

Sentiment or Valence

- Category: positive, negative, neutral
- Intensity: degree of sentiment

Emotions

- Category:
 - Many emotions
 - Basic emotions
 - Valence, arousal, dominance
- Intensity: degree of emotion

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(2010-2018)

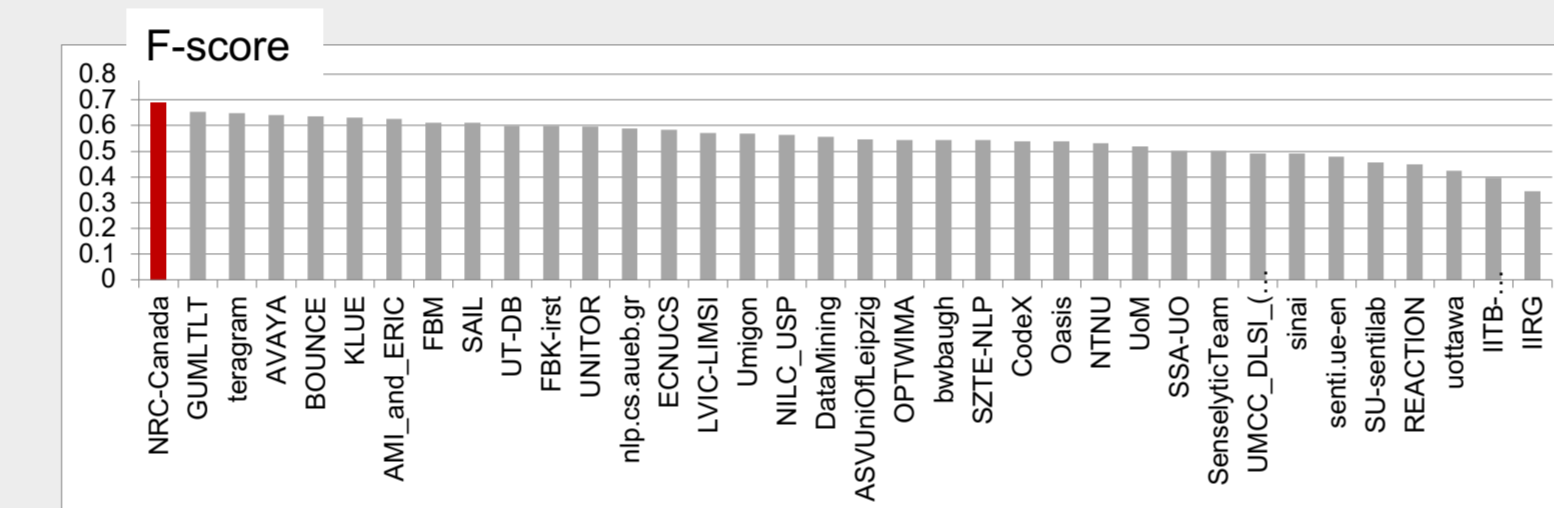
What We Do

- Identify **HYPOTHESES**; formulate **NEW TASK**
- Large-scale **CROWDSOURCED DATA ANNOTATION** with extensive quality control measures
 - Including fine-grained real-valued dimensional annotations with best—worst scaling
- Analyze data; develop **INTERACTIVE VISUALIZATIONS**; evaluate hypotheses
- Develop **AUTOMATIC SYSTEMS**, including deep learning neural network systems, for sentiment analysis and other applications

Applied to Various Textual Units, and Beyond

- Character N-Grams
- Words → Manually created affect lexicons
 - NRC Emotion Lexicon
 - widely used for research
 - commercially licensed
 - used to analyze Brexit discourse, Trump tweets, Radiohead songs, forum posts, etc.
- Phrases
- Sentences
- Tweets
- Documents
- Art → Automatically generated affect lexicons
 - Valence, Arousal, and Dominance Lexicon
 - Affect Intensity Lexicon
 - Sentiment Composition lexicons
- Multi-modal deep learning models

Participation in Shared Tasks



- First in SemEval-2013 Shared Task on Sentiment Analysis of Tweets (40+ teams)
- First in SemEval-2014 Shared Task on Aspect Based Sentiment Analysis (30+ teams)
- First in SemEval-2014 Shared Task on Sentiment Analysis of Tweets (40+ teams)
- First in AMIA-2017 Shared Task on Social Media Mining for Health Applications (9 teams)

Organization of Shared Tasks, and more

- Shared Tasks
 - SemEval-2018 Affect in Tweets (72 teams) (Ethics Evaluation)
 - WASSA-2017 Emotion Intensity in Tweets (22 teams)
 - SemEval-2016 Stance Detection (26 teams)
 - SemEval-2016 Sentiment Intensity (5 teams)
 - SemEval-2015 Sentiment in Tweets (44 teams)
- Workshop
 - 2017 and 2018 Workshops on Computational Approaches to Subjectivity, Sentiment and Social Media Analysis
- Tutorials
 - Computational Analysis of Affect and Emotion in Language. EMNLP-2015.
 - Sentiment Analysis of Social Media Texts. EMNLP-2014. (> 30,000 views on YouTube)

Applications We Worked On

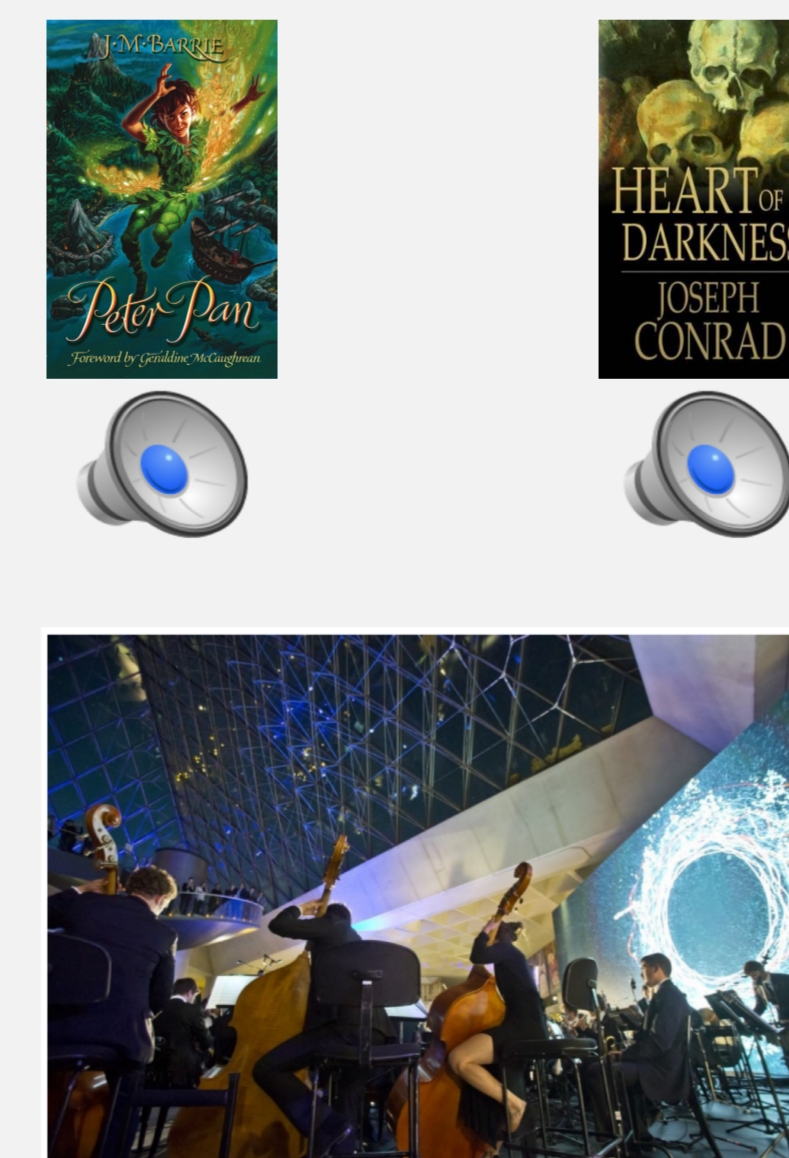
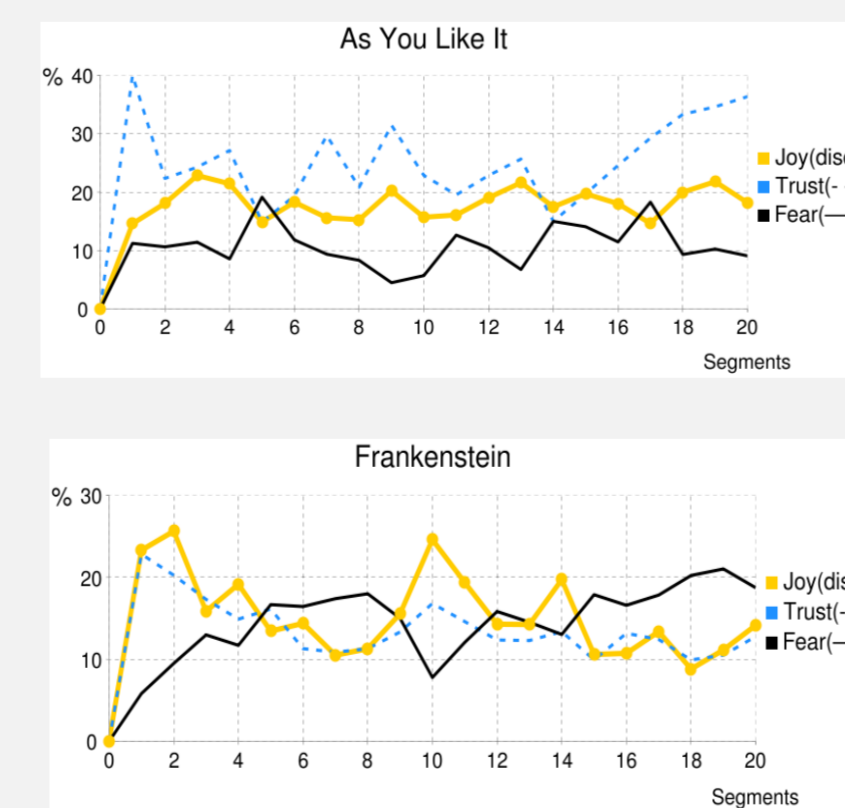
- Personality trait identification
- Understanding metaphors
- Machine translation
- Stance detection
- Quantifying beliefs, claims, public opinion
- Evolutionary linguistics

Computational Literary Analysis

- deriving emotional trajectories in stories

Generating Music from Literature

- commercial interest
- popular press coverage
- music played at the Louvre, Paris



Art project, **Wishing Wall**, uses the NRC Emotion lexicon. Displayed in:

- Barbican Centre, London, England, 2014
- Tekniska Museet, Stockholm, Sweden, 2014
- Onassis Cultural Centre, Athens, Greece, 2015
- Zorlu Centre, Istanbul, Turkey, 2016

Popular Press Mentions

- The Crosstab, March 2, 2017. [Trump's SOTU vs. the Past — Sentiment Analysis and Topic Modeling.](#)
- **Esquire**, February 23, 2017. [All Radiohead Songs Are Sad, but This Graph Shows Which Are the Saddest.](#) Also picked up in:
 - A Journal of Musical Things, February 24, 2017. [Science Discovers Which Radiohead Song is the Saddest](#)
- Religion in Public, February 13, 2017. [Evangelical leaders are as negative on immigration and Islam as Donald Trump.](#)
- February 11, 2017. [Text Analysis of NHL Hockey Coach Interviews.](#)
- **Washington Post**, October 22, 2016. [Donald Trump and Hillary Clinton took to the debate stage and made sweet, sweet music.](#)
- [Washington Post, CBS News, Columbia Tribune, and others, September 23, 2016. This symphony had both human and computer composers.](#)
- **Washington Post**, August 12, 2016. [Two people write Trump's tweets. He writes the angrier ones.](#)
- BGR, August 11, 2016. [Donald Trump's angriest tweets are sent from his Android while the nice ones are sent from an iPhone.](#)
- NYC Data Science Academy, August 7, 2016. [Twitter Analysis of Presidential Candidates 2016.](#)
- Variance Explained, August 6, 2016. [Text analysis of Trump's tweets confirms he writes only the \(angrier\) Android half.](#) Also picked up by [NPR, Los Angeles Times, Scientific American, The Verge, and others.](#)
- **The Telegraph**, June 15, 2016: [EU referendum: Remain uses Project Fear more in tweets than Leave, analysis shows. \[Use of the NRC Emotion Lexicon to track sentiment in \(Brexit\).\]](#)
- **Fast Company**, March 25, 2016: [An Emotional Map Of The City, As Captured Through Its Sounds. \[Use of the NRC Emotion Lexicon, aka EmoLex to create Chatty Maps.\]](#)
- PC World, May 15, 2014: [AI System Reads Novels, Writes Music.](#)
- Popular Science, May 14, 2014: [Robot Reads Novels, Writes Songs about Them.](#)
- io9, May 12, 2014: [Researchers Train Computers to Manipulate Human Emotions with Art.](#)
- LiveScience, May 11, 2014: ['TransProse' Software Creates Musical Soundtracks from Books.](#)
- **TIME**, May 7, 2014: [This Is What Classic Novels Sound Like When a Computer Turns Them Into Piano Music.](#)
- **SlashDot**, March 23, 2014: [Algorithm Composes Music By Text Analyzing the World's Best Novels.](#)
- The Physics arXiv Blog, March 20, 2014: [The Music Composed By An Algorithm Analysing The World's Best Novels.](#)
- Glass Hammer, December 3, 2013: [Are Your Emails Communicating a Lack of Confidence?](#)
- Singularity Hub, November 10, 2013: [Algorithm Tracks Literary Emotion in Shakespeare, the Brothers Grimm.](#)
- The Physics ArXiv, October 4, 2013: [Data Mining Reveals the Emotional Differences in Emails Written by Men and Women.](#)
- **SlashDot**, October 4, 2013: [Data Mining Reveals the Emotional Differences In Emails From Men and Women.](#)
- The Physics ArXiv, October 1, 2013: [Text Analyser Reveals Emotional Temperature of Novels and Fairy Tales.](#)
- **SlashDot**, October 1, 2013: [Text Analyzer Reveals Emotional 'Temperature' of Novels and Fairy Tales](#)
- The New Scientist, September 27: [What your email style says about your personality](#) Also in Times of India, MSN, Pharmacon, Galileo
- **TIME**, August 14, 2013: [Main Tweet: Researchers Dig Into The Intersection of Politics and Twitter.](#)