Biomechanics: The Machine Inside

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As computers become cheaper and powerful, biomechanical modelling has become very popular in the past decade. Computer models in biomechanics can be traditionally subdivided into two groups: multi-body models and numerical models. Multibody musculoskeletal models are capable of predicting muscle forces and joint contact pressures simultaneously. On the other hand numerical models are used for multiscale flow modeling, blood flow propagation, boundary conditions, fluid-solid coupling in biomechanics.

Nowadays combining multi-body biomechanical modelling with robotics and computer sciences has opened a new door for creating biomechanical simulator for the human musculoskeletal system. The simulation and animation of human movement is a difficult problem in many respects. Comprehensive solutions must seek to refine and integrate knowledge from biomechanics, robotics, control, and animation. Models for human motion must also meet a high standard, given our familiarity with what the results should look like. Biomechanics, robotics and animation research share a number of common aims and problems with respect to understanding and modeling the motor control of human movement.

They approach these problems from different angles. Biomechanics research focuses on biological accuracy and detail, robotics focuses on building skillful machines and animation focuses on developing virtual humans. This presentation is an overview of relevant results in the area of biomechanics, robotics and animation.