

Table 1. Anthropologic data and physiological characteristics of experimental subjects.

	A	B	C	D	E
Height [cm]	160	161	175	180	168
Weight [kg]	50	47	65	61	60
HRave [bpm]	73.5	75.3	82.5	81.2	65.2
HRsd [bpm]	2.3	2.4	3.2	2.6	2.5
Motion	Aerobic	nurse-care1 assisted	nurse-care1 service	nurse-care2 assisted	nurse-care2 service

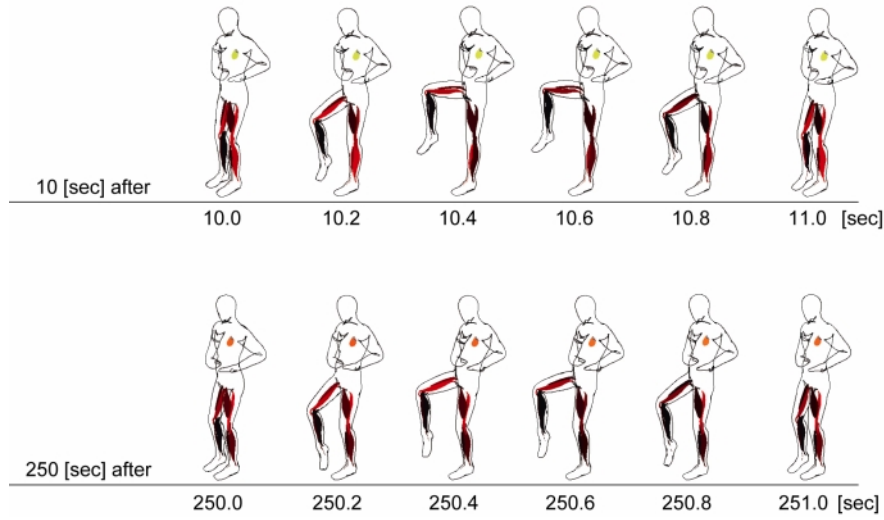


Fig. 4. Visualization results of health condition during aerobic dance.

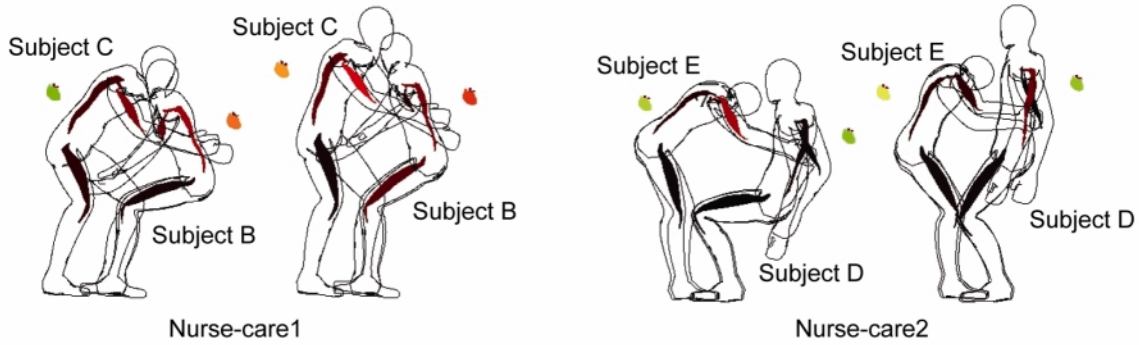


Fig. 5. Visualization results of nurse-care motions performed by two pairs.

minute]) is calculated from the R-R interval (RR [s]) of ECG in accordance with the following equation:

$$iHR = 60/RR.$$

2) The iHR time series is interpolated by the spline method. This interpolated time series is resampled at 60 [Hz].

3) To calculate S.iHR, average and standard deviation are calculated from the iHR time series measured in the resting condition. S.iHR is calculated by

$$S.iHR = (iHR - HRave)/HRsd,$$

where HRave is the average and HRsd is the standard deviation of the time series of iHR during the resting condition.

4) S.iHR is assigned to the color of the heart model. Sympatho-vagal balance controls heart rate variability. Parasympathetic nerves decelerate the heart rate and sympathetic nerves accelerate it (Hainsworth, 1995). Warm color is associated with sympathetic nerves and cool color with the parasympathetic nerves. The S.iHR is neutral (average iHR of during resting condition) so the color of the left heart model (model a) is green. The S.iHR is high so the color of the right heart model (model b) is red (warm color).

3. Visualization Results

3.1 Experimental condition

To evaluate the usefulness of the proposed system, two experiments were performed.

1) Aerobic dance (knee-up 300 [sec]; tempo 140 [bpm])