COMPUTER SCIENCE TRIPOS Part II – 2019 – Paper 9

10   Mobile and Sensor Systems (cm542)

A mobile phone software developer is programming her own behaviour tracking app and she wants to make it suitable for use in areas with intermittent and low bandwidth cellular connectivity.

(*a*) Explain the precautions the developer can take to make the app work well in this environment. Describe examples of mechanisms which can help with this.

[5 marks]

(*b*) The app uses various sensors to monitor user activity and its surrounding environment. In particular, it uses the microphone to monitor location ambience (surrounding sounds).   Describe a suitable machine learning approach and discuss system considerations. [6 marks]

(*c*) Describe how the developer can use location data to provide mobility prediction and how mutual information can improve the mobility prediction algorithm.

[4 marks]

(*d*) A very able user wants to test the app for privacy leaks before using it on their own phone. What techniques can be used? Illustrate each technique's specific purpose and the assumptions it is predicated on. [5 marks]