

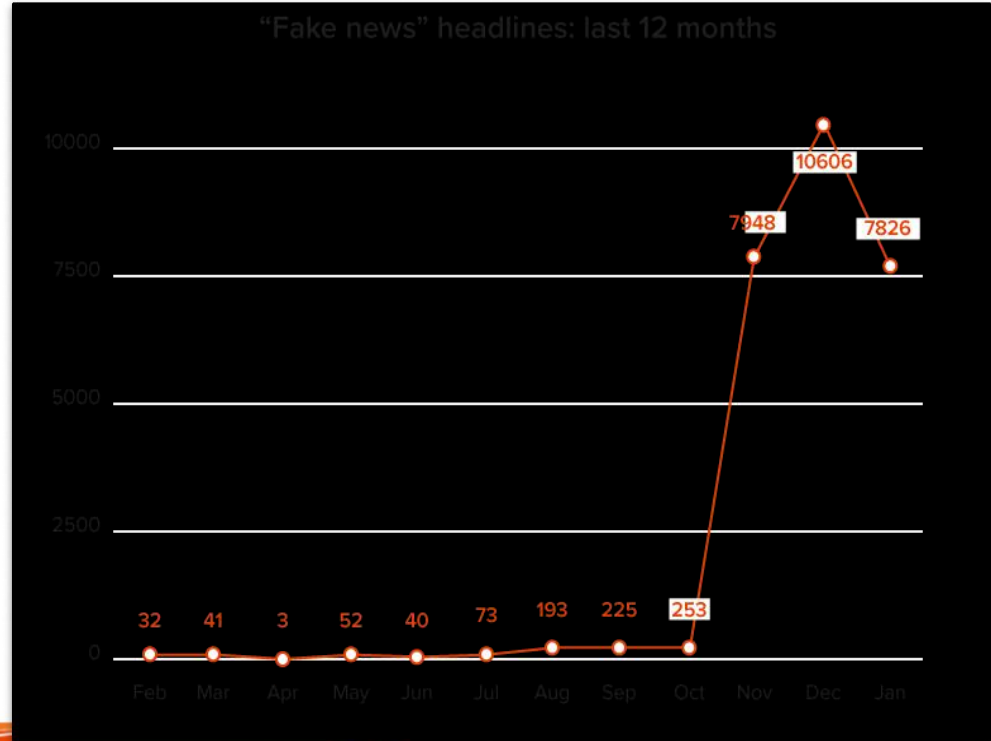
# Fake News Detection Bot in social media

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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

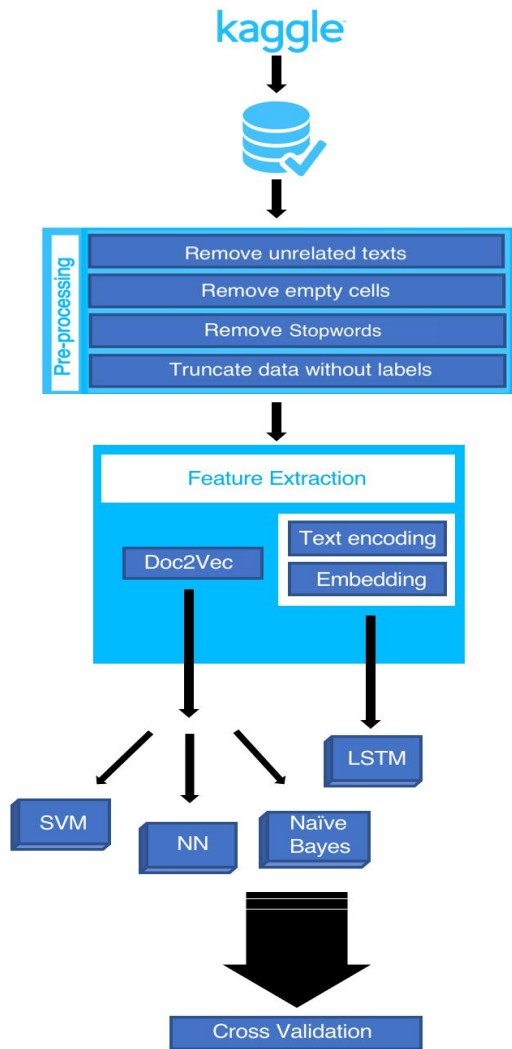
◆ ID, Title, Author, Text, Label

◆ Label 1 - Unreliable

◆ Label 0 - Reliable

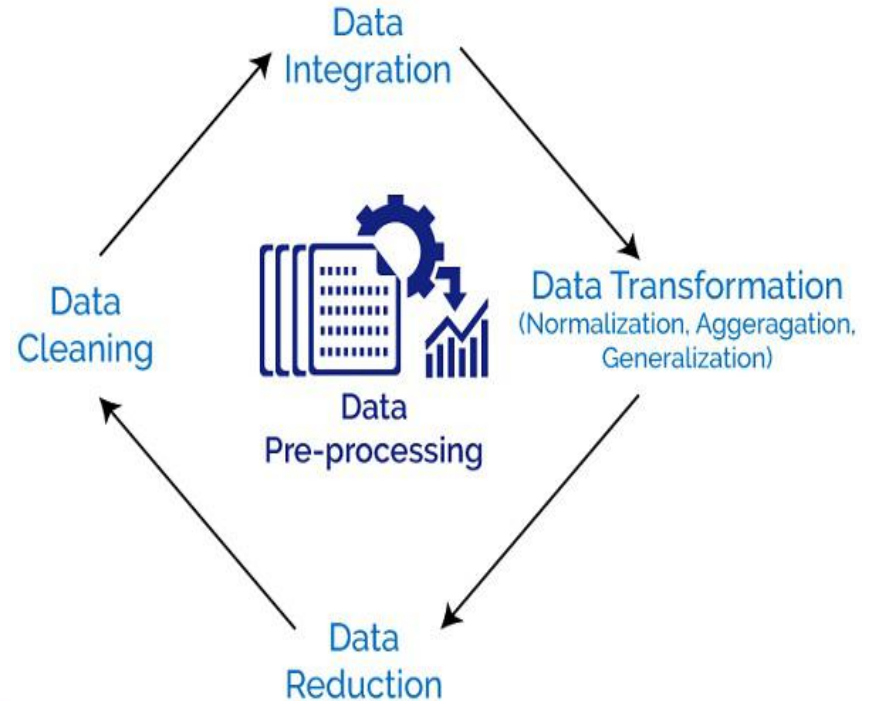
id	title	author	text	label	
0	House Der	Darrell Luc	House	1	
1	FLYNN: Hi	Daniel J. F	Ever get th	0	
2	Why the T	Consortiur	Why the	1	
3	15 Civilian	Jessica Pul	Videos 15	1	
4	Iranian wc	Howard Po	Print	1	
5	Jackie Ma	Daniel Nus	In these tr	0	
6	Life: Life C	nan	Ever	1	
7	Benoît F	Alissa J. Ru	PARIS "â€"	0	
8	Excerpts F	nan	Donald J. T	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



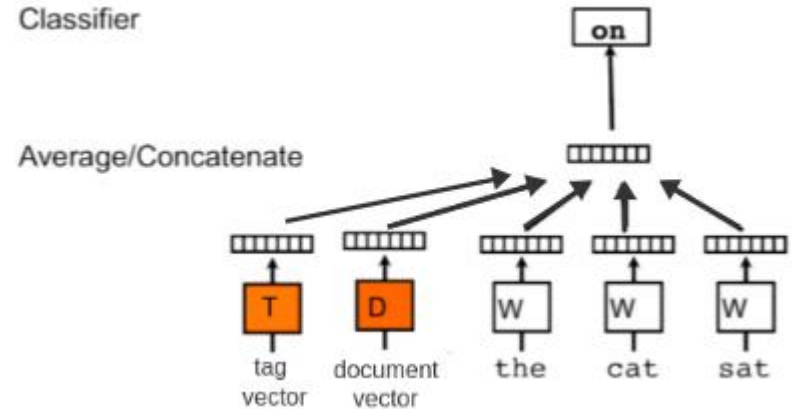
# Data Preprocessing

- 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

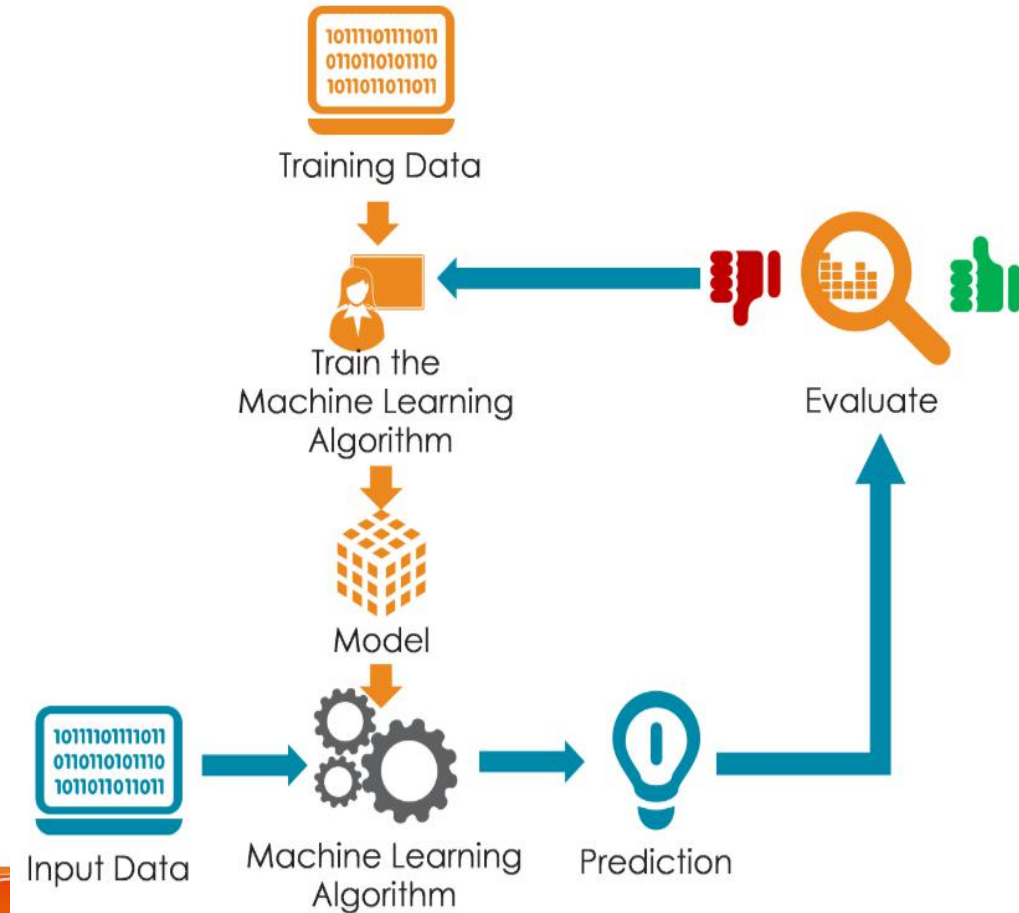
- ◆ Based on Word2Vec model
- ◆ Preserves word order information
- ◆ Extracts Word2Vec features and adds an additional “document vector” with information about the entire document



# 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

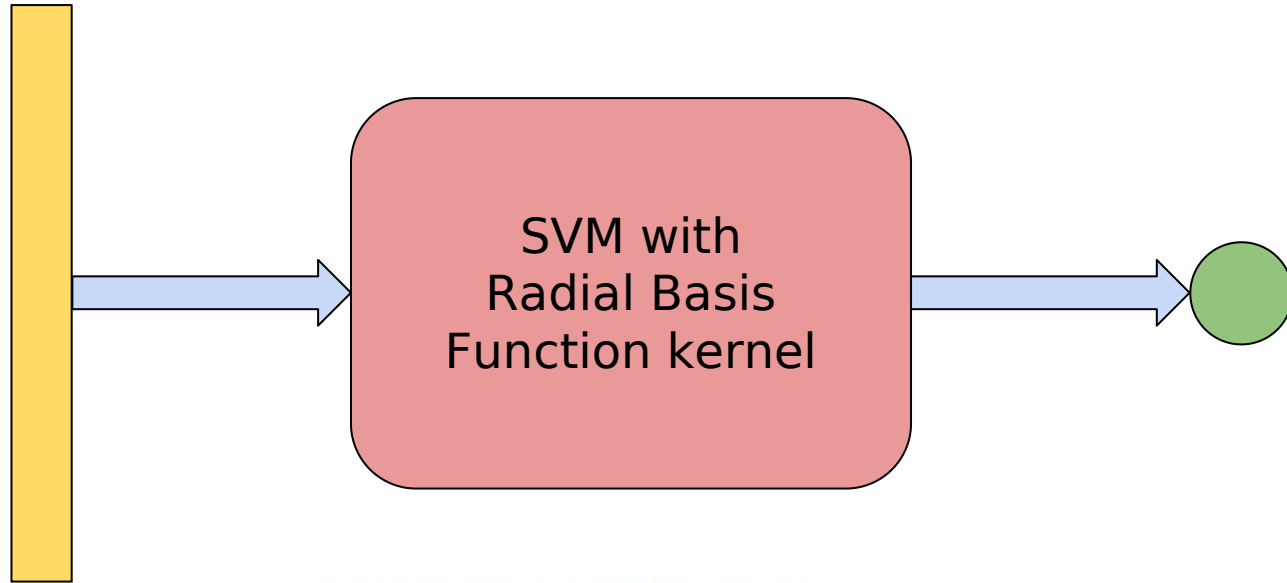
1. Convert data set into a frequency table
2. Create likelihood table by finding probabilities
3. Use Naive Bayesian equation to calculate posterior

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:

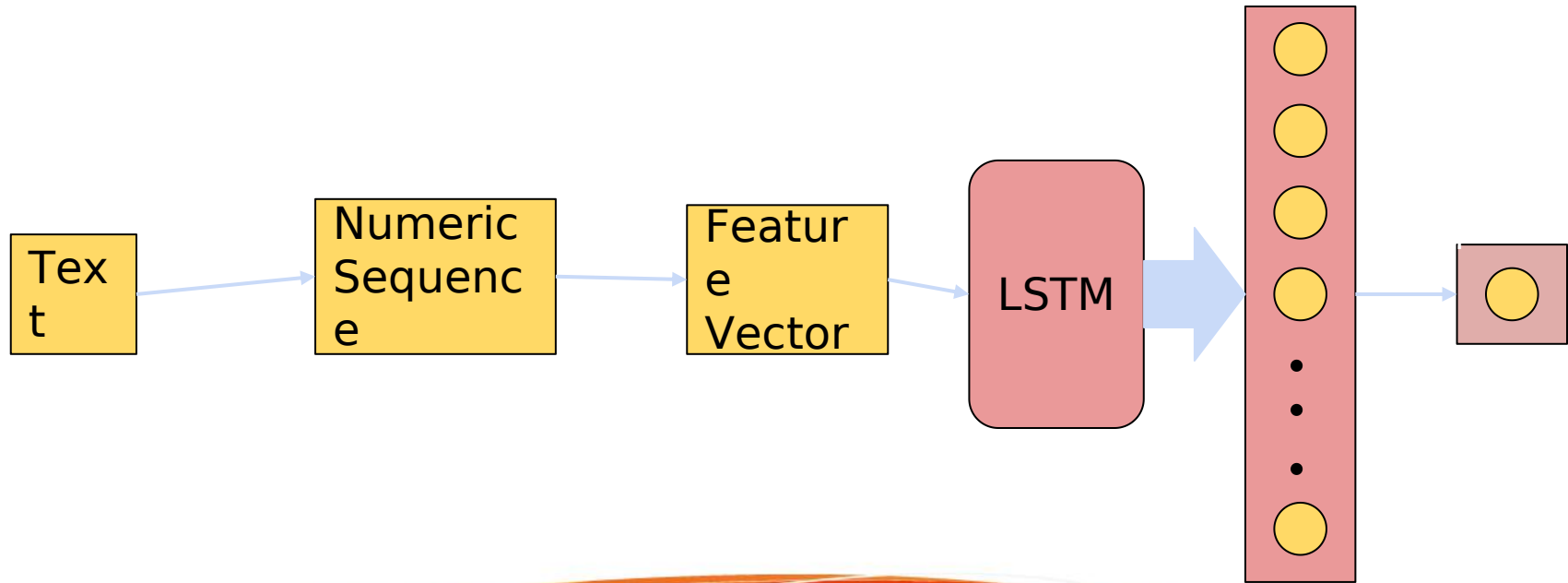
- Likelihood** points to  $P(x|c)$
- Class Prior Probability** points to  $P(c)$
- Posterior Probability** points to  $P(c|x)$
- Predictor Prior Probability** points to  $P(x)$

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

# Support Vector Machine (SVM)

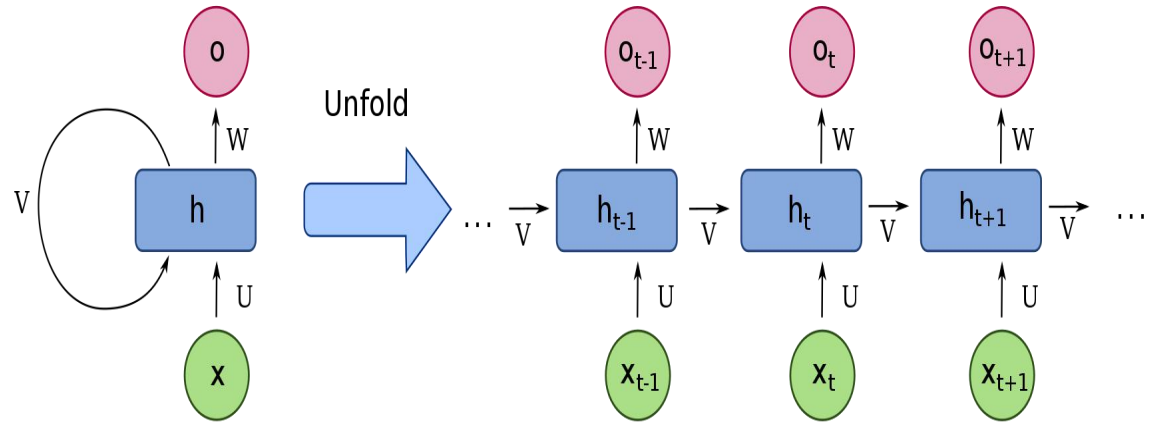


# LSTM



# Simple RNN(Recurrent Neural Network)

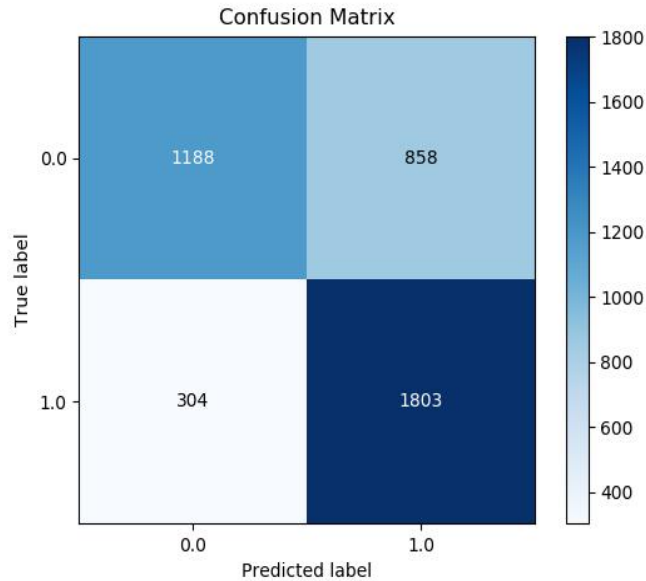
A recurrent neural network (RNN) is a class of artificial neural networks where connections between nodes form a directed graph along a temporal sequence.



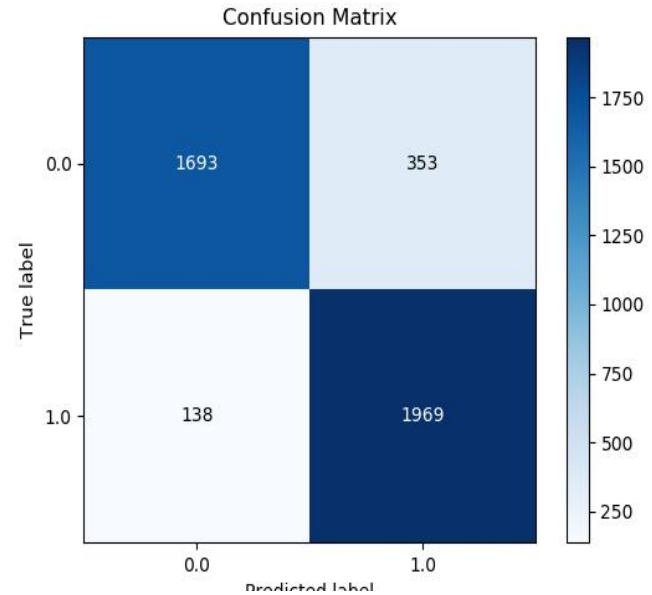
# Comparison of Models

Model	Accuracy
Naive Bayes	72.94%
SVM	88.42%
Simple RNN	94.12%
LSTM	94.53%

# Confusion Matrices



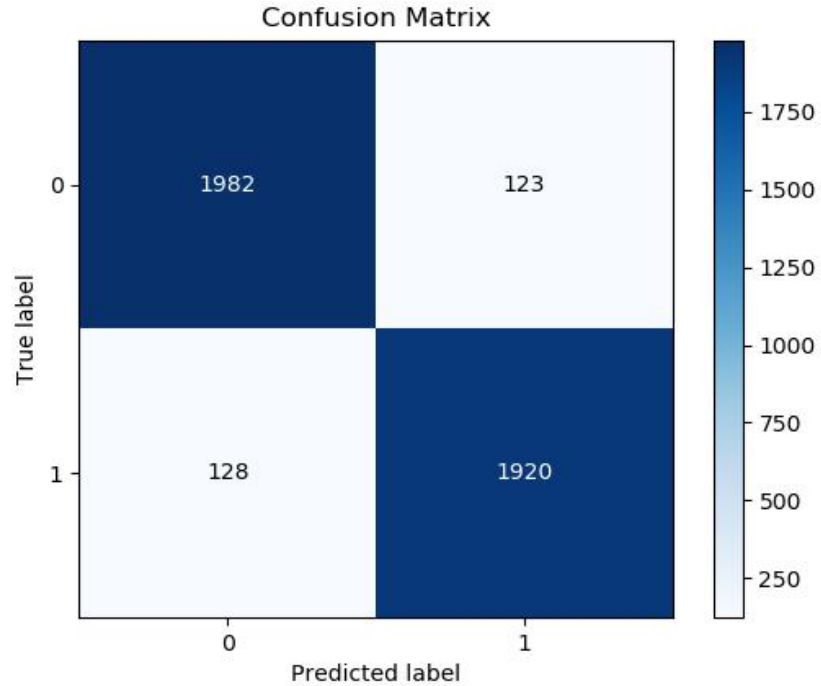
Naive Bayes



SVM

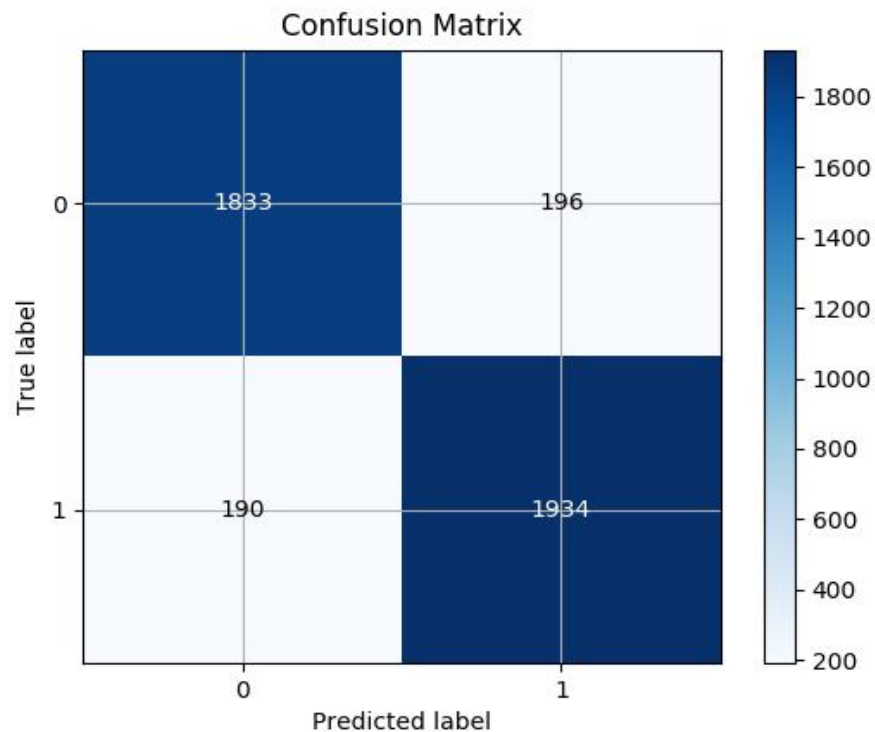
# Confusion Matrices

LSTM



# Confusion Metrices

SimpleRNN





# 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/holwech/NewsScraper>
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