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Paper Title: 2D Ultra Light-weight Infant Pose Estimation with Single Branch Network

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Abstract

The 2D and 3D pose estimation methods have now improved well in general performance but have not yet been emphasized in terms of speed and efficiency for the infant dataset and the non-existence of public data on infants is a significant challenge. Furthermore, clinical studies related to the analysis of the pose and movements of infants are attracting considerable attention. That motivated us to collect infant data and develop a lighter model for estimating infant poses that can run on edge devices and CPUs. Most current methods are characterized by complex structures and multiple parallel branches of inference to synthesize pose estimated results. We aim to propose a new definition of the single-branch model be refined the architecture of the pose estimation algorithm based on an approach of OpenPose-2016, for use on edge devices and training that model on 2D images. The proposed simplified model is designed to estimate infant pose with a size of 4.09 million parameters and complexity of 8.97 giga floating point operations per second (GFLOPs), allowing it to run at approximately 23 frames per second on a Core i5-10400f. The proposed methodology demonstrates compact dimensions while achieving superior performance compared to existing methods on the same self-collected infant dataset.