Principal component analysis (PCA)
09/10/19

Three mounts have be tested. The cardboard, styrofoam, and wooden.
The camera is best when under the mount.

Threaded screws need to be anchored to belt system to attach the camera mount.
These should be long enough to allow the camera to be adjusted to around 7 in high.

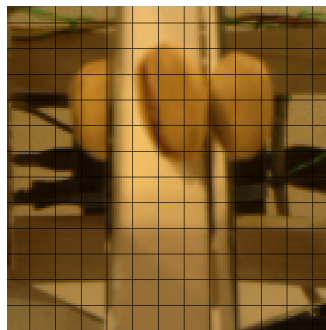Given a 128 x 128 image of a cracked pistachio
Step 1 is to capture an image to perform the feature detection.
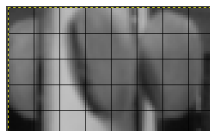"sudo raspistill -e bmp -vf -h 128 -w 128 -t 285 -o thumb0000.bmp";

r4thumb0000.bmp from the camera.

Step 2 is to extract a smaller image to perform the feature detection.

r4thumb0000.bmp from the camera flipped vertically with a grid.

Step 3 The image used to perform the 80 x 50 feature detection.

r4thumb0000.pgm 80 x 50 extracted from r4thumb0000.bmp with a grid.
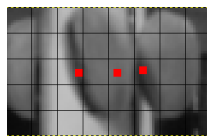Feel free to place comments here.

!!!
!!! Warning: This is a KLT data file. Do not modify below this line !!!

KLT Feature List
----

nFeatures = 10

feature | (x,y)=val
--------+----------------
    0 | (53, 24)= 685
    1 | (28, 25)= 155
    2 | (43, 25)=   47
    3 | (-1, -1)=   -1
    4 | (-1, -1)=   -1
    5 | (-1, -1)=   -1
    6 | (-1, -1)=   -1
    7 | (-1, -1)=   -1
    8 | (-1, -1)=   -1
    9 | (-1, -1)=   -1

The crack in the mirror is the first feature detected.

0 | (53, 24)= 685

The larger crack on the left is 2nd feature detected.
1 | (28, 25)= 155

The pistachio is the 3rd feature detected.
2 | (43, 25)=   47

***********Draft***********
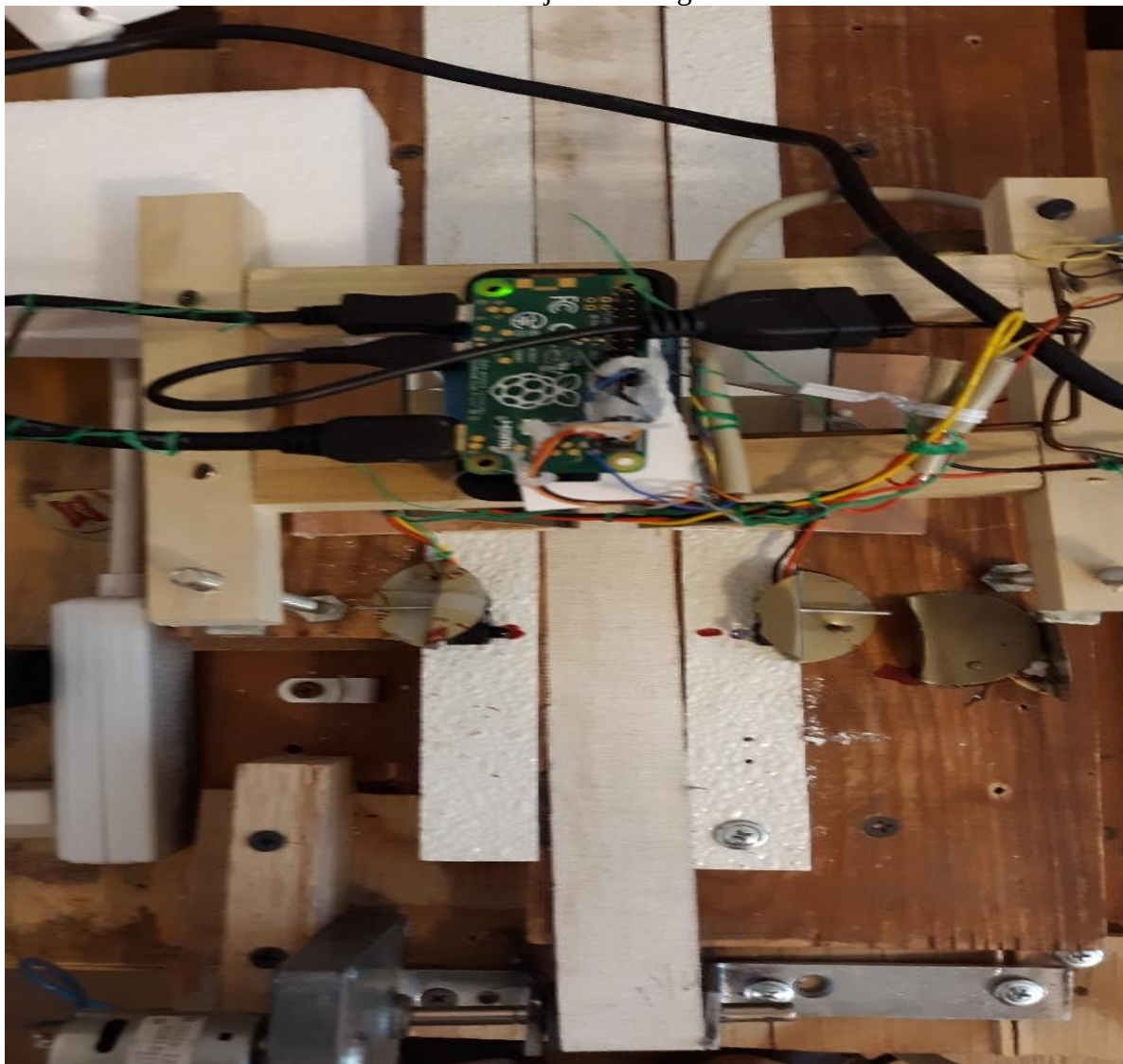# Principal component analysis (PCA)
09/09/19
***********Draft***********

Using an extraction of 80 x 50. This required several changes to get the extracted images correct for the klt program.
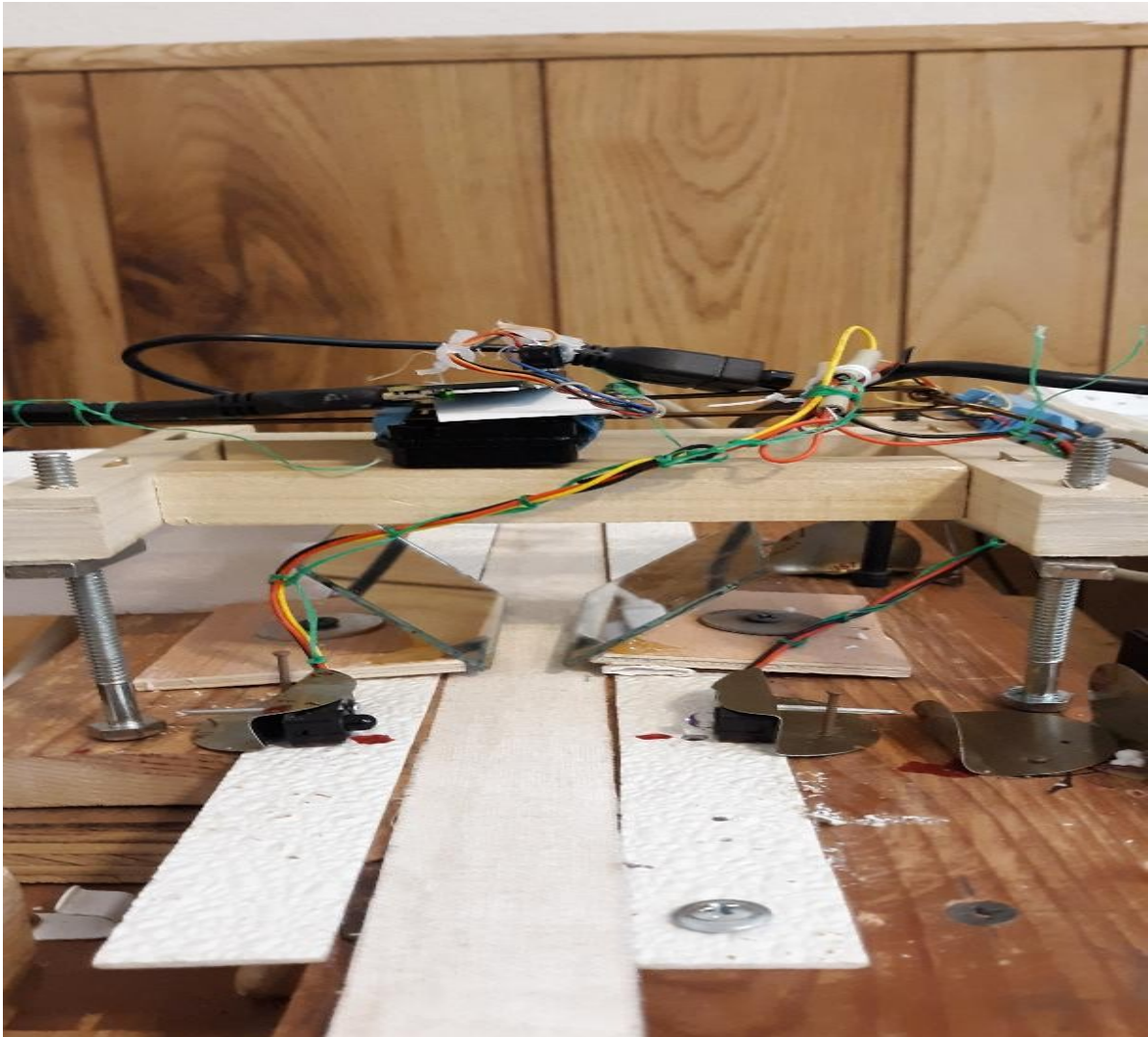q
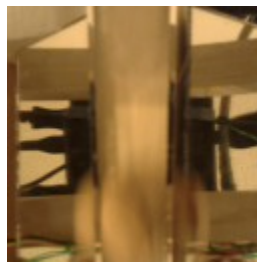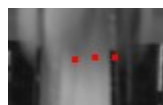Top View of canera mount lower with screw to adjust the height.

Front view

Front view

r1thumb0000.bmp

r1thumb0000.pgm

r1feat1.ppm

Feel free to place comments here.

!!
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KLT Feature List
----

nFeatures = 10

feature | (x,y)=val
--------+----------------
    0 | (53, 24)= 537
    1 | (33, 25)= 205
    2 | (43, 24)=   26
    3 | (-1, -1)=   -1
    4 | (-1, -1)=   -1
    5 | (-1, -1)=   -1
    6 | (-1, -1)=   -1
    7 | (-1, -1)=   -1
    8 | (-1, -1)=   -1
    9 | (-1, -1)=   -1

r1feat1.txt

r2thumb0000.bmp not cracked
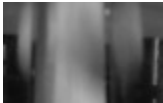
r2thumb0000.pgm

r2feat1.ppm

Feel free to place comments here.

KLT Feature List
----

nFeatures = 10

feature | (x,y)=val
--------+-----------------
   0 | (53, 24)= 495
   1 | (35, 25)=   72
   2 | (24, 24)=   51
   3 | (-1, -1)=   -1
   4 | (-1, -1)=   -1
   5 | (-1, -1)=   -1
   6 | (-1, -1)=   -1
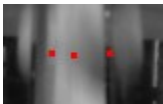   7 | (-1, -1)=   -1
   8 | (-1, -1)=   -1
   9 | (-1, -1)=   -1

r2feat1.txt

r3thumb0000.bmp
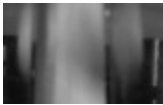
r3thumb0000.pgm

r3feat1.ppm

Feel free to place comments here.

KLT Feature List
----

nFeatures = 10

feature | (x,y)=val
--------+-----------------
    0 | (53, 24)= 495
    1 | (35, 25)=   72
    2 | (24, 24)=   51
    3 | (-1, -1)=   -1
    4 | (-1, -1)=   -1
    5 | (-1, -1)=   -1
    6 | (-1, -1)=   -1
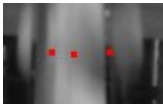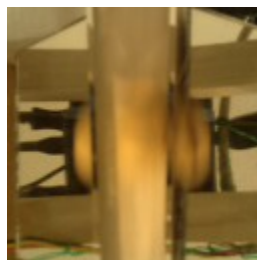   7 | (-1, -1)=   -1
    8 | (-1, -1)=   -1
    9 | (-1, -1)=   -1

r3feat1.txt

r4thumb0000.bmp

r4thumb0000.pgm
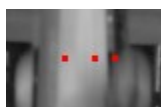
r4feat1.ppm

Feel free to place comments here.

!!!
!!! Warning: This is a KLT data file. Do not modify below this line !!!

KLT Feature List
----

nFeatures = 10

feature | (x,y)=val
--------+-----------------
   0 | (54, 24)= 807
   1 | (44, 24)=   50
   2 | (29, 24)=   22
   3 | (-1, -1)=   -1
   4 | (-1, -1)=   -1
   5 | (-1, -1)=   -1
   6 | (-1, -1)=   -1
   7 | (-1, -1)=   -1
   8 | (-1, -1)=   -1
   9 | (-1, -1)=   -1

r4feat1.txt

r5thumb0000.bmp

r

5thumb0000.pgm

r5feat1.ppm

Feel free to place comments here.

KLT Feature List
----

nFeatures = 10

feature | (x,y)=val
--------+-----------------
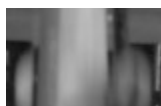   0 | (52, 24)= 696
    1 | (42, 25)=   35
    2 | (24, 24)=   28
    3 | (-1, -1)=   -1
    4 | (-1, -1)=   -1
    5 | (-1, -1)=   -1
    6 | (-1, -1)=   -1
    7 | (-1, -1)=   -1
   8 | (-1, -1)=   -1
    9 | (-1, -1)=   -1

r5feat1.txt

r6thumb0000.bmp

r6thumb0000.pgm

r6feat1.ppm

Feel free to place comments here.

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KLT Feature List
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nFeatures = 10

feature | (x,y)=val
--------+-----------------
      0 | ( 53, 24)=  656
      1 | ( 30, 24)=  118
      2 | ( 43, 24)=   18
      3 | ( -1, -1)=  -1
      4 | ( -1, -1)=  -1
      5 | ( -1, -1)=  -1
      6 | ( -1, -1)=  -1
      7 | ( -1, -1)=  -1
      8 | ( -1, -1)=  -1
      9 | ( -1, -1)=  -1
```
r4feat1.txt