Chapter 19
Affecting Computing in Multimodal Mobility

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ABSTRACT

Computational models that simulate human emotions have witnessed a substantial development in recent years for widening the spectrum of applications. Emotional computation is becoming crucial in human-to-computer interactions with exponential growth of artificial intelligence. Normally referred to as emotion recognition, it is widely believed that the prospective detection of a person's emotional state of mind should be computed from their facial expressions. Face-movement combinations may express many different emotion types, for instance, hate, anger, panic, joy, grief, surprise, shock, to name a few. The goal and emphasis of this manuscript is the deployment of different algorithms and computation models for emotions. Considerable advancements in this domain of emotion recognition can be made through AI model development that discusses the challenges of the system and Facial Action Coding as an integral part of the models.

INTRODUCTION

Artificial Intelligence (AI) for emotion computation is an interesting study with a prime focus on developing algorithms and models to enable recognition, interpretation, and response to human emotions. The challenge for AI is to detect and understand

DOI: 10.4018/978-1-6684-8582-8.ch019

these cues and use them to infer the emotional state of a person. The relationship between cognition, emotion and behaviour patterns has undergone a shift as a result of contemporary research in the psychology, information theory, and sciences of emotion. Emotional computation is a key component of affective computing, which is the study of how computers can detect, interpret, and respond to human emotions. The AI research community encourages a frequent adaptive role that emotions play in human behaviour to determine the adaptability and capability of a system. Emotional computing encompasses human emotions and sentiments for emotion recognition & sentiment classification, respectively. Many experts presume emotional computing as a fundamental domain of affective computing, built on different modalities of data such as text, image, video, and audio. The physical information for emotional computation is illustrated by vision data (YouTube videos) and physical signals (ECG, EEG, Sensors), thereby making it challenging to portray a person's inner feelings with their active concealment from facial expressions, aural tones, body motions, etc. Emotional computation employs two major sub-tasks as:

1. *Recognition of emotions*: Emotion recognition is the process of identifying and interpreting the emotional state of a person based on their facial expressions, body language, and other nonverbal cues. This process involves using machine learning algorithms to analyses and classify the various emotional cues that a person exhibits.
2. *Analysis of sentiments*: Sentiment analysis is the process of using natural language processing (NLP) and machine learning techniques to identify and extract subjective information from textual data, and to classify that information into positive, negative, or neutral sentiment. The goal of sentiment analysis is to automatically determine the emotional tone behind a piece of text, such as a review, a tweet, or a news article.

Two models for the better understanding of one's emotion and feelings which are

1. *Discrete/Basic emotion model*: The discrete/basic emotion model is a theory of human emotion that proposes that there are a small number of basic emotions that are innate and universal across cultures that can be identified through specific facial expressions, physiological responses, and subjective experiences.
2. *Dimensional emotion model*: The dimensional emotion model is an alternative theory of human emotion that proposes that emotions can be described along several continuous dimensions, rather than as discrete and categorical states that can be characterized by their intensity or arousal level, their valence (positive or negative), and their motivational or action tendencies.