

T,E.D. (Transformations, Emotional Deconstruction)

by Sean Hathaway

Statement:

Thanks to the interconnectivity provided by the internet people have never before been better able to express their emotions to the world community. Every day hundreds of thousands of people use a myriad of blogs and other online outlets to discuss how they are feeling on an endless array of topics ranging from superficial thoughts on the quality ones 'hair day' to extremely intimate considerations of love, betrayal or even whether or not they should end their lives. Literally every subtle increment on the scale of the human emotional condition is expressed on the World Wide Web. Alas, due to the tremendous scale of information available many of these expressions are buried within a sea of noise. The goal of my installation "T,E.D." is to give a literal voice and physical presence to a portion of this content as it is expressed in real-time.

Synopsis:

T,E.D. is a large, wall-based installation consisting of an array of 80 Teddy Ruxpin dolls that speak emotional content gathered from the web via synthetic speech with animated mouths. The speaking of the emotional content is accompanied by one of twenty-four musical vignettes written by Carlos Severe Marcelin that have been paired to the emotional content being spoken. Each vignette, representing one of twenty-four subtle variants of human emotion, have been composed in such a way that the beginnings and ends of the short pieces will seamlessly dogleg in any possible configuration and stream endlessly as a unified whole. The installation is allowed to drift about freely through the emotional landscape being driven only by those who are contributing content to the piece whether unwittingly or consciously. As such, the overall presentation of the piece can vary greatly based on external conditions such as seasons, world events and even time of day. The instantaneous emotional pulse of the internet, this collective pulse, like a human pulse, varies over time.

Details:

Bears: The bears which invoke the presence of the anonymous online poster are 1980s style Teddy Ruxpin dolls that have been significantly modified for the installation. Each bear's original circuitry has been removed and replaced with a controller board designed specifically for the installation (figure 1). These custom boards allow the centralized control computer to animate each bears eyes and mouths

for lip-syncing with a pulse width modulated (PWM) signal which replaces the bears original cassette tape based tone modulation control scheme. As a child, I was scared of these bears (I was not alone) for their vague and gross mechanical representation of a living thing but this is a character I found very suiting for the installation.

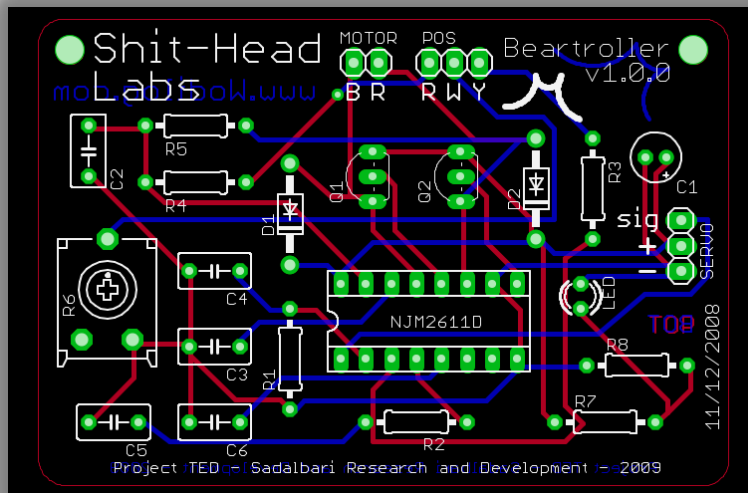


Figure 1

Voices: The comments of the online posters will be spoken through one of 30 different synthetic voices. These are the types of voices one may hear on an automated phone service. While the voices are highly understandable they are, as with the bears, only vaguely and mechanically representative of a real human. This pairs them quite nicely with the bears. The collection of voices has been built to give the most varying ranges of gender, age and ethnicity of English speaking voice synthesis I could muster.

Emotional classification: The installations emotional classifying scheme and accompanying musical vignettes are based on an emotional classification system developed by the late professor and psychologist Robert Plutchik and laid out in his 1980 paper Emotion: A Psychoevolutionary Synthesis. Plutchik proposed that there are a small number of basic, primary, or prototype emotions and that all other emotions are mixed or derivative states that occur as combinations, mixtures, or compounds of the primary emotions. The scheme involves a wheel of primary emotions laid out in a color-wheel like representation (figure 2). The circle face represents the relationship of primary, pure emotions of the highest intensity. The conical 3-dimentional shape represents layers of emotional intensity decreasing from the pure, intense emotional state to the point of zero intensity like various hues in color. Like the

color wheel analogy, the eight pure emotions of various hues can be mixed to produce the full landscape of human emotion.

Plutchik's Wheel of Emotions

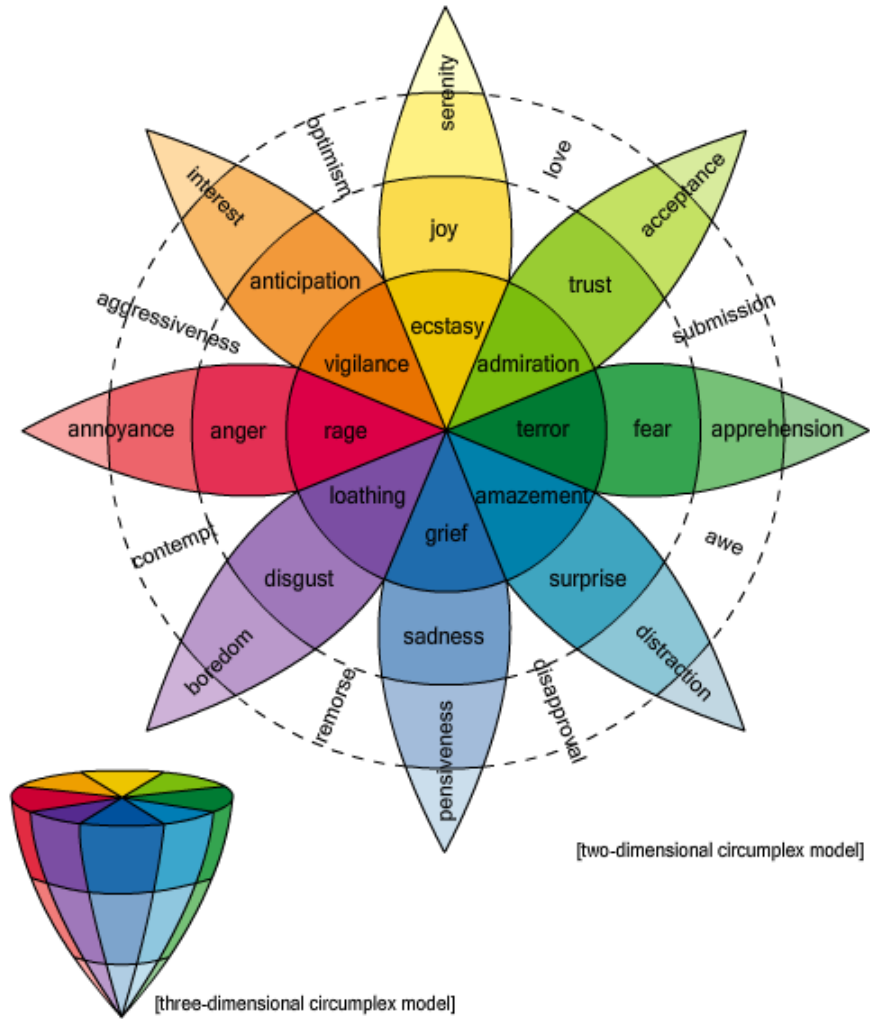


Figure 2

In order to properly classify and present comments of similar emotional content as discrete sets I created a list of thousands of common emotions and, with the help of friends, completed the task of deconstructing each of the emotions into lists of their constituent parts from Plutchik's wheel of twenty-four primary emotional states. This turned out to be a very subjective process and everyone involved spent a good deal of time exploring their own experiences with emotion as a result.

Music: The music for the installation was composed by Carlos Severe Marcelin as a collection of twenty-four 1 minute variations on a theme. Each piece is based on one of the petal segments from Plutchick's Emotion Wheel. The instrumentation and amount of variation from the consonant central theme is inspired by the relation of the emotion in question to the center of the Wheel. Each piece was composed, recorded and mastered in such a way as to begin and end on a consistent note and level so that the individual pieces can be seamlessly stitched together in any order by the software as the piece progresses without any audible break or disruption.

Lighting: In addition to any ambient and spot lighting required to illuminate the wall(s) of bears in the space the installation also includes a pair of very small but powerful custom-built robotic pin spots. These are used to spot-light the one or two bears that are currently speaking in the array. With so many identical bears in the installation this spotting helps to set the viewers focus where the current action is taking place. The entire lighting package consists of two pipe clamp style moving mirror light heads with a lightweight controller box that can be easily mounted to a wall, ceiling or pipe fixture nearby. The entire lighting package runs off of a single 110 ac plug with maximum current draw of about 4 Amps and receives control messages via a single Cat-5 ethernet connection networked to the central control computer.

Data Sources: The raw content for T,E.D. is currently aggregated from three main sources. The first and most important source is data received through an internet feed provided by the site wefeelfine.org. This excellent site is a project created by Jonathan Harris and Sep Kamvar which provides a truly beautiful visualization and organization of emotional content on the internet. They have generously provided access to the web crawler developed for the We Feel Fine project which is constantly searching thousands of English speaking blogs for emotional content. Without access to the data provided by their servers it would be nearly impossible to create a project such as T,E.D. that is able to run on a single work station computer and with a regular consumer grade internet connection. To them I owe much thanks and appreciation. Secondly I am able to add additional interactivity to those viewing the installation by providing a dedicated phone number [(559)TXT .2.T,E.D.] with which the viewer may send anonymous text and voice messages to the piece. These viewer contributions generally take about one and a half to two minutes to be incorporated into the output. Voice messages to this numbers mailbox, if enunciated clearly, are automatically transcribed as text and rendered in one of the synthetic voices as to protect the identity of the sender. A third source of content is though a display terminal located in the room with the installation that provides feedback of the inner workings of the

piece and allows viewers/participants to send their sentiments directly to installation. As with text messaging the time to incorporate these statements is about two minutes.

Software: The software for the piece consists of five distinct components all written in the c# language. All components operate independently but rely on a centralized database containing multiple related tables that contain information consisting of such information as the address and location of each bear in the display, a set of several thousand emotional keywords and their respective decoding information, information regarding all of the voices and musical tracks, and all of the raw and cleansed content for the running of T,E.D.

- 1. T,E.D. Mail Client:** The mail client is the T,E.D. component that is responsible for receiving viewer contributed text messages, voice mails and emails.
- 2. T,E.D. Aggregator:** The aggregator is the component responsible for importing all content into the system. This component does checking to see if the feeling statement is able to be rendered as synthetic speech, assigns emotional coding information and does some basic cleansing and spell checking of the incoming statement.
- 3. T,E.D. Renderer:** This component is responsible creating the content that the installation plays. It first uses a genetic algorithm to group statements together based on likeness of emotional content by creating a great number of possible play sets. It then checks the sets for overall emotional likeness and grades each set accordingly. Once grading is complete the highest ranking sets are allowed to breed with each other and randomly mutate. After several thousand generation of this recursive breeding and grading the best 'evolved' and most suited set is allowed to proceed. Once the set is chosen the musical accompaniment is selected based on the most prevalent emotional traits of the winning set. The items in the winning set are then each assigned to a bear and given a rendered voice and associated lip-syncing data. Based on the given musical track chosen for the set some audio effects may be added directly to the audio tracks for the speech to add to the theme expressed by the musical accompaniment. The entire set consisting of all statements, the musical track, the voice audio, lip-syncing and bear location information are all packaged together and passed to the media player. This entire process occurs based on requests for material made by the Media Player component and typically occurs about every 45 seconds.
- 4. T,E.D. Media Player:** The media player is the component responsible for presentation of all content for the installation. It is responsible for keeping track of what is playing, cueing new

content to play and threading all of the streaming musical tracks together seamlessly. This component is responsible for aiming and triggering the spot lighting by sending messages to the robotic lighting controller and also sends information regarding mouth and eye positions to each of the bears in the installation.

5. **T,E.D. Archiver:** This component tackles the comparatively simple task of cleaning up after the other components and keeping a record of the content presented by the installation over the course of a run.

Physical arrangement: The actual installation of the 80 wall mounted teddies can vary greatly depending on the size and shape of the actual gallery space but I have taken care to design the piece as several modular components in order to best fit into and fill the space provided. I have imagined the installation spanning a single large wall with approximate dimensions of 30' by 8' but with some rearrangement and some crowding I could likely use a minimum space of 20' by 8'. A larger or multi-wall installation is easily doable so long as the all of the bears are within a 180 degree view angle of both of the installations robotic lighting heads. This limits the installation to no more than 3 conjoined walls as 360 degree lighting coverage is impossible with my current lighting. With all of this in mind I plan to install the bears on the available wall(s) as follows:

- Five groups of 16 bears each in an organic 'tree' configuration that suggests both natural and artificial network connectivity (figure 3).
- The wiring will be exposed 'old school' 1980's style rainbow ribbon cable that bifurcates at each junction.

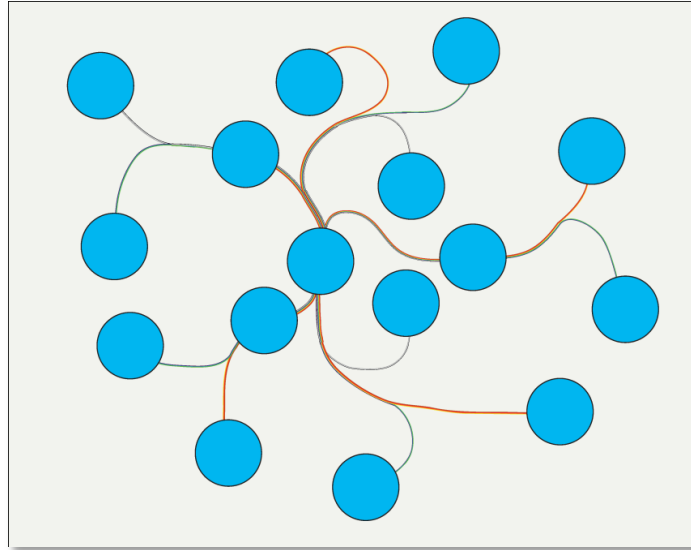


Figure 3

In closing, I appreciate your interest in my installation and having taken the time to read my synopsis. If you have any interest in showing T,E.D. as well as any questions or comments please feel free to comment on this page or contact me via email at: Mupeg.Sadalbari@gmail.com to open a line of communication. Thanks much.

Contributors:

Sean Hathaway – creator, designer, engineer, emotional coding, construction

Carlos Severe Marcelin – music, producer, emotional coding, construction

Jonathan Harris and **Sep Kamvar** (www.wefeelfine.org) - web crawler

Lyndsay Hogland – consultant

Jason Hildner - prop maker for prototype

Kelly Brewer - emotional coding, construction

Ken Hathaway – construction

Miranda Neubert – construction

Roger Hyde - technical consultant, terminal software development

Dedication:

T,E.D. is dedicated to my wife Stacy and daughter Ivy
with whom I transverse the landscape of human emotion
and who put up with a fair deal of my crap.