KINATRAX, iMERIT BRING GAME-WINNING COMPUTER VISION SOLUTION

The world of sport has integrated technology into nearly every aspect of its existence, spanning audience engagement and stadium upgrades off the pitch, as well as player performance optimization on it. Data and analytics are increasingly used by teams and players across sports to spot patterns and identify opportunities. A fast-growing sports analytics startup in this space, KinaTrax, develops a markerless motion capture system used by Major League Baseball (MLB) teams to measure players' performance, fatigue, and monitor for risks of injury.

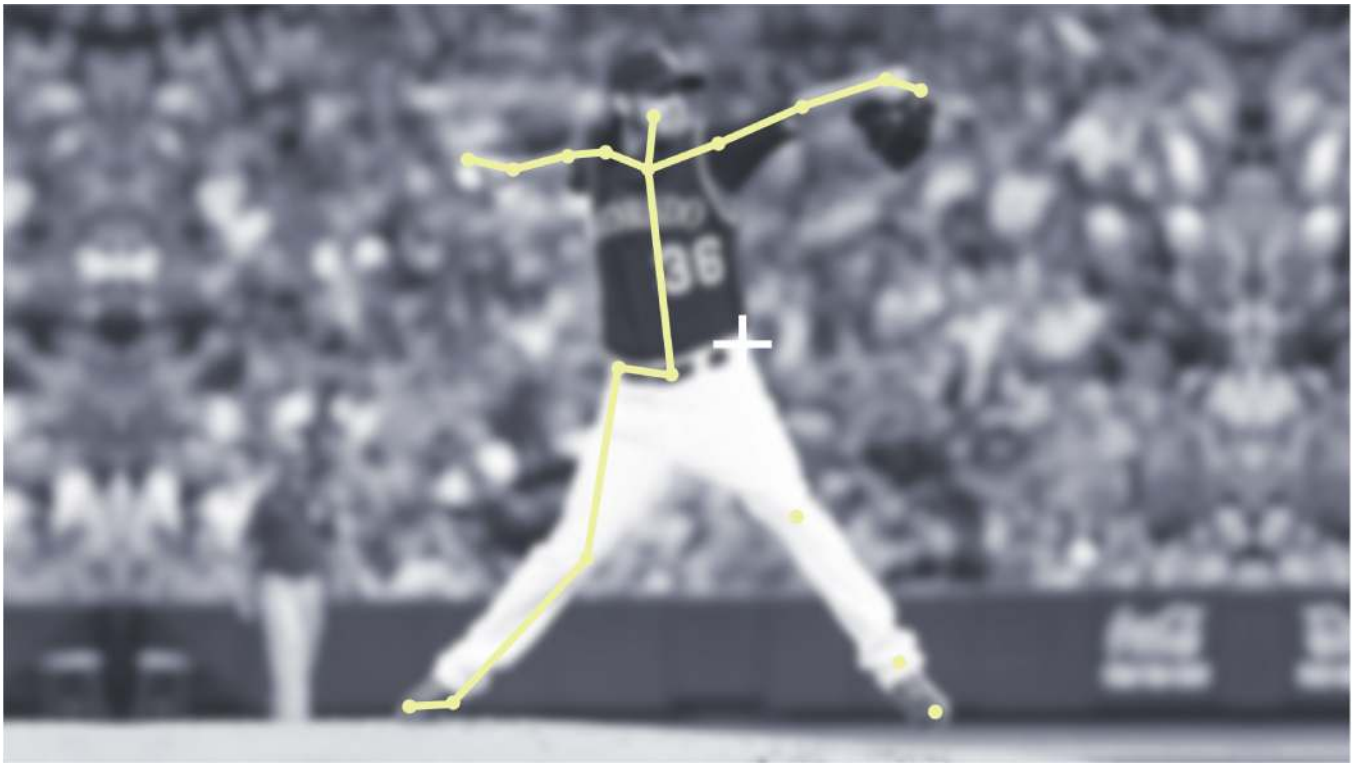
> "iMerit's data annotation services are fundamental to our work at KinaTrax, enabling us to build accurate models for hundreds of MLB pitchers and turn these models into actionable insights. We look forward to working with iMerit for seasons to come!"
>
> **Steven Cadavid** President, KinaTrax

THE CHALLENGE

KinaTrax's state-of-the-art technology enables precise 3D location and bone segment orientation, both indoors and outdoors. Using in-game footage of players captured from twelve different cameras, KinaTrax built Machine Learning computer vision algorithms capable of analyzing the movements of MLB pitchers. MLB teams then use the analyses to make decisions about player health, performance, and safety, and make the necessary adjustments to optimize player mechanics and performance. In order to build these algorithms, the KinaTrax team needed to precisely and accurately label the position of the players' joints over hundreds of moments of the footage gathered from cameras recording the activity on the pitch from a variety of angles.

THE SOLUTION

iMerit has developed a customized end-to-end workflow for its engagement with KinaTrax, leveraging its proprietary tools and technology as well the expertise of its experienced Computer Vision teams. The process begins when the gametime videos and the list of pitchers to focus on are validated based on the data and guidelines provided, thereby preparing the datasets for production. iMerit's expert labelers extract still images from in-game video footage of the players captured from numerous angles. The images are annotated precisely based on KinaTrax's requirements. The joints on the body are marked using keypoints that are then connected to each other to build a 3D model of the movement. Each pose is also studied from all relevant angles to give a complete picture of the player in action. This frame-by-frame reconstruction allows KinaTrax to train its system to understand and analyze the movements of pitchers. The quality of the labeled data is measured based on well-defined benchmarks. The labeled images are then fed into KinaTrax's systems for ongoing analysis and distribution to MLB teams.



THE RESULTS

iMerit teams created accurate 3D models for over 300 MLB pitchers, across 60,000 pitches and 6,000,000 frames. These models are used as the foundation for ongoing in-game analysis by KinaTrax. The engagement has also been expanded to include analysis of batter performance, including the work that KinaTrax has been doing in partnership with batting facilities. KinaTrax's studies are focused on better understanding baseball, batting, pitching and injury risk.

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