

**A study on statistical human joint models  
with application to the long-distance running.**

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We study the problem of modeling and analyzing the human movement data. A study on the human movement is very important roles in the fields of sports/health management, physical therapy, robotics and any other research. Most effective measurement instrument for the human movement analysis is motion capture system. Motion capture system is able to observe the precise measurements of spatial locations. In the sports analysis, it requires to seek the optimal movements (e.g. running speed, steady movement, minimize the fatigue etc...) based on the athletes individuality. However, previous researches, based on the motion capture systems, were only focused on general optimal movement, it does not based on the athlete's movement individuality. In this research, we propose the optimal movement estimation method based on the human joint model using motion capture system's 3-dimensional coordinate data. Finally, we apply our proposed method to the long-distance running form analysis, focusing on the athlete's movement individuality.

**Key Words:** Human joint model, Sports analysis, Long-distance running analysis, Motion capture system