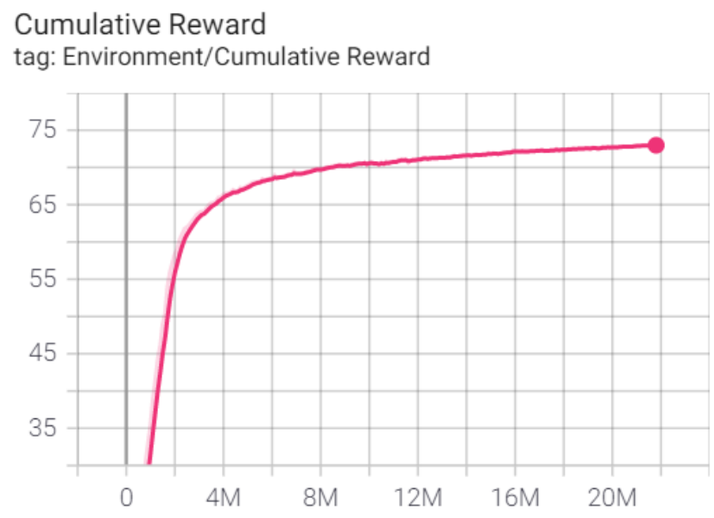
NANYANG TECHNOLOGICAL UNIVERSITY
SINGAPORE

School of Computer Science and Engineering
College of Engineering

Deep Learning in Virtual Reality

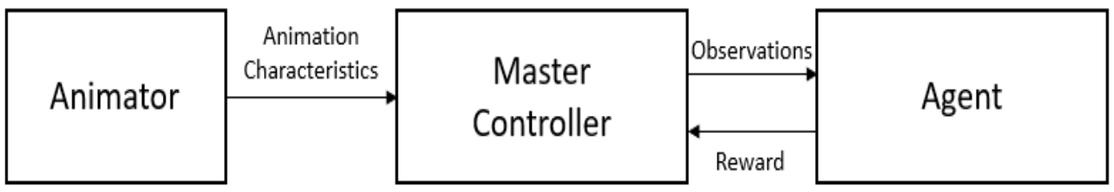
Student: Feng Chengxuan **Supervisor: Dr Lin Feng**



Project Objectives:

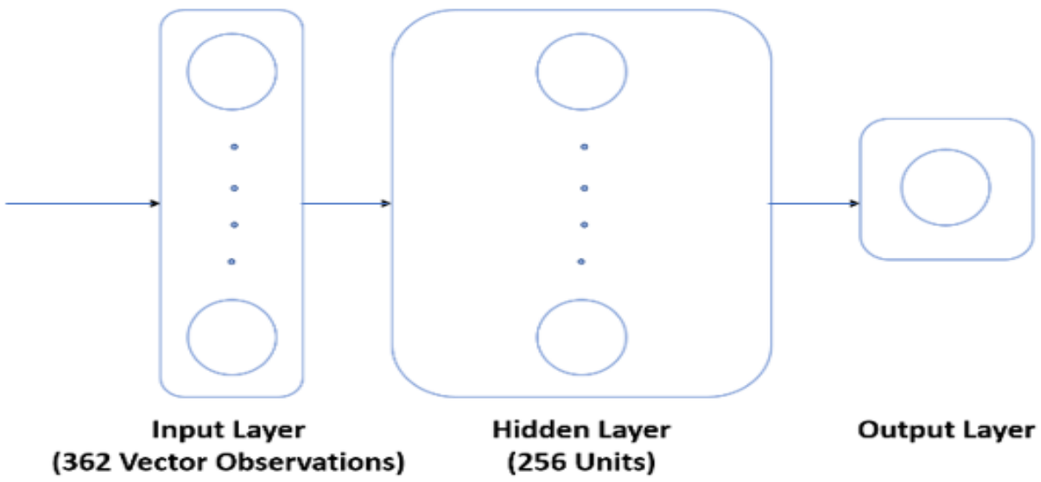
This project aims to integrate reinforcement deep learning with VR to produce a golf environment targeted at patients with shoulder arthritis. It should be able to replicate the user's movement and provide feedback to the user. This should allow the user to review the performance after the set of movements have been executed. To achieve this goal, this project simulates a golf environment where the humanoid agent imitates the golf swing animation of the humanoid trainer that is supposed to represent the user's movement.

Character Controller



- **Animator:** Obtain characteristics of trainer e.g. velocity, position, rotation and angular for every body part
- **Master Controller:** Calculates the offset between the agent's and trainer's characteristics
- **Agent:** Observations are used by agent to compute Reward

Training with Proximal Policy Optimization (PPO)



PPO uses a neural network to approximate the ideal function that maps an agent's observations to the best action an agent can take in each state