CS-4040/CS5132/CS6001

May 19, 2023

Final Exam
Total Time: 3 Hours
Total Marks: 100

Course Instructor

Prof. Dr Shahzad Sarfraz

Instructions:

1. Attempt all questions and share your working in **PDF as per the given order along with dataset generated during exam**.
2. The **exam is lab based** without discussion. On each discussion invigilator is authorized to recommend deduction of TEN Marks.
3. In case you shared any part of the answer with others; your exam will be cancelled.
4. **Use only your own devices such as Laptop, Computer, etc. If you do not have your own, then you are not allowed to get from others.**
5. Read the questions carefully for clarity of context and understanding of meaning and make assumptions wherever required, for neither the invigilator will address your queries, nor the teacher/examiner will come to the examination hall for any assistance.
6. **Mobile Phones/Smart Watches/Data Bundles devices are not allowed.**
7. Submit your working in **PDF** document. The document name must be like **Roll_No_Name_final.pdf**

	Q-1	Q-2	Q-3	Q-4	Q-5	Q-6	Total
Total Marks	25	20	15	20	10	10	**100**
Marks Obtained							

Vetted By: _____ **Signature:** _____

Q.1. You have been provided with the Satellite image named *Pathum_etm* and perform the following tasks on the above image. **(25 marks)**

i. Supervised classification on the satellite image (10)
   a) At least 6 classes and mention the classes names/types on the document before documenting the workflow.
   b) Should only use around 60% area for classification from the provided image.

ii. Export the output as vector data. (5)

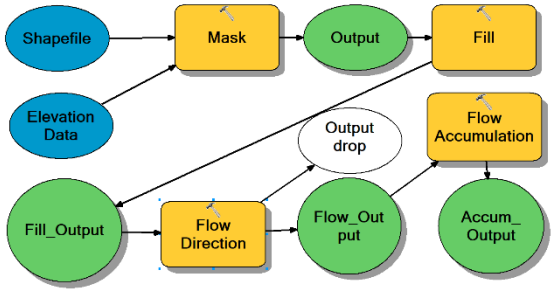
iii. Convert any Single Class into Google Earth readable file and save it into the folder. (5)

iv. Export the area of any class into CSV/DBF format. (5)

Q.2. Develop the following module in ArcMap based on the following inputs. **(20 marks)**

i. Input must be from the following district. (10)

District	Names Started From	District	Names Started From
Abbottabad	A to C	Khyber Agency	S to T
Bajaur Agency	D to F	Malakand P.a.	U to V
Batagram	G to I	Mardan	W to X
Buner	J to L	Mohmand Agency	Y to Z
Haripur	N to O	Muzaffarabad	M
Hattian	P to R		



ii. Calculate the Maximum Flow using the formula using the conditional operator. (5)

iii. Convert the output into Vector dataset and export the maximum flow as KML file. (5)

Q.3. You have been giving data in excel file named as *Students_Data.* Plot the student's data based on the following parameters. **(15 marks)**

i. Students online learning methods (assign suitable legends) (5)

ii. Export the layout of the map along Pakistan Shapefile. (10)

For BS Students Only

Q.4. Working on Vector Dataset **(20 marks)**

i. Convert and display the dataset of Iqbal Town based-on *Plot_size* field.

ii. Filter the plot size (using query) consists of 3 Marla OR I Kanal; reserved for Private School.

Q.5. Perform the IDW interpolation on the marks attribute used in **Q. No. 3**. **(10 marks)**

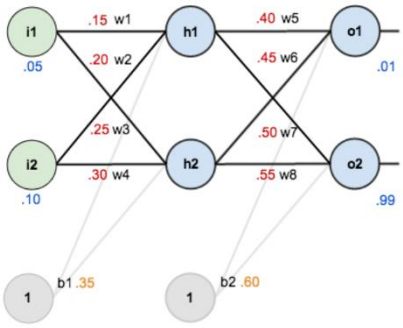
Q.6. Create any 5-10 new points in the above file and extract the values of these new points from the resulting image of IDW. Display the tabular values along existing values. **(10 marks)**

Submit your complete working/screenshots through PDF along with supporting files.

For MS/PhD Students Only

(This part shall be submitted on answer sheet)

Q.4. Look into the architecture, compute forward and backward passes for a single epoch, and mention the updated weights. Provide the complete mathematical process. The partially cooked answer will not be considered. **(20 marks)**



Two pages are required for the answer (front and back).

Q.5. Convolve the following image patch with the given 3*3 filter and produce the output image. Draw the complete steps. Partially cooked answers will not be considered. **(10 marks)**

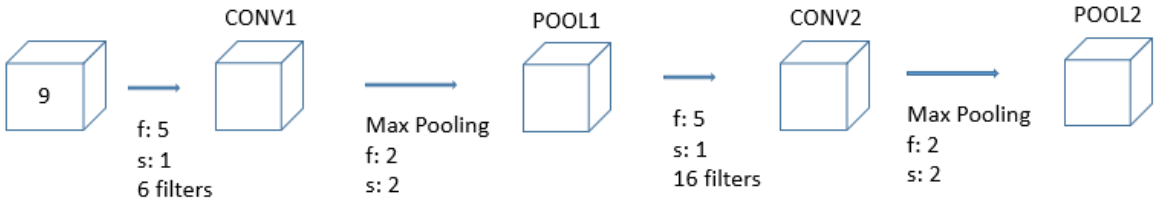
3	0	1	2	7	4
1	5	8	9	3	1
2	7	2	5	1	3
0	1	3	1	7	8
4	2	1	6	2	8
2	4	5	2	3	9

1	0	-1
1	0	-1
1	0	-1

A single Page is required for the answer.

Q.6. Compute the dimensions at each step where the image input size is 32 * 32 * 3. Partially cooked answers will not be considered. **(10 marks)**

A single Page is required for the answer.



Submit your complete working/screenshots through PDF along with supporting files.
MS/PhD students shall submit the above part on answer sheets.