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

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 vital. Commercial uses include advancing automated product testing, and various uses in

1

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   Procedure

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. 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   Scope

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 build-

ing a simple user interface to run the code.

6   Expected Results

I expect to obtain somewhat accurate results, but not the same level of results as previous experiments (80-100% accuracy) with more advanced cameras. However, I do expect an accuracy rate of at least 60%.

References

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