Automated Detection of Human Emotion

Jennifer Lee
Computer Systems Lab 2009—2010

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.

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.

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 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.

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.

Development

Development will occur in two stages, facial feature tracking and emotion recognition. Facial feature tracking will be then split into two more stages, basic and detailed. Basic facial tracking focuses on webcam integration, marker detection, and very basic tracking. This will then be added upon to create detailed tracking which will account for facial tilt and movement, and focus on each facial feature in greater detail. Emotion recognition will then analyze the results of the facial tracking to determine emotion.
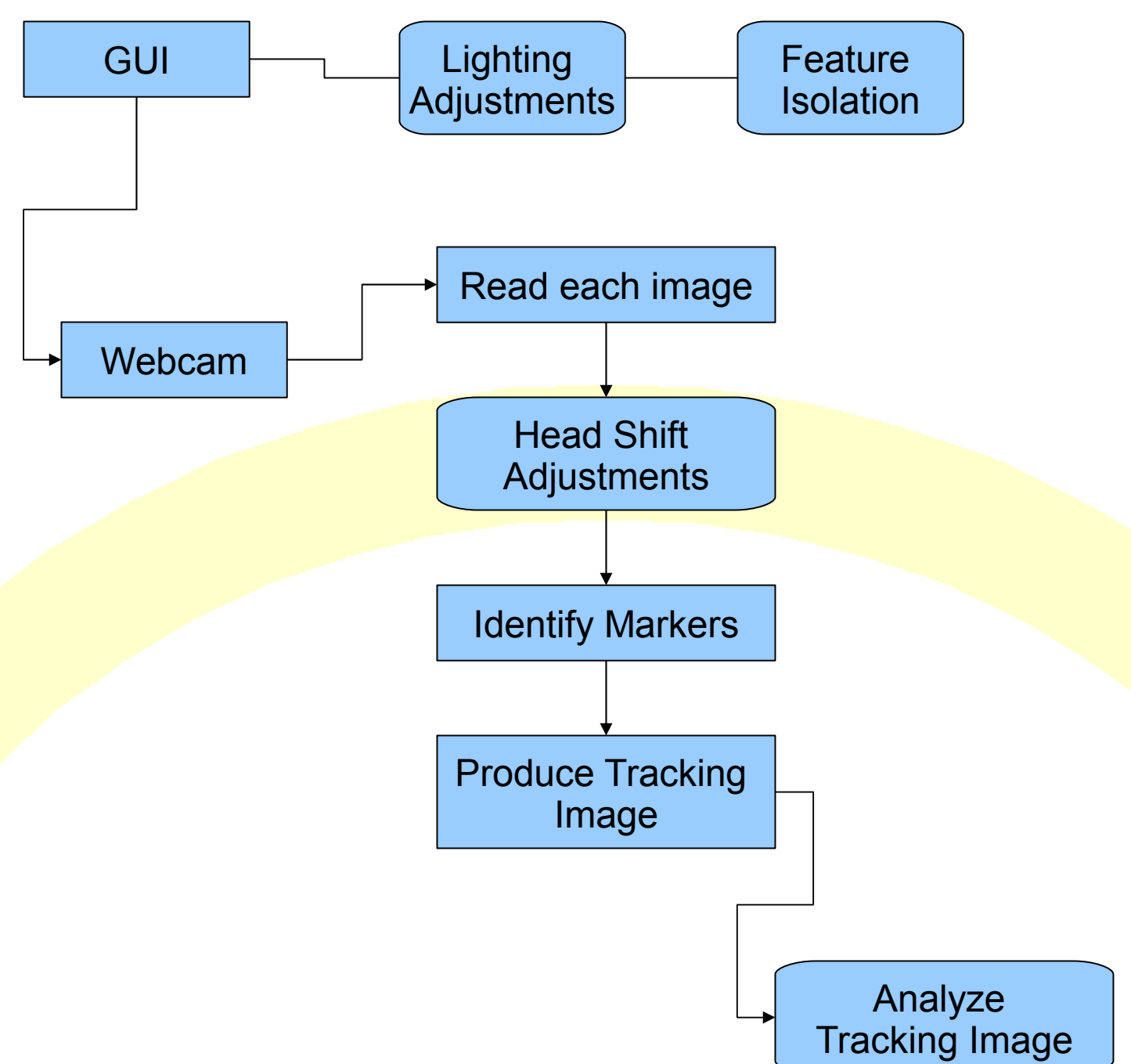
Discussion

Currently, only basic tracking has been implemented. 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.

Marker recognition and basic tracking results. Basic tracking results are very vague, making emotion recognition extremely difficult.