"Perform Pose Estimation using Computer Vision"

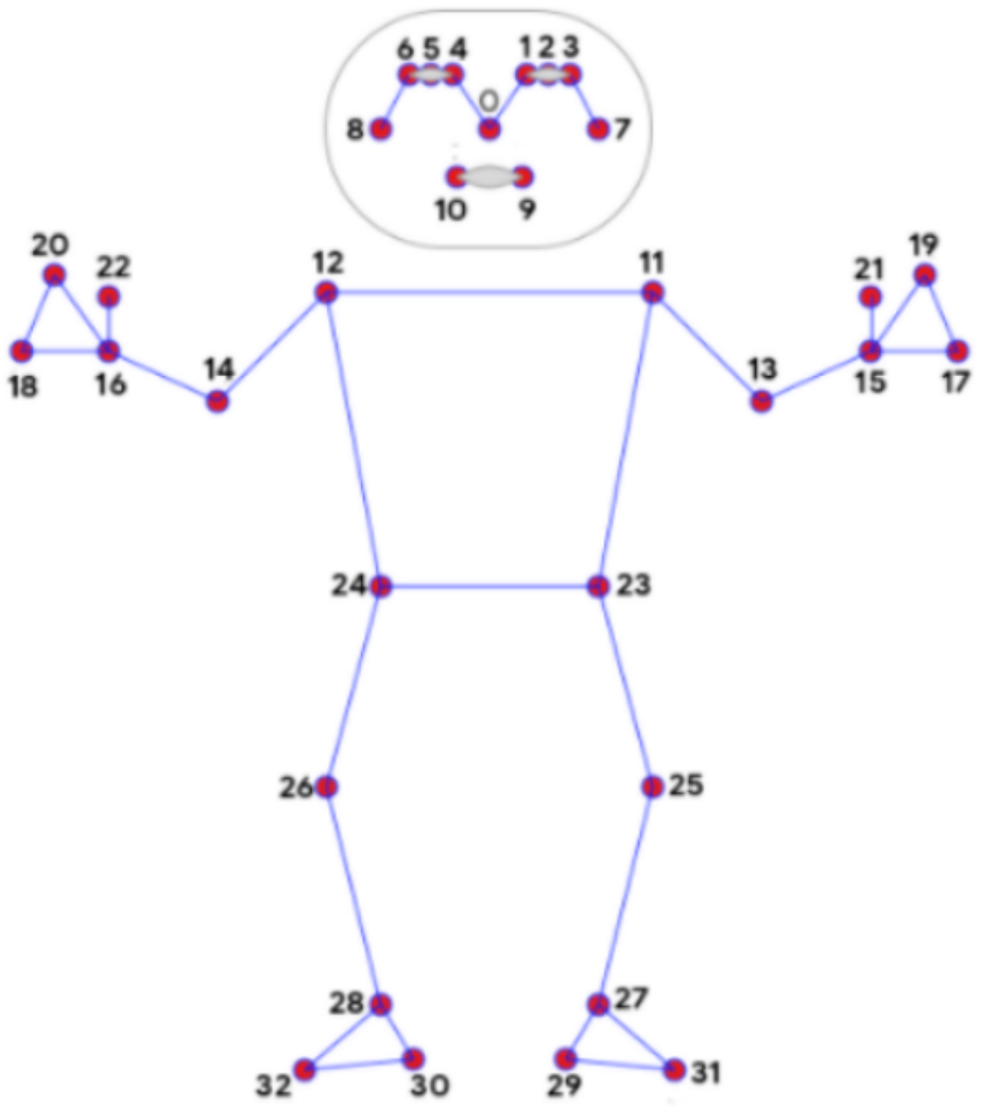
Pose estimation is a popular task in Computer Vision. As a field of Artificial Intelligence (AI), computer vision enables machines to perform image processing tasks with the aim of imitating human vision.

POSE ESTIMATION

Human pose estimation and tracking is a computer vision task that includes detecting, associating, and tracking se3mantic key points. Examples of semantic key points are "right shoulders", "left knees" or the "left brake lights of vehicles".

The performance of semantic key point tracking in live video footage requires high computational resources what has been limiting the accuracy of pose estimation. With the latest advances, new applications with real-time requirements become possible, such as self-driving cars and last-mile delivery robots.`

Today, the most powerful image processing models are based on convolutional neural networks (CNNs). Hence, state-of-the-art methods are typically based on designing the CNN architecture tailored particularly for human pose inference.



Bottom-up VS Top-down methods:-

All approaches for pose estimation can be grouped into bottom-up and top-down methods.

- Bottom-up methods estimate each body joint first and then group them to form a unique pose. Bottom-up methods were pioneered with DeepCut.
- Top-down methods run a person detector first and estimate body joints within the detected bounding boxes.

Importance of Pose Estimation

In traditional object detection, people are only perceived as a bounding box (a square). By performing pose detection and pose tracking, computers can develop an understanding of human body language. However, conventional pose tracking methods are neither fast enough nor robust enough to occlusions to be viable.

High-performing real-time pose detection and tracking will drive some of the biggest trends in computer vision. For example, tracking the human pose in real-time will enable computers to develop a finer-grained and more natural understanding of human behavior.

This will have a big impact on various fields, for example, in autonomous driving. Today, the majority of self-driving car accidents are caused by "robotics" driving, where the self-driving vehicle conducts an allowed but unexpected stop, and a human driver crashes into the self-driving car. With real-time human pose detection and tracking, the computers are able to understand and predict pedestrian behavior much better – allowing more natural driving.