Project Progress VIII

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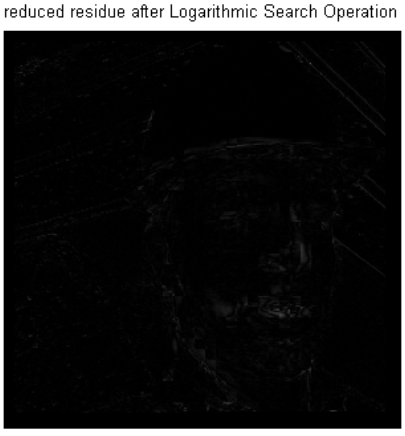
Logarithmic search was implemented in MATLAB with macroblock size 8x8 and search area 24x24 for 10 consecutive frames of the video sequence of "Foreman", to get 10 residual frames after proper motion compensation while forming the predicted frames. Hence a set of motion vectors were also generated. The following MATLAB code was implemented:

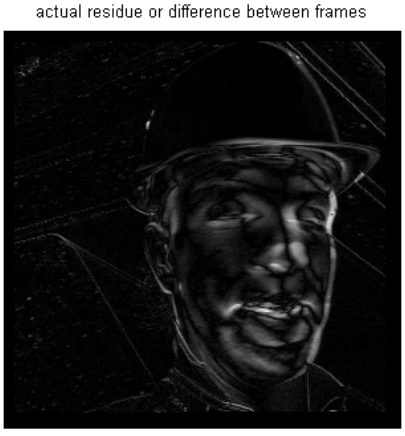
```
clc
clear all
close all
tstart=cputime;
f_ref(1:300,1:300)=0;
Im=imread('E:\foreman_10frames\f001.pgm');
 f_ref(9:288,9:288)= Im(9:288,9:288);

 srcFiles = dir('E:\foreman_10frames\*.pgm');

f_p=zeros(300,3000);

X=zeros(35,350);
Y=zeros(35,350);
MSE=zeros(1,9);
for frameNo=1:9
    filename = strcat('E:\foreman_10frames\',srcFiles(frameNo+1).name);
     f_2(1:300,1:300)=0;
    Im2= imread(filename);
    f_2(9:288,9:288)= Im2(9:288,9:288);
    f_pre(1:300,1:300)=0;

s=1;
X_motion= zeros(22,22);
Y_motion=zeros(22,22);
for i=9:8:288
    t=1;
    for j=9:8:288
 img_abs=[0 0 0 0 0];
img_24=f_ref(i-8:i+7+8,j-8:j+7+8);
img_8=f_2(i:i+7,j:j+7);
flag = 1;
I=1;
Rc=9;
```

```
Cc=9;
step_size=4;

while flag
    r=[Rc,Rc-step_size,Rc,Rc,Rc+step_size];
    c=[Cc,Cc,Cc-step_size,Cc+step_size,Cc];

    for g=1:5
    if r(g)<=0 || r(g)>=17
        img_abs(g)=255*64*255;
    elseif c(g)<=0 || c(g)>=17
        img_abs(g)=255*64*255;
    elseif g==I && g-1>0
        img_abs(g)=255*64*255;
    else
        img_abs(g)=sum(sum((img_24(r(g):r(g)+7,c(g):c(g)+7)- img_8).^2));
    end
    end


[M,I] = min(img_abs);
switch (I)
    case 1
        step_size=step_size/2;
    case 2
        Rc=Rc-step_size;
    case 3
        Cc=Cc-step_size;
    case 4
        Cc=Cc+step_size;
    case 5
        Rc=Rc+step_size;
end
if step_size<1
    flag=0;
    break;
else
    continue;
end
end
    f_pre(i:i+7,j:j+7)=img_24(Rc:Rc+7,Cc:Cc+7);
    X_motion(s,t)= Rc-9;
    Y_motion(s,t)= Cc-9;

t=t+1;
    end
    s=s+1;

end
f_p(1:300, 1+(300*frameNo):300*(frameNo+1))=f_pre;
X(1:35, 1+(35*(frameNo-1)):35*frameNo)=X_motion;
Y(1:35, 1+(35*(frameNo-1)):35*frameNo)=Y_motion;
```

```
residu=abs(f_2-f_pre);
MSE(frameNo)=(sum(sum((residu).^2)))/90000;
figure,imshow(uint8(residu));
title('reduced residue after Logarithmic Search Operation');
figure,imshowpair(f_2,f_ref,'diff');
title('actual residue or difference between frames');

f_ref=f_2;
end
telapsed=cputime-tstart;
Frame=[1 2 3 4 5 6 7 8 9];
figure,LogSearch=plot(Frame,MSE);
title('Mean Square Error [MSE] Vs Frames Plot');
ylabel('MSE found in Logarithmic Search');
xlabel('Frame number');
display('time elapsed in search');
display(telapsed);
display(MSE);
```

```
time elapsed in search

telapsed =

   11.8750


MSE =

  Columns 1 through 7

   23.2319   18.5147   21.4357   18.4010   15.1979   20.9555   22.0864

  Columns 8 through 9

   24.6960   25.6278
```

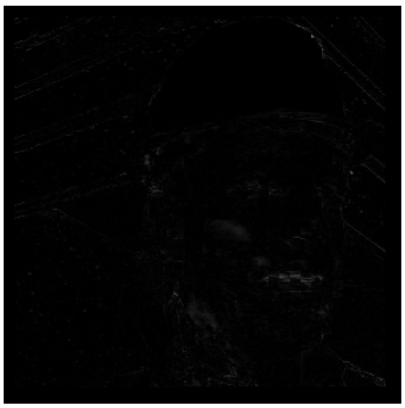




reduced residue after Logarithmic Search Operation

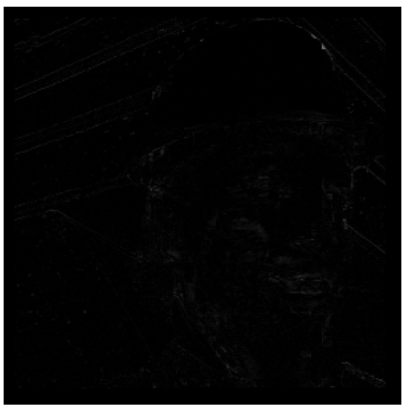
actual residue or difference between frames

reduced residue after Logarithmic Search Operation



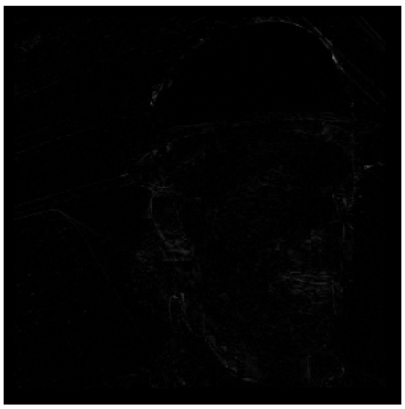
actual residue or difference between frames

reduced residue after Logarithmic Search Operation



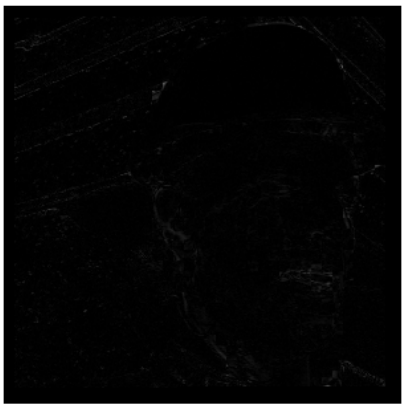
actual residue or difference between frames

reduced residue after Logarithmic Search Operation



actual residue or difference between frames

reduced residue after Logarithmic Search Operation

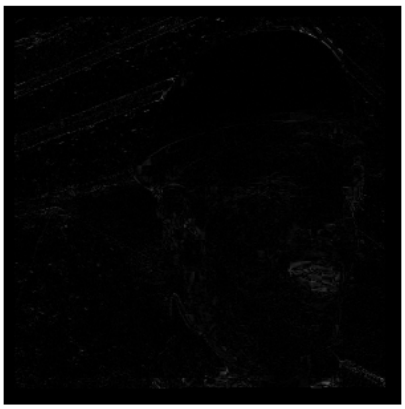


actual residue or difference between frames

reduced residue after Logarithmic Search Operation

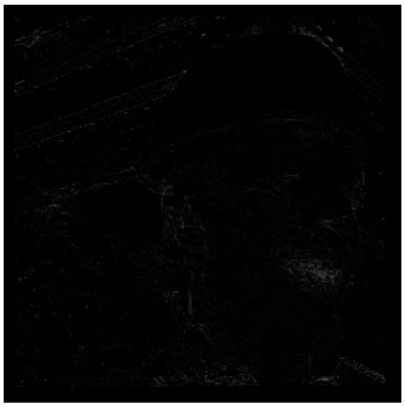
actual residue or difference between frames

reduced residue after Logarithmic Search Operation



actual residue or difference between frames

reduced residue after Logarithmic Search Operation



actual residue or difference between frames