

Real-Time Feedback System for Cricket Shot Defect Detection for Left-Handed Players Using Deep Learning Model

Gagana chiranjitha* and Piyumi Wijerathna

Department of Information and Communication Technology, Faculty of Technology, University of Ruhuna, Karagoda Uyangoda, Kamburupitiya, Matara, Sri Lanka.

*gaganachiranjithacoc2@gmail.com

Abstract

Cricket is a popular global sport that has many disciplines within it like batting, balling, and fielding. The batsman plays a prominent role and over the history game has produced many great batters. This research is focused on the innovative real-time cricket shot classification and feedback system for left-handed batsmen. The suggested methodology aims to address the gap in professional training availability and cost-effective tools for technical improvement for non-professional players. It mainly focuses on three basic cricket strokes: front foot defense, back foot defense, and cover drive, distinguishing between correct and incorrect executions. The model embeds into a feedback system that can accurately classify the correct or incorrect posture of these three shots while giving immediate feedback if the player is playing a wrong shot by calculating the angles between key points using algorithms. This method assists beginners by improving their skills on these 3 shots. The research involved creating a completely new data set of 58 left-handed players across different age groups. This completely new data set consists of 1,960 videos, 490 per shot category, with correct and incorrect shots captured from multiple angles from the offside of the batsman. A 2D convolutional neural network (CNN) was developed for shot classification with the Nadam optimizer. The model demonstrates exceptional performance by achieving 97% accuracy on the test data set. Specifically, the system exhibited low error rates with a 9.7% overall false positive rate and 1.04% overall false negative rate. Further to that backfoot defense classification resulted in a 0.00% false negative rate, a 2.45% false negative for cover drive shot, and a 0.99% defensive false negative rate was demonstrated. Future work on this would involve extending the system to increase the number of cricket shots analyzed and enhancing the dataset to make the classification broader and more accurate.

Keywords: Cricket, Cricket Shot Classification, Real-time Feedback, Machine Learning, CNN