# MSc in Artificial Intelligence

# AI Research and Development Projects Jan- April 2023

# Module Leader: Dr Maria Luisa Davila Garcia

# GROUP PROJECT PROPOSAL

**Date:23/01/2024**

| **Names of Students in Group** | **Student Number** |
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| **1.Danylo Krywyj** | **c0010969** |
| **2. Reece Wareham** | **c0024660** |
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1. **Group Number:** 5
2. **Group name:** The Fall Guys
3. **Title of Project**: Fall detection from video footage.
4. **Description of the Project** *(Give a brief overview of the project):*

Fall detection is a critical aspect of healthcare, particularly for older adults and those with mobility issues. Falls are the leading cause of injury-related death among older adults and are a major cause of hospitalisation and long-term care. Fall detection systems use various technologies such as sensors and machine learning algorithms to detect when a fall has occurred and send an alert to a caretaker or emergency services. This can greatly improve response times and ultimately save lives. Additionally, fall detection systems can also provide valuable data on fall patterns and risk factors, which can be used to prevent future falls and improve overall health outcomes.

The goal of this project is to create a machine learning algorithm that has the capability to detect a person falling from video footage. In the project, we will mainly be focusing on detecting people falling forward due to this being the most common type of fall in older adults and it also keeps the project from becoming too complex. We can add extra types of falls in future if time allows it. Also due to the fact that a large suitable dataset does not exist in this field, a secondary goal is to create a suitable dataset usable for training machine learning models.

1. **Project Aims** (*List the aims of the project, what you are going to deliver, not how you are going to do it).*

The aims of this project are as follows:

* Gather video footage data for use in a dataset. This includes both training and testing data.
* Properly annotate and label the dataset and prepare it for machine learning algorithms. This includes creating skeletons for people in the videos and labelling whether they are falling or not.
* Evaluate and compare different machine learning models and identify the best performing model at predicting whether or not a person has fallen.
* Experiment with implementing machine learning models to predict falls in real time. This includes experimenting with integrating camera systems with the model.

1. **Project Deliverable** (*Describe the final deliverable):*

The final deliverable for this project will be a dataset containing a variety of different videos of people falling over which can be used to train machine learning models and also a machine learning algorithm capable of identifying falls from video footage will be delivered. This machine learning algorithm should also be able to predict a fall in real time using camera systems. The main focus of the algorithm will be to identify people falling forwards as previously mentioned in the project description.

1. **Software/ Hardware Needed** (*List all software the group will need):*

The software and hardware that will be needed for this project are as follows:

* Trello (For project management)
* Github (For version control)
* Python (Main programming language used for this project)
* Python Libraries (Scikit Learn, Matplotlib, Numpy etc.)
* Virtual Machine (For training our model)

1. **Technical skills** (*List any new technical skills the group will need to have in order to complete the project): python knowledge, computer vision and machine learning*

* Project Management Skills (Trello, GitHub)
* Python Knowledge
* Machine Learning Knowledge
* Computer Vision Knowledge
* Research Skills
* Dataset Research
* Cloud Computing Skills (Virtual Machine)

1. **Notes:**