Automated Detection of Human Emotion
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Abstract

An automated method to identify human emotions using electronic visual data has been pursued in hopes of advancing human-computer interaction and various other commercial needs. While previous ventures into this area have proven successful, the majority of them require high-end equipment which keeps this technology out of reach for most casual uses. By utilizing an easily accessible web camera and python, an inexpensive alternative can be created with hopefully the same level of accuracy as more expensive attempts.

Keywords: Emotion recognition, Human-Computer Interaction (HCI), visual

1 Introduction

This project will explore the limitations of using low-end equipment to accurately track facial movement to identify emotions. By researching previous expensive attempts, a variety of tracking techniques can be found and utilized. The results of this project can then be used to expand human-computer interaction, or expand the commercial use of this technology, possibly in the standard household.

2 Objective

The purpose of this project is to analyze human emotions using a cheap low quality camera (standard webcam) that can be used in various interactive applications.

3 Background

3.1 Past Work

The ability to read human emotions automatically and efficiently has been a goal for both computer scientists and commercial entities. Human-Computer interaction is a quickly expanding field where this information is vi-

tal. Commercial uses include advancing automated product testing, and various uses in the entertainment industry. However, various different approaches have been previously used in previous experiments. Some rely on both visual and auditory data while others rely on one or the other. Visually based experiments also utilize different techniques such as tracking placed markers and analyzing shadow placement. However, most of these experiments utilized high end equipment while I am attempting to recreate the same results at a much cheaper price.

4   Development

4.1   Tracking

Currently, only basic tracking functions have been implemented. In basic tracking, markers are identified and a tracking image is created. However, the program does not take into account facial tilt and gives very basic results. The next step would to begin adding to the tracking algorithim to a detailed tracking system. This tracking system would take into account facial shift and create seperate, zoomed in, tracking images for each feature.

4.2   Emotion Recognition

Nothing has been done in emotion recognition at this moment. Emotion recognition development will follow after the detailed tracking and will take into account all features to determine what emotion is being expressed.

4.3   Software

Python will be used to code this project using the OpenCV package to receive webcam information and the PIL package to analyze the visual data.

4.4   Procedure

This project will be completed over the next school year and will include a fully function user interface. The initial stages of the project include testing various tracking techniques before beginning to write the tracking code. Once tracking code has been written, the emotion detection stage will begin and rigorous testing and debugging will follow. The final stages of the project will include fine-tuning some mechanics and building a simple user interface to run the code.
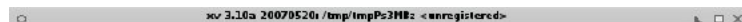
4.5   Testing

Testing will first be heavily controlled by repeatedly using sample data to test various tracking techniques. In later stages of the testing, real time data will be used to analyze the performance of the program and make appropriate changes.

5   Discussion

Basic tracking results are extremely vague, making it difficult to actually decipher what they mean. Thus, detailed tracking will require separate files for each feature rather than a blurry view of all the features.

Above is an example of basic tracking with only mouth markers.

http://books.google.com/books?id=9_4p8mfGywwC&
Time+Emotion+Recognition+Using+Biologically+In
DEI&hl=en&ei=3FKqStCOK8LZlAfs7vTeBg&sa=X&
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