Facial Expression Recognition using Deep Learning

Omid Nezami

IARG meeting

Department of Computing

Faculty of Science and Engineering

MACQUARIE
University

April 23, 2018

Outline

- Introduction

- Facial Expression

- Facial Expression Recognition Models

- Modelling using Deep Learning

  - State-of-the-art architectures

  - Pre-processing differences

  - Facial expression-based domains

Introduction

- Emotional properties, including recognizing and expressing emotions, are required in designing intelligent systems to produce intelligent, adaptive, & effective results (Lisetti 1998).

- Emotion detection based on visual data mainly considers facial expression due to its importance in conveying emotions (Zeng et al. 2009).

- The research on facial expression was started more than a century ago when Darwin published his book titled, "The expression of the emotions in man and animals" (Ekman 1973).

Facial Expression

- Non-verbal communication conveying attitude, affects & intentions

- Result of facial features & muscles changes during time

- Happiness, sadness, fear, surprise, anger, and disgust

Facial Expression Recognition Models

- Hand-crafted & general-purposed

    - Histogram of Oriented Gradients (HOG)

    - Gabor

    - Local Binary Pattern (LBP)

    - …

- Modelling using Deep learning

    - Convolutional Neural Networks (CNNs)

    - Winning submissions in different challenges e.g. Emotion Recognition in the Wild (EmotiW) & Facial Expression Recognition (FER)

    - Successfully applied for feature extraction & transfer learning

Modelling using Deep Learning

- Deep Learning using Linear Support Vector Machines

- Image based Static Facial Expression Recognition with Multiple Deep Network Learning

- EmoNets: Multimodal Deep Learning Approaches for Emotion Recognition in Video

- Fusing Aligned and Non-Aligned Face Information for Automatic Affect Recognition in the Wild: A Deep Learning Approach

- Facial Expression Recognition using Convolutional Neural Networks: State of the Art

- Learning Social Relation Traits from Face Images