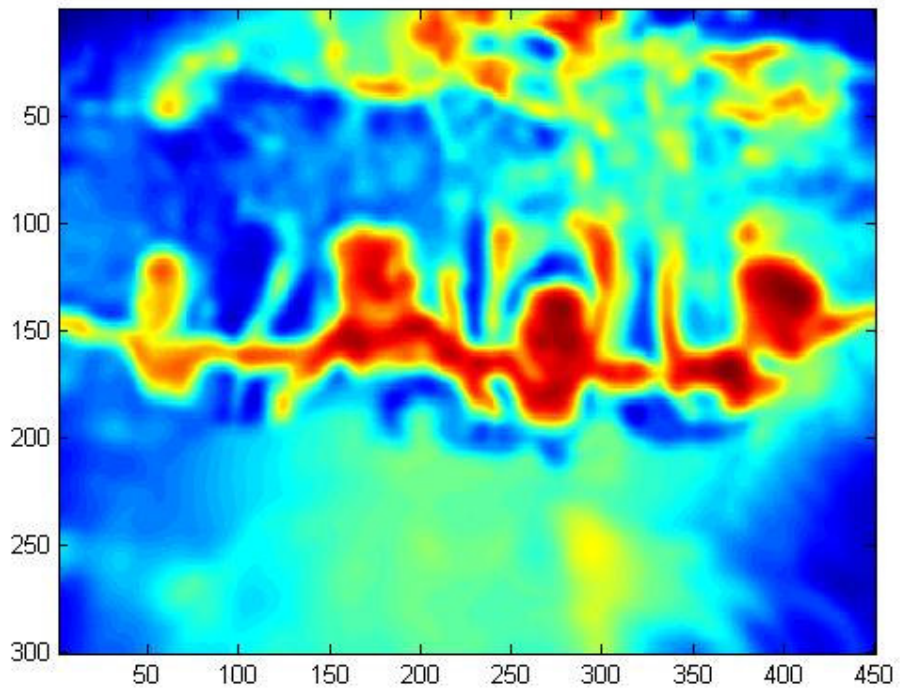
$\Delta t = 0.270$; 30 iteration
Distortion increases when 0.250 bound is exceeded.



$\Delta t = 0.300$; 30 iteration
Distortion is very high that no relation to the first image can be seen.



$\Delta t = 0.125$; 50 iteration



$\Delta t = 0.250$; 25 iteration

This result is same as the previous picture of $\Delta t = 0.125$; 50 iteration.

