Project Progress VII

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As Full search was implemented in MATLAB with macroblock size 8x8 and search area 16x16 and for24x24 10 consecutive frames of the video sequence of "Foreman", to get 10 residual frames after proper motion compensation while forming the predicted frames, so this presented piece of work is intended to compare between both the search strategies, although both the methods imply the same motion estimation, but different search area dimensions. Hence the following MATLAB code was implemented to compare these parameters. The results obtained in this work direct to use 24x24 search area as the residual content decreases in this strategies.

Contents

full_srch16

```
clc
clear all
close all
Frame=[1 2 3 4 5 6 7 8 9];
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);
X16=zeros(35,350);
Y16=zeros(35,350);
MSE_Full16=zeros(1,9);
tstart_full16=cputime;
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);

    s=1;
    X_motion16=zeros(35);
    Y_motion16=zeros(35);
```

```
    f_pre(1:300,1:300)=0;
    for i=9:8:288
        t=1;
        for j=9:8:288

            img_abs=zeros(8,8);
            img_16=f_ref(i-4:i+7+4,j-4:j+7+4);
            img_8=f_2(i:i+7,j:j+7);

            for p=1:8
                for q=1:8

                    img_abs(p,q)=sum(sum((img_16(p:p+7,q:q+7)- img_8).^2));
                end
            end

            [M,I] = min(img_abs(:));
            [row_cor, col_cor] = ind2sub(size(img_abs),I);


            f_pre(i:i+7,j:j+7)=img_16(row_cor:row_cor+7,col_cor:col_cor+7);

            X_motion16(s,t)= row_cor -5;
            Y_motion16(s,t)= col_cor -5;
            t=t+1;
        end

        s=s+1;
    end
    f_p(1:300, 1+(300*frameNo):300*(frameNo+1))=f_pre;
    X16(1:35, 1+(35*(frameNo-1)):35*frameNo)=X_motion16;
    Y16(1:35, 1+(35*(frameNo-1)):35*frameNo)=Y_motion16;

    residu1=abs(f_2-f_pre);
    MSE_Full16(frameNo)=(sum(sum((residu1).^2)))/90000;
    figure,imshow(uint8(residu1));
    title('reduced residue after Full Search Operation');
    figure,imshowpair(f_2,f_ref,'diff');
    title('actual residue or difference between frames');
    f_ref=f_2;
end
telapsed_full16=cputime-tstart_full16;
figure,fullSearch16=plot(Frame,MSE_Full16);
title('Mean Square Error [MSE] Vs Frames Plot');
ylabel('MSE found in Full Search_16');
xlabel('Frame number');
```

reduced residue after Full Search Operation

actual residue or difference between frames

reduced residue after Full Search Operation

actual residue or difference between frames

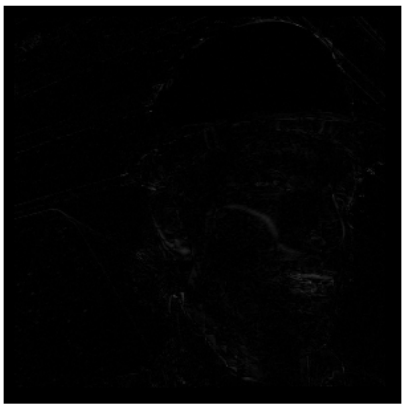
reduced residue after Full Search Operation

actual residue or difference between frames

reduced residue after Full Search Operation

actual residue or difference between frames

reduced residue after Full Search Operation



actual residue or difference between frames

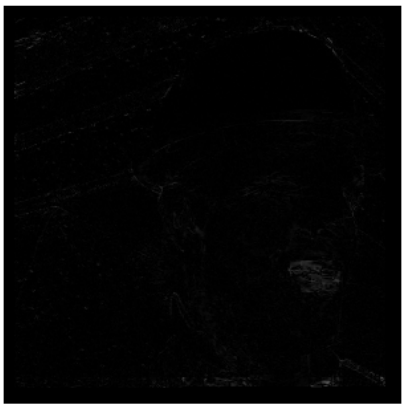
reduced residue after Full Search Operation

actual residue or difference between frames

reduced residue after Full Search Operation

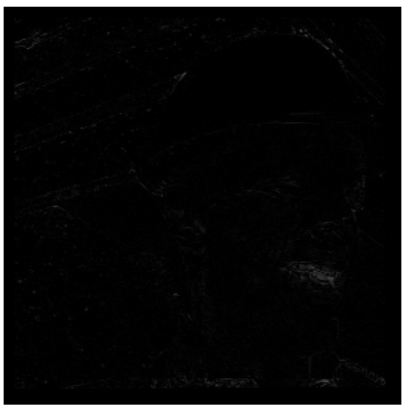
actual residue or difference between frames

reduced residue after Full Search Operation

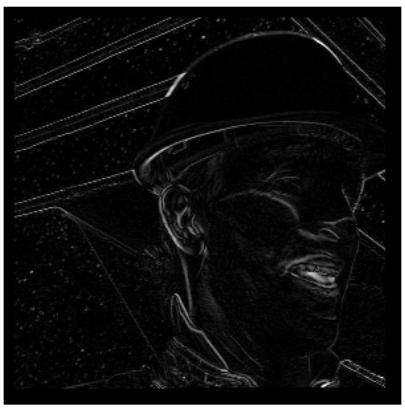


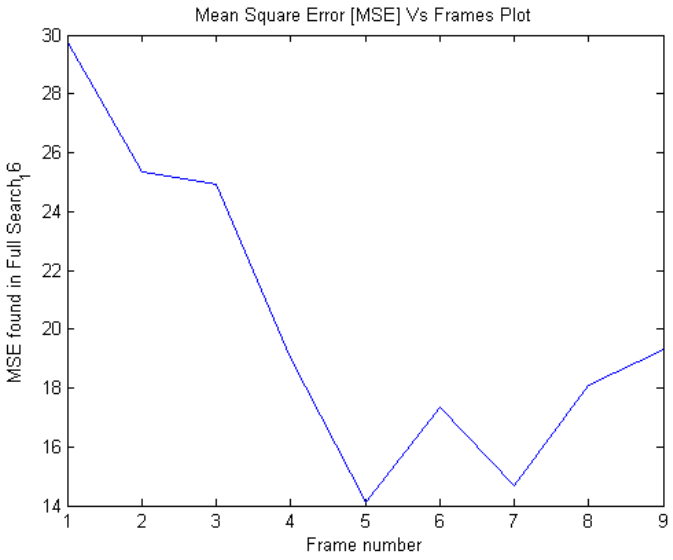
actual residue or difference between frames

reduced residue after Full Search Operation



actual residue or difference between frames

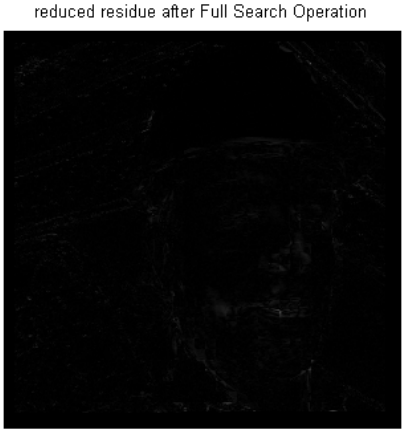


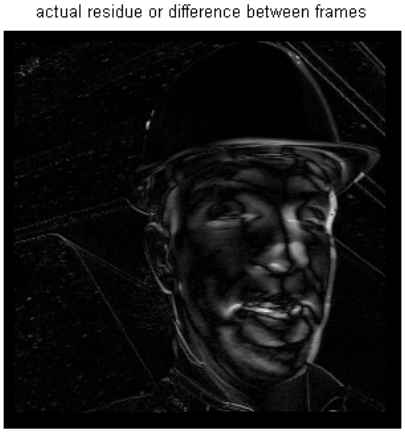


full_srch24

```
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);
X24=zeros(35,350);
Y24=zeros(35,350);
MSE_Full24=zeros(1,9);
tstart_full24=cputime;
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);

    s=1;
    X_motion24=zeros(35);
    Y_motion24=zeros(35);
    f_pre(1:300,1:300)=0;
    for i=9:8:288
        t=1;
        for j=9:8:288

            img_abs=zeros(8,8);
            img_24=f_ref(i-8:i+7+8,j-8:j+7+8);
            img_8=f_2(i:i+7,j:j+7);

            for p=1:17
                for q=1:17

                    img_abs(p,q)=sum(sum((img_24(p:p+7,q:q+7)- img_8).^2));
                end
```

```
            end

            [M,I] = min(img_abs(:));
            [row_cor, col_cor] = ind2sub(size(img_abs),I);


            f_pre(i:i+7,j:j+7)=img_24(row_cor:row_cor+7,col_cor:col_cor+7);

            X_motion24(s,t)= row_cor -9;
            Y_motion24(s,t)= col_cor -9;
            t=t+1;
        end

        s=s+1;
    end
    f_p(1:300, 1+(300*frameNo):300*(frameNo+1))=f_pre;
    X24(1:35, 1+(35*(frameNo-1)):35*frameNo)=X_motion24;
    Y24(1:35, 1+(35*(frameNo-1)):35*frameNo)=Y_motion24;

    residu1=abs(f_2-f_pre);
    MSE_Full24(frameNo)=(sum(sum((residu1).^2)))/90000;
    figure,imshow(uint8(residu1));
    title('reduced residue after Full Search Operation');
    figure,imshowpair(f_2,f_ref,'diff');
    title('actual residue or difference between frames');
    f_ref=f_2;
end
telapsed_full24=cputime-tstart_full24;
figure,fullSearch24=plot(Frame,MSE_Full24);
title('Mean Square Error [MSE] Vs Frames Plot');
ylabel('MSE found in Full Search');
xlabel('Frame number');
```

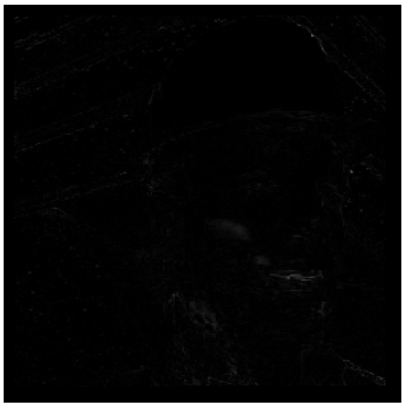




reduced residue after Full Search Operation

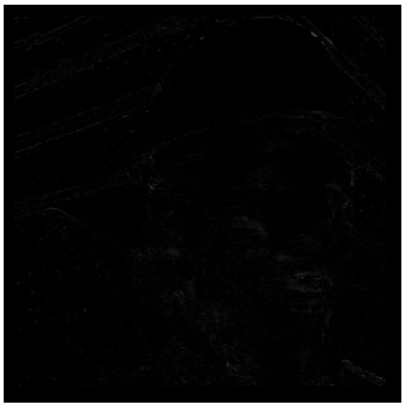
actual residue or difference between frames

reduced residue after Full Search Operation



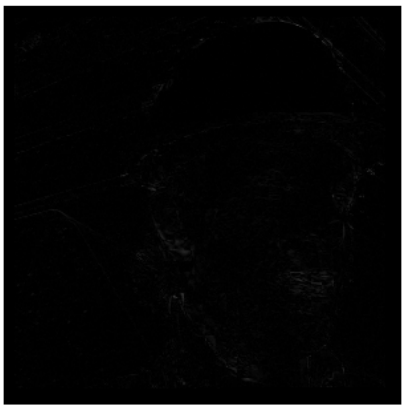
actual residue or difference between frames

reduced residue after Full Search Operation



actual residue or difference between frames

reduced residue after Full Search Operation



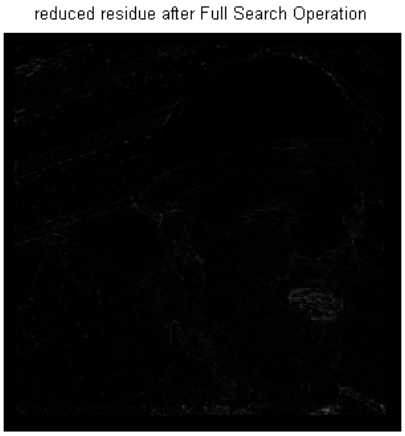
actual residue or difference between frames

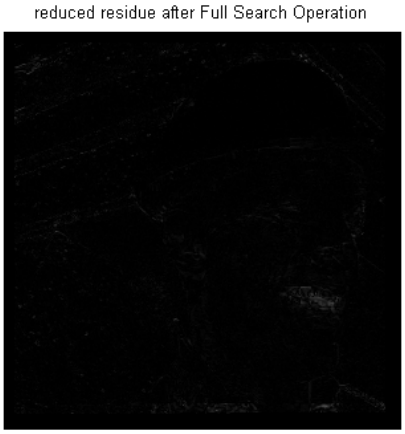
reduced residue after Full Search Operation

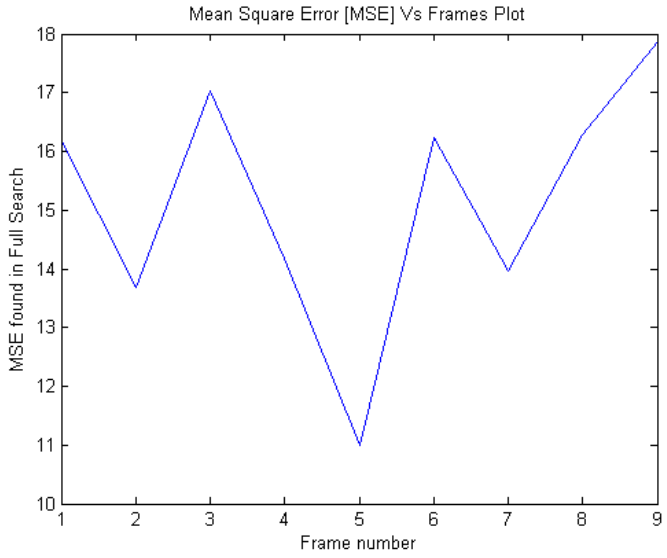
actual residue or difference between frames

reduced residue after Full Search Operation

actual residue or difference between frames





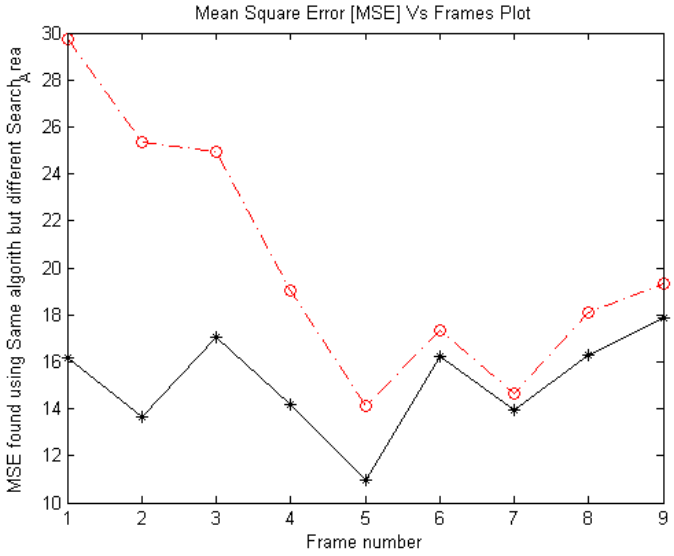


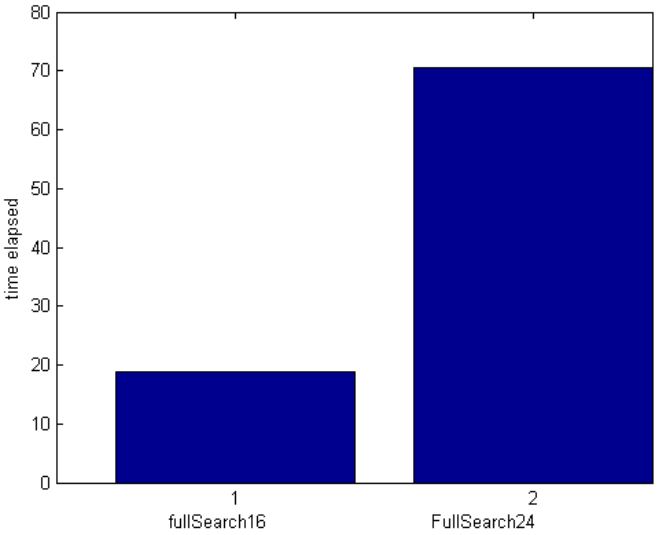
Compare

```
figure,plot(Frame,MSE_Full16,'r-.o',Frame,MSE_Full24,'k-*');
```

```
title('Mean Square Error [MSE] Vs Frames Plot');
ylabel('MSE found using Same algorith but different Search_Area');
xlabel('Frame number');

timeelapsed=[telapsed_full16,telapsed_full24];
% Search=['full_Search','Log_Search', 'FullLog_Search'];
figure,bar(timeelapsed);
xlabel('fullSearch16                                FullSearch24');
ylabel('time elapsed');

difference_Xvector=zeros(35,350);
difference_Yvector=zeros(35,350);
difference_Xvector=sum(sum(abs(X16-X24)));
difference_Yvector=sum(sum(abs(Y16-Y24)));
display(difference_Xvector);
display(difference_Yvector);
```

```
difference_Xvector =

        6663


difference_Yvector =

        9399
```




80
70
60
50
40
30
20
10
0
time elapsed
1
fullSearch16
2
FullSearch24