The main aim of this study was to investigate if a model of note synchronization, based on measurements of the mechanics of a real piano, would provide as side effects the so-called “melody lead effect” and more naturalness in automatic music performance of piano music. A real-time model was validated with a listening test.

Seven experienced pianists participated as subjects. For each of five pieces of music, they were instructed to adjust two sliders corresponding to parameters tempo and synchronization for making the piece sounding “as realistic as possible”. Subjects could exaggerate the effect of both melody lead and inverted melody lead by up to 200 percent. In the second part of the test subjects were asked to adjust tempo to a preferred value with a slider, and to choose the most realistic synchronization with the mouse from three anonymous alternatives, in a forced choice fashion. The three alternatives corresponded to (1) perfect synchronization, (2) 100 percent melody lead, and (3) 100 percent inverted melody lead.

Main results show that on average subjects preferred positive synchronization values, corresponding to normal melody lead. Subjects preferred positive synchronization (normal melody lead) correlated with tempo, and this result assimilates reality. For negative synchronization values (inverted melody lead) the relationship to tempo seems more arbitrary.