

CSCI 5722 PROBLEM SET 1

Total:
20pts

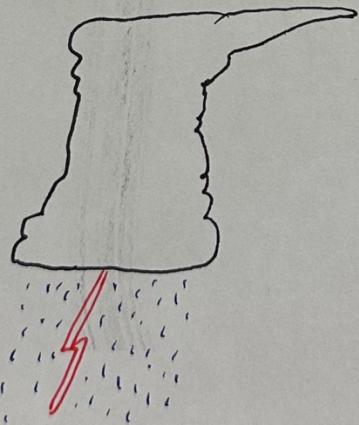
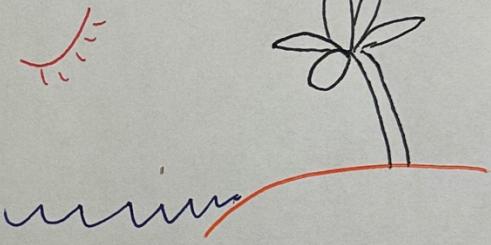
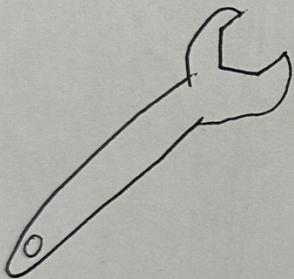
Name: David Chapparo

Due:
1/24/23

Student ID: dach 6662

Q1. About Yourself (3 pts)

In the space below, sketch 3 objects that best represent yourself.



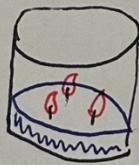
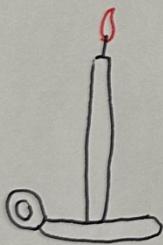
Q2: Challenges in Computer Vision (2 pts)

Illustrate the following with your "original" sketches.

a. VIEWPOINT VARIATIONS



b. INTRA-CLASS VARIATIONS (3 variations per class)



Q3: Illumination Variations (2pts)

Take 4 photos of an object in your room under different lighting conditions. Paste them below. Maximize illumination variations, while keeping scale and viewpoint constant.

1.



2.



3.



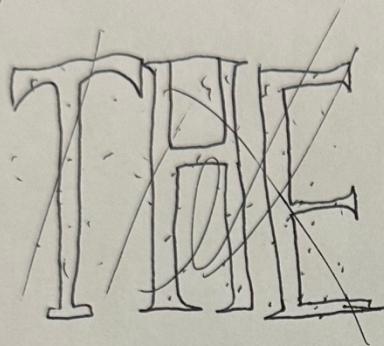
4.



Q4: Low, Mid, High-level Vision (3 pts)

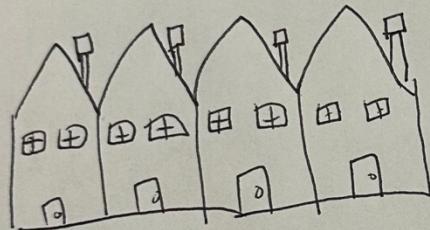
In the space below, create an original sketch to illustrate the 3 levels of computer vision tasks

Low



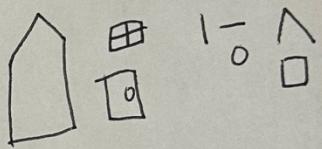
Denoise / reshape

Mid

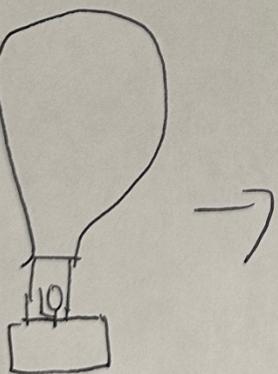


THE

Shape Detect / Shape patterns

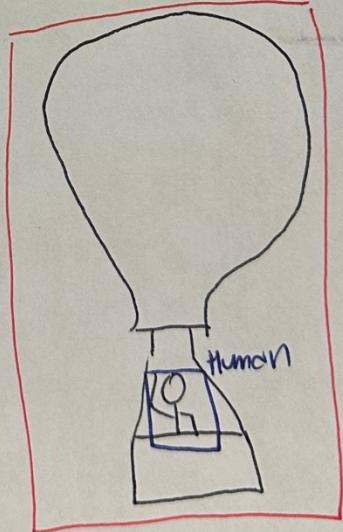


High



Classification

Classification
Balloon



Q5: OCR TEST (3 pts)

Hand write 50 words about yourself in your native language. Run OCR. Paste the result. Highlight errors.

a. Hand written text (2)

I am David. I have loved engineering for a long time,
and love it in graduate school too. I like to be
adventurous, meet new friends, relax, and challenge myself.

You can often find me at Dorna practice, the beach,
or a fun party. Cannot wait to make new friends in
this class!

From Tesseract IOS App by Gurvathan, Rajesh

b. OCR result with errors highlighted (1)

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ts class!

Q6. Object Recognition Test (4 pts)

Install an object recognition app and test it around your home. Find examples of the following.

Name of the app: Objectify Tryss

a. "Almost" correct



Ground Truth Label:

Shoe

Predicted Label:

Weekend Running Shoe

b. Very wrong but funny



Ground Truth Label:

Back pack

Predicted Label:

Neck Brace

Q7: Python / Numpy (3 pts)

Compute these using Numpy

$$\text{Let } A = \begin{bmatrix} 4 & 2 & 3 & 7 \\ 3 & 5 & 2 & 1 \\ 1 & 9 & 4 & 2 \end{bmatrix}, B = \begin{bmatrix} 2 & 7 & 6 \\ 1 & 3 & 2 \\ 4 & 5 & 1 \end{bmatrix}$$

$$(AA^T)^5 = \begin{bmatrix} [[43656066711 37024251209 59416680210] \\ [37024251209 31498508478 50577837358] \\ [59416680210 50577837358 81222370620]] \end{bmatrix}$$

$$(A^TA)^2 = \begin{bmatrix} [[3273 6717 3897 4506] \\ [6717 17197 9079 8736] \\ [3897 9079 4990 5223] \\ [4506 8736 5223 6335]] \end{bmatrix}$$

$$(BA - (A^TB)^T)^4 = \begin{bmatrix} \end{bmatrix}$$

LinAlgError: Last 2 dimensions of the array must be square

Unable to calculate, dimensions must be square to raise a matrix to a power, DNE