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BlazePose-Assisted Frontal Gait Video Analysis: An Efficient Alternative for Biomechanical Assessment and Early Disease Detection

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The study of human gait offers invaluable insights into biomechanics and has become an essential tool for the early detection of potential diseases (e.g., stroke, Parkinson's disease), post-operative prognosis, and more. However, current methods in gait analysis consume substantial costs, including machine expenses, labor costs, spatial limitations, and time consumption. The issues like above pose challenges for medical professionals and patients, hindering the benefits of gait analysis. Therefore, there is a need for gait analysis methods that can address these cost issues. Among various gait analysis techniques, gait video analysis can solve the cost problem, but the current gait analysis method requires manual analysis by skilled experts, leading to issues of human cost and normalization. Additionally, collecting sagittal gait videos can be complex unless performed by a professional. In this study, we propose frontal gait video analysis to alleviate the challenges of getting lateral gait videos and the complexities of video analysis. In this study, we use BlazePose to analyze gait videos. We utilized a total of 100 frontal and sagittal gait videos captured by a smartphone camera installed at a height of 1 meter. BlazePose was used to estimate the pose of objects in the walking videos to obtain joint data. We get the range of motion from the key point data during walking and analyze. We conduct a comparative analysis between sagittal and frontal gait to verify the reliability of frontal gait analysis. The frontal gait analysis can extract relevant features such as step length, step time, and step speed, just as effectively as the side gait analysis. It was also capable of calculating the asymmetry of the gait pattern.