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# AUTOMATIC HUMAN FACES MORPHING USING GENETIC ALGORITHMS BASED CONTROL POINTS SELECTION

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Abstract. *In this paper, a genetic algorithm guided control point extraction method that enables automatic face image morphing is proposed. This method can morph two face images by automatically detecting all the control points necessary to perform the morph. A face detection neural network, edge detection and medium filters are employed to detect the face position and features. Five control points, for both the source and target images, are then extracted based on the facial features. A triangulation method is then used to match and warp the source to the target image using the control points. Finally, color interpolation is done using a color Gaussian model that calculates the color for each particular frame depending on the number of frames used. A real coded Genetic Algorithm (GA) is used to aid the facial features extraction by overcoming size and orientation changes. We achieve very high quality morphs at high speed.*
**Keywords:** Genetic algorithms, Morphing, Warping, Neural networks, Face detection

1. **Introduction.** Morphing technology was made famous by James Cameron's movie the "Terminator", and by the Michael Jackson's "Black or White" music video. How was it done? How long did it take to do it? Many people were puzzled. Image metamorphosis, or morphing for short, is commonly referred to as the animated transformation of one image to the other. Image morphing finds numerous applications in many fields including computer vision, animation, art and medical image processing. To morph images, three processes are required; control points extraction, image warping and color transition. Image warping can be defined as a method for deforming a digital image to different shapes. Practically, this can be simulated using an image drawn on an elastic surface. By moving the corners of the elastic material to new positions, the image will deform accordingly. During the morphing process, the number of intermediate images must be decided before hand, and then new positions and color transition rates for the pixels in each of the images in the sequence must be calculated. The processes of feature extraction, warping and color transition [1] involved in morphing proceed concurrently. The control points are similar features in the two images. After their extraction, warping can then be performed based on the number of intermediate images. However, control points decision is a difficult process that is conventionally performed manually. Warp generation is an algorithm that calculates and transforms the pixels in one image to new positions in