



University
of Glasgow

Friday 6 May 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)

Mobile Human-Computer Interaction (H)
COMPSCI4068

(Answer All 3 Questions)

**This examination paper is an open book, online
assessment and is worth a total of 60 marks.**

1. The Google Pixel 4 smartphone had a feature called Motion Sense, which could detect hand movements in mid-air above the screen – for example, a swipe to the side would skip to the next song in a music playlist.
 - (a) The Motion Sense feature was not included in the Google Pixel 5 smartphone. Identify and discuss possible reasons that this feature might have been removed, drawing on your knowledge from across this course. [10]
 - (b) How could mid-air hand movements make it easier for users to interact with their smartphone while driving a car? [5]
 - (c) What interaction challenges might users experience when using mid-air hand movements for input while driving a car? [5]
2. A package delivery company would like to use Mixed Reality technology to improve their logistics operations: from the receipt of new goods, to picking and packaging items for delivery, to the final delivery of parcels to a customer's location. Warehouse operations are the core of their business, with employees routinely packing, storing, and picking goods for transit.
 - (a) Identify an appropriate Mixed Reality device that could be introduced to the warehouse usage context and explain how it could be used to help warehouse employees. You do not need to identify a real consumer device, but should instead focus on form factor, device capabilities, and necessary tracking requirements. Remember to justify your choices. [9]
 - (b) After deploying the Mixed Reality device described in your answer to part (a), work-related warehouse accidents increased significantly. Identify potential hazards that your MR device may have introduced and discuss how you could alter the design of the device (or its software) to mitigate those risks. [6]
 - (c) The logistics company want to determine if employee work performance has improved as a result of introducing the Mixed Reality technology to the workplace. Propose two workplace performance metrics that could be detected by the mixed reality device. Reflect on the ethical implications of using Mixed Reality technology to monitor employees in this way. [5]

- 3.** You have been hired by a company that provides a smartphone app that supports tourists in finding and discovering nearby landmarks and sights. The company want to port this application to a new smartwatch.
- a)** Discuss two potential interaction challenges that might be encountered when adapting their smartphone app to work on a smartwatch. Propose solutions to these problems. [4]
- b)** When exploring their holiday destination, the smartwatch app will deliver notifications to alert the user to nearby landmarks and points of interest.
- i) Propose two interaction techniques that would allow users to accept or dismiss those notifications.
 - ii) Identify the necessary sensing requirements for each technique.
 - iii) Discuss the strengths and weaknesses of those interaction techniques. [8]
- c)** If a suggestion notification is accepted by the user, the smartwatch should help them navigate to the landmark using an appropriate walking route. Propose one visual and one non-visual approach for presenting navigation instructions via the smartwatch. Explain why you chose each of those designs. [3]
- d)** Propose a user study to evaluate these navigation approaches. [5]