

Pitching-Motion: Pose-Based Pitch Trajectory Overlay System

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Abstract—This study reviews the current practical use of the electronic strike zone in baseball, which typically features a fixed high-low strike zone. This system deviates from the baseball rules, which dictate that the strike zone should be adjusted according to the batter's shoulder, waist, and knee positions. Consequently, This study proposes a system based on commonly used baseball game camera perspectives. Using YOLO-Pose technology, it automatically detects players' body structures. It combines them with the baseball nine-grid positioning principle to promptly establish a strike zone that complies with baseball rules and player positions. The accuracy of this system, as measured by the Intersection over Union (IoU) metric, is 0.8541, representing a 14.29% improvement over the current electronic strike zone's IoU metric of 0.7473. Considering both viewers' perspective and sports analysis requirements, the system integrates an automated pitch trajectory detection system. It can overlay multiple pitch trajectories, allowing for a visual comparison of their differences. Combined with the strike zone detection system proposed in this study, it provides a more comprehensive view of the overlap between pitch trajectories and the strike zone. This study aims to enhance baseball officiating and analysis by introducing a more accurate and visually informative system for determining the strike zone and analyzing pitch trajectories..

Keyword—Pose estimation, Sports video, Ball Trajectory, Kalman Filter, Position measurement



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