Student number:	2467273
Course title:	COMPSCI4014, Interactive Systems (H)
Questions answered:	ALL

Section B

a)

A potential problem with this system would be that there could be many errors in the gesture input made because of either system-specific limitations in perceiving/interpreting the gestures or users not being accustomed to this input method. Thus, I would take *method of input* as an independent variable (either remote-control or accelerometer) and *error rates* as a dependent variable to explore whether there is any difference. My null hypothesis would be: *There is no difference in error rates between remote-control television and gestural input control television*. I have some control variables, like the sitting environment and everything in it (chair height, distance to TV, time of day, etc), but other variables would be kept random, like participant right- or left-handedness, in order to increase external validity. These participants would be within-subjects to analyse more the way they switch to the new system, because, currently, the majority of TV input is by remote (physical or software in mobile devices), which means that most people using the new gestural system would be more experienced with TV remotes than anything similar to the new system. Thus, it would be beneficial to make this lab experiment a longitudinal study to measure how well participants learn to use the new system with time. All of the participants would be given consent forms explaining the nature of the experiment, any risks (including fatigue from prolonged use of the new system), explaining that they can withdraw from the experiment at any point and that their information will be kept anonymous.

To explore the hypothesis, error rates could be measured both by giving tasks to the participants and seeing completion times and rates, while also asking closed-ended questions to the participants during the experiment and in the end, using multiple choice answers on a Likert scale, e.g., "How would you agree or disagree with this statement? *There were times when the system did not navigate to where I wanted it to while using the new (gestural input) system*."

A potential confounding variable with any experiment involving this new system would be fatigue effects resulting from the new system involving more hand motion than usual, which could mean that participants get worse at tasks in the later stages of the experiment. This could be mitigated by ensuring that participants are given breaks between longer sessions of using the new system and ensuring that they are not hungry or dehydrated at any point of the experiment. These breaks could be varied based on participants' preferences because of varied rates of fatigue. Another way to reduce fatigue would be to ensure sessions of using the new system would be interchanged regularly with sessions of using a remote control to give time for the participants' bodies to relax and not over-exert themselves.

b)

One issue that is immediately recognisable is that “informed consent” is acquired only at the first launch of the app, which might mean that users are agreeing to something they have not experienced yet and do not have full knowledge of. Changes about initial the terms & conditions I would suggest would be to include them in the app store and also put a summary of it on first launch while also having access to the full T&Cs.

Another issue is the overabundance of information gathered. A change I would suggest is to either limit the types of information acquired when it’s relatively sensitive and potentially indirectly identifiable, like geographical locations, or ask users explicitly for consent to acquire each specific type of data (which modern apps already do). Additionally, interruptions could be put into the app at longer intervals to check that the users are aware of their data being logged and to re-inform them of their right to withdraw consent. The implementation of an easy mechanism to withdraw consent, like a simple button to press, instead of a more complex mechanism, like writing an email, would ensure that informed consent is kept as a high priority.

Another difficulty could be in the language of the T&Cs and other informed consent mechanisms, which could easily be solved by providing them in the languages of all of the countries, in whose app stores the app is released. Another possible solution to improve understanding of the terms would be to visualise the data being logged (which could help both native and non-native English speakers).

An additional issue could be with the CIA triad of data security because of constant logging of information. One solution to mitigate the risks of data theft could be to only store any data collected on users’ devices, which can then be sent to the researchers if they’ve agreed to their data being logged or deleted from the device otherwise.