Università degli Studi di Brescia,
Dipartimento di Ingegneria dell'Informazione

IMAGE DATA ANALYSIS

(***FEW EXAMPLES OF QUESTIONS** of the written test*)

Date: January 2023

Surname: _____ Name: _____ Matricola: _____

Select your answers to the following close response questions (USUALLY from 1 to 36) using the symbol 'X' (*Scores:* +1 *for each right answer;* 0 *for each no answer; up to* 0.5 *point less each wrong answer*),
For answers to open questions (AT LEAST two) use the available space for each answer (Scores for each answer range from 0 to 4 points),
The global score will be normalized as m/30 (thirtieths).

[Question 1] A geomtric error can result:

☐ from the effect of the atmosphere.
☐ from the wavelength dependence of solar radiation.
☐ from the curvature of the earth.

[Question 2] Ground Control Points (GCPs):

☐ are used for improving image quality.
☐ are use to establish a geometric relationship between remote sensing image and a correct map.
☐ are used to reduce the effects of instrumentation errors.

[Question 3] Principal Components decomposition:
☐ is a method for geometric correction.
☐ can be used for bandwidth compression.
☐ is not useful when data has a lot of spectral bands.

[Question 4] In the Bayesian Classification process, the Decision Surfaces:

☐ are obtained using a χ^2 distribution.
☐ are used to determine the a priori probabilities.
☐ are used to determine the class membership of a pixel.

[Question 5] "Slack variables" in SVM:

☐ can be adopted when the training set is reliable but the data are affected by noise.
☐ must be estimated for every training data even if the data is on the correct side of the hyperplane.
☐ determines an increased dimensionality of the data space thus improving class separability

[Question 6] In Machine and Deep Learning, hyperparameter selection:

☐ is a form of dimensionality reduction.
☐ is made during a cross-validation phase.
☐ is a way to reduce the model complexity.

[Question 7] In a multi class classification problem which loss is better to use:

☐ Cross-entropy loss
☐ MSE loss
☐ Dice loss

[Question 8] Which of the following do you typically see as you move to deeper layers in a ConvNet?

☐ nH and nW increases, while nC decreases
☐ nH and nW decrease, while nC increases
☐ nH and nW decreases, while nC also decreases

[Question 9] Three relevant data preprocessing/curation phases, especially in a medical image analysis context, are:

☐ data denoising, feature extraction, data annotation
☐ data anonymization, ethical approval, certification
☐ data selection, de-identification, data annotation

The space in this page can be used, if needed, to complete one or both the following open-answer questions.

[Question 10] EXAMPLE OF OPEN ANSWER QUESTION Describe and comment on all the ways you know for introducing spatial context awareness in pixel-wise parametric classification systems.