Measuring Social Values using Emotive Biometrics

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Finding a way to connect emotive biometrics to social media data.

I. Making the Argument

Current methodologies for analyzing emotion rest on the theory that emotions run on genetically derived circuits shared by all humans around the world and that these emotions can be detected in microexpressions on the face via the Facial Action Coding System (FACS), across cultures, such that you can create an Atlas of Emotions, as endorsed by the Dalai Lama.

Companies like Affectiva, which has raised over $14 million, use this theory for interpreting facial expressions to determine affective, and therefore emotive context, with application to marketing products or determining how people feel about a given topic [research, funding].

An Affectiva analysis, likely provides reasonable results among members of a shared culture, e.g. 21st-century, liberal-leaning city dwellers who use smartphone apps and have a large amount of disposable income with a heavy preference for convenience — and is therefore likely to provide a return on the investment, but it's important to note the limitations of this kind of analysis.

FACS-based analyses might not hold true for an ISIS member, rural Russian or ancient Roman — and believing that it would, has dangerous consequences.

For example, the common belief that smiling with the eyes crinkled (the Duchenne marker) is a true smile, whereas others are fake, might hold true in post-1900s United States — but would not hold true in ancient Rome, where there wasn't even a word for smile.

While there is evidence to believe that the FACS theory is scientifically misguided, techniques based on FACS nonetheless provides practical and useful results based on functional heuristics when used in a group that shares common culture, but may not be effective in detecting actual affect.

The theory of constructed emotion contradicts FACS and posits that emotions are constructed and not biologically inherent; that they are the end result of body budgeting algorithms constantly taking into account body sensation (stomach full, hands hot, neck tight, etc.) and result in an underlying state of physical sensation (affect) which the mind attaches emotion concepts to, depending on context [research].

The concept of **affective realism**, that feeling as if someone feels something makes it so, is supported by the belief that we can read people's feelings from their faces. This belief arises because it is an effective heuristic, especially when analyzing individuals who share a cultural background, but does not seem to hold up in recent cross-cultural studies. This is a point of heated debate between cognitive and affective neuroscientists [Ekman response].

This belief can be harmful in an increasingly global world, because my affective realism is completely different from the affective realism of a rural Afghan man who might have been recruited by ISIS, or might just be a farmer. If I were a law enforcement officer, believing that I can tell the difference based on how I feel, has harmful and deadly consequences, either by apprehending or punishing the wrong individual or completely failing to detect an actual threat.

Created: 20 October 2017
Edited: 1 November 2017

In order to resolve the debate, scientists have to go underneath emotion and analyze raw affect, or emotive biometrics.

II. Proposed Methodologies

*This project proposes to take away the middle-man of emotive words or facial expressions, going straight to the **affective reality**, or physical sensations and reactions in the body.*

A proposed methodology is to begin by gathering affective baseline reactions to certain words or groups of words in various settings, asking the individual to describe how they are feeling to determine which emotion concepts they are attaching, and then determining what behaviors are culturally acceptable for certain emotion concepts, and extrapolating that data into behavior prediction. ***Extreme care should be taken to remove bias, as in all scientific experiments, and the predictions should be used to gain insight into potential conflict and create cost-effective and life-effective verbal and non-violent methods for resolution. These predictions should never be used for predictive punishment or punitive action.***

1. Affective Baselines: Scientists can measure the affect of individuals reading individual words or words in context, to gather a baseline for what a population of shared demographic background physically feel when they read certain words or experience certain concepts. The experiment should be run on at least two significantly distinct demographics. Testing across demographic allows scientists to determine relatively global reactions as compared to subgroup specific reactions. This allows data scientists to tap into terabytes of easily mineable social media data produced on a daily basis to map the spread of affect.

2. Emotions Concepts and Culturally Appropriate Action: The next step is to attach emotion concepts and culturally acceptable action to the affective data, to understand how the individual is interpreting his or her physical state, and what they see as an appropriate action in light of that affect. For example, if they feel heat in their hands and feel angry, and violence under certain situations is an acceptable response in the culture (such as self-defense is a socially acceptable cause for killing in the U.S. legal system), then you can reasonably assume that if enough people feel a certain way with certain concepts in certain contexts, then violence is likely to emerge.

3. Prediction: Using these baselines, you can predict the affective reality of a population based on easily mineable social media text data. By mapping affective baselines, emotion concepts, and culturally appropriate action, you can predict physically or emotionally violent events.

4. Antidote & Resolution: If certain words or concepts make certain populations feel unpleasant sensation, then an antidote of healing words and emotions can help those populations deescalate negative affect. Combined with cultural awareness and education, the conceptual source of unpleasant affect can be decoupled from the sensations, allowing for deeper and non-judgmental peace without resorting to manipulative and/or secretive propaganda techniques.

Created: 20 October 2017
Edited: 1 November 2017

General Outline

I. Key Idea

Attaching emotion words to social media data is ineffective because emotions themselves are concepts and different for everybody. Using emotive biometrics that are not socially constructed, such as heart rate, breathing, EEG, and skin conductance is more effective and relatively simple.

II. Key Issue

This research project requires collaboration with medical labs at universities to gather emotive biometric data at scale, a team with both data science and bioscience experience to make biometric data accessible to machine learning algorithms, collaboration with private industry for computational and social media data resources.

III. Making the Argument (methodologies and references added)

Define what they are and how to find and measure: emotion, affect, concepts, words.
What is wrong with current methodologies?
What methodology is proposed? (combining emotive biometrics to social media data)

IV. How can you measure social value of violence, shame?

Many #MeToo's gets 100+ likes… tags and likes are a way to measure social value, and then to analyze the emotional content of the words

1. Take the physical reaction to certain words across a group of people to get baselines (**body**, measuring affect)
2. Use ML to analyze emotion sentiment of certain #hashtags (**mind**, measuring words)

These data points allow us to predict and track spread of affect across large scales using easily-accessible word data and hashtag data from social media.

V. Why is this important?

This gives us a gauge to community-wide affect, and allows us to track spread of affect, which the human mind attaches concepts to.

The human mind is often not aware that it is making up a story to match it's underlying physical sensations, and as a result, actions come from misguided concepts.

Knowing when unpleasant affect is surging in a population allows us to predict and counteract violent events by using effective language and media campaigns.

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Who can do this already?

Currently asking around.

Emotion Recognition in the Wild via Convolutional Neural Networks and Mapped Binary Patterns

Affective Neuroscience Lab, Northeastern, Feldman-Barrett

Affectiva

Apple's Secret Exercise Lab

Funding

What grants are there available?
NSF, DOD, Templeton
List from Northeastern Affective Neuroscience Lab

Venture Capital
Collaborative Fund, others

Team (volunteer basis)

(tentative commitments)
2 Machine Learning Professionals
1 Social Media Data Analyst
1 Science and Grant Writer

(needed)
Data Scientists
Affect Measurers (collaboration needed with medical lab)

Plan of Action

Begin to establish Compassionate Technologies as research nonprofit (1-year)
Draft research methodology, research proposal
Begin contacting labs, soft circling commitment to assist if funding comes through
Apply for funding, NIH Grant Funding**,** Templeton, etc.

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Edited: 1 November 2017