



**Friday 12 August 2022
14:00-16:00 BST
Duration: 2 hours
Additional time: 30 minutes
Timed exam – fixed start time**

DEGREES OF MSc, MSci, MEng, BEng, BSc, MA and MA (Social Sciences)

Computational Social Intelligence M COMPSCI5095

(Answer all 3 questions)

This examination paper is an open book, online assessment and is worth a total of 75 marks.

1. In Computational Social Intelligence, it is common to measure the relationship between two random variables.

- (a)** Explain what is the covariance between two random variables X and Y . The answer can include up to 1,000 words, any text beyond the first 1,000 words will not be considered.

[15 marks]

- (b)** Explain what is the correlation (also known as Pearson Correlation or Person Correlation Coefficient). The answer can include up to 1,000 words, any text beyond the first 1,000 words will not be considered.

[15 marks]

2. Multimodality is “communication via composite signals received through more than one sensory channels. We use the word “signal” [...] to refer to the entire set of communicative features [...] of an animal’s behavior that occur” (quoted from Partan and Marler, “Issues in the Classification of Multimodal Communication Signals”, *The American Naturalist*, 166(2), pp. 231-245, 2005).

- (a) Explain the most important aspects of multimodality. The answer can include up to 1,000 words, any text beyond the first 1,000 words will not be considered.

[15 marks]

- (b) Explain the difference between redundant and non-redundant signals. Provide an example of multimodal communication based on redundant signals and one example of multimodal communication based on non-redundant signals. The answer can include up to 1,000 words, any text beyond the first 1,000 words will not be considered.

[15 marks]

3. Please explain the most important aspects of one of the four experimental studies that have been presented during the course (please mention in the answer the study you have decided to present):

1. Synthetic impressions;
2. Speech and Personality;
3. Facial Expressions;
4. Nonverbal Behaviour in Phone Calls.

The answer can include up to 1,500 words, any text beyond the first 1,500 words will not be considered.

[15 marks]