SCC Undergraduate Ethics Form

1. Basic information

Name of Student: Beata Haracewiat **Student ID:** 34849726

Course: MSci Hons Computer Science (with Industrial Experience)

Name of Supervisor: Dr Emma Wilson

Project Title: Analysis of a pose matching solution for an interactive game

Aim(s) of the research project. The project aims to evaluate a pose matching system created for an interactive game and seek further improvements to its design.

In line with GDPR the lawful purpose of this research is for scientific research in accordance with safeguards. To see more information on data protection policy, go to:
https://www.lancaster.ac.uk/research/participate-in-research/data-protection-for-research-participants/

2. Proposed research methods and analysis

Overview
The pose estimation system presented in the research will be evaluated by assessing its accuracy in classifying a set of 6 poses used by the interactive game. For this purpose, 6 adult participants aged will be asked to follow a sequence of the poses in a predefined set of scenarios. This will be recorded with a depth camera and fed to a pose detection algorithm. The estimated pose data produced by the algorithm will be then used to produce the predicted labels for different pose matching solutions.

Data collection

A set of 6 subjects will be selected and asked to participate in the data collection phase. Each subject will be invited separately into the recording area and familiarized with the study.

Prior to starting the recordings, every study subject will be presented with 7 pose icons, 6 of which represent the poses used in the interactive and 1 illustrating an idle pose. The subject will be informed that these icons were used to form 6 sequences where the poses are randomized and each is separated by an idle pose to form the following pattern:

idle - <some pose> - idle - <some pose> - idle - <some pose> etc.

The last idle pose icon within each set will feature a yellow dot in the left top corner to signalize the end of a sequence. These will be used to direct the participant during the recordings. The purpose of having randomized sequences is to avoid the possibility of the participant memorizing the order of the poses and thus influencing the quality of their pose matching during subsequent recordings.

As part of the research, it is important that the study subjects are not shown the poses being mimicked by the study lead. The intent is such that they will base their interpretations of the poses purely on the 2D icons. This will provide an insight into how different people may interpret the same set of images.

Upon introducing the subject to the poses set, they will be informed about the set of scenarios in which they will be put. The scenarios are modelled to mimic different conditions which future players may represent and are as follows:

- The player wears a face covering [1]
- The player uses a wheelchair[2]
- The player wears culture appropriate attire[3]

As a control variable, a regular scenario is introduced to serve as a benchmark for the above-mentioned scenarios.

The camera used for this procedure is the Luxonis OAK-D. It provides the capacity of recording data via its three channels: the RGB (colour) channel and two mono (grey) side channels for the depth data. The camera will be placed at a height of 60 cm and angled at 30° as specified by the interactive attraction's requirements.

Upon recording each video, the output is placed into respective folders based on the participant's ID and the current scenario.

Data processing

The collected data is processed in the following manner:

1. The output (.h264 and .h265 files) are converted to .mp4 files.
2. The .mp4 files are passed through a pose detection model, BlazePose. For every video frame, the model produces a data object which contains the prediction score and the pose data.

[1] A face mask is used to provide face cover.
[2] The study participant is asked to sit on an office chair to mimic a wheelchair.
[3] The interactive attraction is intended for an UAE-based client, hence it is expected that the players may wear culture appropriate attire. The study participant gets to choose 1-2 outfits from a set of 4 outfits.

3. The produced data objects are store for each frame in a .csv file. Each entry is labelled with accordance to the file it relates to, e.g. subject1_scenario2_frame1.
4. Additionally, for every frame a new .jpg file is created. It contains the same RGB data as well as a render of the skeletal data produced by the pose detection algorithm.
5. Upon producing pose data for each video, all resulting .jpg files are analysed by the researcher and labelled to determine which of the 6 poses they feature. The labels are appended to the file's name by appending an underscore followed by the pose name. Any frames that show either an idle pose or feature moments right before or after entering any of the poses are discarded.
6. A further analysis on the quality of pose data is performed by analysing the rendered skeletal data on each of the retained frames. Shall the pose data be found to be inaccurate, the frame will be discarded.
7. The resulting set of data will be reflected by the .csv files to only contain the reimaging frames.
8. The video and image files will be deleted. Only the .csv data with anonymised file labels (e.g. subject1_scenario2_frame1_poseA) will be kept.

3. Information about Human Participants

The participants will be selected from the researcher's work environment. They are all adults aged between 20-40. A total of 6 participants will be recruited based on the subjects' availability.
An effort will be made to ensure a diversity of the selected group, where the study subjects will represent different genders and varying body types (tall, short etc.).

Does the research involve deception, trickery or other procedures that may contravene participants' informed consent, without timely and appropriate debriefing, or activities that cause stress, anxiety or involve physical contact?

No

Access to records of personal or other confidential information, including genetic or other biological information, concerning identifiable individuals, without their knowledge or consent?

No

Does the research project & associated experiments potentially risk the physical safety of yourself or the participants?

No

Does the research involve travel to areas where you might be at risk?

No

4. Information about non-human participants such as animals

The research does not involve animals.

5. Data handling

What type of data will be collected?

Video data in .h264 and .h265 format. This will be converted into .mp4 for easier playback and individual frames will be extracted into .jpg files to facilitate the process of data labelling.

How will this be stored?

The data will be stored on the researcher's personal computer and deleted once the processing stage is finished.

What steps will be taken to ensure the anonymity of the data collected?

The data will be labelled using the following pattern:

subject<x>_scenario<y>_frame<n>_label,

where each subject will be assigned an ID to avoid using the participant's name.

What steps will be taken to ensure the confidentiality of the data collected? State how individual identifying information will be removed, where the data will be stored and who will have access to the data.

The participants will be assigned ID numbers to avoid using their names or other identifying data. The collected videos and extracted frames will be stored securely on the researcher's personal computer and accessed by the researcher only. Upon processing the data by extracting pose information, the video and image files will be deleted. The pose data is

represented by a list of 3D vectors which describe the joints' positions and makes it impossible to track back to the human subject based on this information.

6. Please complete all sections by ringing the appropriate answer.

1. RISKS

Do any aspects of the study pose a possible risk to participants' physical well-being (e.g. use of substances such as alcohol or extreme situations such as sleep deprivation)?	Y	(N)
Are there any aspects of the study that participants might find embarrassing or be emotionally upsetting?	Y	(N)
Are there likely to be culturally sensitive issues (e.g. age, gender, ethnicity etc)?	Y	(N)
Does the study require access to confidential sources of information (e.g. medical, criminal, educational records etc.)?	Y	(N)
Might conducting the study expose the researcher to any risks (e.g. collecting data in potentially dangerous environments)?	Y	(N)
Does the intended research involve vulnerable groups (e.g. prisoners, children, older or disabled people, victims of crime etc.)	Y	(N)

2. DISCLOSURE

Does the study involve covert methods?	Y	(N)
Does the study involve the use of deception, either in the form of withholding essential information about the study or intentionally misinforming participants about aspects of the study.	Y	(N)

3. DEBRIEFING

Do the planned procedures include an opportunity for participants to ask questions and/or obtain general feedback about the study after they have concluded their part in it?	NA	(Y)	N

4. INFORMED PARTICIPATION/CONSENT

Will participants in the study be given accessible information outlining: a) the general purpose of the study, b) what participants will be expected to do c) individuals' right to refuse or withdraw at any time?		(Y)	N
Will participants have an opportunity to ask questions prior to		Y	N

agreeing to participate?			
Have appropriate authorities given their permission for participants to be recruited from or data collected on their premises (e.g. shop managers, head teachers, classroom lecturers)?		Y	N

5. ANONYMITY AND CONFIDENTIALITY

Is participation in the study anonymous?		Y	N
If anonymity has been promised, do the general procedures ensure that individuals cannot be identified indirectly (e.g. via other information that is taken)?		Y	N
Have participants been promised confidentiality?		Y	N
If confidentiality has been promised, do the procedures ensure that the information collected is truly confidential (e.g. that it will not be quoted verbatim)?		Y	N
Will data be stored in a secure place which is inaccessible to people other than the researcher?		Y	N
If participants' identities are being recorded, will the data be coded (to disguise identity) before computer data entry?		Y	N

7. SUMMARY OF ETHICAL CONCERNS

If any of the boxes below require ticks, more detail may be required to get ethical approval. If none of the boxes require ticks, then it is reasonable to expect approval.

If you have answered 'YES' to any of the questions in Section 1 (risks), please tick the box	
If you have answered 'YES' to any of the questions in Section 2 (Disclosure/covert methods), please tick the box	
If you have answered 'NO' to any of the questions in Section 3 (debriefing), please tick the box	
If you have answered 'NO' to any of the questions in Section 4 (consent), please tick the box	
If you have answered 'NO' to any of the questions in Section 5 (confidentiality), please tick the box	

8. Declaration

I confirm that this is an accurate record of the project to be undertaken.

Student signature Date

 27/05/2022

I confirm that I have read this proposal and agree that it is a clear and accurate assessment of the project to be undertaken. I have emailed a copy of this ethics form to the teaching office.

Project supervisor Date

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