

Fake News Detection Bot in social media

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[GitHub](#)

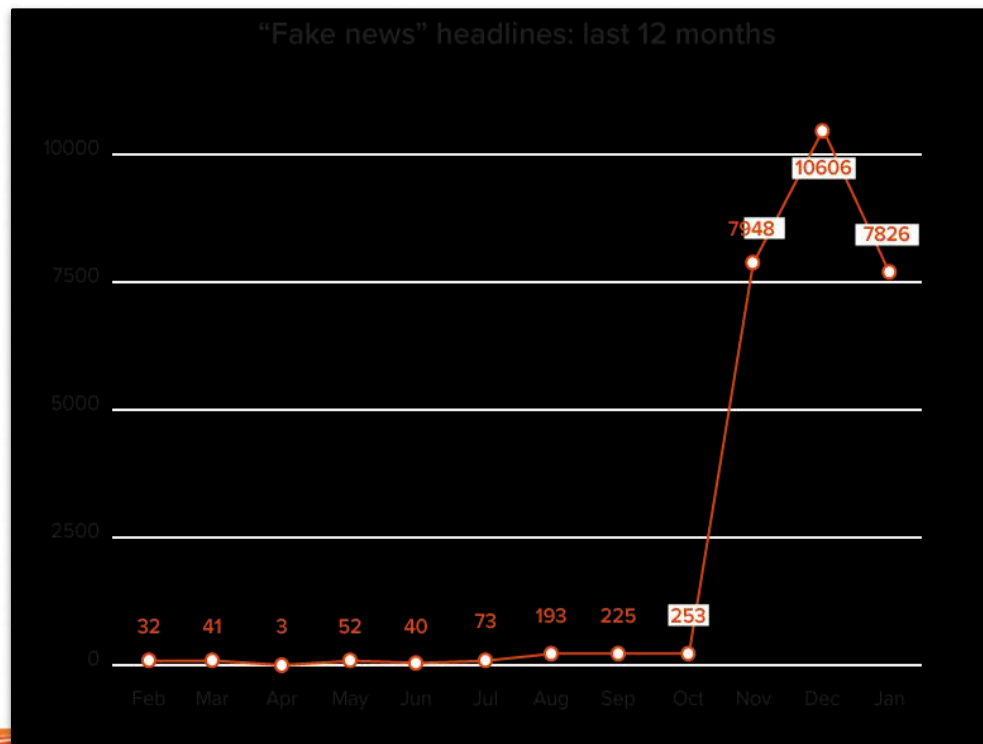
Motivation

- ◆ Prevalence of fake news on social media

- ◆ Emerging research area in Natural Language Processing

- ◆ Basic countermeasures inflexible and inefficient

- ◆ Current progress in this area



Problem Statement

◆ Develop a machine learning program to identify fake/unreliable news based on content acquired like image and text, if possible in video.

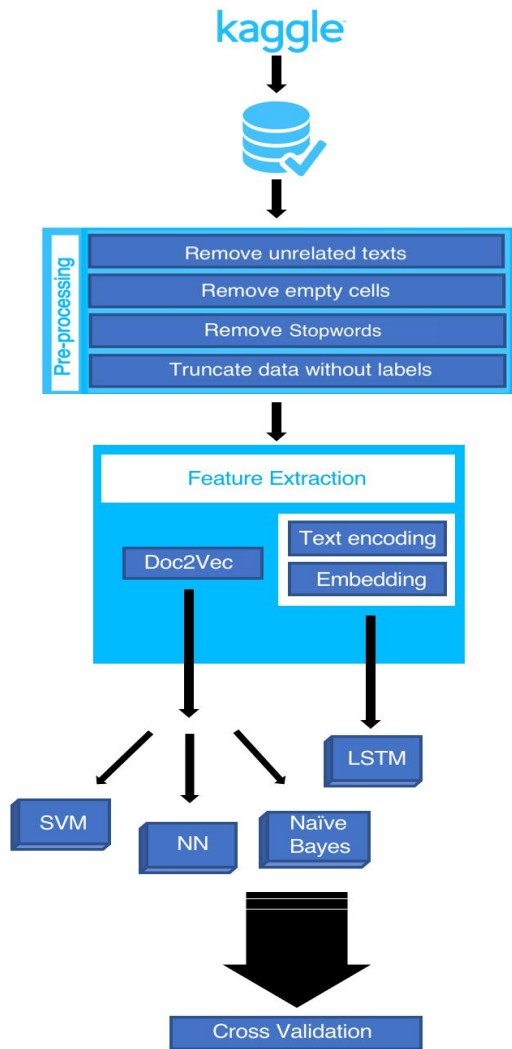


Data

- ◆ Dataset source - Kaggle
- ◆ Scrapped various website to get Data
- ◆ ID, Title, Author, Text, Label
- ◆ Label 1 - Unreliable
- ◆ Label 0 - Reliable

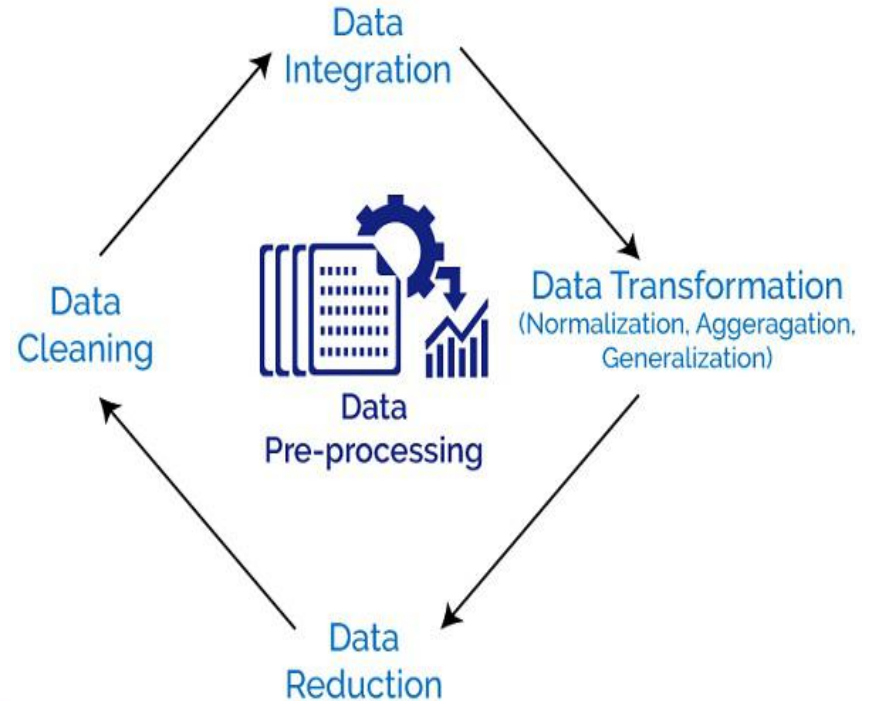
id	title	author	text	label	
0	House Der	Darrell Luc	House	1	
1	FLYNN: Hi	Daniel J. F	Ever get th	0	
2	Why the T	Consortiur	Why the	1	
3	15 Civilian	Jessica Pul	Videos 15	1	
4	Iranian wc	Howard Po	Print	1	
5	Jackie Ma	Daniel Nus	In these tr	0	
6	Life: Life C	nan	Ever	1	
7	Benoît F	Alissa J. Ru	PARIS "â€"	0	
8	Excerpts F	nan	Donald J. "	0	
9	A Back-Ch	Megan Tw	A week be	0	
10	Obamaâ€	Aaron Klei	Organizing	0	
11	BBC Come	Chris Tom	The BBC p	0	
12	Russian Re	Amando F	The	1	
13	US Official	Jason Ditz	Clinton	1	
14	Re: Yes, Th	AnotherAr	Yes,		
BART SIMPSONSON					
Hey	itâ€™s jus	channels	and programs	fellating them	da
Itâ€™s not	I imagine	oil compa	difficult to	know who to	trust o
In any soc	most people	do nothing.	Itâ€™s up to	the minority	tc
If I read the	article correctly	the government	is targeting	conserv	
The DNC is	stupid and	but these j	@ck@sses	ramp it up	to 11.) Ta
I almost p	which wa	especially	1		

Workflow



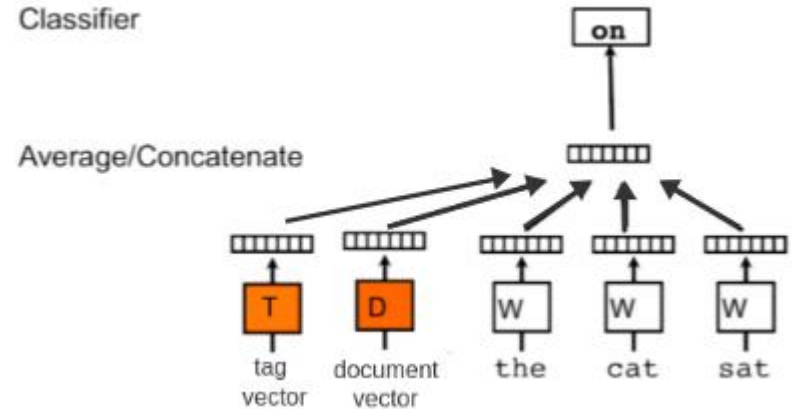
Data Preprocessing

- Perform various text cleaning steps (remove all non-alphanumeric characters, delete stopwords, delete missing rows, etc.)
- For Doc2Vec, convert to LabeledSentences(), comma separated word format



Doc2Vec Model

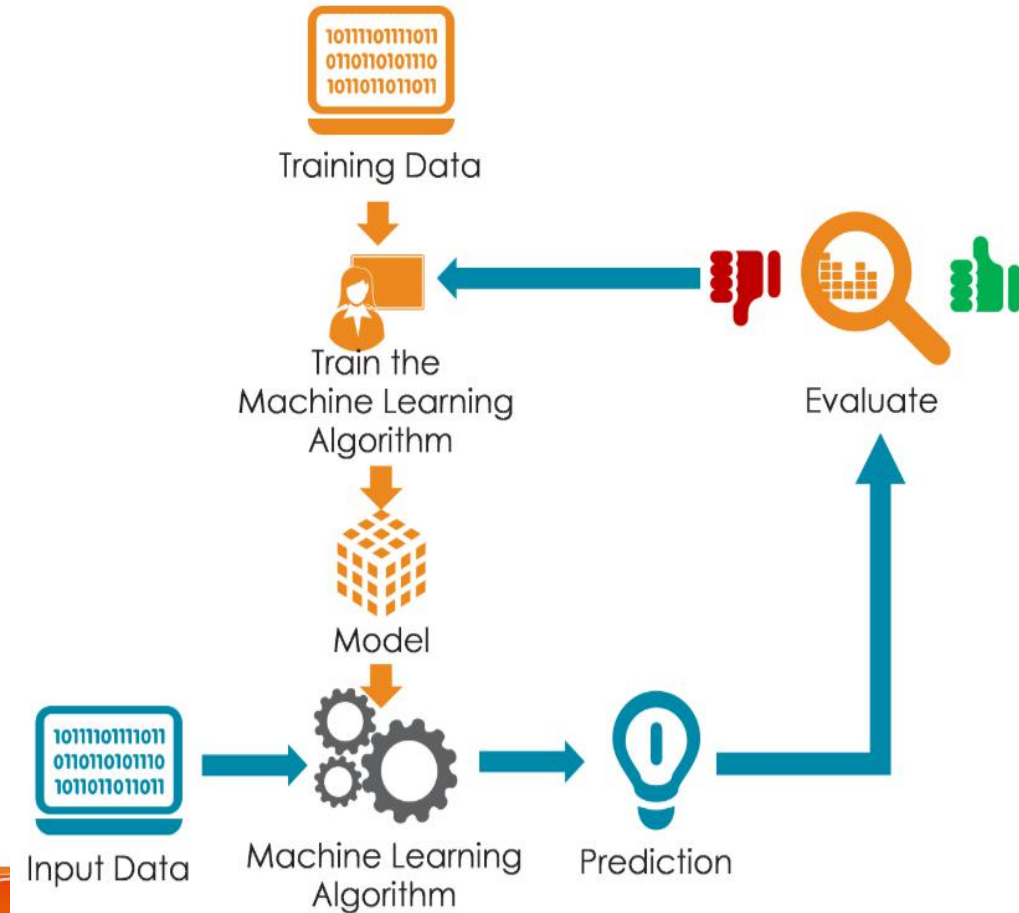
- ◆ Based on Word2Vec model
- ◆ Preserves word order information
- ◆ Extracts Word2Vec features and adds an additional “document vector” with information about the entire document



Training a Model

◆ Models used-

- Naive Bayes
- Support Vector Machine (SVM)
- Neural Network
- Long Short-Term Memory (LSTM)
- RNN



Naive Bayes

◆ Classification technique based on Bayes' theorem with an assumption of independence among predictors

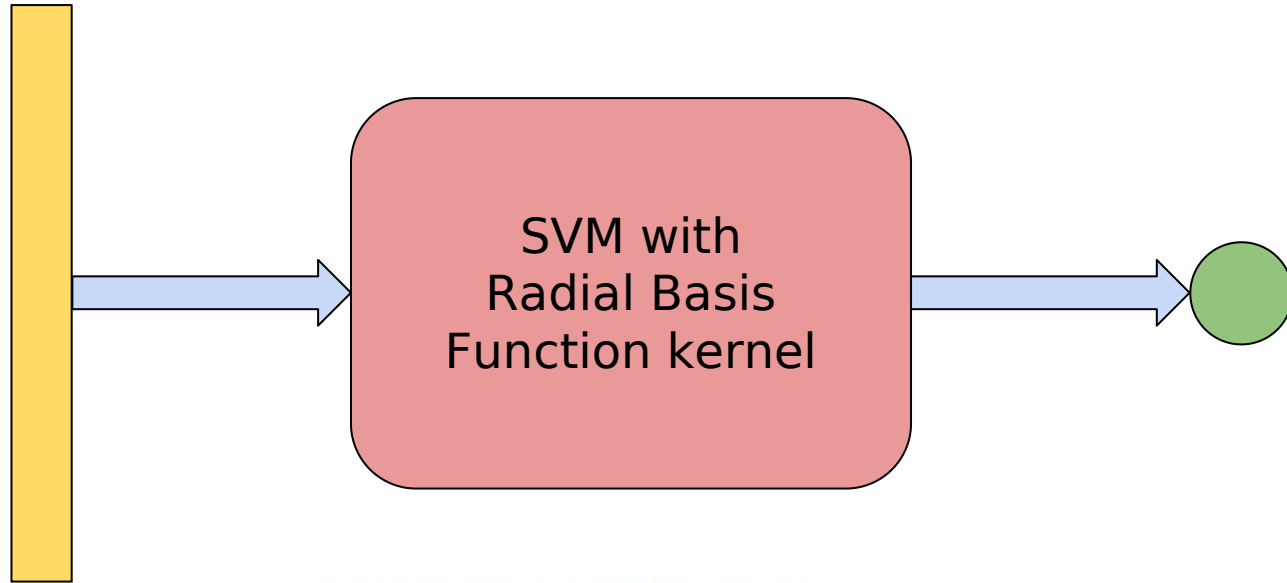
1. Convert data set into a frequency table
2. Create likelihood table by finding probabilities
3. Use Naive Bayesian equation to calculate posterior

The diagram shows the Naive Bayes equation $P(c|x) = \frac{P(x|c)P(c)}{P(x)}$ with four labels and arrows pointing to the corresponding parts of the equation:

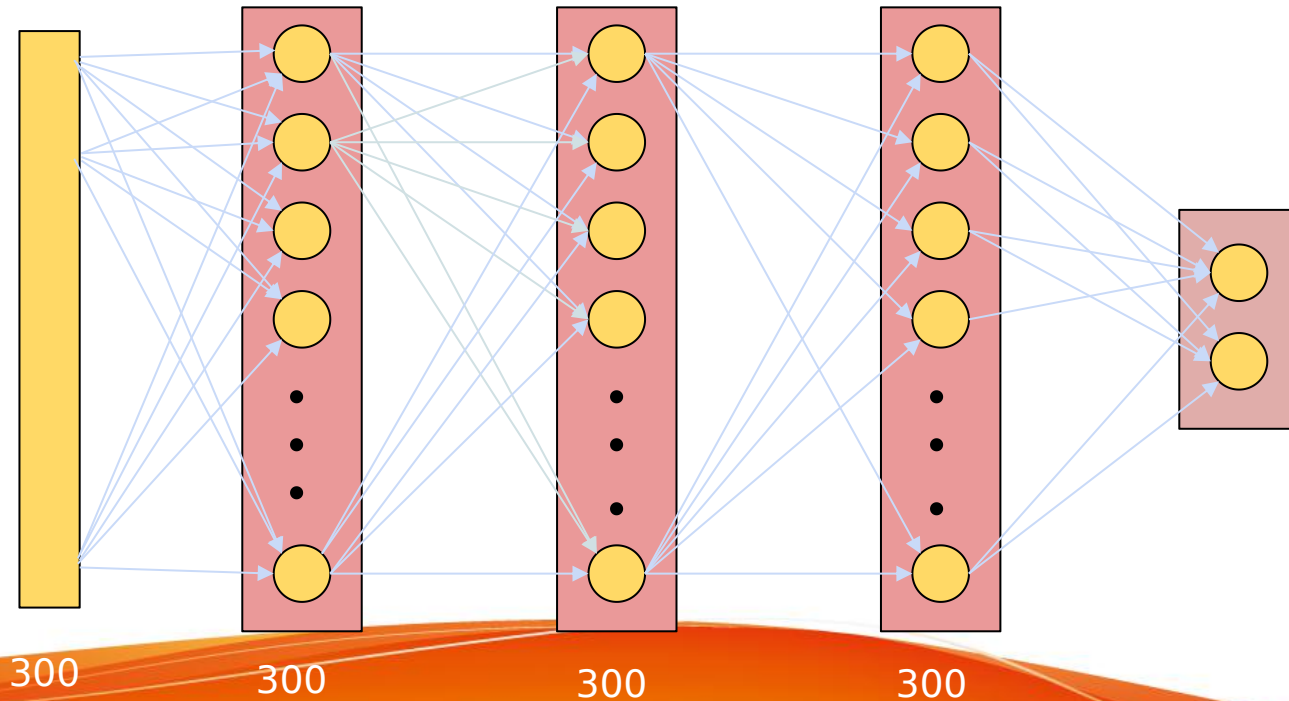
- Likelihood** points to $P(x|c)$
- Class Prior Probability** points to $P(c)$
- Posterior Probability** points to $P(c|x)$
- Predictor Prior Probability** points to $P(x)$

$$P(c|X) = P(x_1|c) \times P(x_2|c) \times \dots \times P(x_n|c) \times P(c)$$

Support Vector Machine (SVM)



Neural Network



Neural Network

TensorFlow

Hidden Layer Structure
(300, 300)
(300, 300, 300)

Learning rate:
0.001

Training Steps:
20000

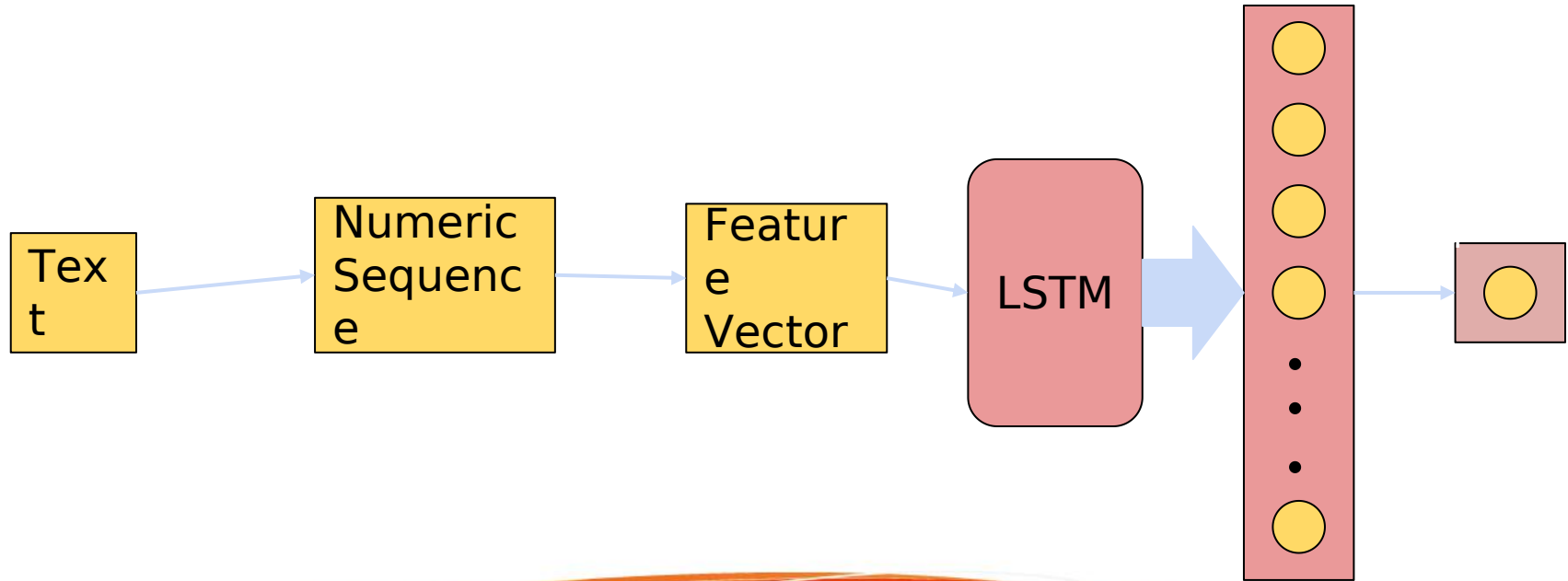
Keras

Hidden Layer Structure
(256, 256, 80)

Learning rate:
0.01

Training Steps:
10000

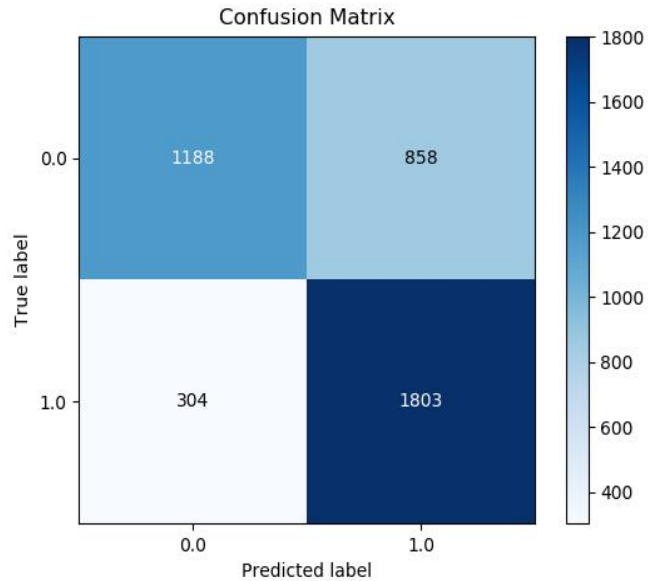
LSTM



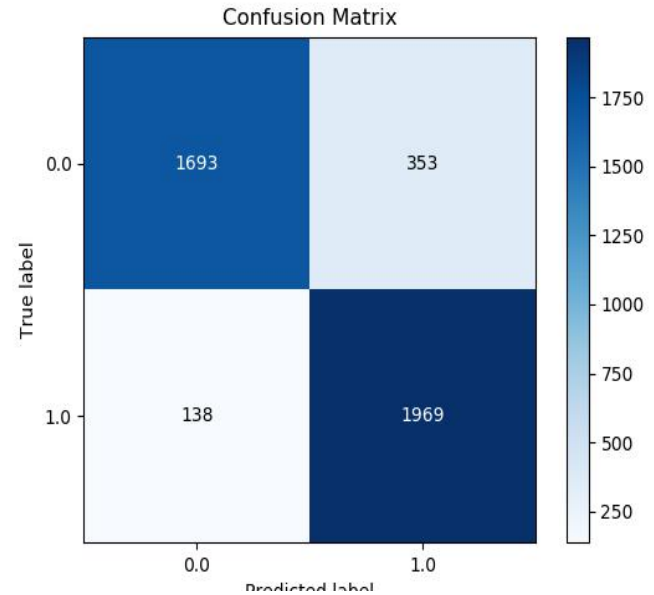
Comparison of Models

Model	Accuracy
Naive Bayes	72.94%
SVM	88.42%
Neural Network using TensorFlow	81.42%
Neural Network using Keras	92.62%
LSTM	94.53%

Confusion Matrices

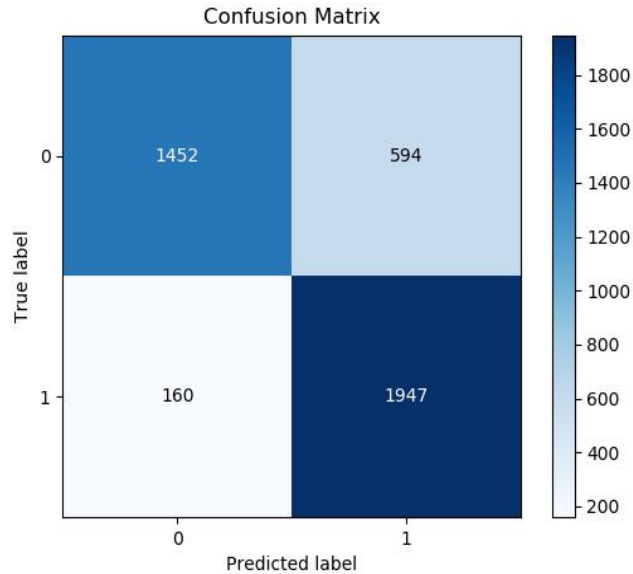


Naive Bayes

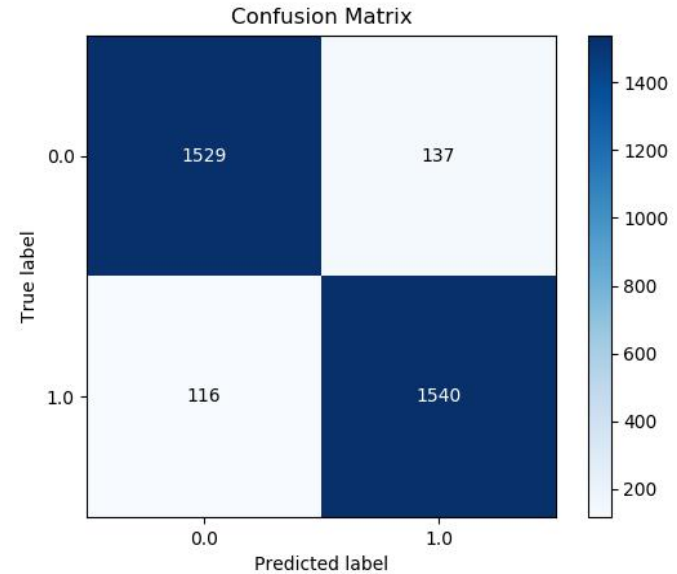


SVM

Confusion Matrices

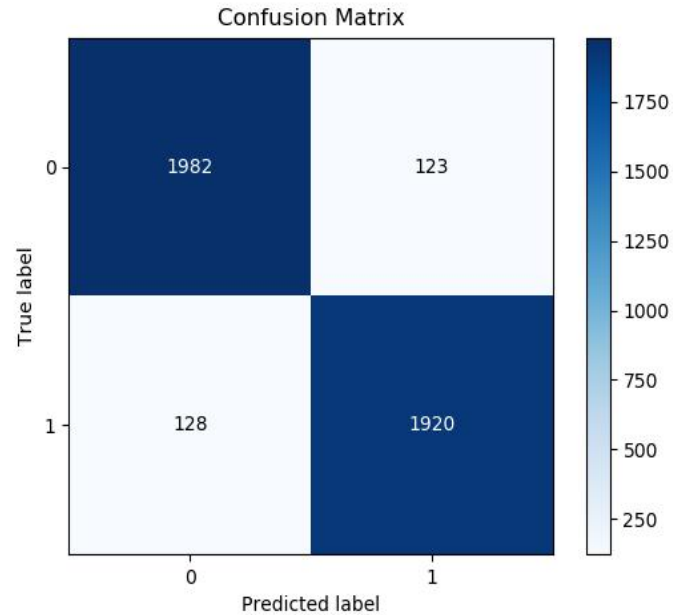


Neural Network using
TensorFlow



Neural Network using Keras

Confusion Matrices



LSTM

Challenges Faced

- ◆ Lack of clean data to directly work with might have slowed down our progress
- ◆ The loss to value of information in a real scenario for news is very high
- ◆ Content based classification is just a part of the whole picture
- ◆ Distinguish between click-bait and actual fake news



Future Work

- ◆ Assemble the classifiers to achieve better performance
 - Adam Boost
- ◆ Check the sources of the news
- ◆ Search the news on the web to check the content of the news



Data's all, folks!
Thank You!



References

- ◆ [Fake News Detection: A Data Mining Perspective](#)
- ◆ [Fake News Identification - Stanford CS 229](#)
- ◆ [BS Detector](#)
- ◆ [Datasets from Kaggle](#)
- ◆ <https://github.com/rockash/Fake-news-Detection>
- ◆ <https://github.com/holwech/NewsScraper>