**CPE383 Machine Learning: Quiz5**

1. Calibrate Camera. 2 hrs. Using the “Calibrate Camera by ChatGPT” program shown in class,

calibrate your laptop or mobile phone camera to find its intrinsic parameters using 10-15

checkerboard images. Make sure you are not using mirror images. If the processing is slow, it

may help to reduce the size of each image to a width of around 1,000.

* 1. 10 points. Report the fx, fy, cx, cy, and lens distortion (k1, k2, k3, p1, p2) parameters

found using left##.jpg, frame-##.png, and your camera’s images.

**Text

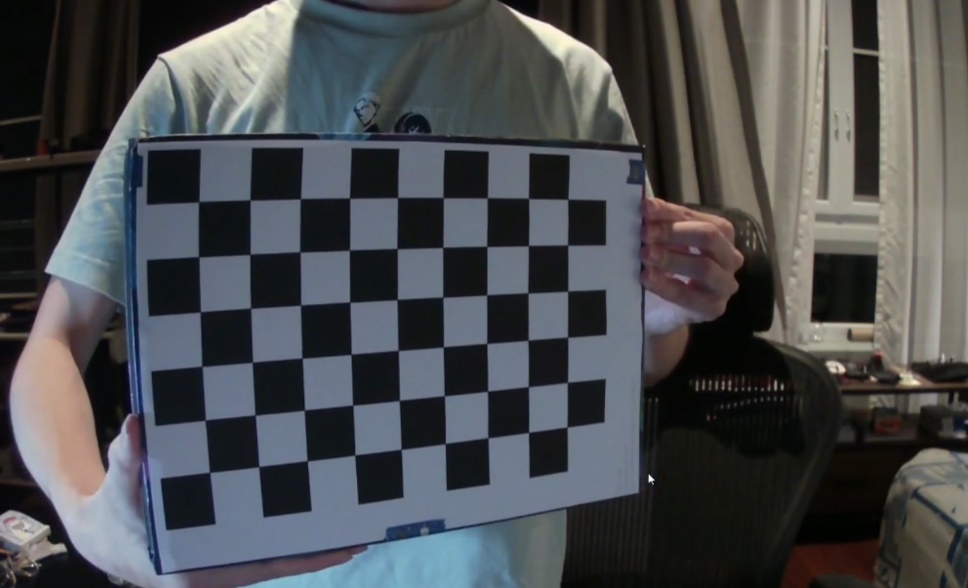
Description automatically generated**

1.2. 10 points. Show the Original and Undistorted image for one of your checkerboard images.

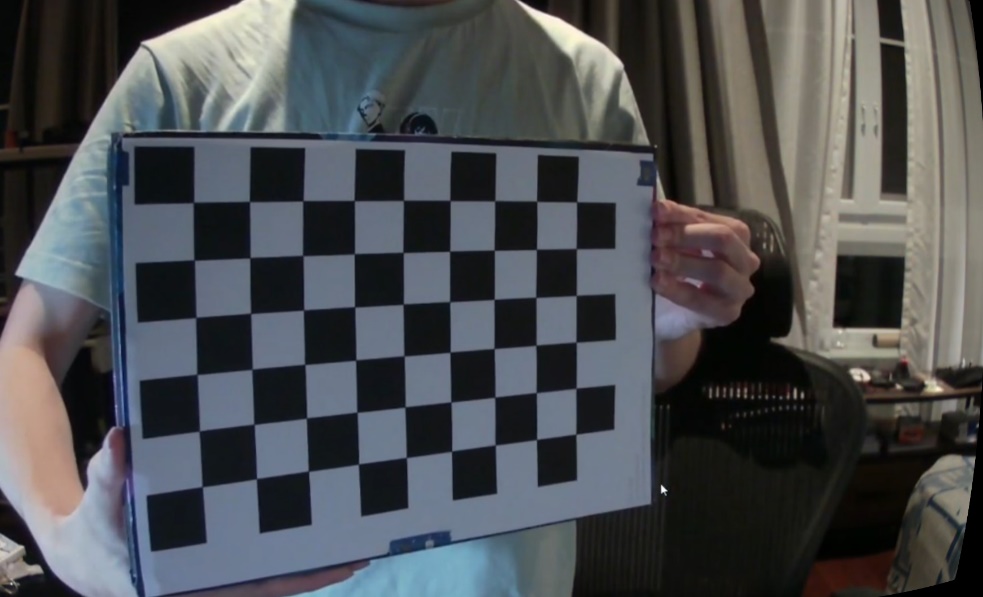
Draw straight lines across the original image and undistorted image to see if the distortion

has improved.

**Distorted**



**Undistorted**



1. Using the Regression on diabetes data example:

Text

Description automatically generated

* 1. 5 points. 1 hr. Is age highly correlated with total cholesterol / HDL (column ‘S4’)?

Text

Description automatically generated

**ANS** only a small proportion of the variation in diabetes\_s4 can be explained by diabetes\_age. Therefore, the correlation between the two variables is weak.

* 1. 5 points. 0.5 hr. Is blood pressure highly correlated with total cholesterol / HDL (column ‘S4’)?

Text

Description automatically generated

**ANS** only a small proportion of the variation in diabetes\_s4 can be explained by diabetes\_bp. Therefore, the correlation between the two variables is weak.

2.3. 15 points (4+3+3+5). 1 hr. Report Linear fit results for y = ax + b where x is the blood

sugar level

Text

Description automatically generated

1. Linear fit coefficients and intercept of the training data

Text

Description automatically generated

1. Graphical user interface

   Description automatically generatedWhat is the R^2 for the training data?
2. What is the R^2 for the prediction of y based on blood sugar level for the test data?

Text

Description automatically generated with low confidence

1. Show a scatter plot of the train set (x, y) as blue circles and predicted (x, y) as green circles. Also show the best fit line in red.

Chart, scatter chart

Description automatically generated

1. 2 hrs. Use the data provided in the shared file gasoline\_use.txt to:
   1. 10 points. Show the equation found by fitting the training data: y = f(x1, x2, x3, x4) = a0+ a1x1 + a2x2 + a3x3 + a4x4

Text

Description automatically generated

**ANS** y = -40.32x1 - 0.08x2 - 0.002x3 + 1464.30x4 + 383.71

3.2. 5 points. What is the R^2 for the prediction of y? Use testing data.

Graphical user interface, text

Description automatically generated

* 1. 5 points. What would happen to gasoline consumption if taxes are increased by $2.00? Use training data.

Text

Description automatically generated Text

Description automatically generated  
ANS it’s tell that on average, the model predicts that gasoline consumption will decrease by approximately 76.07 units, but in my opinion tax is not relate to gasoline consumption at all.