



## Title: Video-Based Baseball Pitch Type Recognition

### Abstract

Unlike many other sectors in the society, the professional sports industry is driving technical innovations. Team owners, managers, and players recognize the huge value of technology for improving athlete performance, game officiating, as well as helping fans to better enjoy the games. A good example is the US major league baseball. In this talk, I report a preliminary study on video-based pitch type recognition using deep learning. To facilitate the study, we first developed a semi-automated way of building datasets based on publicly available video and pitch information for MLB games. For pitch type recognition, we used the two-stream inflated 3D convolutional neural network (I3D). To improve the state-of-the-art of research, we trained and tuned the I3D model extensively, primarily combating the problem of overfitting while still trying to improve final validation accuracy. We are able to achieve an accuracy of 53.43% +/- 3.04% when oversampling and 57.10% +/- 2.99% when not oversampling, which is a significant improvement over the published best result of an accuracy of 36.4% on the same six pitch type classes.

### Bio

Wenbing Zhao received his Ph.D. in Electrical and Computer Engineering at University of California, Santa Barbara, in 2002. Dr. Zhao has a Bachelor of Science degree in Physics in 1990, and a Master of Science degree in Physics in 1993, both at Peking University, Beijing, China. Dr. Zhao also received a Master of Science degree in Electrical and Computer Engineering in 1998 at University of California, Santa Barbara. Dr. Zhao joined Cleveland State University (CSU) faculty in 2004 and is currently a Professor in the Department of Electrical Engineering and Computer Science (EECS) at CSU. Dr. Zhao published over 200 peer-reviewed papers in the area of distributed systems (three of them won the best paper award), smart and connected health, computer vision, machine learning, physics, and education. Dr. Zhao's research is supported in part by the US National Science Foundation, the US Department of Energy, the US Department of Transportation, Ohio State Bureau of Workers' Compensation, Ohio Department of Higher Education, and by Cleveland State University. Dr. Zhao is currently serving on the organizing committee and the technical program committee for numerous international conferences. He is an Associate Editor for IEEE Access and for MDPI Computers. Dr. Zhao is a senior member of IEEE.