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Abstract
In the thesis, we make some improvements of automatic guitar mechanism design and a practical music input system to enhance the level of design and application of an automatic guitar system. In the control circuit design, the PC-Based control is adopted instead of the past single-chip design. That not only increases the data transmission speed, but also simplifies the circuit design and the system software design. In system software design, we develop low-level guitar control codes to act as the intermediate form of music input. The users are also allowed to directly input music by these control codes. The teaching function, which is often neglected by most software, is a feature of the proposed system. In the presented system, it can teach the beginners how to play the guitar in an animated way. Also, the real-time sound simulation is provided to check the accuracy of the user's music input by multi channel MIDI instruments. Furthermore, to make the high-level guitar music input feasible, the user-friendly GUI of tablature staff of six lines for both folk and classical guitar is specifically designed. In system mechanism design, it mainly press or pluck the guitar strings by way of driving the pneumatic cylinders. We apply the four-bar linkage-crank-rocker mechanism to improve the automatic guitar plucking action. It should be a feasible way from the simulation results. We deeply hope this musical robot kind of research can not only improve the design techniques in both electrical and mechanical engineering, but also promote the collaboration of arts and technology.
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