Text-Based Emotion Classification

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Introduction

Similar to sentiment analysis, in which machines are trained to recognize the positive, neutral or negative attitudes from texts, **emotion analysis aims to detect different human feelings, such as happiness, fear and sadness, from texts**.

Emotion detection has been applied in E-Commerce platforms, ChatBots, and also applications such as emotion retrieval from suicide notes, detecting insulting sentences in conversations, and so on. Models frequently used for this topic include SVM, BERT, Bi-LSTM, CNN, episodal memory network (EMN) with self-attention (SA), etc.

Conducted based on the assumption that there's some mapping from humans' internal emotions to shared language expressions.

- Barrier I. Emotion signals are less complicated than human feelings. Language and true emotions don't have a perfect correspondence to one another.
- Barrier II. There's no agreed-upon ontology of emotion expressions.
- Barrier III. Text analytics restricts itself to the syntactic analysis of words and sentences.

The data for this project came from "Emotions dataset for NLP" on Kaggle. The data was initially collected by Saravia et al. (2018) as an emotion dataset through noisy labels and annotated by @omarsar0 and the Hugging face team via distant supervision (Go et al. 2009).

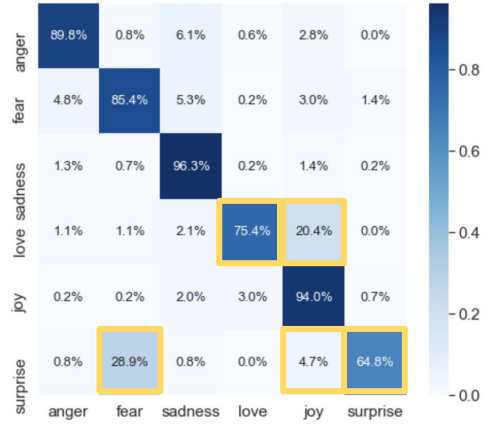
- 20,000 texts; 6 emotion labels.

joy 😆	sadness 😢	anger 😡	fear 😱	love 🥰	surprise 😳
6,761	5,797	2,709	2,373	1,641	719

Methods & Results

- Applied feature extraction using TF-IDF and converted each text corpus into a 250 entries' long vector, with both 1 and 2 gram in bag-of-words to capture a more comprehensive context.
- Trained and tuned hyperparameters for 4 classifiers (Logistic Regression, Support Vector Machine, Fasttext and LSTM) on 80% data, and tested their performances on the rest 20% data. SVM has the best performance in terms of classification accuracy and F1 score in the test set.
- As the classification results show in the heatmap (recall rates are represented as in percentages in cells), the SVM model does a great job in detecting sadness and joy, but it sometimes couldn't separate surprise from fear and joy, or love from joy.
- Misclassification examples:
  - 'i wanted to please her and make her feel accepted' is labeled as 'love' but classified as 'joy'
  - 'i feel an urgency to introduce readers to the amazing and touching story of anna iya and erik' is labeled as 'surprise' but classified as 'joy'

	Accuracy	F1 Score
Logistic Regression	90.5%	86.1%
SVM	91.6%	88.5%
Fasttext	91.3%	89.5%
LSTM	91.4%	86.8%



Thank you 🥰