The sonification of elderly care alert systems using Kinect

C-F. Huang, Y-J. Luo, H-L. Lin. ***The sonification of elderly care alert systems using Kinect, based on Laban movement analysis*** *Gerontechnology 2014;13(2):210;* doi:10.4017/gt.2014.13.02.282.00 **Purpose** Long-term care for older adults can be difficult for caregivers, because it is impossible to accompany the older adult at all times. This paper purposes a system that can detect the movement of the older adult using Laban Movement Analysis, (LMA)[1] to remotely monitor the emotion of the older adult, providing a convenient method of caring for older adults. Caregivers can just listen to a variety of music[2], which represents the movement of the older adult[3], to monitor the emotions of the older adult. **Method** LMA is a method for describing, visualizing, interpreting, and documenting all varieties of human movement. LMA is divided into two parts: effort and shape. Effort includes four parameters: space, weight, time and flow. Shape includes two parameters: shaping and directional location, each represents information about patient's movements. This system computes the parameters of LMA from movement of the older adult captured by Kinect, and then maps to the two dimensional model of emotion (*Table 1*). According to emotion parameters from the emotion model, the music generator performs algorithmic compositions based on the result of the LMA and changes the rhythm complexity and tonality[2] to generate a melody so that the music generator automatically composes a corresponding melody. *Figure 1* shows the flowchart of the proposed system. In a validation experiment, the demonstrator in the video performed four kinds of movement that correspond to happy, angry, sad, and polite. 128 subjects answered a questionnaire to evaluate the degree of connection between video and music using a 10-point scale. **Results and Discussion** *Table 2* shows the statistical results of the relevance between music and movement. We speculate that the low scores in 'happy' and 'polite' in the mapping resulted from a lack of robustness between movement and music, which needs to be improved in future work.

Table 1.The relevance between Laban Movement Analysis parameters and the two dimension model of emotion

State	Correlation					
	Flow	**Time**	**Weight**	**Space**	**Shaping**	**Directional**
Arousal	Negative		Negative	Positive	Positive	
Valance		Positive	Positive			Positive

References

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Table 2. Results of the experiment, showing the accuracy of mood detection

	Relevance			
	Happy	**Sad**	**Angry**	**Polite**
Average	6.41	8.31	6.71	6.41
Mode	7.00	10.00	7.00	6.00
Standard Deviation	2.42	1.68	2.14	2.18

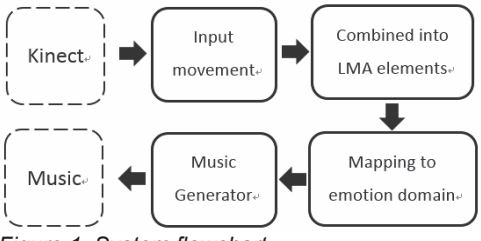

Figure 1. System flowchart