

*****Draft*****

Principal component analysis (PCA)

09/21/19

*****Draft*****

Up to this point only the R image had been used. Created 3 versions of exe1a.c (R image) , exe1b.c (G image) , and exe1c.c (B image).

These versions were tested with cracked and not cracked pistachios.

The red & green images provide the most information

redfeat1.txt

```
feature | (x,y)=val
-----+-----
0 | ( 25, 25)= 623
1 | ( 46, 25)= 496
2 | ( 35, 25)= 461
```

rrednofeat1.txt

```
feature | (x,y)=val
-----+-----
0 | ( 41, 25)= 356
1 | ( 26, 25)= 269
2 | ( 51, 24)= 14
```

rgrnfeat1.txt

```
feature | (x,y)=val
-----+-----
0 | ( 24, 25)= 1023
1 | ( 46, 25)= 830
2 | ( 36, 25)= 504
```

rgrnnofeat1.txt

```
feature | (x,y)=val
-----+-----
0 | ( 29, 25)= 269
1 | ( 39, 25)= 61
2 | ( 55, 24)= 23
```

rblufeat1.txt

```
feature | (x,y)=val
-----+-----
0 | ( 34, 25)= 312
1 | ( 24, 25)= 259
2 | ( 45, 25)= 241
3 | ( 55, 25)= 125
```

```
rblunofeat1.txt
feature | (x,y)=val
-----+-----
0 | ( 25, 25)= 143
1 | ( 35, 25)=  90
2 | ( 55, 24)=  26
3 | ( 45, 25)=  19
```

```
cp exe1a.c exe1.c
make
./disp_images.sh rred
```

```
cp exe1b.c exe1.c
make
./disp_images.sh rgrn
```

```
cp exe1c.c exe1.c
make
./disp_images.sh rblu
```

*****Draft*****

Principal component analysis (PCA)

09/10/19

*****Draft*****

Three mounts have been 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

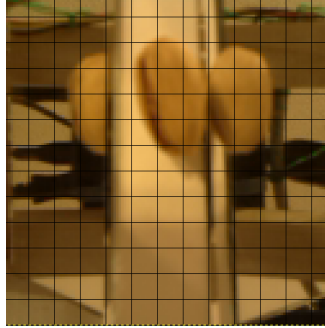
Step 1 is to capture an image to perform the feature detection.

```
"sudo raspistill -e bmp -vf -h 128 -w 128 -t 285 -o thumb0000.bmp";
```



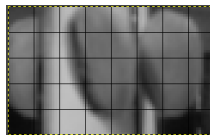
r4thumb0000.bmp from the camera.

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.

!!

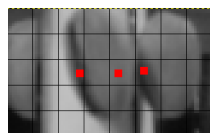
!!! Warning: This is a KLT data file. Do not modify below this line !!!

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.

$0 \mid (53, 24) = 685$

The larger crack on the left is 2nd feature detected.

$1 \mid (28, 25) = 155$

The pistachio is the 3rd feature detected.

$2 \mid (43, 25) = 47$

*******Draft*******

Principal component analysis (PCA)

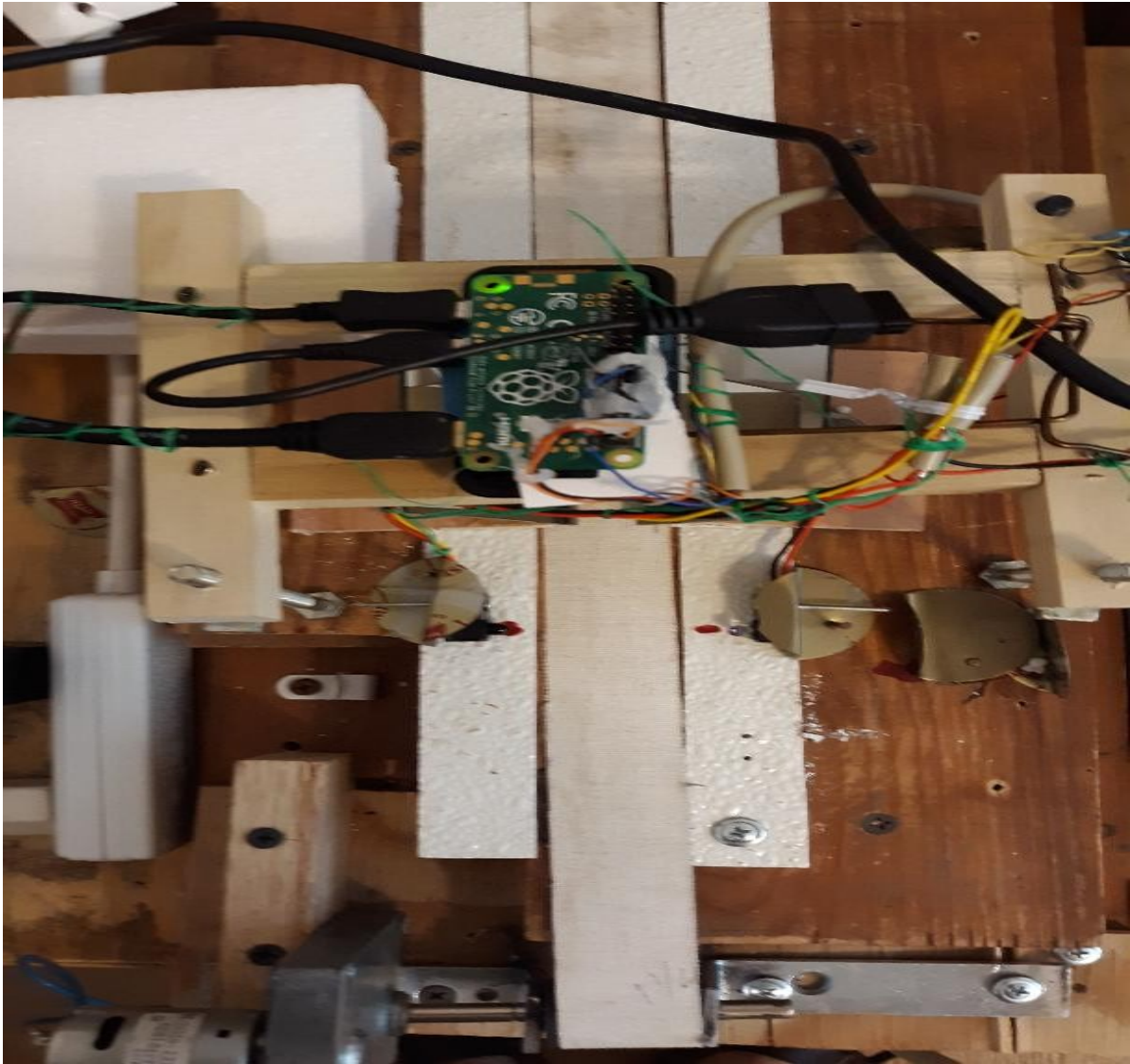
09/09/19

*******Draft*******

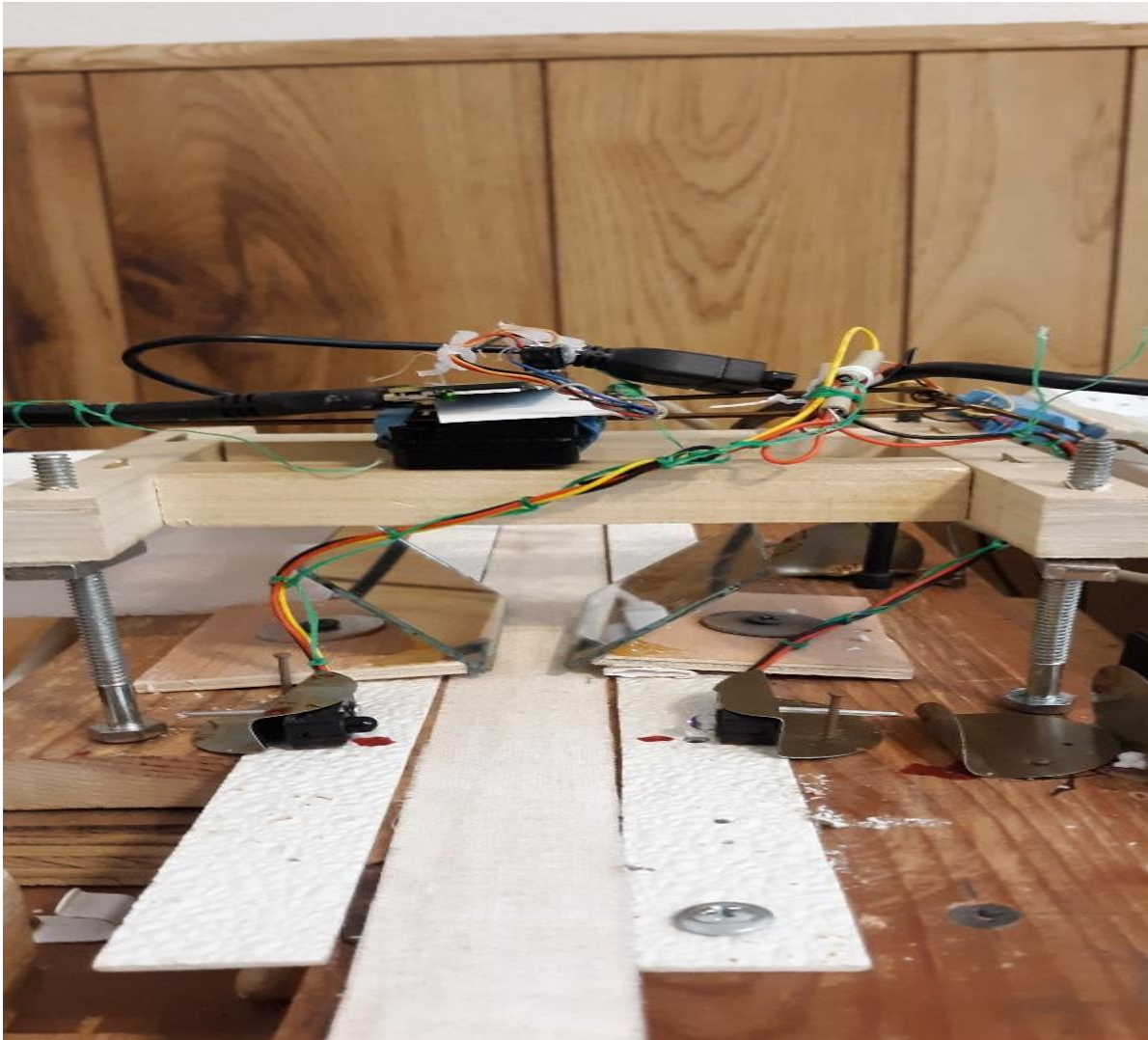
Using an extraction of 80 x 50. This required several changes to get the extracted images correct for the klt program.

q

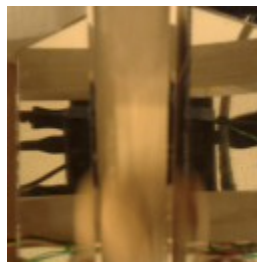
Top View of camera mount lower with screw to adjust the height.



Front view



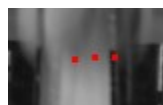
Front view



r1thumb0000.bmp



r1thumb0000.pgm



r1feat1.ppm

Feel free to place comments here.

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

KLT Feature List

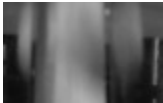
nFeatures = 10

feature		(x,y)=val
0		(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

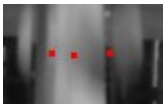
r1feat1.txt



r2thumb0000.bmp not cracked



r2thumb0000.pgm



r2feat1.ppm

Feel free to place comments here.

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

KLT Feature List

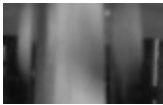
nFeatures = 10

feature (x,y)=val		
-----+-----		
0	(53, 24)=	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

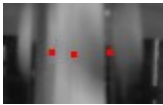
r2feat1.txt



r3thumb0000.bmp



r3thumb0000.pgm



r3feat1.ppm

Feel free to place comments here.

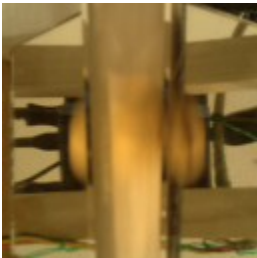
!!
!!! Warning: This is a KLT data file. Do not modify below this line !!!

KLT Feature List

nFeatures = 10

feature (x,y)=val		
-----+-----		
0	(53, 24)=	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

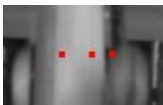
r3feat1.txt



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

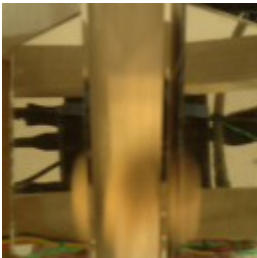
nFeatures = 10

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

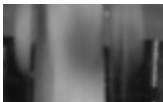
r4feat1.txt

r5thumb0000.bmp

r



5thumb0000.pgm



r5feat1.ppm

Feel free to place comments here.

!!

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

KLT Feature List

nFeatures = 10

feature | (x,y)=val

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