Adapting 3D Markerless Pose Estimation (OpenCap) to Wider Use

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OpenCap, developed by the Stanford Neuromuscular Biomechanics Lab, is an open-source software project aimed at providing a comprehensive solution for capturing and analyzing human motion data. The project's core component, OpenCap Core, is designed to be a flexible and extensible platform that can be integrated with various motion capture systems and data processing tools.

OpenCap uses the cameras of two or more IOS-based devices to produce 3D motion capture. Opencap employs OpenPose, an AI-based, markerless 2D pose estimation software with open access. OpenCap is presently only compatible with IOS devices.
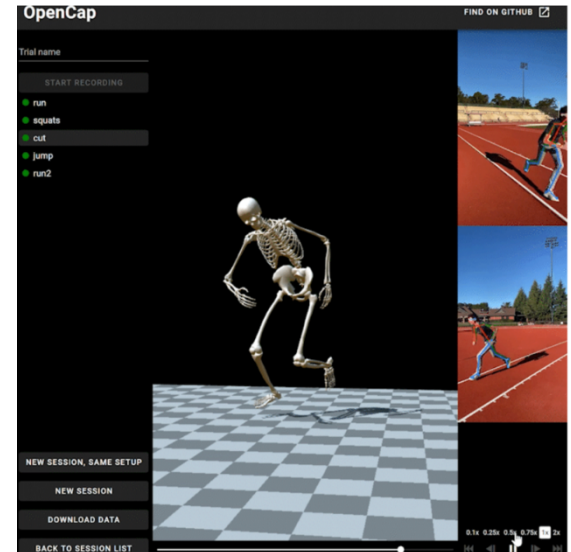
The "fisheye" effect is a common characteristic of many action cameras, including GoPro. This effect is a result of the wide-angle lens used in these cameras, which typically have a field of view (FOV) of up to 170 degrees. This wide FOV allows the camera to capture a large portion of the scene in front of it, which is particularly useful for action sports and other situations where you want to capture as much of the environment as possible.

However, the downside of this wide FOV is that it can cause distortion around the edges of the image, making straight lines appear curved. This is known as the "fish-eye" effect, because it resembles the view you would get from a fish-eye lens, which is a type of ultra wide-angle lens. GoPro cameras often come with different FOV settings, such as "Wide", "Medium", and "Narrow". These settings allow you to choose how much of the fish-eye effect you want in your footage. Additionally, GoPro also provides software that can help correct the fish-eye distortion post-production.

We seek to adapt OpenCap to GoPro to assist our surfers from the IQFoil team in video analysis.

Possible extension:
Replacing the current calibration of the cameras, from a chess board to be more generic.
Extending to web cams.

Links:
OpenCap project - https://github.com/stanfordnmbl/opencap-core
https://www.biorxiv.org/content/10.1101/2022.07.07.499061v1
IQFoil - https://www.iqfoilclassofficial.org/
https://www.mako.co.il/news-sport/sports_others-2023_q1/Article-a78600a1cb19681026.htm