**CSE 541 Computer Vision**

**Section 1**

**Group 8**

**Project Number 7: Identification of lower extremity injuries from jump-landings videos: A Deep Learning Approach**

**Weekly Report 7**

**Problem Statement**

Competitive sports demand rapid high-intensity movements requiring exceptional physical

fitness, stamina and flexibility. Prolonged high-intensity repetitive exercises and asymmetric

postures increase the risk of injuries in athletes. This increased risk is attributed to altered or

reduced neuromuscular control during sports movements, leading to changes in lower limb joint

mechanics, including motions and loads. Landing is one such frequent movement in a sport

like basketball.

**Progress**

Till now, we have prepared our training dataset images having proper error values and class associated with it. In order to train and test the images extracted from jump landing videos, activity recognition based models are required. There are various such models which perform the task. One such model is the OpenPose model. OpenPose is a powerful tool for real-time multi-person pose estimation, capable of detecting key points on the human body, including those involved in jump-landing movements. By analyzing these points, OpenPose can help identify errors in jump-landing images, such as improper landing techniques or biomechanical issues. However, it's important to note that OpenPose primarily focuses on pose estimation and may not directly classify errors without additional training or integration with a classification model. For specific error detection, a custom model trained on labeled jump-landing images with identified errors could be developed, leveraging the pose data from OpenPose as input features. This approach combines the strengths of OpenPose for pose estimation with machine learning techniques for error classification, potentially offering a robust solution for analyzing jump-landing videos for injury prevention and biomechanical analysis.

Another such model is PoseNet. PoseNet, a real-time pose estimation model, can be utilized to detect errors in jump-landing images by identifying key body parts and their positions. However, it primarily focuses on pose estimation rather than error classification. For specific error detection, integrating PoseNet with a classification model trained on labeled jump-landing images could enhance its ability to identify errors. This approach combines the strengths of PoseNet for pose estimation with machine learning for error classification, potentially offering a robust solution for analyzing jump-landing videos for injury prevention and biomechanical analysis.

MoveNet is a lightweight deep learning model designed by Google for detecting human poses in images or videos. It can be used to extract body key points from jump landing images, which can then serve as input features for classifying potential errors or injury risks associated with the landing technique, such as stance width and lateral flexion.

We are yet exploring models and we would select one such that it aligns with our goals and the type of dataset we have.