
```

clc; clear;
load('/MATLAB Drive/mnist.mat');
mu = double(zeros(10,784,1));
cnt = zeros(10,1);
v = zeros(10,784,784);
d = zeros(10,784,784);

for i = 1:1:10
    muu = double(zeros(784,1));
    for j = 1:1:6000
        if int8(labels_train(j)) == i-1
            z = digits_train(:, :, j);
            muu = muu+double(reshape(z,[784,1]));
            cnt(i) = cnt(i) + 1;
        end
    end
    mu(i, :, :) = muu/cnt(i);
    %figure();imshow(reshape(uint8(mu(i, :, :)),[28,28]));
end
Cov = double(zeros(10,784,784));
for i = 1:1:10
    c = zeros(784,784);
    for j = 1:1:6000
        if labels_train(j) == i-1
            z = double(reshape(digits_train(:, :, j),[784,1]));
            c = c + (z-mu(i, :, :))'*(z-mu(i, :, :))';
        end
    end
    Cov(i, :, :) = c/cnt(i);
    [v(i, :, :), d(i, :, :)] = eig(c/cnt(i));
    %v(i)=v1
end

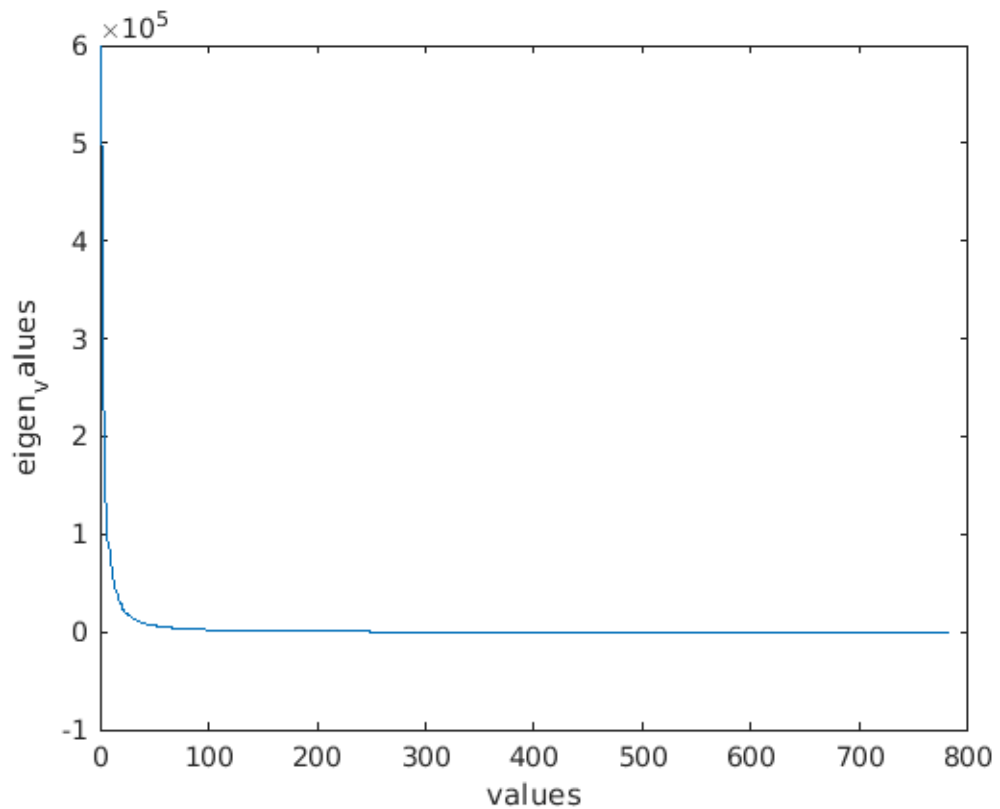
%for i = 1:10
%    [v(i), d(i)] = eig(Cov(i, :, :));
%end
%max = 0;
eigv_max=zeros(10:784:1);
eig_max=zeros(10,1);
eigen_values=zeros(10,784);
for i = 1:10
    for j = 1:784
        if eig_max(i) < d(i, j, j)
            eig_max(i) = d(i, j, j);
            eigv_max(i, :, :) = v(i, :, j);
        end
        eigen_values(i, j) = d(i, j, j);
    end
end
for i = 1:10
    y = sort(eigen_values(i, :), 'descend');
    x = [1:784];

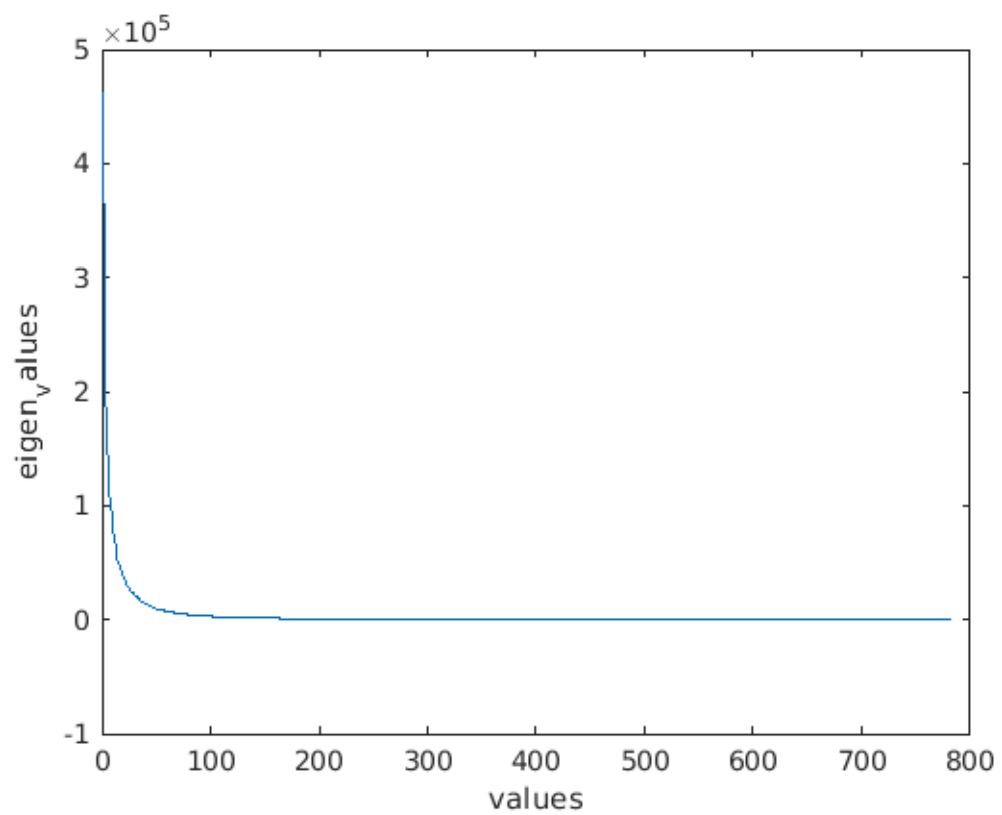
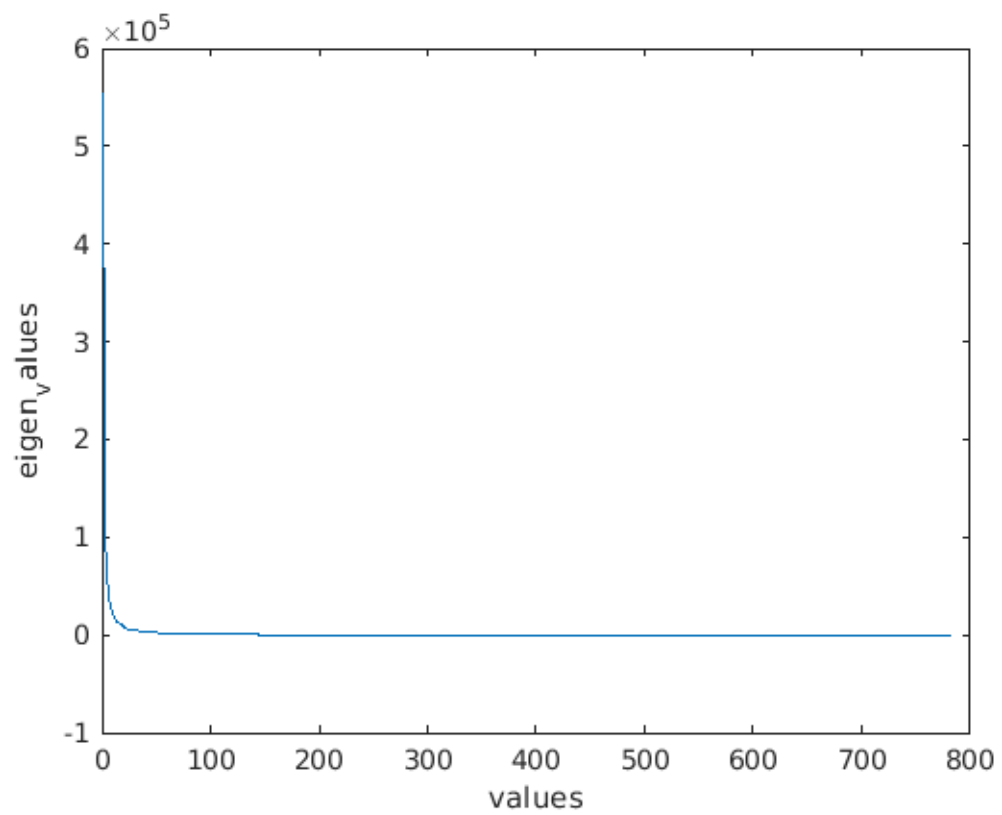
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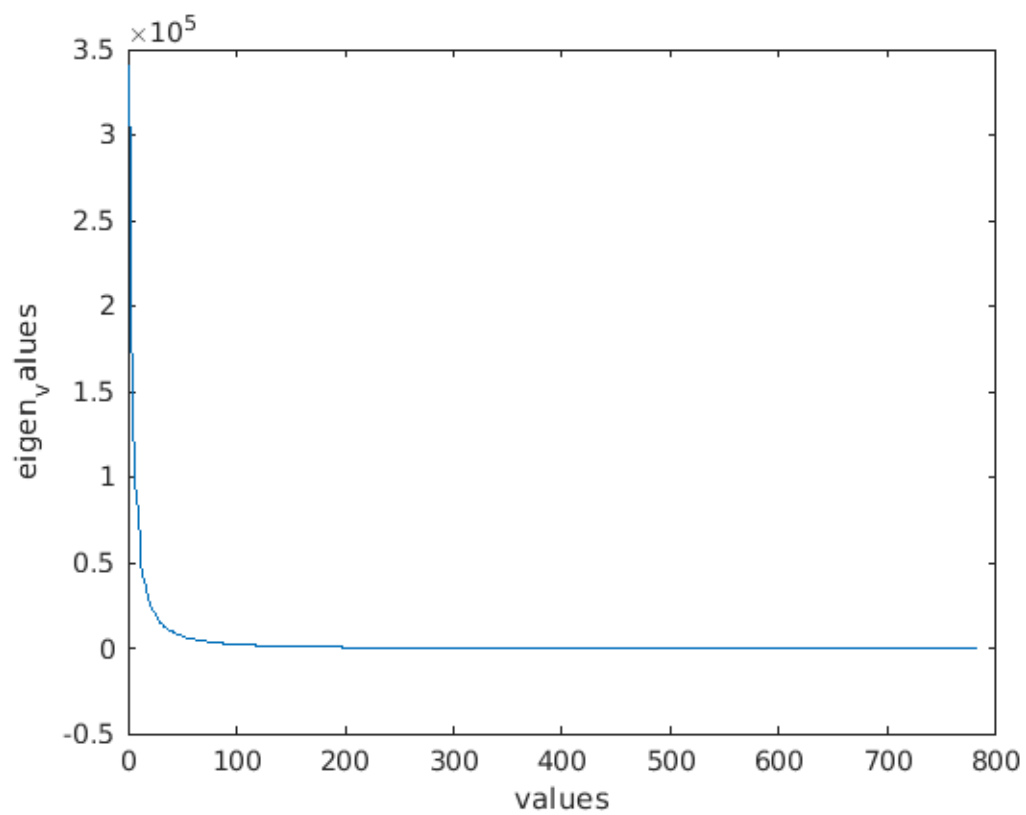
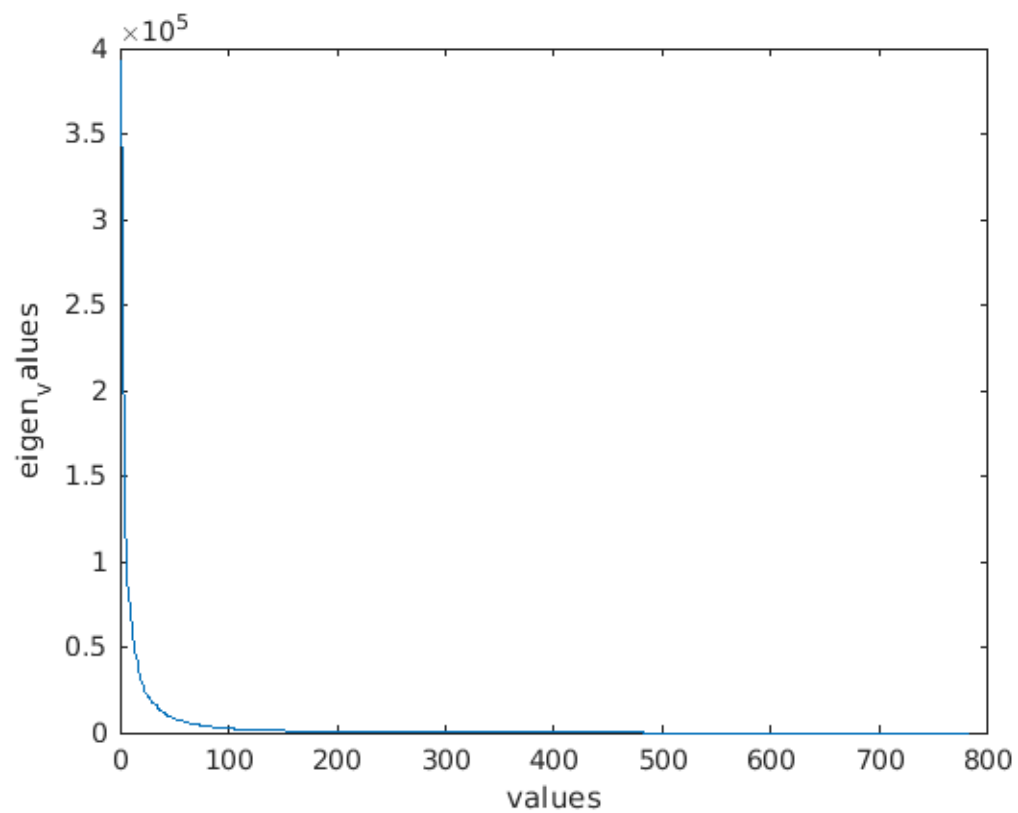
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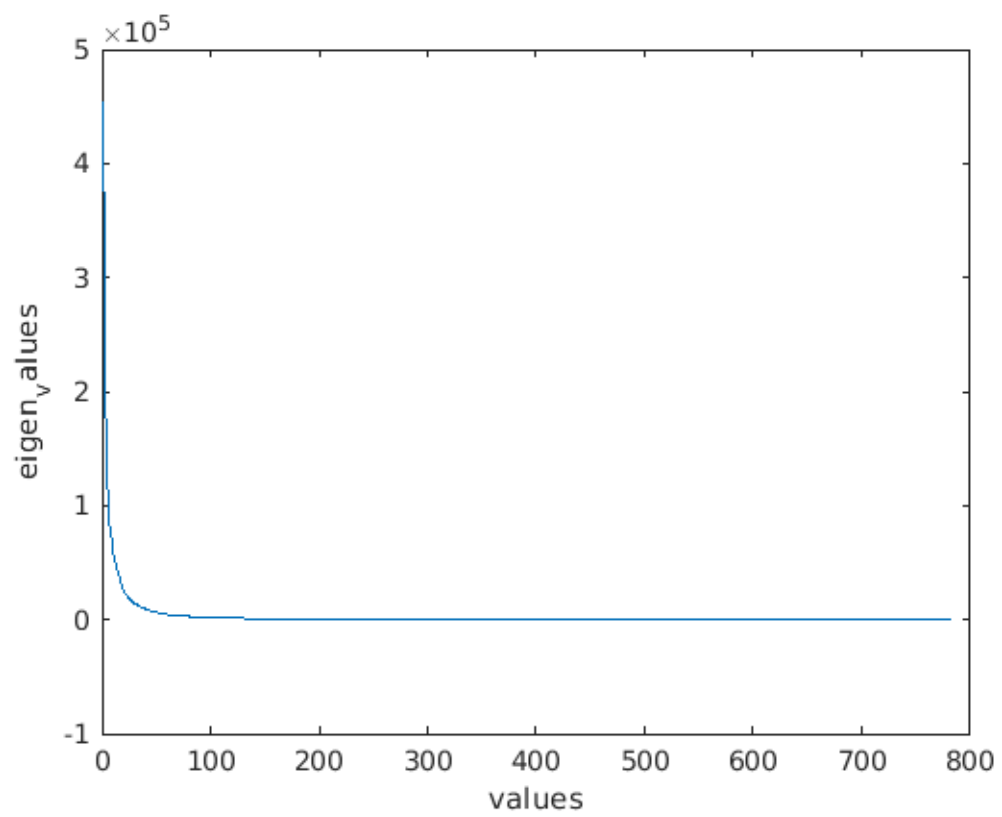
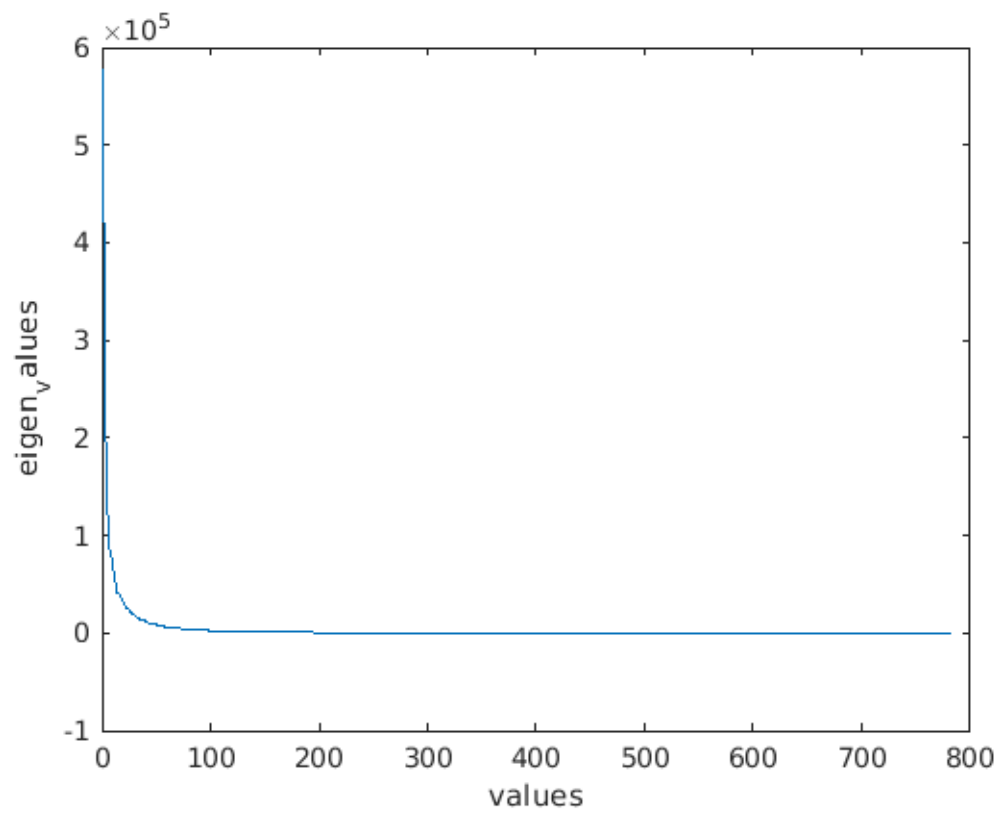
figure(); plot(x,y);
xlabel('values');
ylabel('eigen_values');
end
for i = 1:10
y1 = reshape(mu(i,:)-sqrt(eig_max(i))*eigv_max(i,:),[28,28]);
y2 = reshape(mu(i,:),[28,28]);
y3 = reshape(mu(i,:)+sqrt(eig_max(i))*eigv_max(i,:),[28,28]);
figure();
subplot(1,3,1); imshow(rescale(y1));
subplot(1,3,2); imshow(rescale(y2));
subplot(1,3,3); imshow(rescale(y3));
%figure(); imshow(reshape(sqrt(eig_max(i))*eigv_max(i,:),
[28,28]));
end

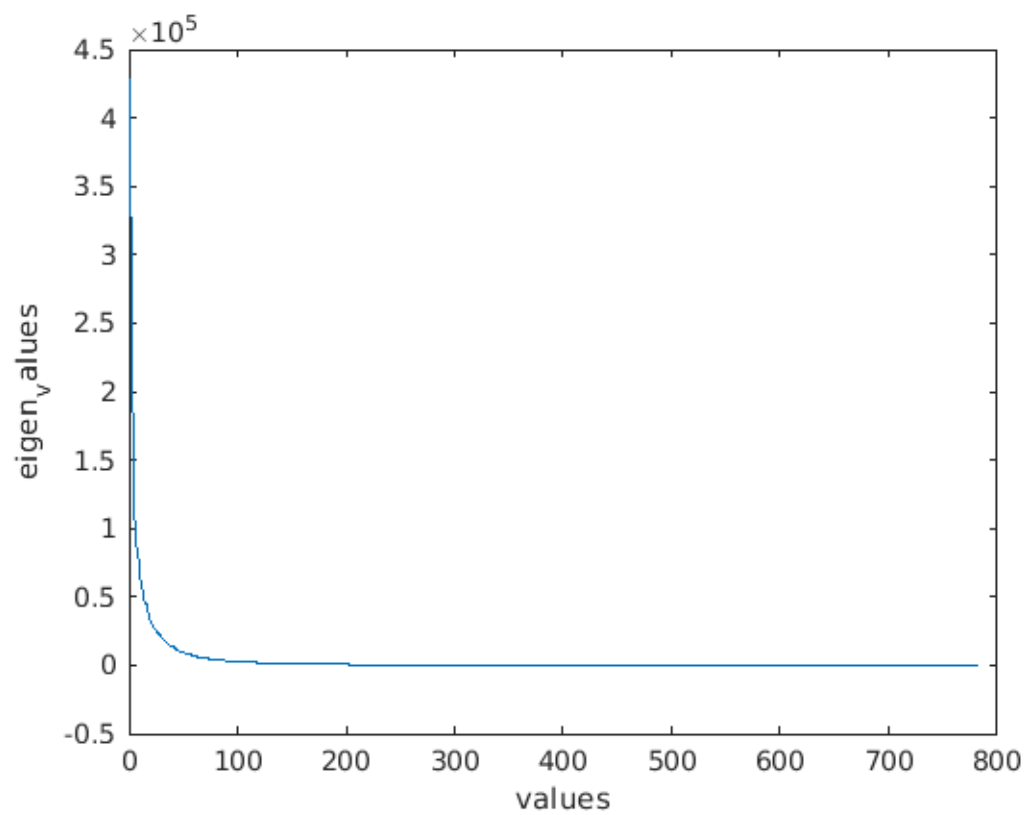
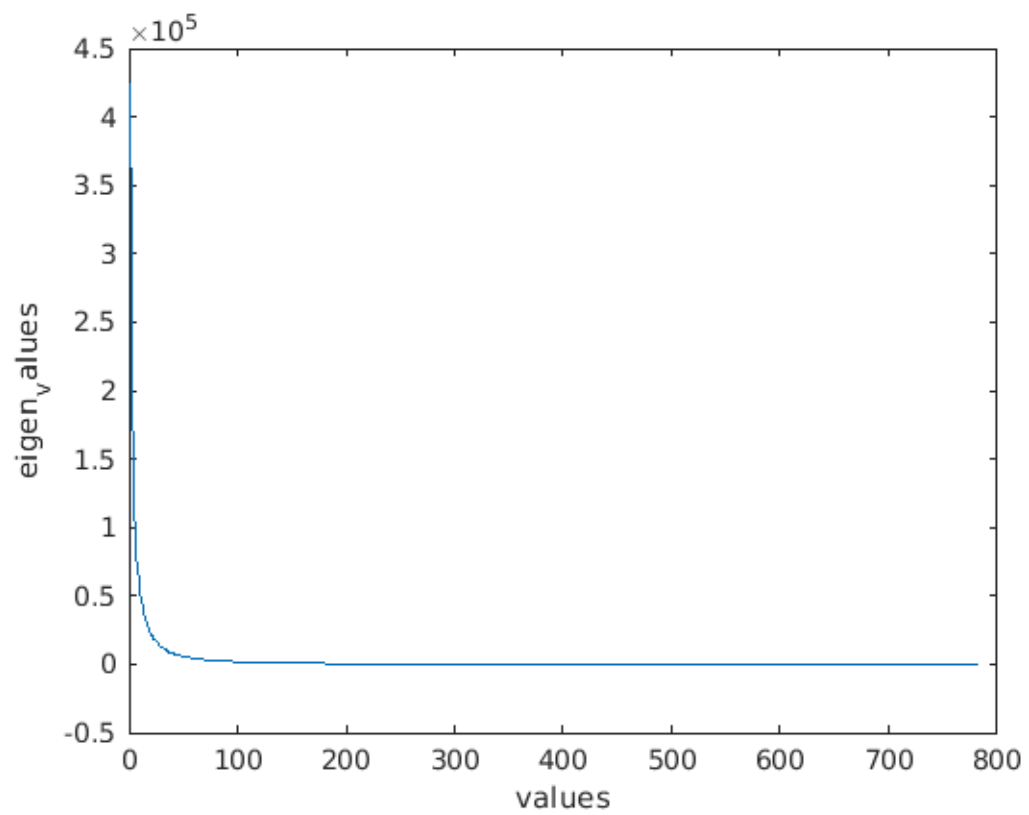
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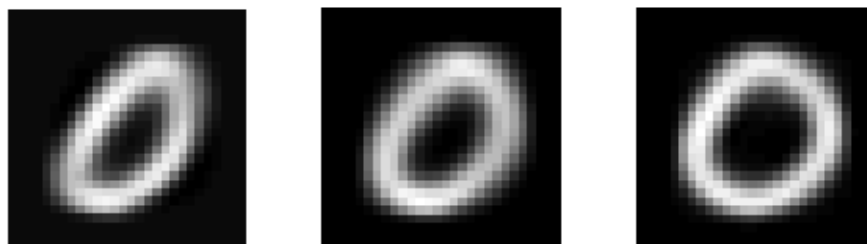
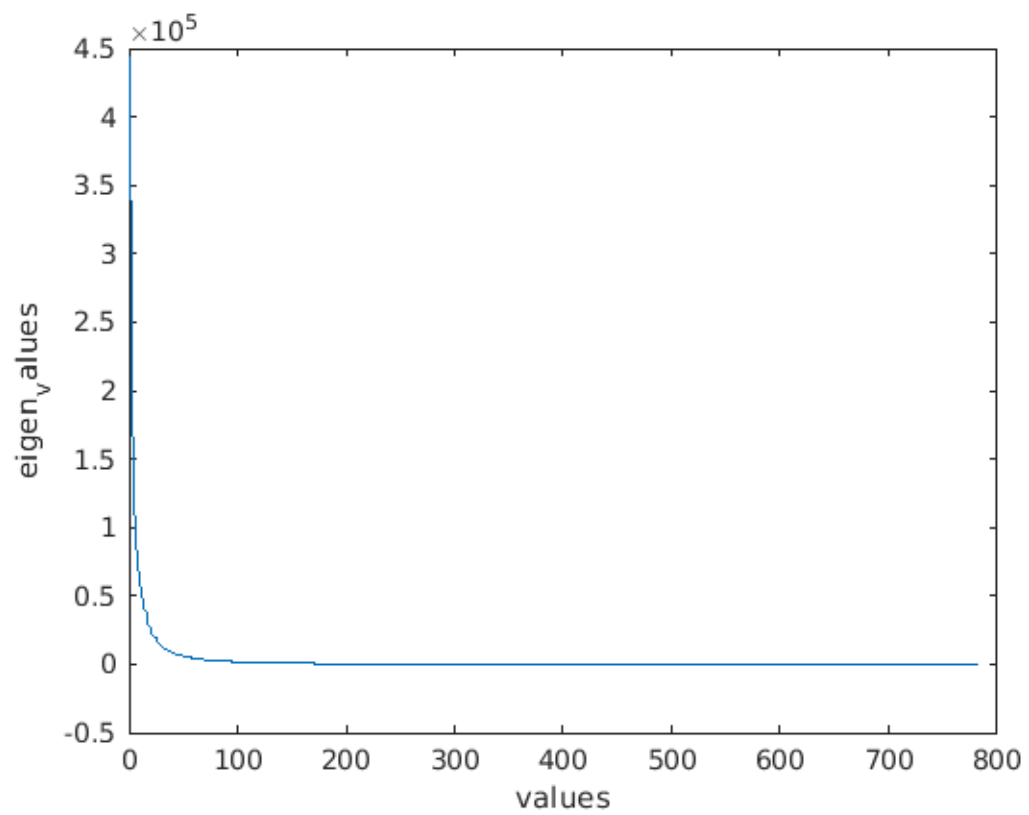


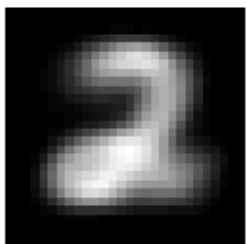
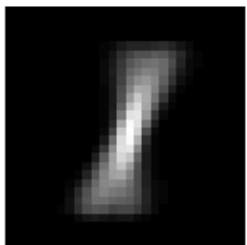
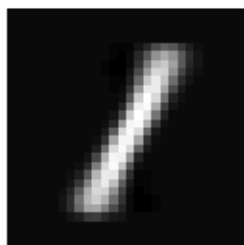


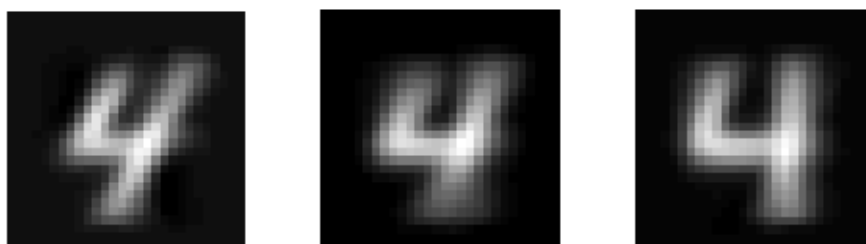


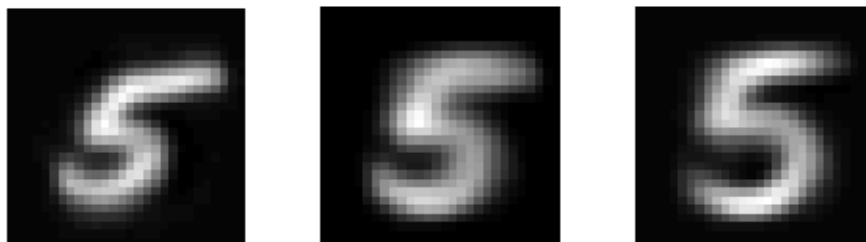


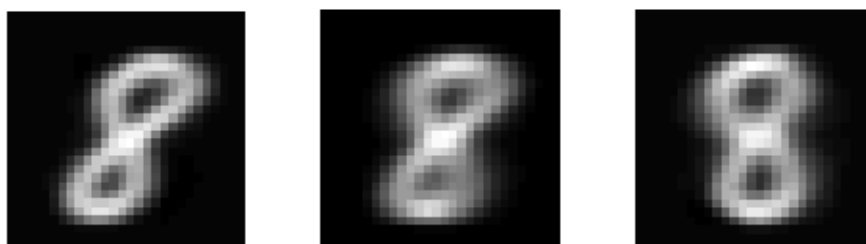














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