CS4242 Machine Learning for Interactive Systems
Final Project Brief [DRAFT]

The Brief
Working in groups of 2 create an interactive system that uses machine learning. Your system should demonstrate your ability to choose a relevant supervised machine learning technique [classification, regression, dynamic time warping], and to train and run a model.
The system may be a game, a prototype for some commercial application, a piece of art, a system for performing experimental music with, a system that helps explain ML to a student, a critical artwork that serves as a provocation to consider the potential effects of AI and ML in society, etc.

Your system and the accompanying report should also demonstrate **your research and exploration of an idea or topic that you are interested in**. For example, if you are building a system to explore classification of hand gestures your report might present your research on different approaches to hand gesture recognition, existing commercial approaches, particular difficulties, new developments etc. If you are using faceOsc, your report might present your research on the ethics of facial recognition, the development and deployment of this technology etc.

n.b. students should form groups on Thursday 4th April and begin brainstorming their ideas. Students not in a group will be assigned to a group by the module leader, so don't worry if you aren't sure who to work with.

Deliverables: Each **<u>group</u>** must present:
1. An initial presentation of an idea [completed Thursday 4th April. Pdf or ppt emailed to Nicholas.ward@ul.ie]

2. A demo of their project, a 4 to 6 page report, and 1 minute video demonstration of the project.

Deadlines:
Initial Presentation: 4th April [prepared and presented in class, rapid fire]
Demonstration: Thursday 25th April, 11:00 Room CS1044.
Report and Video: Submit **via brightspace by** Wednesday 1st May 11pm.

Details [please read carefully]

Demo: Please setup your system in Room CS1044 on Thursday 25th at 11AM. You must be ready to present and also to listen to your classmates presentations from 11:15. Each group will present their work at their desk and answer any questions from classmates and faculty.

The report

Please use the attached template [acm_submission_template.doc] for your report. Do not alter the layout or fonts. Simply replace the text with your text. Remember to include your names at the top. Include diagrams and photos where appropriate.

Suggested Sections for your report include
1. An introduction summary of the idea and what you did
2. The results of your research on your topic e.g. an overview of the history of AI in games, a technical description of audio feature extraction techniques for ML etc.
3. A description of your development process.
   a. An overview of the system you wanted to build
   b. Choice of algorithm
   c. Training process, training data,
   d. Feature extraction. How did you choose features? What features?
   e. The development of the output, e.g. choice of sound and video, MAX or processing coding.
4. Conclusion and Future Work
   a. What was learned?
   b. What worked?
   c. What didn't work as planned and why didn't it?
   d. Future work: how might this be developed further.
5. References
   a. Include references for the sources you read for your research.
   b. Include references for the software you used [e.g. wekinator, processing, max]
   c. Your formatting should match those in the template. I tend to sue Zotero and the zotero word plugin to simplify this process.

Video: Please compress the video to 1080p H.264. I recommend using the free video compression software handbrake (handbrake.fr) with the "Fast 1080p 30" preset.

Grading Rubric
In assessing the work I am considering several qualities. Central to my evaluation is whether the student has critically thought about the algorithm they have chosen, the particular output, and the broader topic etc.

Secondly I am looking for development and ambition: Has the group created an initial simple minimum working system and then developed a more complicated version for example. Have they tried combining techniques such as DTW and classification, etc.

Thirdly, I want to see that the student has thought carefully about the features they are extracting from their system and can comment on the success of their model, i.e. has the training resulted in a model that is accurate, if not why not, how might it be improved. Why were the particular features chosen? In hindsight might better features be used.

Fourthly, I am interested in and will award marks for students' demonstration of self-directed development in any related necessary skills such as, electronics, max/msp programming, processing, Arduino, multimedia development (Audio recording and editing, video and image etc)

All of these qualities, or the lack of them, are demonstrated in your written report and presentation of the work.