

Calculators may be used in this examination provided they are not capable of being used to store alphabetical information other than hexadecimal numbers

UNIVERSITY OF BIRMINGHAM

School of Computer Science

Intelligent Interactive Systems

Main Summer Examinations 2023

Time allowed: 2 hours

[Answer all questions]

Note

Answer ALL questions. Each question will be marked out of 20. The paper will be marked out of 60, which will be rescaled to a mark out of 80.

Question 1

- (a) What are Markov Decision Processes (MDPs)? Illustrate your answer with an example of your own invention. **[6 marks]**
- (b) Propose MDP-based recommender systems for one, or more, healthcare interventions. Describe each element of the MDP definition. Describe how the parameters of the model could be determined and how it can be tested? **[6 marks]**
- (c) What are the pros and cons of MDP-based recommendation? How could it improve healthcare? What are the risks? **[8 marks]**

Question 2

- (a) What are the assumptions behind a Bayesian Spam Filter? **[6 marks]**
- (b) Illustrate a Bayesian Spam Filter using example messages/words and natural frequencies. **[6 marks]**
- (c) Critically analyse the role of decision theory in labelling a message as spam? **[8 marks]**

Question 3

- (a) Describe two ways in which sensorimotor noise affects how people interact with computers? **[6 marks]**
- (b) Propose an intelligent system that models the consequences of human sensorimotor noise and uses this model to predict behaviour in pointing tasks. **[6 marks]**
- (c) Critically analyse the role of models of humans in intelligent interaction. **[8 marks]**

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Do not complete the attendance slip, fill in the front of the answer book or turn over the question paper until you are told to do so

Important Reminders

- Coats/outwear should be placed in the designated area.
- Unauthorised materials (e.g. notes or Tippex) must be placed in the designated area.
- Check that you do not have any unauthorised materials with you (e.g. in your pockets, pencil case).
- Mobile phones and smart watches must be switched off and placed in the designated area or under your desk. They must not be left on your person or in your pockets.
- You are not permitted to use a mobile phone as a clock. If you have difficulty seeing a clock, please alert an Invigilator.
- You are not permitted to have writing on your hand, arm or other body part.
- Check that you do not have writing on your hand, arm or other body part – if you do, you must inform an Invigilator immediately
- Alert an Invigilator immediately if you find any unauthorised item upon you during the examination.

Any students found with non-permitted items upon their person during the examination, or who fail to comply with Examination rules may be subject to Student Conduct procedures.