Interpreting Code

With Natural Language Processing

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The problem

Problem

Spread of child sexual abuse material online and other harmful content, such as, cyber bullying, drug sales and hate speech.

Solution

Guardian of virtue: upholding digital ethics.

- Use machine learning to automatically detect harmful texts.

Impact

Social impact on teen's mental health.
Companies benefit from:

- Sentiment Analysis
- Hate Speech Detection
- Content Moderation

Preprocessing Procedures

Train / Test Split

Split data into train & test for modeling.

Re-sampling

To counter for class imbalance.

Count Vectorization

Transform text into numbers.

	count	hate_speech_count	offensive_language_count	neither_count	class	tweet
0	3	0	0	3	2	!!! RT @mayasolovely: As a woman you shouldn't...
1	3	0	3	0	1	!!!!! RT @mleew17: boy dats cold...tyga dwn ba...
2	3	0	3	0	1	!!!!!!! RT @UrKindOfBrand Dawg!!!! RT @80sbaby...
3	3	0	2	1	1	!!!!!!!!! RT @C_G_Anderson: @viva_based she lo...
4	6	0	6	0	1	!!!!!!!!!!!! RT @ShenikaRoberts: The shit you...

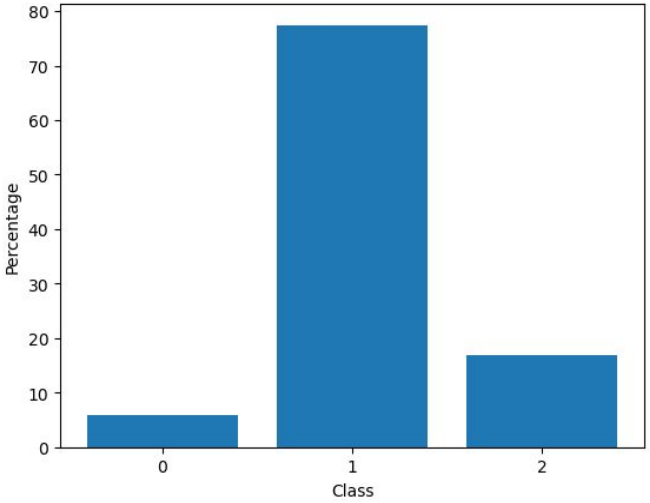
Target: class
Feature: tweet

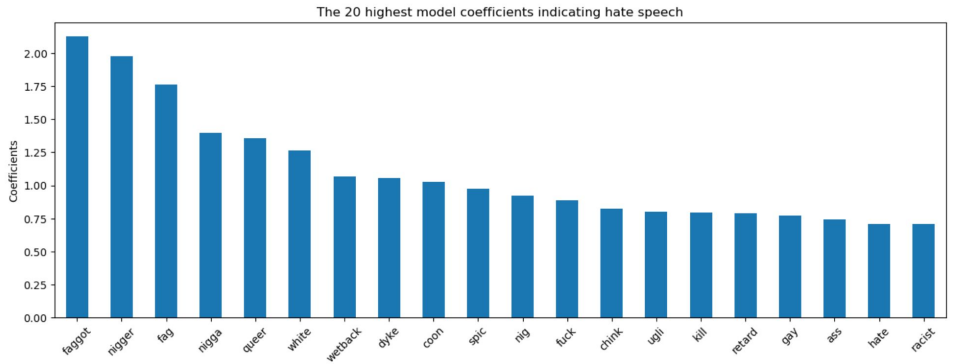
Data source: Huggingface hate_speech_offensive

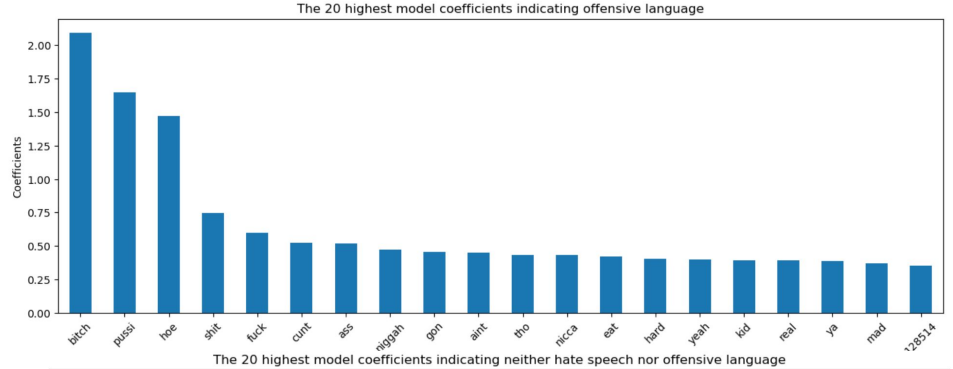
EDA

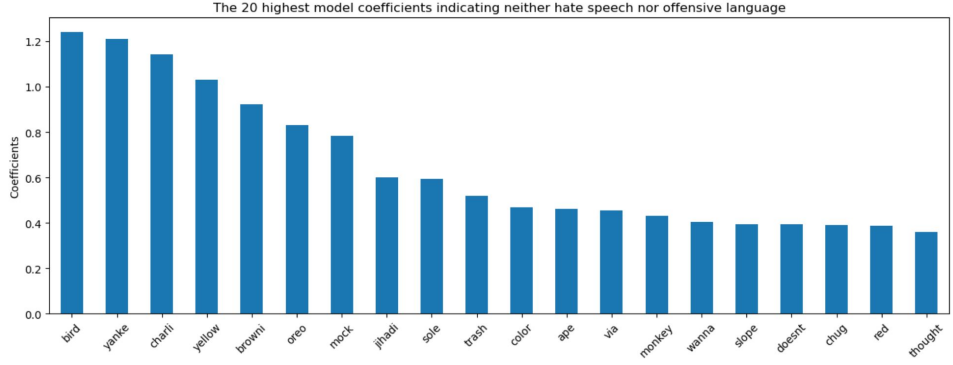
Class Imbalance

- class 0 (6%) - hate speech
- class 1 (77%) - offensive language
- class 2 (17%) - neither







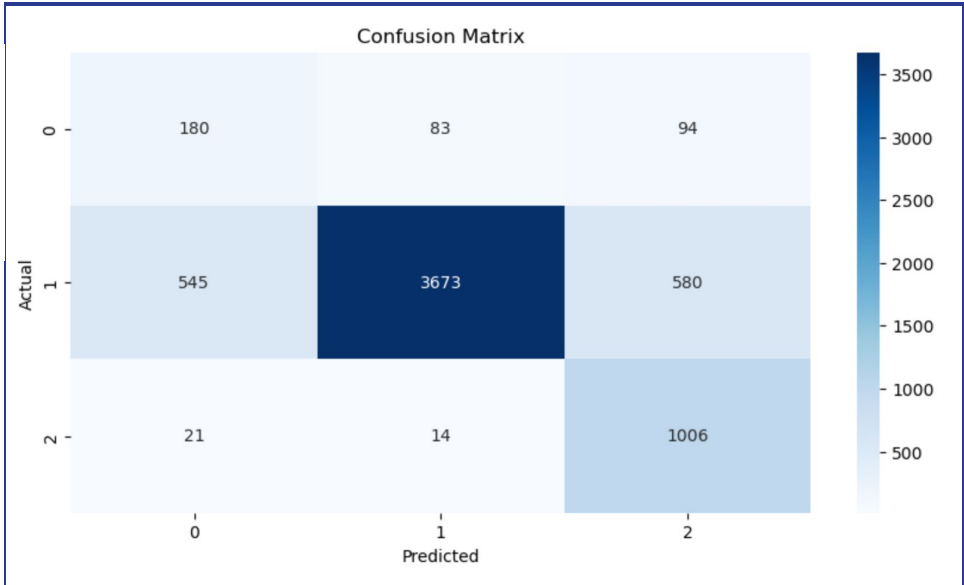


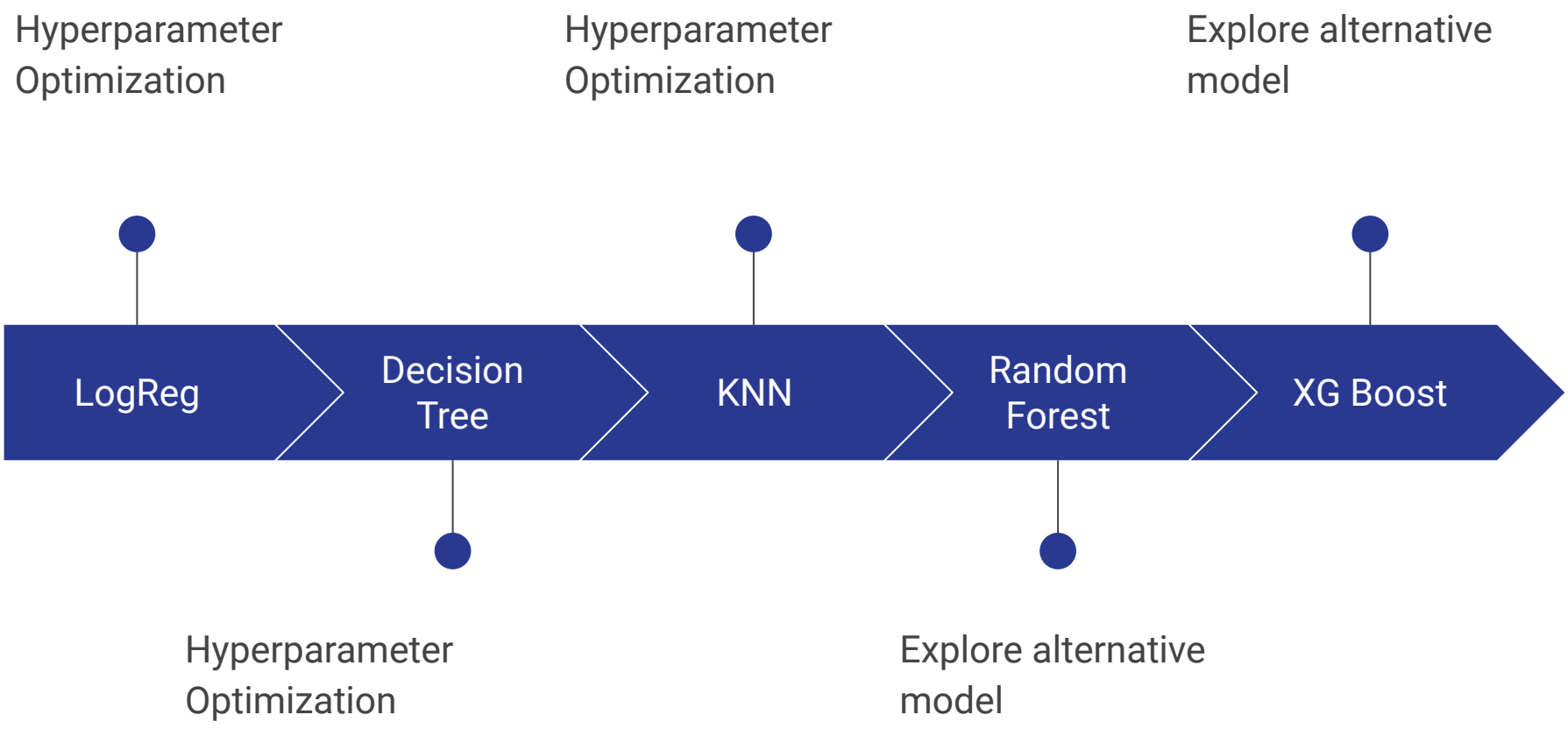
Baseline models

Model	Parameters	Train Accuracy (%)	Test Accuracy (%)	Notes
Logistic Regression	C=0.1	84.4	81.3	No overfitting
Decision Tree	max_depth=10	80	78.4	No overfitting
KNN	n/a	89.6	80	Slight overfitting

Evaluation Metrics

	precision	recall	f1-score	support
0	0.24	0.50	0.33	357
1	0.97	0.77	0.86	4798
2	0.60	0.97	0.74	1041
accuracy			0.78	6196
macro avg	0.60	0.75	0.64	6196
weighted avg	0.87	0.78	0.81	6196




Hyperparameter Optimization
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Explore alternative model
LogReg
Decision Tree
KNN
Random Forest
XG Boost
Hyperparameter Optimization
Explore alternative model

Questions