Darvish Zadeh Varcheie, P., Gagnon, L. "Lip Tracking Using Adaptive Fuzzy Particle Filter in the Context of Car Driving Simulator under low Contrast Near-Infrared Illumination" In 35th International Conference on Acoustics, Speech, and Signal Processing (ICASSP 2010). Dallas, TX, USA, March 14-19, 2010.

Abstract

A real-time lip tracking on very low contrast images acquired under near-infrared illumination is presented. We developed a modified particle filter tracker based on fuzzy logic that is appropriate for non-linear modeling and robust to the non-Gaussian noise. Fuzzy model is used to normalize the particle filter samples weights. Fuzzy membership functions are applied to geometric and appearance features. Lip modeling and tracking are done by sampling around lip regions using a particle filter and scoring sample features are done based on a fuzzy rule. The performance of the tracking algorithm is evaluated for different people with various mouth changes, such as smile and speech. More than 78% of the lip corners are correctly detected within distances less than 5% of the lip length from the ground truth.

Index Terms

Lip tracking, particle filter, fuzzy modeling.