Midterm presentation CL Team Lab

Group 9 Emotion Classification

Lara Grimminger, Jiwon Kim

14.06.2021

Emotion Classification

- International Survey On Emotion Antecedents And Reactions (ISEAR)
- Students asked to describe emotional events for 7 emotions including *joy*, *fear*, *anger*, *sadness*, *disgust*, *shame*, and *guilt*
  - *joy* - A party I went to last Christmas.
  - *disgust* - An Engineer I know wants war so he can get a job making bombs.
- Supervised Classification Task: Predict correct emotion given a text sequence from the data set

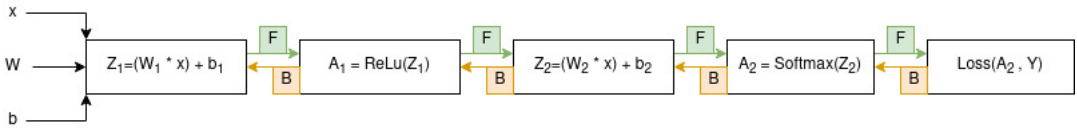
Data Preprocessing and Neural Network

- Convert text data to numerical data with tf_idf approach
- Convert text labels (i.e. the 7 emotions) to numerical data with one hot encoding
- 2-layer neural network with input layer, hidden layer, and output layer

Data Preprocessing: tf_idf and One Hot Encoding

- tf-idf = Term frequency (tf) $*$ Inverse document frequency (idf)
  - $\star$ $\text{tf}_{t,d}$ of term t in document d is the number of times t occurs in d
  - $\star$ df_t is the number of documents that t occurs in
  - $\star$ $\text{idf}_t = \log_{10} \frac{N}{df_t}$, N is the number of documents in the data set
- One Hot Encoding
  - $\star$ *joy*$= [1,0,0,0,0,0,0,0]$, *fear*$= [0,1,0,0,0,0,0,0]$, *shame*$= [0,0,1,0,0,0,0,0]$, etc.

2-Layer Neural Network



2-Layer Neural Network

Forward-propagation	Backward-propagation
input layer: (n_data, n_features= 1000)	Get derivatives
hidden layer:(n_features=1000, 7)	Reverse steps from forward function
hidden layer to ReLu function	
output layer: (n_data, 7)	
output layer to softmax function	
output to cross-entropy function(loss))	

Training of the 2-Layer Neural Network

- Initialization with Kaiming (No exploding or vanishing weights and gradients)
- 1 Epoch
- Batchsize of 32
- Learning rate of 0.01

Precision, Recall and $F_1 Score$

Advanced Classifier

- Tackle Curse of Dimensionality with Word Embeddings or PCA
- Add more layers (Universal Approximation Theorem)
- Change ReLu to another activation function
- Use optimizer