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We introduce a new algorithm that produces a three dimensional surface reconstruction only from a single frontal portrait. Our algorithm is mainly based on supervised learning and radial-basis-function, which seeks an optimal recovery with respect to Sobolev norm. Given prototypical images as a training set, the Adaboost algorithm is employed to automatically detect various facial expressions. Since the human face can be characterized by a few main features such as eyes and lips, our algorithm effectively reconstructs the surface using the main features, the landmarks of a human face. Then, using the classified feature points and a reference surface, the smoothest surface in Sobolev norm is calculated via the polyharmonic radial-basis-function interpolation. (Received September 19, 2017)