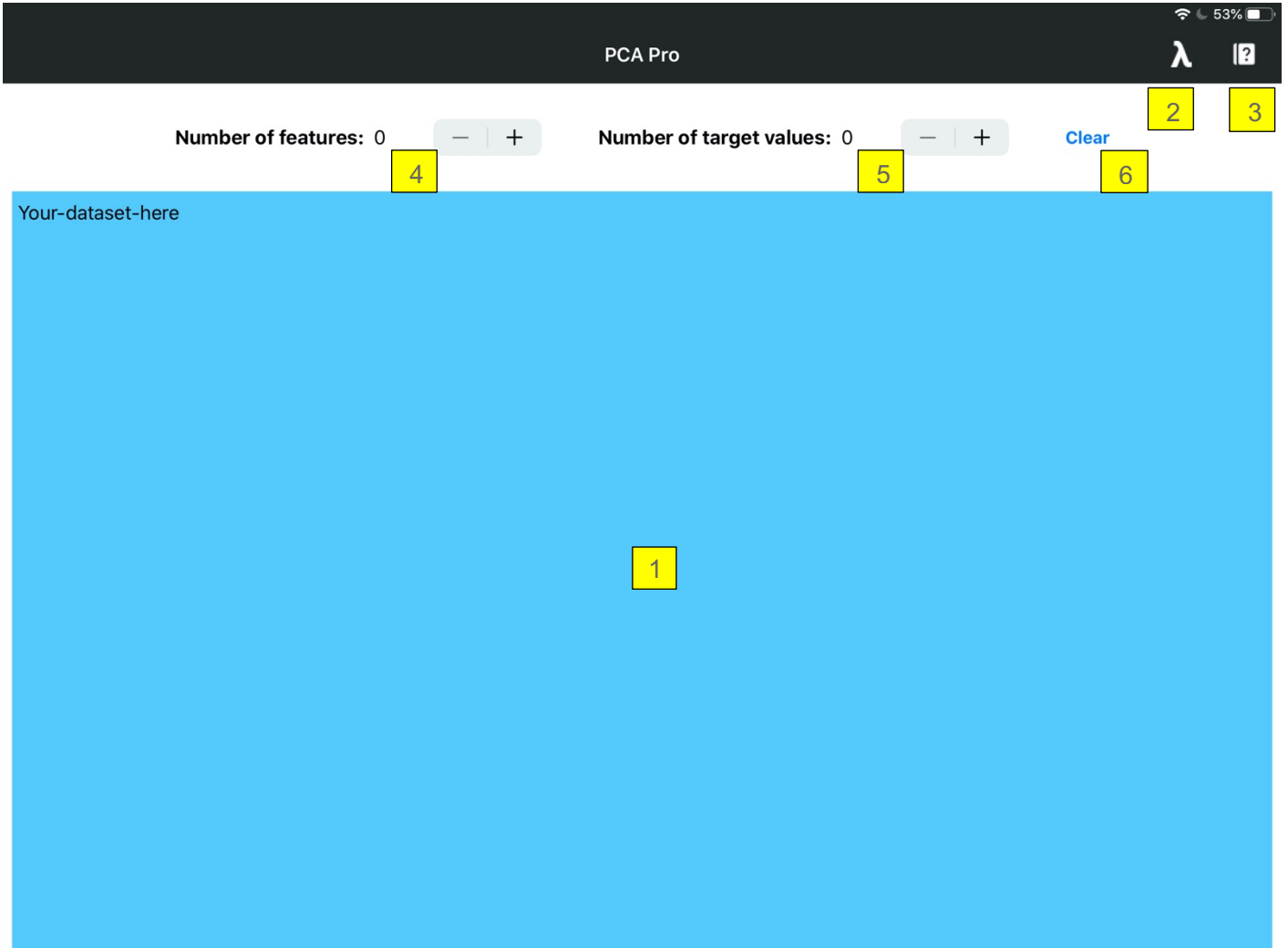


Home

When the app launches this is the first page.



PCA Pro

Number of features: 0 - + Number of target values: 0 - + Clear

2 3 6

Your-dataset-here

1

- 1) Text area that holds the comma-delimited dataset.
- 2) Eigenvalue, eigenvector and scree plot page.
- 3) Typical step-by-step help page.
- 4) For the dataset under analysis indicate the number of features.
- 5) For the dataset under analysis indicate the number of target values.
- 6) Blank-out the dataset data and reset the feature and target counters to zero.



PCA Pro©

Dataset specification

Paste in the dataset and specify the number of features and target values in the data. In this example there are 9 features and 1 target value. Use the stepper control buttons to set those values. Touch the Lambda icon to generate the eigenvalues and eigenvectors.

PCA Pro

Number of features: 9

– +

Number of target values: 1

– +

Clear

48,23.5,70,2.707,0.467408667,8.8071,9.7024,7.99585,417.114,0

83,20.69049454,92,3.115,0.706897333,8.8438,5.423285,4.06405,468.786,0

82,23.12467037,91,4.498,1.009651067,17.9393,22.43204,9.27715,554.697,0

68,21.36752137,77,3.226,0.612724933,9.8827,7.16956,12.766,928.22,0

86,21.1111111,92,3.549,0.8053864,6.6994,4.81924,10.57635,773.92,0

49,22.85445769,92,3.226,0.732086933,6.8317,13.67975,10.3176,530.41,0

89,22.777,4.69,0.890787333,6.964,5.589865,12.9361,1256.083,0

76,23.8,118,6.47,1.883201333,4.311,13.25132,5.1042,280.694,0

73,22.97,3.35,0.801543333,4.47,10.358725,6.28445,136.855,0

75,23.83,4.952,1.013839467,17.127,11.57899,7.0913,318.302,0

34,21.47,78,3.469,0.6674356,14.57,13.11,6.92,354.6,0

29,23.01,82,5.663,1.145436133,35.59,26.72,4.58,174.8,0

25,22.86,82,4.09,0.827270667,20.45,23.67,5.14,313.73,0

24,18.67,88,6.107,1.33,8.88,36.06,6.85,632.22,0

38,23.34,75,5.782,1.06967,15.26,17.95,9.35,165.02,0

44,20.76,86,7.553,1.6,14.09,20.32,7.64,63.61,0

47,22.03,84,2.869,0.59,26.65,38.04,3.32,191.72,0

61,32.03895937,85,18.077,3.790144333,30.7729,7.780255,13.68392,444.395,0

64,34.5297228,95,4.427,1.037393667,21.2117,5.46262,6.70188,252.449,0

32,36.51263743,87,14.026,3.0099796,49.3727,5.1,17.10223,588.46,0

36,28.57667585,86,4.345,0.921719333,15.1248,8.6,9.1539,534.224,0

34,31.97501487,87,4.53,0.972138,28.7502,7.64276,5.62592,572.783,0

29,32.27078777,84,5.81,1.203832,45.6196,6.209635,24.6033,904.981,0

35,30.27681661,84,4.376,0.9067072,39.2134,9.048185,16.43706,733.797,0

54,30.48315806,90,5.537,1.229214,12.331,9.73138,10.19299,1227.91,0

45,37.03560819,83,6.76,1.383997333,39.9802,4.617125,8.70448,586.173,0

50,38.57875854,106,6.703,1.752611067,46.6401,4.667645,11.78388,887.16,0

66,31.44654088,90,9.245,2.05239,45.9624,10.35526,23.3819,1102.11,0

35,35.2507611,90,6.817,1.513374,50.6094,6.966895,22.03703,667.928,0

36,34.17489,80,6.59,1.300426667,10.2809,5.065915,15.72187,581.313,0

66,36.21227888,101,15.533,3.869788067,74.7069,7.53955,22.32024,864.968,0

53,36.7901662,101,10.175,2.534931667,27.1841,20.03,10.26309,695.754,0

28,35.85581466,87,8.576,1.8404096,68.5102,4.7942,21.44366,358.624,0

43,34.42217362,89,23.194,5.091856133,31.2128,8.300955,6.71026,960.246,0

51,27.68877813,77,3.855,0.732193,20.092,3.19209,10.37518,473.859,0

67,29.60676726,79,5.819,1.133929133,21.9033,2.19428,4.2075,585.307,0

66,31.2385898,82,4.181,0.845676933,16.2247,4.267105,3.29175,634.602,0

69,35.09270153,101,5.646,1.4066068,83.4821,6.796985,82.1,263.499,0

60,26.34929208,103,5.138,1.305394533,24.2998,2.19428,20.2535,378.996,0

77,35.58792924,76,3.881,0.727558133,21.7863,8.12555,17.2615,618.272,0

76,29.2184076,83,5.376,1.1006464,28.562,7.36996,8.04375,698.789,0

76,27.2,94,14.07,3.262364,35.891,9.34663,8.4156,377.227,0

75,27.3,85,5.197,1.089637667,10.39,9.000805,7.5767,335.393,0

69,32.5,93,5.43,1.245642,15.145,11.78796,11.78796,270.142,0

71,30.3,102,8.34,2.098344,56.502,8.13,4.2989,200.976,0

66,27.7,90,6.042,1.341324,24.846,7.652055,6.7052,225.88,0

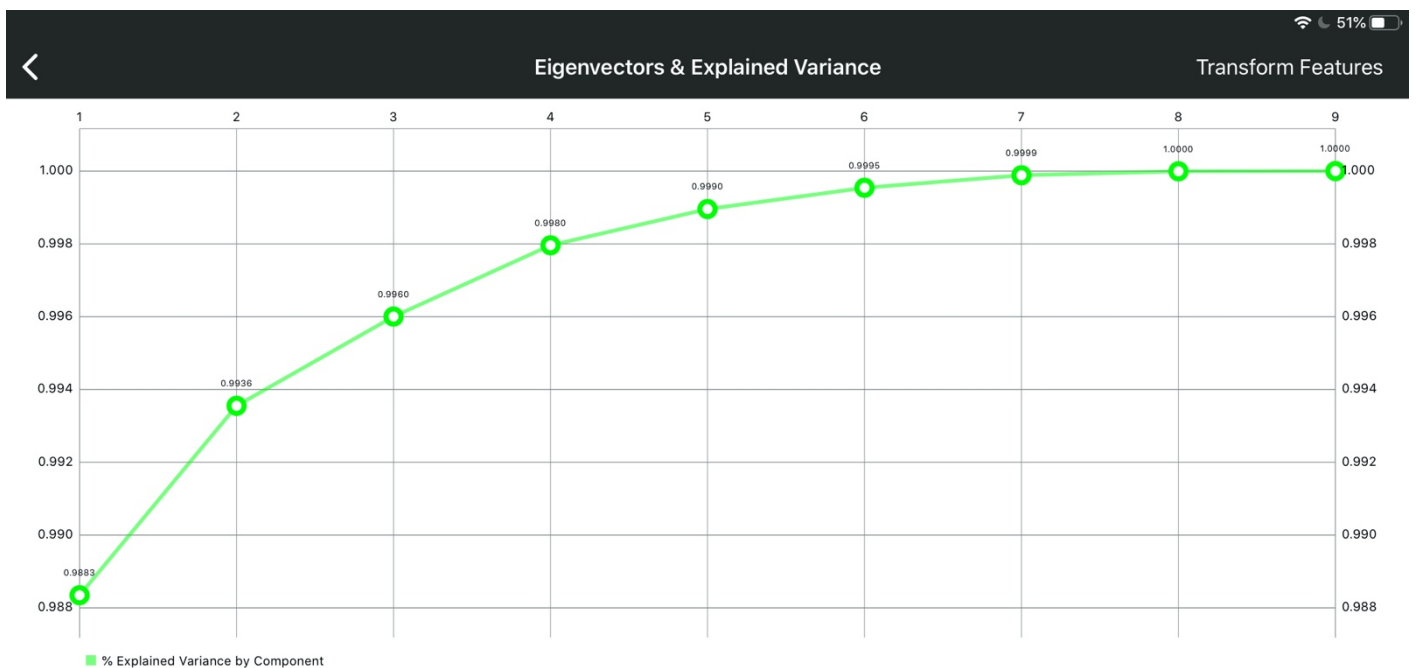
1 target

9 features



Eigenvalues and Eigenvectors

PCA Pro first standardizes the dataset features to a mean of 0 and a standard deviation of 1. Then, a covariance matrix is calculated from the dataset features. Eigenvectors and eigenvalues are calculated from the covariance matrix. The eigenvalues are sorted in descending order. The cumulative percent variance for each eigenvalues is plotted for each component.



*** Eigenvalues ***

```
119719.2648371632
630.3423614139454
297.0419686148173
237.24228057096389
120.56965065023954
70.78130573039017
41.714732895954214
13.130660562369949
0.6713070849234283
```

*** Right eigenvectors ***

```
[[ 0.0006415204549381588
  0.22261191162083013
  0.34930201412547796
 -0.8964956814284664
 -0.03899283381704039
 -0.10394708645640469
 -0.1039970161101155
 -0.03902771325777247
  0.007946177081409567]
 [ 0.0032541797200359313
  0.06247255016838624
 -0.14538568116959205
```

Transform Features

Touching the “Transform Features” button causes the “Transform Features” page to be displayed. When you land on this page the transformation matrix is assembled from the complete set of eigenvectors from the previous page. Using the stepper button, you can specify the set of eigenvectors that make up the transformation matrix. (Recall that the eigenvectors are sorted in descending order of their corresponding eigenvalues.)

Touching the “Do transform” button transforms the feature dataset by multiplying it by the transformation matrix. If your dataset includes target values, those values will be left unchanged. Note, if your dataset includes the target values, you could then copy/paste the contents of the Transformed features text area into the [Machine Learning Playground](#) app for modeling in a neural network.

← Eigenvectors & Explained Variance
Transform Features

Select top 5 – + eigenvectors [Do transform](#)

Transformation matrix

```
[0.0006415204549381588, 0.22261191162083013, 0.34930201412547796,
-0.8964956814284664, -0.03899283381704039]
[0.0032541797200359313, 0.06247255016838624, -0.14538568116959205,
-0.03693353519310179, 0.024958731086179912]
[0.01732557072526044, 0.7725292584256983, 0.46010656136999223,
0.33736771961150014, 0.02807185216378944]
[0.005094923181687881, 0.21860458211382136, 0.012851370229922847,
0.15325092664491746, 0.2067557724986301]
[0.002741813816362658, 0.09894778923319959, 0.027235134646347872,
0.051878863259855426, 0.054443122967997394]
[0.0008095892565119445, 0.5165178262280293, -0.790193802142952,
-0.20043903863262388, 0.16796036343092235]
[-0.003974505179834624, -0.038623565208713864,
-0.0008785794431856719, 0.10240154511184846, 0.16866213267020308]
[0.01314777717243132, 0.15350873350934177, -0.1407487667073199,
0.06507550131985315, -0.9458186572557072]
[0.9997329800546264, -0.0177103917664171, -0.0053773943898684905,
-0.006360851391971331, 0.011227536500383075]
```

Transformed features

```
-118.14672686832833, -33.745254310856446, 0.05348419155961828, 1.70821
31160531215, -0.17690486860657706, 0.0
-66.12599702542623, -10.355521007707617, 23.071916202746838, -23.097801
616255023, 2.687570389149667, 0.0
19.768220310059924, -7.546286272771339, 13.536771576296756, -22.690130
72273399, 3.490997454194749, 0.0
393.0266647153963, -31.556932070500928, 6.31341141211629, -17.10989879
548245, 0.28196355024220576, 0.0
239.01861148227522, -15.04519508874012, 23.20453398538888, -26.880972
031964404, -0.5204334119948615, 0.0
-4.484787239828669, -19.251738675378096, 11.254295268557442, 8.584581
95245114, -0.07759277511235903, 0.0
720.8343001670974, -33.67830528715125, 14.002154384211314, -37.3978965
97919754, 2.5777494578741926, 0.0
-253.71244371512788, 10.063494354796404, 36.65261149811927, -4.6167819
05485655, 1.9880522705539843, 0.0
-397.87637374596227, -4.806507971321146, 26.61886737639132, -8.81612682
9025126, -2.425796325858939, 0.0
-216.69109503443582, -11.342214233642796, 9.665133397451667, -18.62632
925985093, 1.0767074684181348, 0.0
-180.53960929878434, -26.835015388702054, -4.914732794024416, 16.6816
8802060439, 2.569694034918195, 0.0
-360.2758453931939, -11.078178648681213, -20.329119814884404, 20.98965
116344643, 9.415551125359084, 0.0
-221.3876555329463, -22.430161807374773, -10.59308738408339, 26.19865
5678281515, 1.198073690181107, 0.0
97.08250465789878, -29.62142871721981, -0.35464094986548994, 31.28254
3703547564, 9.850247716743457, 0.0
-370.08615445261984, -23.699877707625916, -5.001094640685585, 14.11121
7498792632, -0.61833336500256, 0.0
-471.30541366352486, -12.750292690165132, 4.276634533561917, 13.848477
3249054, 0.4691248308108431, 0.0
-343.4019074008152, -11.80103815921727, -5.889281571795942, 7.868150476
033501, 9.926840076947444, 0.0
-90.3893731845424, -3.2312016561849934, -7.760252710877296, -7.0762532
45708815, 1.6007303641985853, 0.0
-282.26825484350394, -0.46018030558564976, 6.848324938797292, -6.273
```