

Sentimental ECrits

Modelling Customer Emotions to Predict Critical Situations

Motivation

Problem Management Records (PMRs) at IBM allow customers to receive help in resolving their issues. If customers feel they are not receiving the level of support they need, they have the option of escalating their support ticket through a process called a Critical Situation (CritSit). Although CritSits are an important avenue for customers to state their concerns, they require extra resources to handle in addition to the resources already being used to help the customer; furthermore, CritSits are a sign that the customer is not happy, and keeping the customer happy is a top priority for IBM.



Research Questions

RQ1. Are the emotions of customers significantly different during support tickets that escalate versus support tickets that do not escalate?

RQ2. Are the trends in the emotions of customers significantly different during support tickets that escalate versus support tickets that do not escalate?

RQ3. Can these differences in emotions be utilized to assist support analysts in understanding which customers are likely to escalate their support tickets?

Solution

Sentimental ECrits is a project designed to leverage the emotion and sentiment of customers in PMRs to predict CritSits against PMRs. The emotions and sentiment of customers and support analysts are extracted from conversations in PMRs, using the Watson Natural Language Understanding API.



Preliminary Results

RQ1: Watson NLU Emotions

Emotion	Pearson P-Value		Mann-Whitney 2-Tailed P-Value
	Escalation	Non-Escalation	
Customer Analysis			
Anger	0.000000	0.000000	0.017498 (< 0.05)
Disgust	0.000000	0.000000	0.002044 (< 0.05)
Fear	0.000000	0.000000	0.117554
Joy	0.000000	0.000000	0.828245
Sadness	0.000000	0.000000	0.646006
Sentiment	0.000000	0.000982	0.006840 (< 0.05)
Support Analyst Analysis			
Anger	0.000000	0.000000	0.391951
Disgust	0.000000	0.000000	0.540574
Fear	0.000000	0.000000	0.434205
Joy	0.000000	0.000000	0.856163
Sadness	0.000000	0.000000	0.003692 (< 0.05)
Sentiment	0.000000	0.000000	0.000000 (< 0.05)

RQ2: Watson NLU Tendencies

Emotion	Pearson P-Value		Mann-Whitney 2-Tailed P-Value
	Escalation	Non-Escalation	
Customer Analysis			
Anger	0.000000	0.000000	0.068769
Disgust	0.000000	0.000000	0.787300
Fear	0.000000	0.000000	0.918420
Joy	0.000000	0.000000	0.167925
Sadness	0.000000	0.000000	0.570610
Sentiment	0.000000	0.000023	0.060273
Support Analyst Analysis			
Anger	0.000000	0.000000	0.003913 (< 0.05)
Disgust	0.000000	0.000000	0.194411
Fear	0.000000	0.000000	0.497468
Joy	0.000000	0.001196	0.952699
Sadness	0.000000	0.003244	0.650903
Sentiment	0.000000	0.334982 (>0.05)	0.001003 (< 0.05)

RQ3: Predictive Modelling

K Nearest Neighbors (100)

Precision 98.89%
Recall 07.74%
Summarization 96.08%

Logistic Regression

Precision 59.83%
Recall 52.04%
Summarization 56.51%

Gaussian Naive Bayes

Precision 66.94%
Recall 48.45%
Summarization 63.81%