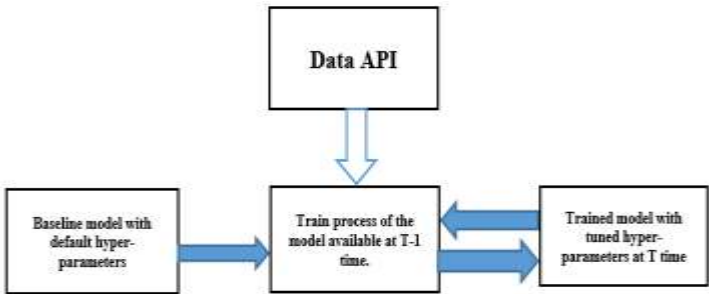


Real-time Hate Speech Detection on Social Media with Spark

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<h3>Introduction</h3> <p>With the massive increase in social interactions on online social networks, there has also been an increase of hateful activities that exploit such infrastructure.</p> <p>The need in software to effectively and reliably detect such hateful speech is important for analyzing public sentiment of a group of users towards another group, and for discouraging associated wrongful activities.</p>	<h3>Models</h3> <p>Logistic regression is widely used to predict a binary response. It is a linear method with the loss function in the formulation given by the logistic loss:</p> $L(w; x, y) := \log(1 + \exp\{-y w^T x\}).$ <p>Random forest is an ensemble learning method for classification that operate by constructing a multitude of decision trees at training time and outputting the class that is the mode of the classes of the individual trees.</p> $f = \frac{1}{B} \sum_{b=1}^B f_b(x)$ <p>Gradient-Boosted Trees (GBTs) are ensembles of decision trees. GBTs iteratively train decision trees in order to minimize a loss function.</p>	<h3>Results</h3> <table><tr><td></td><td>precision</td><td>recall</td><td>accuracy</td><td>F1</td></tr><tr><td>LR</td><td>0.73</td><td>0.78</td><td>0.77</td><td>0.75</td></tr><tr><td>RF</td><td>0.7</td><td>0.8</td><td>0.76</td><td>0.74</td></tr><tr><td>GBDT</td><td>0.72</td><td>0.81</td><td>0.77</td><td>0.76</td></tr></table>		precision	recall	accuracy	F1	LR	0.73	0.78	0.77	0.75	RF	0.7	0.8	0.76	0.74	GBDT	0.72	0.81	0.77	0.76
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<h3>Datasets</h3> <p>The dataset we used is publicly available here.</p> <p>count: 31962 row, 3 col</p> <p>id : integer = id of a post</p> <p>label : integer = 0 (no offense) #count (18217) 1 (offense) #count (13745)</p> <p>tweet : string = the post from a user</p>	<h3>Architecture</h3>  <pre>graph TD; DataAPI[Data API] --> TrainProcess[Train process of the model available at T-1 time.]; BaselineModel[Baseline model with default hyper-parameters] --> TrainProcess; TrainProcess --> TrainedModel[Trained model with tuned hyper-parameters at T time.];</pre>																					