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AN EXPRESSION CONTROL SPACE APPROACH BASED ON FACIAL MOTION CAPTURE

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Abstract. *This paper describes an expression control space approach that enables animators to control the expressions of 3D avatars in real time by selecting a series of expressions from facial expression space in 2D space. This paper uses distance matrices that present distances between facial characteristics' points to show the expression state. The paper defines the set of these distance matrices as the facial expression space. This approach approximately infers the route to move from one expression to another from captured facial expression data. First, the approach assumes that two expressions are close to each other when distance matrices that show facial expression states are within a certain distance of each other. When two random facial expression states are connected with the set of a series of adjacent expressions, the method assumes that there is a route between the two expressions, and that the shortest path between two facial expressions is the path by which one expression moves to the other expression. The approach uses a Floyd algorithm to find the shortest path between two facial expressions. The facial expression space, which is the set of these distance matrices, is a multidimensional space. The approach controls 3D avatars' facial expressions in real time when animators navigate through the facial expressions space. To assist with this task, the approach uses multidimensional scaling for distribution in 2D space, and tells animators to control 3D avatars' facial expressions when using this system.*
Keywords: Facial expression, Multidimensional scaling

1. **Introduction.** Computers are an asset to our method and have taken the place of human work: but they have a limited ability to read and recognize an objects' expression, because faces express more feelings than language. This is why so much research[1-8] has examined how to show facial expressions using 3D computer graphics technology. Recently, as character animation [9] that uses motion capture has become popular in computer animation, actors' facial motions have been captured for use in 3D character animation. Generally, there are two ways to use captured data. One is motion retargetting, to apply an actor's motion data to a new model [4, 10]. This was developed for bodily motion [10] and then was applied to facial expressions [4]: but, this paper doesn't deal with motion retargetting. The other way is to generate new actions by selecting