POSE ESTIMATION FOR FITNESS AND PHYSICAL THERAPY APPLICATION

KNOWLEDGE BRIX

HEALTH CARE

Client:

The client is a startup based in the United States that specializes in human activity monitoring and motion analysis. They have a smartphone app for tracking and estimating human body movements during exercises and physical therapy. The software has tracking features that assist users in exercising properly and achieving their fitness objectives.

The client sought help from Knowledge Brix on the subject of human pose estimate in real-time because open-source methods for mobile posture estimation didn't seem to work for them. It's also worth noting that there were previously no common solutions for error detection and counting repeats.

Challenge:

The client sought to incorporate AI into their app. They have trouble estimating human body poses.

The client wished to expand their fitness app to include real-time error detection during exercises and physical therapy sessions.

Knowledge Brix took on the challenge of building a robust posture estimate and error detection system.

KB Solution:

Significant progress has been achieved in estimating posture, the problem of identifying human activities in real-life environments remains unsolved. The challenge becomes considerably more difficult when approaching this work from a smartphone in real-time.

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KB team used deep learning algorithms designed for complex computer vision problems to detect human joints in motion in real-time. To achieve competitive joint detection quality, KB data engineers had to create a whole new neural network technology.

KB team began by bringing together a variety of free datasets for various types of human posture estimates. In addition, KB data engineers had to create our data augmentation algorithms to expand the dataset even more.

KB team constructed an upgraded human skeleton model with new important points after dealing with the datasets.

The next stage was to design a neural architecture for efficient pose estimation. KB team concentrated on improving operational efficiency and minimizing load time because the client was concerned about the performance of the mobile app.

KB data engineers used PyTorch to create a streamlined training pipeline for the customer, and CoreML models for deep learning and CV models that we constructed.

It's worth mentioning that we had to create custom algorithms for error detection and counting repetitions. It is done so that users of the mobile app may obtain immediate feedback via an audio interface with a virtual AI coach.

Knowledge Brix used its deep learning and computer vision expertise to provide the client with an AI-driven solution. Our experience with mobile neural networks and deep learning enabled us to complete the human activity recognition challenge in a relatively short amount of time, although deep learning methodologies take months to complete.