**Introduction**

Learning and acquisition of new sports skills are often achieved at the cost of requiring a flexible schedule and finding the right coach that best fits the users’ needs. Therefore, the proposed system namely the Metaverse Virtual Sport aims to enable users of different levels of sports to learn and practice their skills through AI coach and AR imagery visualisation techniques at their convenience. The proposed system will further allow the users to obtain feedback from the AI coach, practice and participate in certain sports [with limitations in some sports ] with anyone around the world, share their experiences with others, and track their progress and performances to further improve their existing sports skills. In addition, the proposed system can improve the cognitive performance of the users by providing different scenarios and challenges of sports and allowing repetitions. Furthermore, studies have identified that exergaming (exercise and gaming) can improve the self-efficacy and health of the users (Wu et al., 2022). To illustrate this, the scope of the proposed system along with its assumptions are then discussed below:

**Scope of the System**

The proposed system will require users to set up an account with Metaverse Virtual Sport. When a user opens the application, they will be presented with options to sign up or log in. The sign-up process will require the users to introduce their personal information relevant to the application such as date of birth, height, and weight. The user will then be prompted to create a username if they are not a first-time user or enter it if otherwise. The first-time user will also be asked to create a password which follows specific rules. The users will then be required to agree with the Terms and Conditions as well as be in compliance with the general code of conduct whilst engaging with the services. The data will also be stored and protected in accordance with the data protection and privacy laws of the corresponding countries to prevent security bridges by unwanted parties. Once signed up, the users will then be given an introductory tour of how the application works and they will also be presented with options for the type of sports that they wish to learn and the learning method that works best for them. The users will also be asked for their current level of sports skills so that the system can better accommodate their needs and provide a more personalised experience. Below is the summary of the user requirements:

* **Account set-up**
* **Terms and conditions** (Code of Conduct & Data Policy and privacy)
* **Orientation** (Quickdemonstration of how the application works)
* **Sports and learning methods options**

The proposed system will utilise the use of computer vision and machine learning models to analyse the user’s environment and recognise the body gestures and movements in real time. This will help the users measure their performance after a session and thus, keep track of their progress. The system will further enhance the user’s experience by displaying 3D content that they have to engage or bypass as well as simulating actions on the field in AR i.e., showing the path of the ball, displaying the speed or accuracy of a movement of a physical body or an object. Below is the summary of the hardware requirements to enable the detection, tracking, and analysis of any movement in the environment:

* **Augmented reality (AR) glasses**
* **LIDAR sensor** (image and movement scanner)
* **Watch** (biomarkers tracker for health measurement)

The proposed system will then collect data on the user’s health information and sports performance. The statistics will be displayed on a user’s home dashboard to allow a better understanding of their progress. Machine learning models will be generated based on the data gathered from professional players to learn the optimised ways of learning and techniques which will then be used to provide suggestions to a user on possible diets and different techniques for improvement in sports performance. In addition, the user will be given a demonstration and guidance on the best technique to do sports by an AI coach based on the recommendations of the machine-learning models and thus, will have an opportunity to practice this towards perfection via repetitions.

* **Statistics dashboard**
* **Machine learning models**
* **Coaching**

The proposed system will also allow users to connect with others who can be anywhere around the world. This will enhance their social groups and allow them to share their experiences with each other. While connecting to anyone around the world may not be possible for all kinds of sports, some sports will have mini-games and challenges which can help the users to train their accuracy and cognitive performance. Therefore, there will be a ranking system available to encourage healthy competition between the users.

* **Ranking system**
* **Multi-player option**
* **Social groups**