

A Facial Sketch Animation Generator for Mobile Communication

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Abstract

The ability to analyze and reproduce specific-person facial expression is an important multimedia content service for mobile communication. In this paper, a novel three-layer facial animation model is presented for generating the personalized facial sketch animation, and the three layers are motion sequence layer, the reference shape layer, and the painting shape layer. Based on the model, a facial sketch animation generator was implemented, allowing mobile subscribers to communicate using personalized facial sketch animations created from face snapshot taken by their phone's camera. The sender takes a snapshot of someone's face and transmits it to a multimedia content server, which then generates the specific-person facial sketch image or animation sequence. The server sends the image or animation to the receiver in multimedia message (MMS). The implementation of the generator architecture is low-cost and feasible for multimedia content service in mobile communication.

1. Introduction

Other than making phone calls, mobile phones now have numerous features: text messaging, Internet access, GPS, electronic money, and mobile movies, which have had a great influence on communication technology. There are four hundred million mobile phone subscribers in China, and that number will increase to six hundred million in 2008.

In pace with the fast growth of mobile subscribers, content service for mobile phones has a great market. For example, MMS has brought in extra revenue for telecom carriers by transmitting mobile phone snapshots. Various value-added multimedia content services have been developed for mobile communication and experience-sharing for geographically separate people, and ceaselessly adopted for satisfying the demands of cell phone subscribers. Personalized facial sketch and animation generation is one of the interesting new content services: a facial portrait taken by the phone camera is used to generate personalized multimedia content, and sent to subscribers or their friends as an MMS. As shown in shown in Figure 1, a subscriber sends a face snapshot to a multimedia content server, a personalized facial sketch image or animation sequence is generated in the server, and it is then sent to the phones of other subscribers. Therefore, the key problem is personalized facial sketch and animation generation.

To recreate 2D facial expressions in a sketch, Chen

proposed a face-cartoon generation method: learning the drawing style of a group of facial sketches by a specific artist to generate a non-photorealistic rendering of the face[1]. Bruce Gooch resorted to combing the separately thresholded luminance and brightness images for generating human facial illustration. By exaggerating the difference between the particular face and the average face, a so-called caricature could be generated[2]. Miran introduced his system called LiveMail, which allows mobile subscribers to communicate using personalized 3D face models created from images taken by their phone cameras[3].

The pseudo-muscle model was used to implement 2D facial sketch animation[4]. A group of pseudo-muscles were predefined for controlling the motion of the painting path. To generate a specific expression on the facial sketch, empirical values were assigned to each pseudo-muscle as the facial motion vector. By tuning the facial motion of nearby regions around pseudo-muscles, the painting path of the facial sketch could be transformed to reproduce some different facial expressions.

In this paper, we present a facial sketch animation generator and its architecture, which generates personalized facial sketch and animation content as MMS for mobile communication. The generator is low-cost and feasible for multimedia content service in mobile communication.

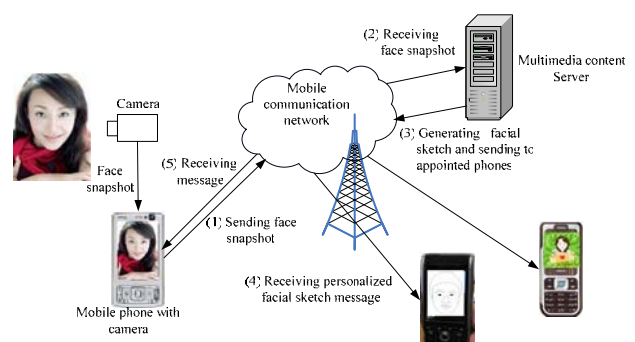


Figure 1. Multimedia contents service use-case scenario for mobile communication

2. System Architecture for Facial Sketch Animation Generator

The main functions of the facial sketch generator are the creation of personalized facial sketches, the generation of facial expression animations, and the

