Static Balancing Control of Small-Size Humanoid Robot

A small-size humanoid robot with 24 degree-of-freedom is design and implemented and a static balancing control method is proposed so that the humanoid robot can stand and balance on a plane. A 3-axis accelerometer is installed on the humanoid robot to obtain the x-axis, y-axis, and z-axis accelerations of the robot. Based on the obtained information from the 3-axis accelerometer, a system structure with two two-input-and-one-output fuzzy systems (forward-and-backward fuzzy system and right-and-left fuzzy system) is proposed. The acceleration and the acceleration's variation of the x-axis and y-axis obtained by the 3-axis accelerometer are considered to be the inputs of forward-and-backward fuzzy system and right-and-left fuzzy system, respectively. Some practical tests are presented to illustrate the proposed method can let the humanoid robot stand and balance on a plane.