COMSATS University Islamabad

Attock Campus

Program/Semester: BS (AI) – 4A

Spring 2023 | Final Examination

Introduction to Computer Vision (AIC-341)
(Subjective)

Time: 90 min
Total Marks: [70]

June 20, 2023

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Attempt all Questions!
Write to the point answers.

Q1. Consider the following Image segment to detect the corner in the image Using Harris Corner detection technique. **[30=5+10+10+5] [CLO: 2,4]**

2	3	3
3	5	5
4	4	6

a) Compute the derivatives using following differential kernel. (No need to Apply Normalization.)

d /dx

-1	0	1

d /dy

-1
0
1

b) Compute the Harris Matrix based on derivative matrices.

c) Calculate the Harris Corner Score using K=0.04.

d) What do we have here: a corner, an edge, a flat area? Justify your answer?

Q2. What is feature encoding? Explain any two techniques with examples. **[10] [CLO: 1,3]**

Q3. a) Given an image *I* and a filter f, after applying convolution operation, find the output of the following cells of the output image O. **[15] [CLO: 5]**

(i) Row: 3, Col: 1

(ii) Row: 4, Col:2

I

1	2	3	4	5
2	1	2	3	4
3	2	1	2	3
4	3	2	1	2
5	4	3	2	1

f

1	0	1
0	1	0
1	0	1

O

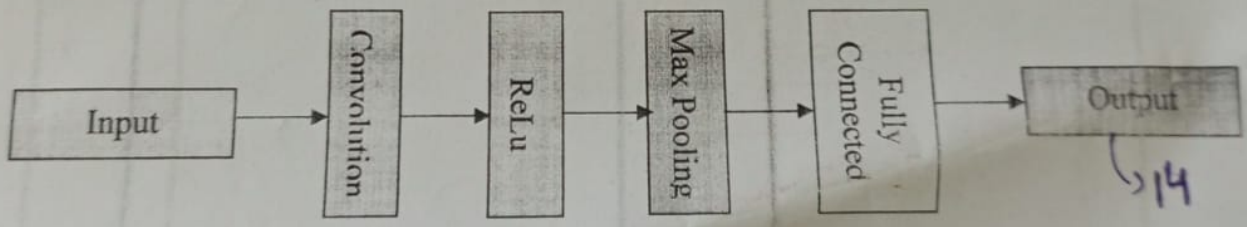
?7				
	?15			

b) Apply Deep learning Model-1 on an image *O* obtain in part a. **[15] [CLO: 5]**

Stride=2, **Pooling=3x3** and filter **f** give below. Show list of feature values/vote values at output layer.

f

0	0	0
0	2	0
0	0	0



Model-1