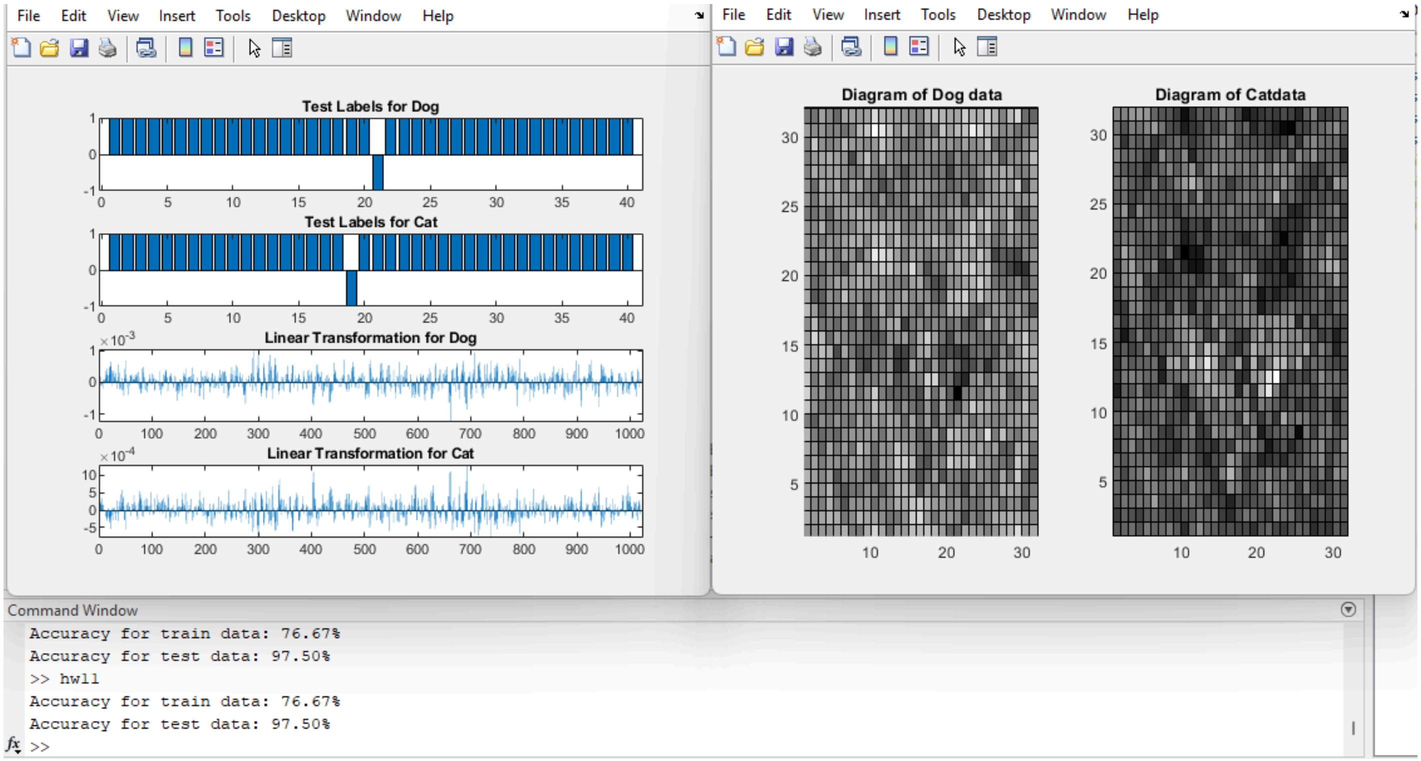
Matlab script(hw11.m)

```
%After using the slides and pages to 202 from the textbook, I just input
%the new formulated data, modified the code after that and added an accuracy
%output code.

load catData_w.mat;
load dogData_w.mat;

CD = [dog_wave cat_wave];
%The textbook(pg202) used this to represent a dog-[1,0] and cat=[0,1] matrices
%but for a different dataset and they used it to make a multi-layered neural
%net instead of lasso and linear regression

train = [dog_wave(:, 1:60) cat_wave(:, 1:60)];
test = [dog_wave(:, 61:80) cat_wave(:, 61:80)];

doglabel = [ones(1, size(train, 2)/2), zeros(1, size(train, 2)/2)];
catlabel = [zeros(1, size(train, 2)/2), ones(1, size(train, 2)/2)];
% Define the desired A matrix
A = [ones(1, size(train, 2)/2), zeros(1, size(train, 2)/2);
    zeros(1, size(train, 2)/2), ones(1, size(train, 2)/2)];

A_dog = doglabel * pinv(train);
A_cat = catlabel * pinv(train);

train_labels_dog = sign(A_dog * train);
train_labels_cat = sign(A_cat * train);
test_labels_dog = sign(A_dog * test);
test_labels_cat = sign(A_cat * test);

subplot(4, 1, 1), bar(test_labels_dog);
title('Test Labels for Dog');
subplot(4, 1, 2), bar(test_labels_cat);
title('Test Labels for Cat');
subplot(4, 1, 3), bar(A_dog);
title('Linear Transformation for Dog');
subplot(4, 1, 4), bar(A_cat);
title('Linear Transformation for Cat');

figure;
subplot(1, 2, 1);
A11 = flipud(reshape(A_dog, 32, 32));
pcolor(A11), colormap(gray);
title('Diagram of Dog data');
subplot(1, 2, 2);
A12 = flipud(reshape(A_cat, 32, 32));
pcolor(A12), colormap(gray);
title('Diagram of Catdata');
```

```
accuracy_train_dog = sum(train_labels_dog == 1) / length(train_labels_dog) *
100;
accuracy_train_cat = sum(train_labels_cat == 1) / length(train_labels_cat) *
100;
accuracy_test_dog = sum(test_labels_dog == 1) / length(test_labels_dog) * 100;
accuracy_test_cat = sum(test_labels_cat == 1) / length(test_labels_cat) * 100;
fprintf('Accuracy for train data: %.2f%%\n', (accuracy_train_dog +
accuracy_train_cat) / 2);
fprintf('Accuracy for test data: %.2f%%\n', (accuracy_test_dog +
accuracy_test_cat) / 2);
```

<u>Output on Matlab</u>


File Edit View Insert Tools Desktop Window Help
Test Labels for Dog
Test Labels for Cat
Linear Transformation for Dog
Linear Transformation for Cat
File Edit View Insert Tools Desktop Window Help
Diagram of Dog data
Diagram of Catdata
Command Window

```
Accuracy for train data: 76.67%
Accuracy for test data: 97.50%
>> hw11
Accuracy for train data: 76.67%
Accuracy for test data: 97.50%
>>
```