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Combining Machine Learning with Knowledge Engineering to Detect Fake News in Social Networks - A Survey

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Research

Topic

Distinguishes between fake and non fake news articles on news media.

Sub Question

How can machine learning and knowledge engineering be combined to better identify fake news?”

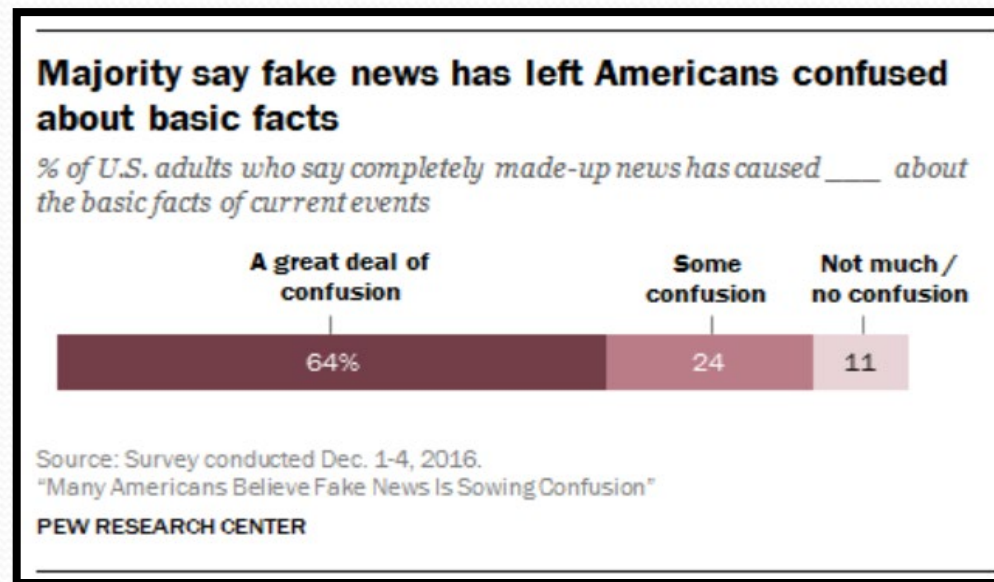
Facts & Stats

- Study from Pew Research Centre

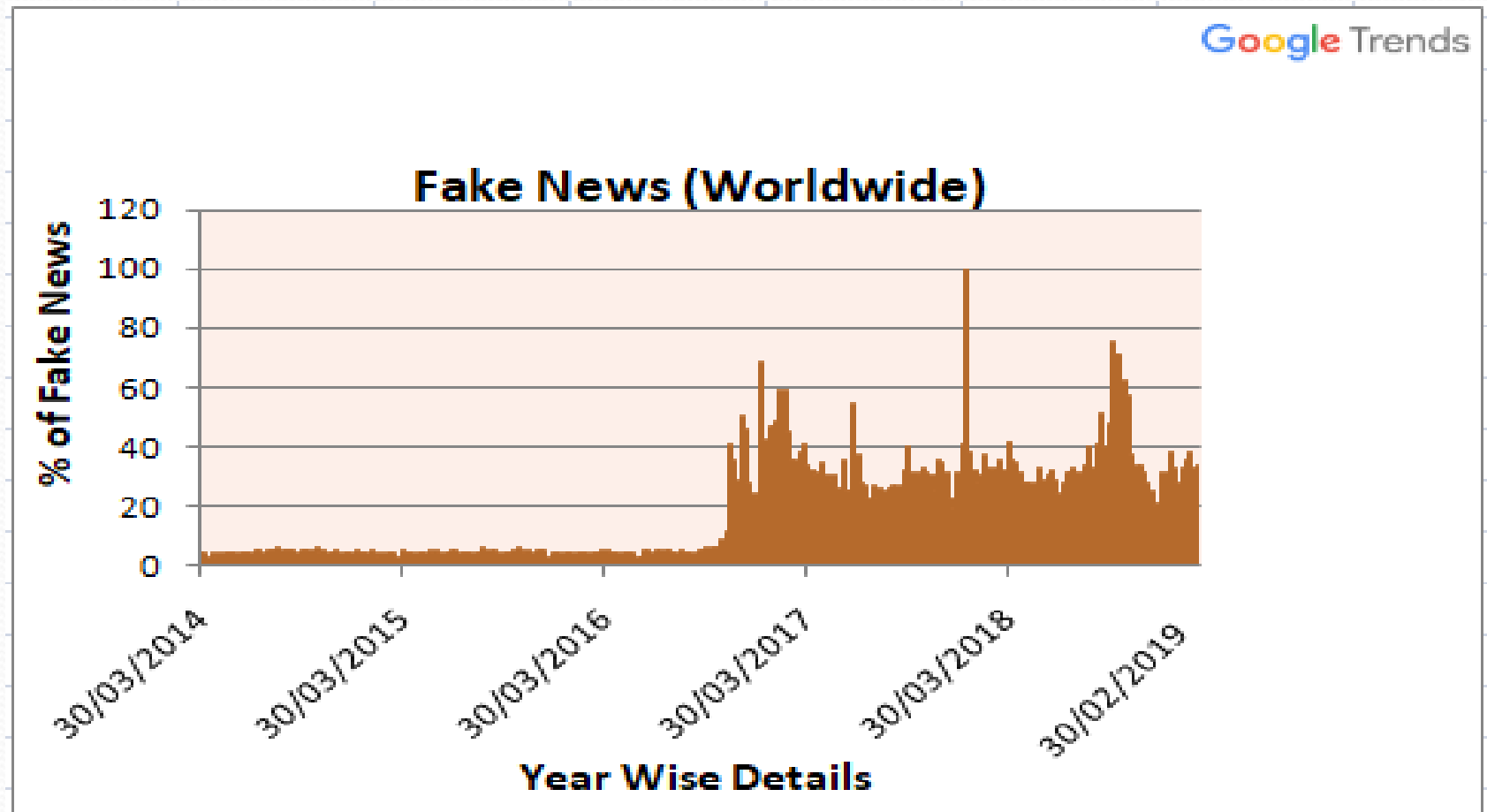
38% adults often gets news online

28% websites/apps

18% social media



Google Trends



Source: Last five years Google trend from 30/03/2014 to 30/02/2019

Fake News

■ What is Fake News?

- Yellow journalism or propaganda
- Consists of deliberate misinformation
- Published with the intent to mislead

■ Types of Fake News

- False connection
- False context
- Manipulated content
- Satire or Parody
- Misleading content
- Imposter content
- Fabricated content

	Satire	False Connection	Misleading Content	False Context	Imposter Content	Manipulated Content	Fabricated Content
Poor journalism		✓	✓	✓			
To Parody	✓				✓		✓
To Provoke or to 'punk'					✓	✓	✓
Passion				✓			
Partisanship			✓	✓			
Profit		✓			✓		✓
Political Influence			✓	✓		✓	✓
Propaganda			✓	✓	✓	✓	✓

Fact Checking Example

- Fact checking by humans

Q: Did Pope Francis endorse Donald Trump? Is Tom Hanks supporting him?

A: No, the pope has not endorsed him, and Tom Hanks does not support him.

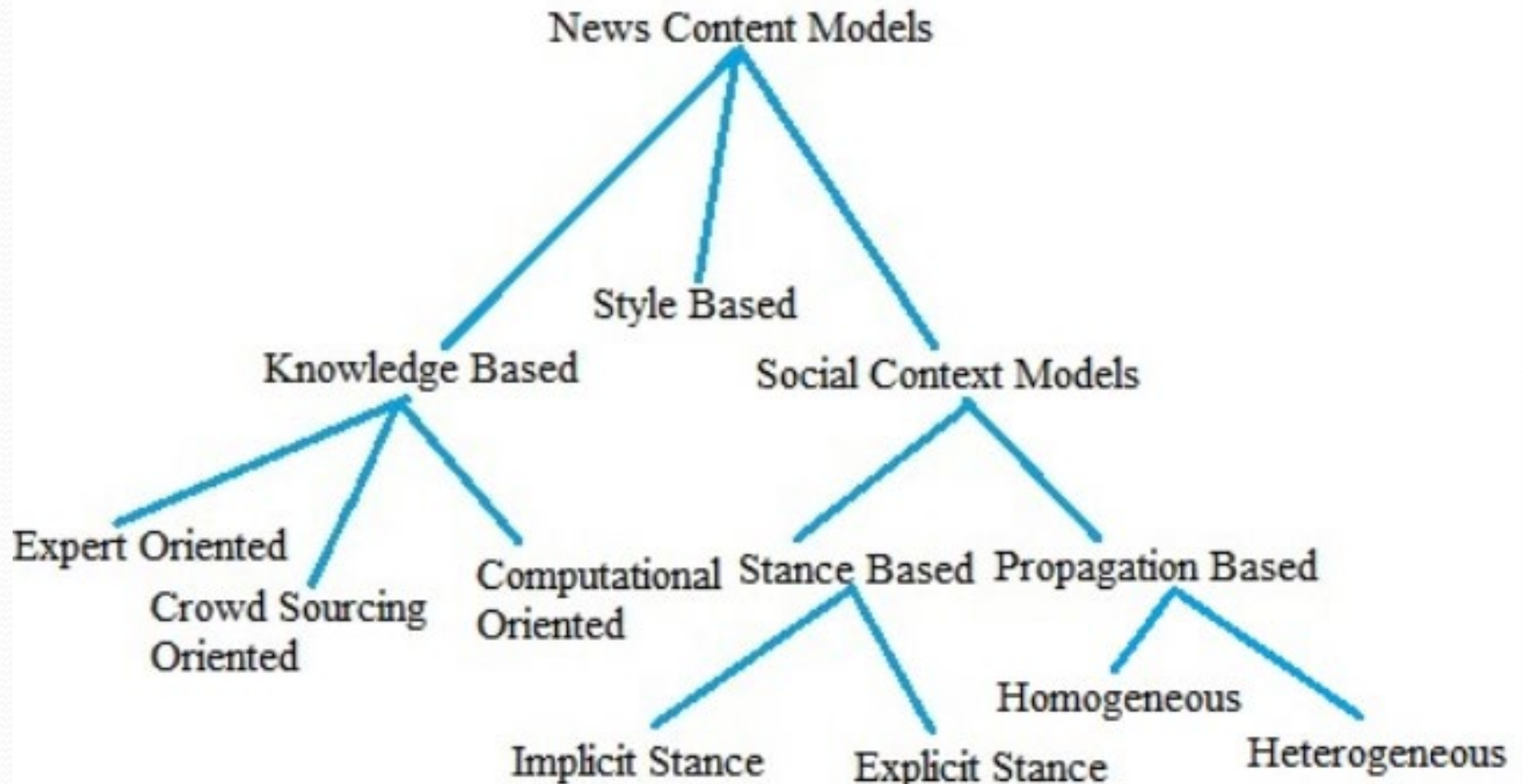
Fake of course. Pope Francis' supposed endorsement of Trump originated on the satirical website WTOE 5 News, with the headline "*Pope Francis Shocks World, Endorses Donald Trump for President, Releases Statement.*" **961,000 Facebook shares, comments and reactions**



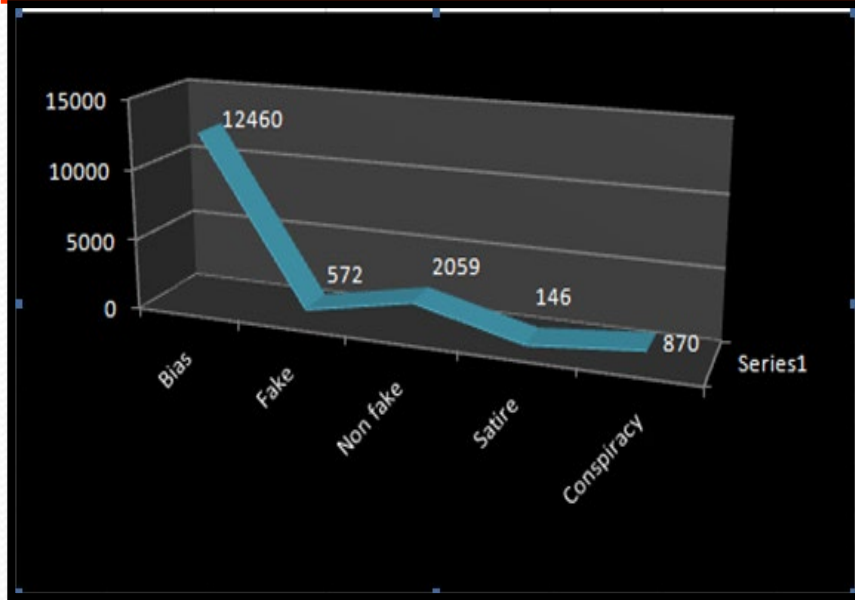
Similar Applications

- **Spam detection**
 - input: document
 - classes: spam / ham
- **Hot topic detection**
 - input: Key Words
 - classes: Hot Topic/ Not
- **Clickbait Detection**
 - input: Key Words
 - classes: Yes / No

Taxonomy of Approaches



First Experiments



•Data Set

17946 News Articles:

Biased : **12460**

Fake: **572**

Non Fake: **2059**

Conspiracy: **870**

Satire: **146**

• Meta data

- Location of the article
- publication details
- Author
- Date
- Unique id

• Indicators

- Replies
- Participants
- likes
- Comments
- Total number of shares

Suggested Approach

Data Driven

Text Classification

Classify as fake or non fake

Issue: Possible for tracking rumors in social media, not fact checking.

Stance Detection

Understand what others are saying about the same topic

Issue: Embedding features on individual posts to predict stance of that particular content.

Knowledge Engineering

Fact Checking

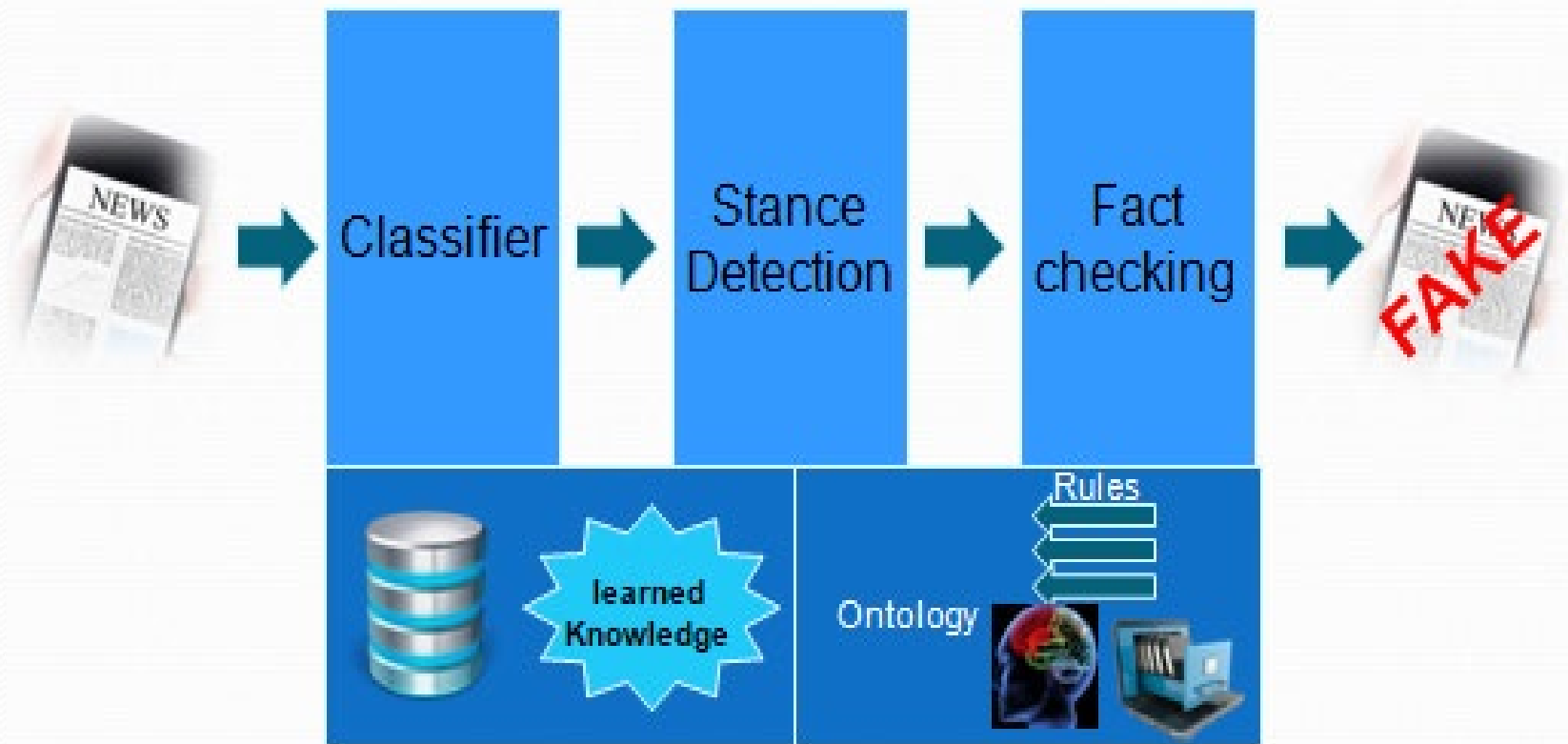
Check the fact of the news on the basis of the known facts.

Topic
Author
Source

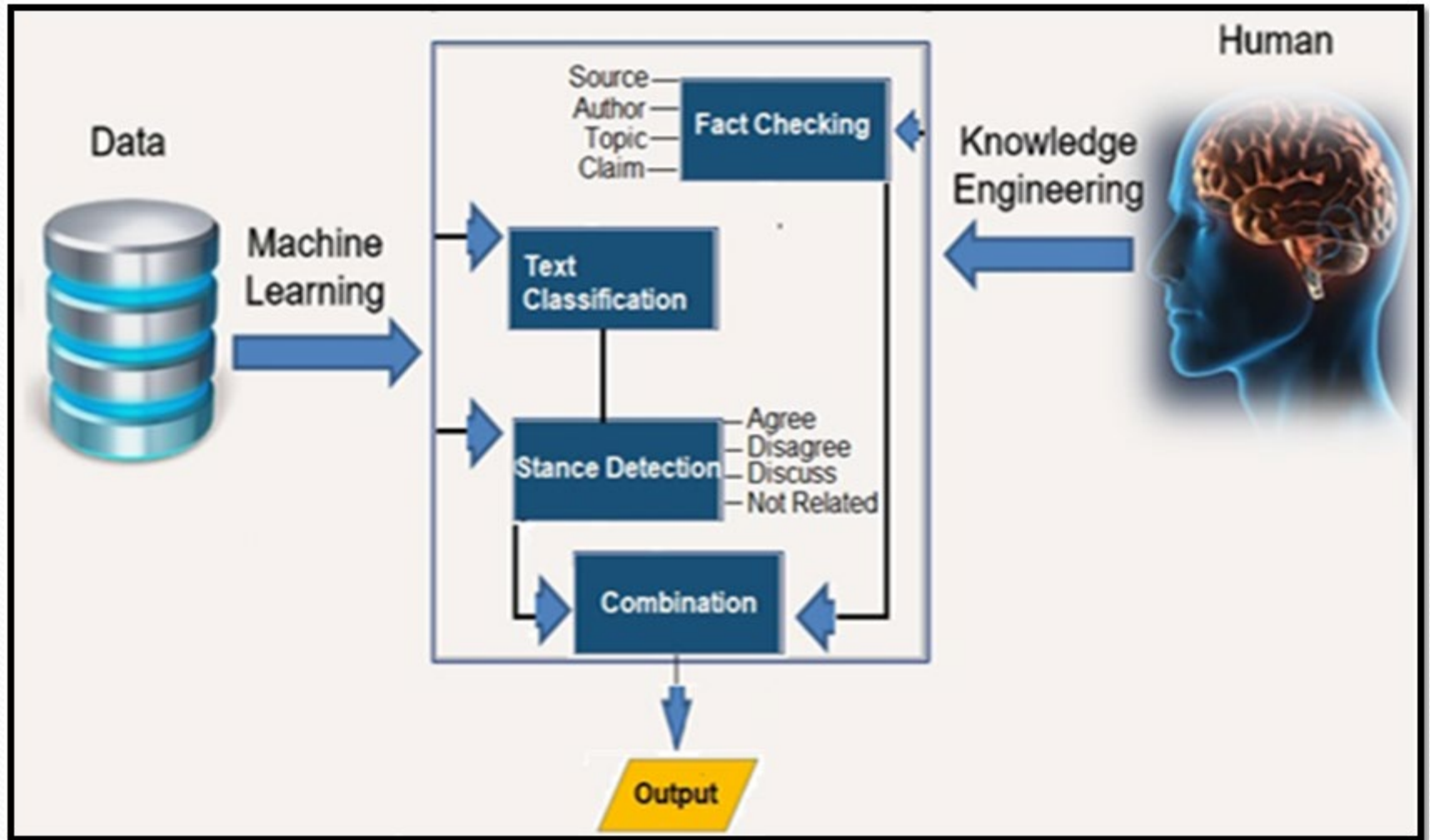
Combining

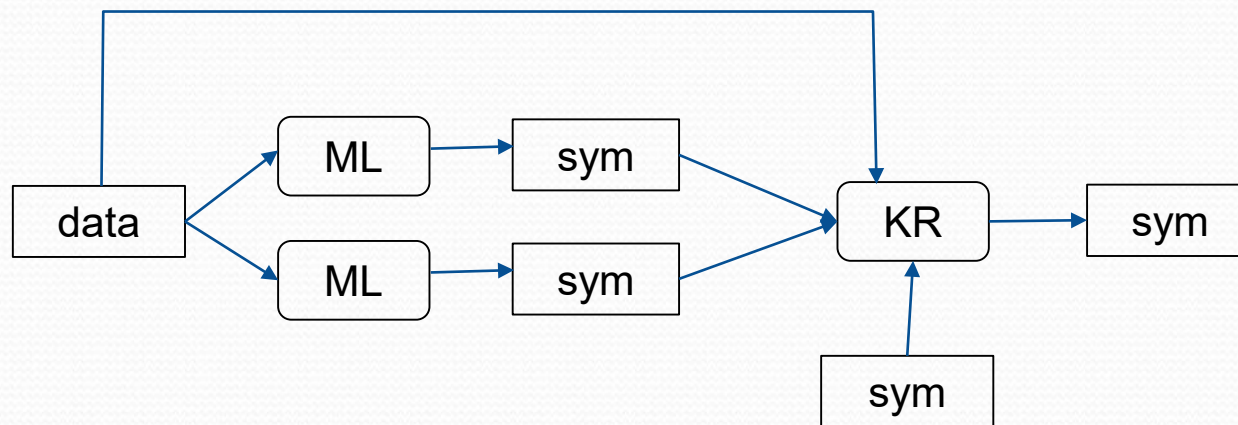
1. Human Knowledge
2. Web Search

Approach



Contd.





Challenges

- Data Collection
- Classifier accuracy
- Knowledge Base