“Eagle-Eye”
Legality Analysis of Bowling Action in Cricket Using Deep Learning

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Abstract

Cricket in present day has a major concern of identifying the legality of a bowler's bowling action. Due to the complexity of the bowling arm's biomechanical movement, the umpire on-field is unable to determine the legality of the bowling action. The state-of-the-art method for determining the legality of their action is using inertial sensors. The legality of the bowling action is a crucial aspect of a cricket player's career. To do a clearance test with existing sensor-based systems is costly and time-consuming due to resource scarcity.

Further to thorough analysis and research, this study introduces the Eagle-Eye system for analyzing bowling action in cricket. The Eagle-Eye system calculates the bowler's elbow extension in order to determine whether the action is legal or illegal. 3D human pose estimation, Detectron2 object detection, and a mathematical approach have been used to measure the bowler's elbow extension in order to determine if the action is legal or not. Both the mathematical approach and the system for calculating angles had been tested and evaluated.

Keywords: Bowling Action Analysis; Cricket; Bowler; Deep Learning; Human Pose Estimation; 3D Analysis; Inertial sensors; Classification; Computer Vision.