Simulation of Intelligent Robot in Boxing Exercises Based on Kinect Sensor

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SUBJECT AREAS

Robotics

KEYWORDS

taijiquan, motion mechanics analysis, intelligent robot, motion simulation, human-computer interaction, Kinect Sensor

Abstract

In the continuous development process, robot technology has been widely used in aerospace, medical, education and service industries, and the relationship between robots and humans is getting closer.The improvement of robot intelligence is a process of continuously learning outside knowledge.Since the introduction of human-computer interaction technology in 1959, it has provided more and more technical support for human research robots.This paper first takes Taijiquan as an example, and carries out mechanical analysis and deconstruction of its standard Taiji pusher action, and obtains corresponding action parameterization information;Then, based on the human-computer interaction technology, the human body depth image and the skeleton structure are acquired through the Kinect sensor, and the human joint position data is recorded.The coordinate conversion is sent to the Nao robot, which realizes the imitation learning of the robot's push action on the Taiji.

Full Text

Due to technical limitations, full-text HTML conversion of this manuscript could not be completed. However, the manuscript can be downloaded and accessed as a PDF.

Figures

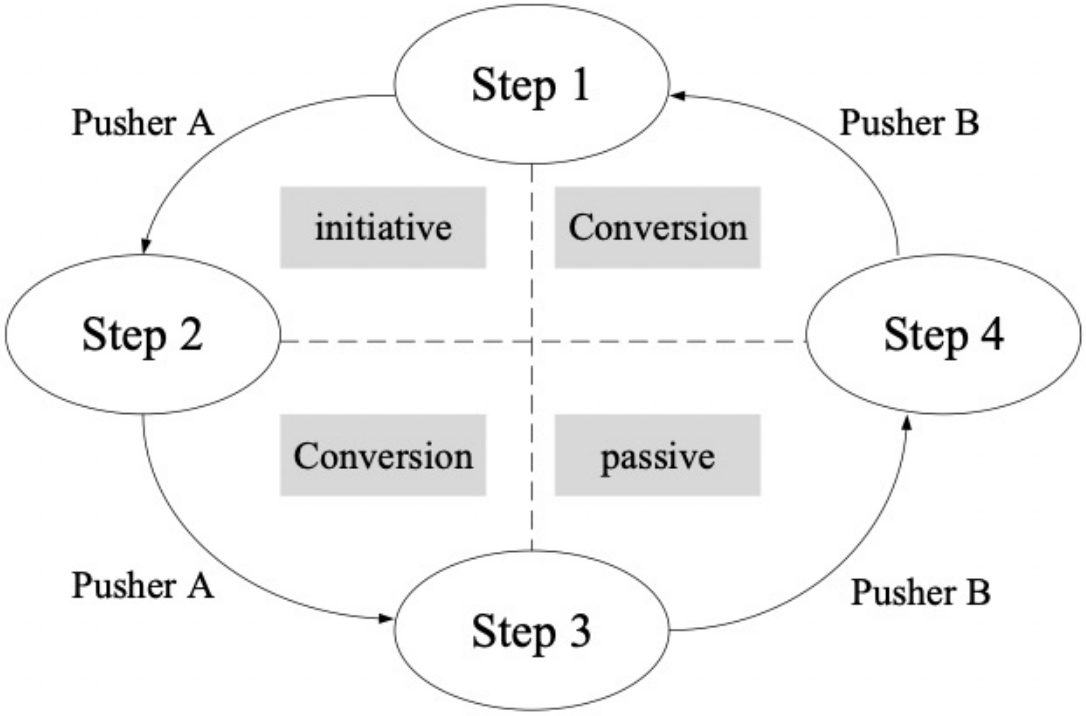


Figure 1

Division of the stage of the pusher

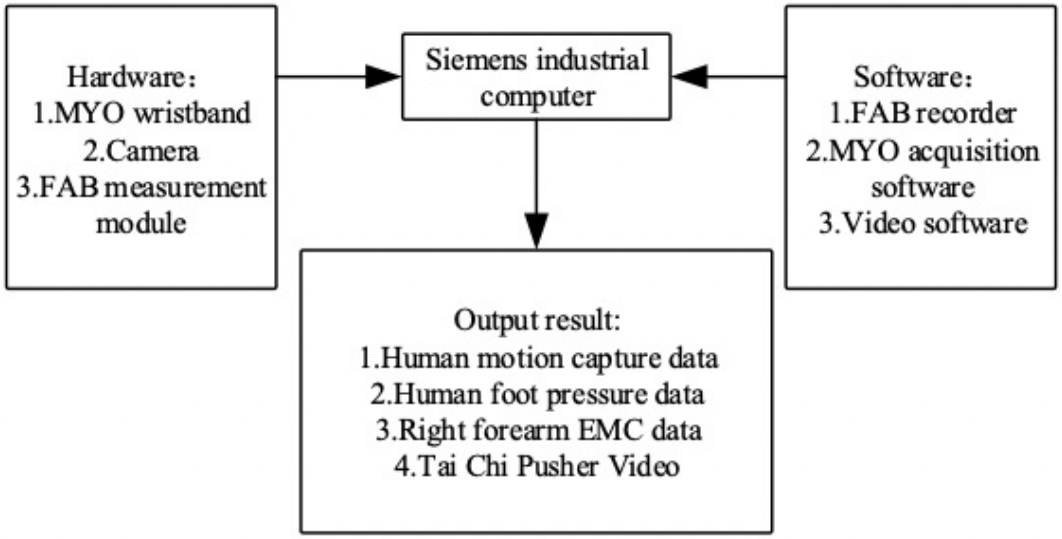


Figure 2

Measurement process

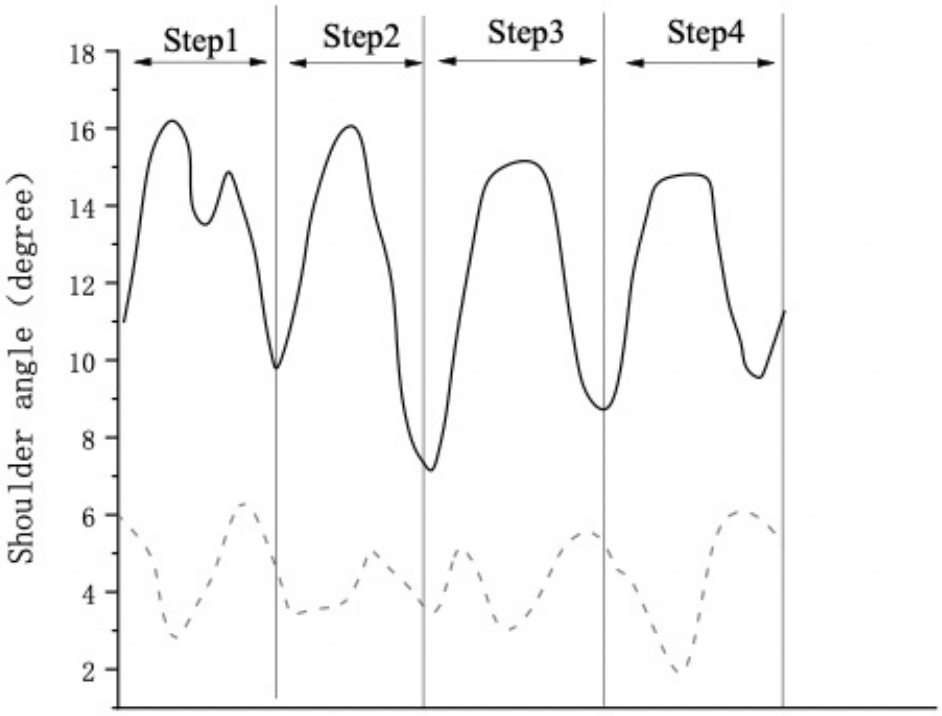


Figure 3

Curve of shoulder movement

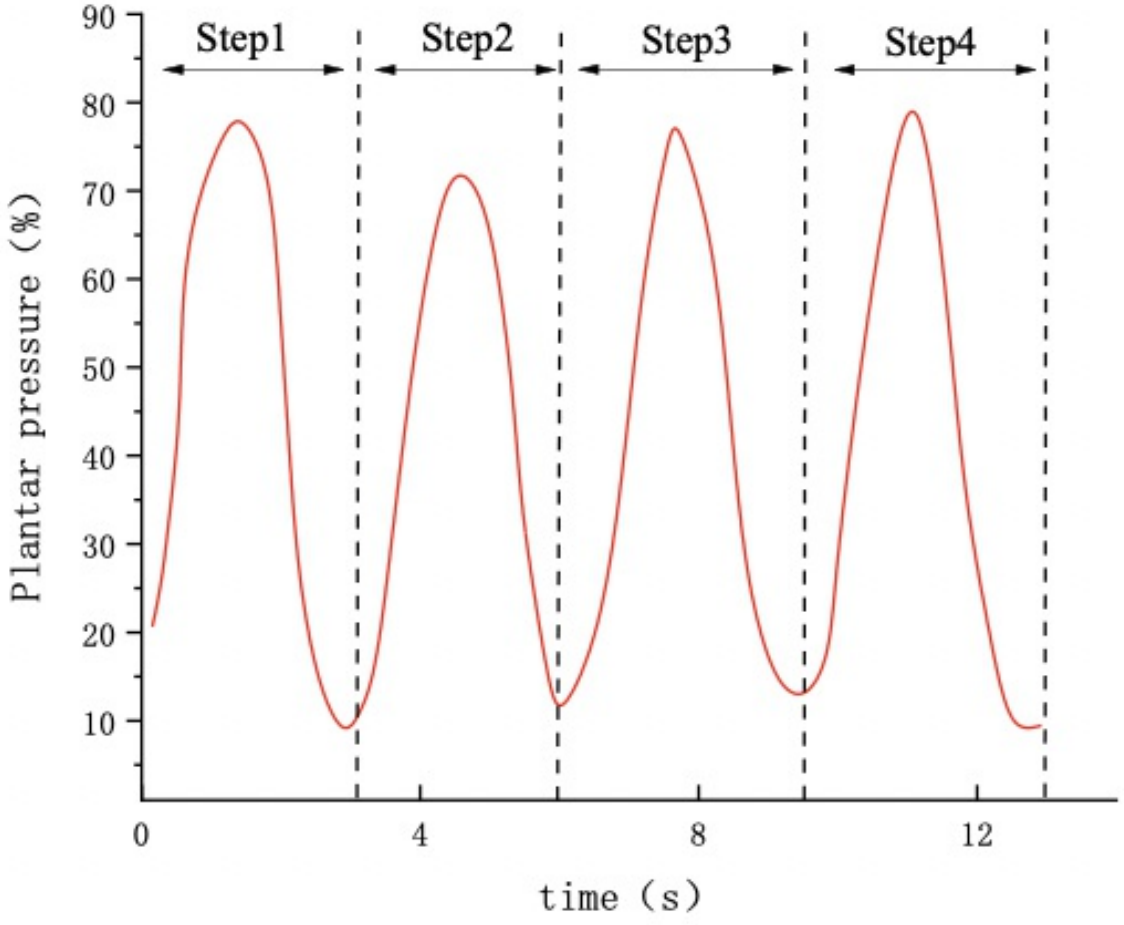


Figure 4

Curve of plantar pressure

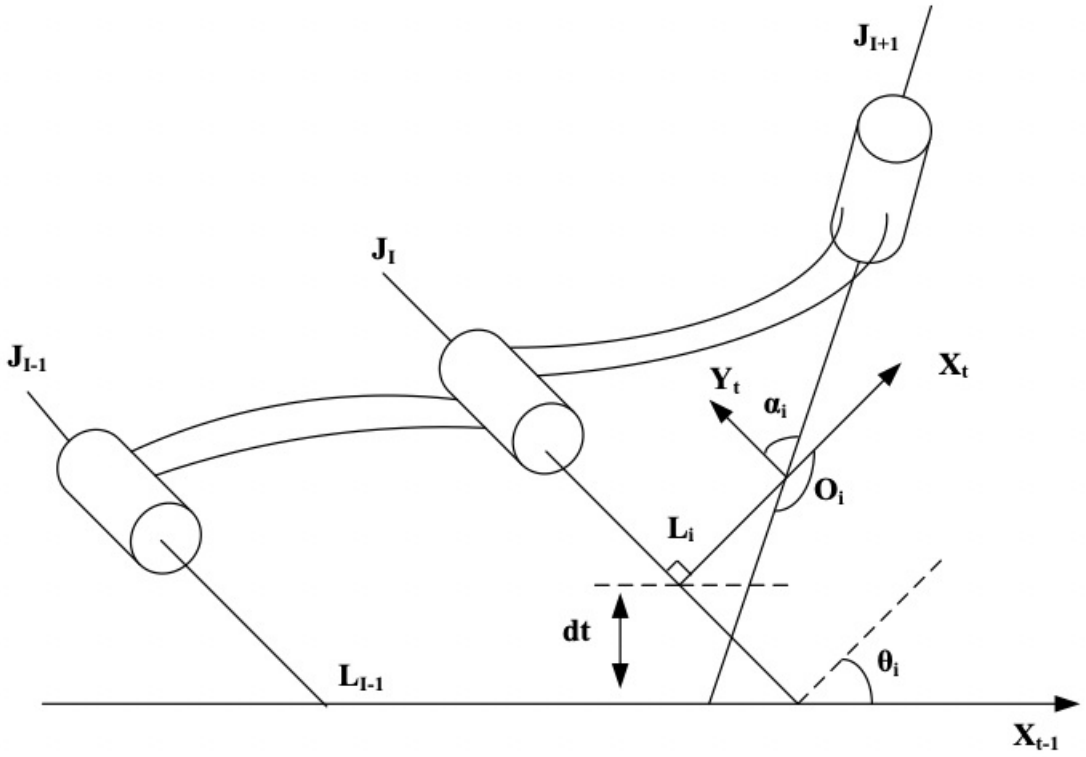


Figure 5

DH method linkage coordinates

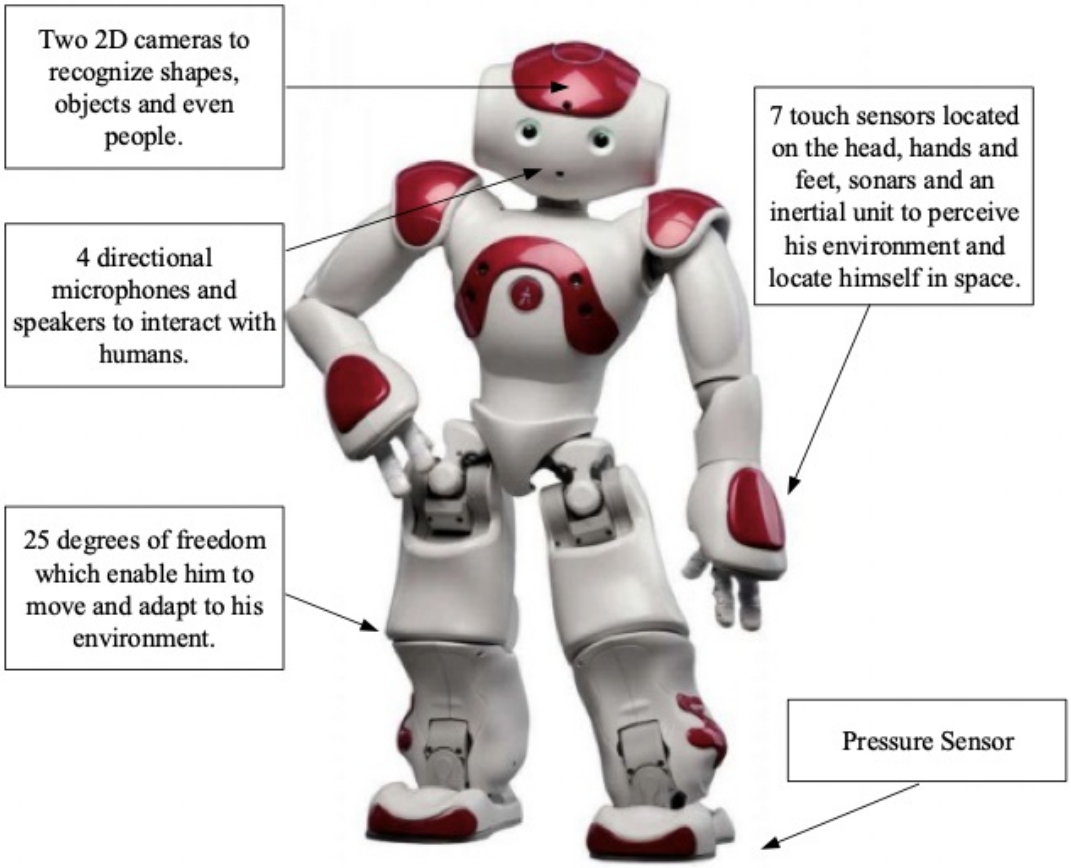


Figure 6

NAO robot structure

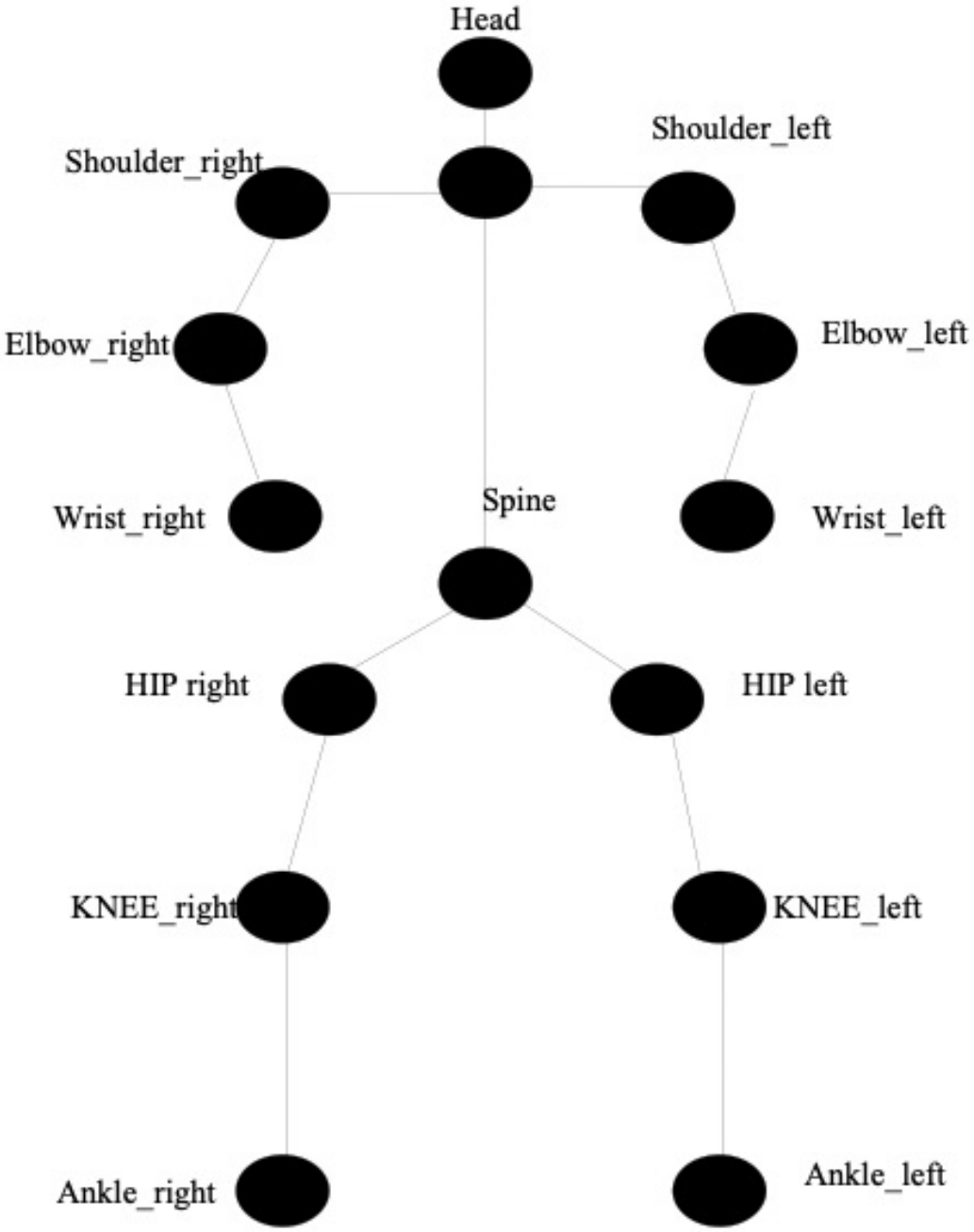
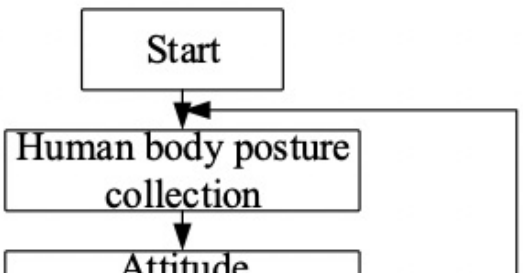


Figure 7

Human Skeletal Architecture



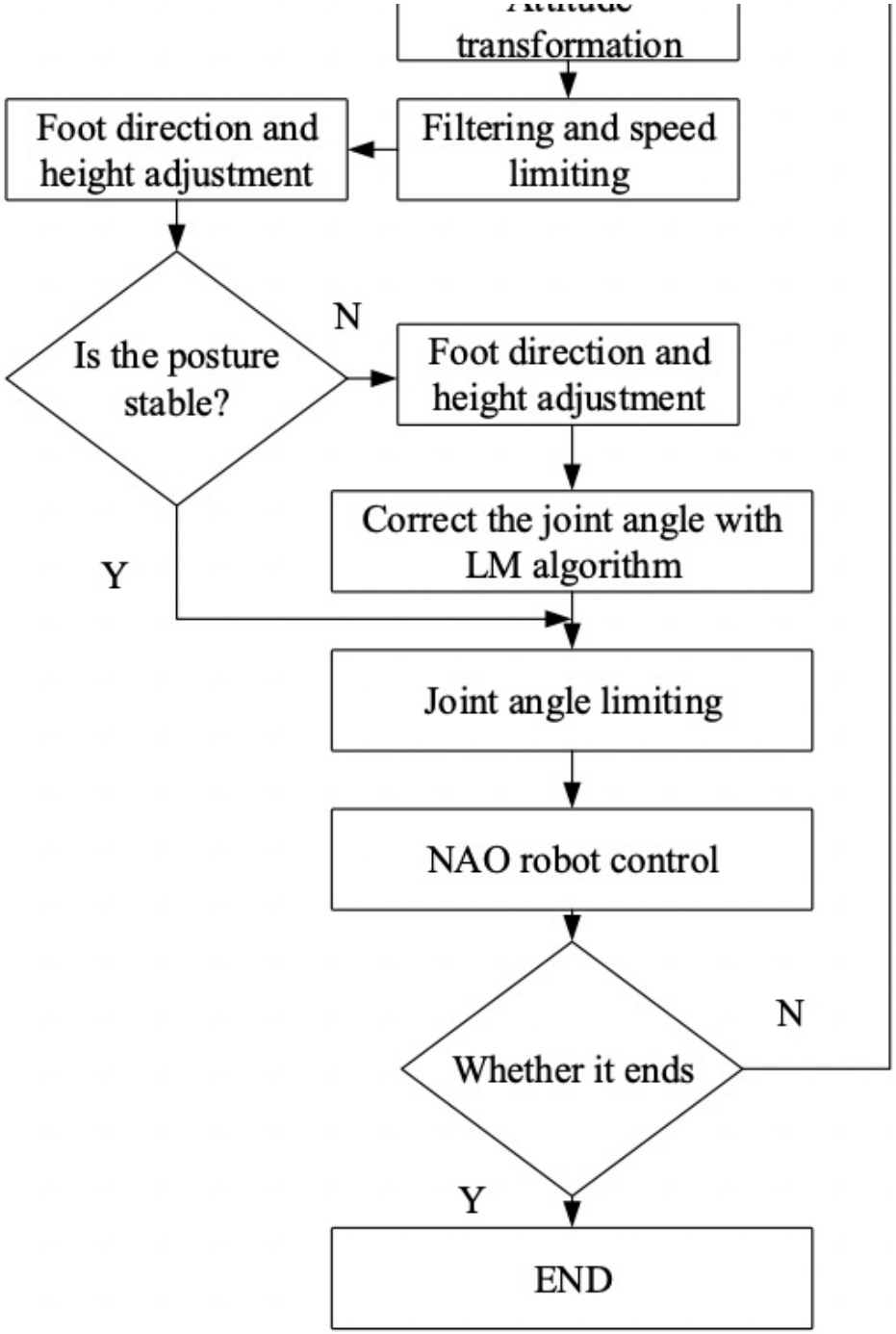


Figure 8

NAO robot action simulation process

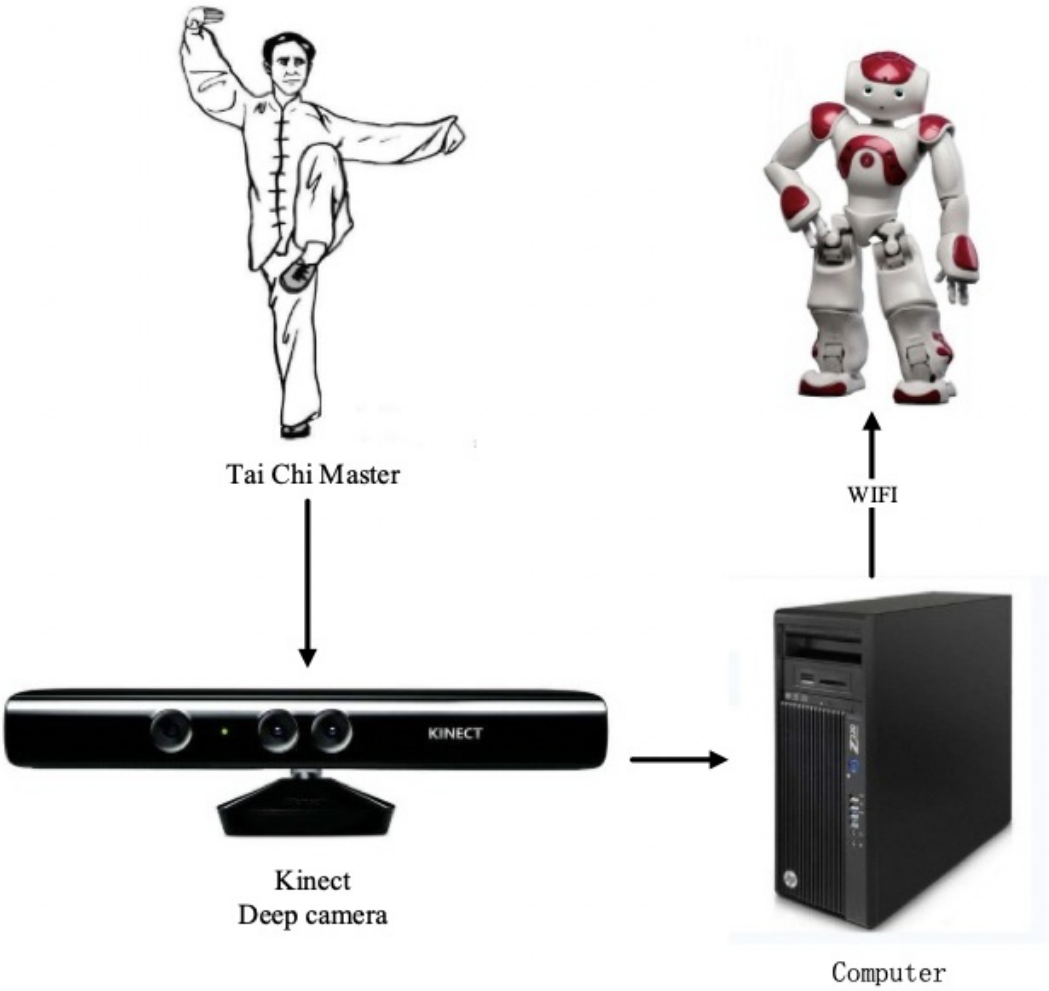


Figure 9

Posture simulation system framework