ARGO: Anthropomorphic Facial Emotion Recognition and Generation Objective through Machine Learning

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In recent years, automated analysis of facial affect (emotion) in images and videos has rapidly gained attention. Most existing research focuses on the task of facial emotion recognition. Aside from the Kismet project of the 1990s, researchers have yet to investigate methods for robotic generation of emotional expressions. In this research project, I proposed a novel generative model to simulate four universal emotional expressions in a robotic agent. This model was based on the features of the discriminative model developed in my research last year, a physiologically based facial landmark detection model for emotion recognition. For my analysis, I constructed ARGO (Anthropomorphic Recognition and Generation Objective), a multi-system robotic agent that incorporated facial tracking, emotion recognition, and expression generation. Movement of facial features was effected by servo motors. During model training, ARGO used a complementary approach that allowed its discriminative and generative systems to reinforce each other. After model training, ARGO could recognize facial emotion and generate the same expression in response. This research is significant in its novel approach to expression generation that can improve human-computer interactions. It has diverse applications in healthcare, such as aiding the disabled in communications and the autistic in learning to decipher and express emotions.

Awards Won: