

Artificial Intelligence Frames

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Motivation and Theory

1. Many papers on AI

2. Many conflicting goals for AI

=> **Contribution in clarifying these goals?**
“frames” (e.g. Goffman 1974)

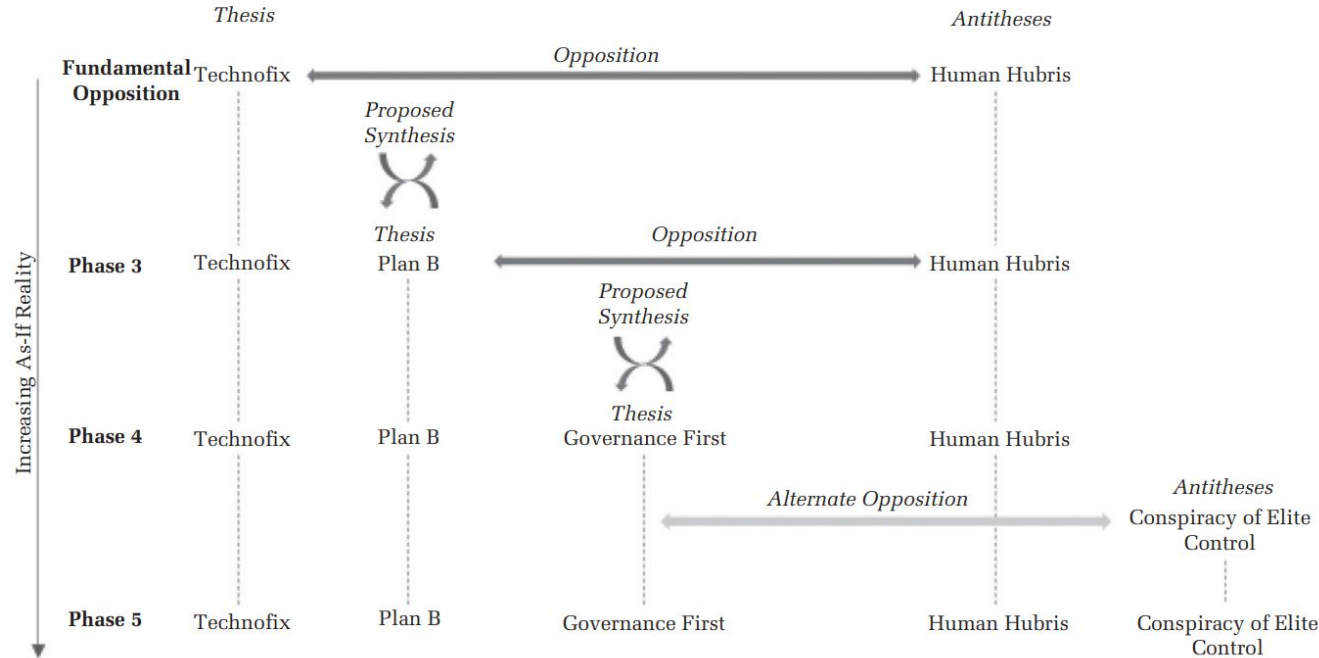
constitution

trade-offs

evolution

Augustine et al 2019 (AMJ)

FIGURE 1
Dialectic Process



AI News on the Web (NOW)

72,951 articles scraped from Google News

```
df['year'].value_counts()
```

20	21255
19	21137
18	13478
17	8466
16	6335
15	831
14	719
11	310
12	186
10	149
13	85

```
df['publisher'].value_counts()
```

analyticsindiamag.com	1712
Digital Journal	776
The Straits Times	770
Times of India	621
Forbes	562
TMCnet	559
Livemint	506
YAHOO!	499
Business Insider	482
DEALSTREETASIA	460
itweb.co.za	438
The Australian Financial Review	432
NEWSTAGE	421
AsiaOne	420
ITWeb	381
The Star Online	374
yourstory.com	362
it-online.co.za	360
PR Newswire	359
The Business Times	353

```
df['country'].value_counts()
```

US	15875
IN	8896
SG	8032
GB	5788
CA	5719
ZA	5049
AU	4935
IE	4692
NZ	2601
MY	2200
??	1985
NG	1896
PH	1309
PK	1194



Intelligence community rolls out guidelines for ethical use of artificial intelligence

BY MAGGIE MILLER - 07/23/20 05:37 PM EDT

24 COMMENTS

Just In...

US proposes new summit with Taliban on interim Afghan government

INTERNATIONAL — 10M 34S AGO

Democrats break COVID impasse with deal on jobless benefits

SENATE — 55M 8S AGO

Justice Dept. pledges to address hate crimes against Asian Americans

ADMINISTRATION — 1H 39S AGO

Disneyland, other Calif. theme parks could reopen April 1

STATE WATCH — 1H 23M AGO

Sullivan returns to Alaska for family funeral

86 SHARES

© Getty Images

The U.S. intelligence community (IC) on Thursday rolled out an “ethics guide” and framework for how intelligence agencies can responsibly develop and use artificial intelligence (AI) technologies.

Among the key ethical requirements were shoring up security, respecting human dignity through complying with existing civil rights and privacy laws, rooting out bias to ensure AI use is “objective and equitable,” and ensuring human judgement is incorporated into AI development and use.

The IC wrote in the [framework](#), which digs into the details of the [ethics guide](#), that it was intended to ensure that use of AI technologies matches “the Intelligence Community’s unique mission purposes, authorities, and responsibilities for collecting and using data and AI outputs.”

“The IC leads in developing and using technology crucial to our national security mission, and we cannot do so without recognizing and acting on its ethical implications,” Director of National Intelligence [John Ratcliffe](#) said in a statement Thursday. “These principles and their accompanying framework will help guide our mission leads and data scientists as they implement technology to solve intelligence problems.”

Most Popular

1 The eight Democrats who voted 'no...

902 SHARES

2 Democrats break COVID impasse with...

788 SHARES

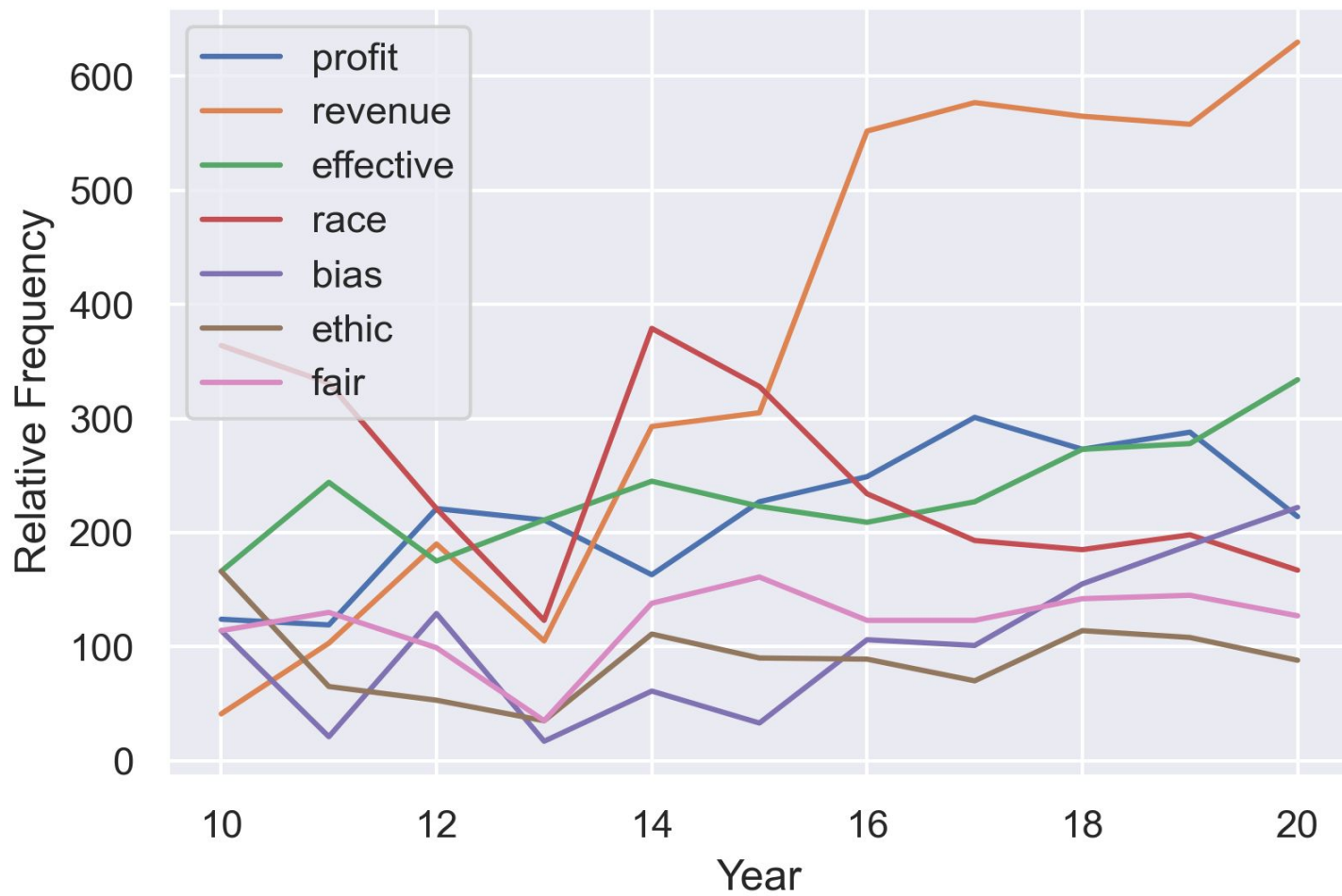
3 Missouri pastor faces backlash...

700 SHARES

4 Iceland has been hit by 18,000...

388 SHARES

5 Judge rules states were too late



Context Matters

2012 article that mentions “bias”

“...Coupled with the data, though, we must have a much better understanding of decision making, which means extending knowledge about cognitive **biases**, about boundary work (scientists, citizens, and policymakers working together to weigh options on the basis not only of empirical evidence but also of values)...”

– “The Future of Big Data”,
Pew Research Center

Context Matters

2020 article that mentions “bias”

“...Current implementations of the software also perpetuate racial **bias** by misidentifying people of color far more frequently than white people...”

– “Fight Against Facial Recognition Hits Wall Across The West”, *Politico*


```
In [135]: vis_ailda = pyLDAvis.gensim.prepare(topic_model=ailda, corpus=corpus, dictionary=dictionary)
pyLDAvis.display(vis_ailda)
```

Out[135]:

Selected Topic:

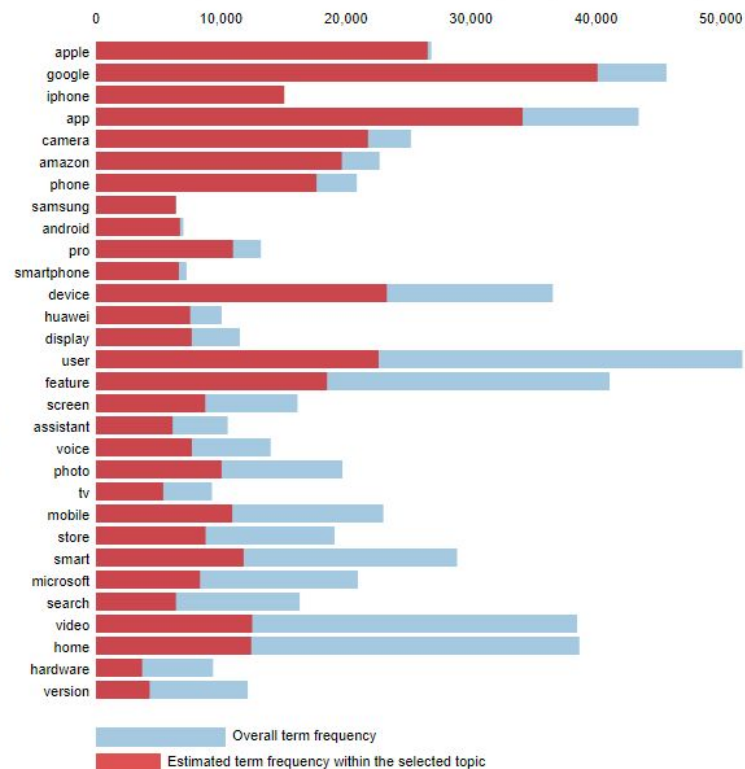
Slide to adjust relevance metric:(2)

$\lambda = 0.2$

Intertopic Distance Map (via multidimensional scaling)



Top-30 Most Relevant Terms for Topic 7 (7.2% of tokens)



1. $\text{saliency}(\text{term } w) = \text{frequency}(w) * [\sum_t p(t|w) * \log(p(t|w)/p(t))]$ for topics t ; see Chuang et al. (2012)

2. $\text{relevance}(\text{term } w | \text{topic } t) = \lambda * p(w|t) + (1 - \lambda) * p(w|t)/p(w)$; see Sievert & Shirley (2014)

	Topic_0	Topic_1	Topic_2	Topic_3	Topic_4	Topic_5	Topic_6	Topic_7	Topic_8	Topic_9
0	google	market	learn	china	health	model	business	say	say	security
1	app	company	human	say	patient	learn	company	people	india	say
2	apple	year	work	company	information	image	customer	work	global	government
3	device	growth	need	facebook	test	machine	service	year	industry	state
4	user	financial	people	chinese	study	network	cloud	game	country	law
5	camera	share	machine	people	disease	high	solution	think	development	public
6	amazon	stock	change	social	medical	base	platform	know	government	information
7	feature	investment	way	trump	say	fig	digital	want	year	africa
8	phone	report	science	coronavirus	research	process	market	come	innovation	national
9	iphone	increase	job	pandemic	help	algorithm	product	thing	sector	country

	Topic_0	Topic_1	Topic_2	Topic_3	Topic_4	Topic_5	Topic_6	Topic_7	Topic_8	Topic_9
0	said	company	google	health	technology	data	data	said	like	data
1	china	market	new	patients	new	learning	said	new	people	ai
2	government	business	apple	medical	ai	model	security	year	just	technology
3	world	year	app	covid	said	machine	facebook	university	time	business
4	chinese	growth	like	research	data	using	information	students	think	new
5	new	million	users	19	systems	used	media	world	world	digital
6	country	companies	amazon	care	energy	models	use	technology	way	learning
7	economic	services	company	healthcare	car	based	content	research	human	work
8	state	financial	phone	data	driving	deep	gt	team	going	need
9	global	data	video	patient	intelligence	neural	people	science	says	intelligence

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
0	human	human	human	human	human	human	human	human	learn	learn	learn
1	computer	computer	computer	computer	people	people	work	work	work	work	work
2	think	think	think	think	computer	work	people	learn	human	human	model
3	robot	say	say	people	work	learn	learn	say	say	machine	human
4	say	robot	learn	work	learn	say	say	people	people	say	machine
5	learn	learn	work	learn	think	think	machine	machine	machine	model	research
6	work	work	people	say	say	machine	think	need	need	research	science
7	people	people	robot	robot	robot	robot	robot	robot	research	people	study
8	science	science	science	machine	machine	computer	computer	think	university	need	patient
9	know	know	machine	science	way	way	way	way	science	science	people
10	year	year	know	way	year	year	research	research	way	university	need
11	machine	machine	year	know	science	research	need	university	think	study	university
12	way	way	way	year	know	know	university	computer	robot	way	test


```
In [192]: aiW2V2.most_similar(positive = ['google','android'], negative = ['facebook'], topn = 3)

Out[192]: [('os', 0.6035407781600952),
            ('voice', 0.5929619073867798),
            ('ios', 0.5700787305831909)]

In [196]: aiW2V2.most_similar(positive = ['machine','learning'], negative = ['deep'], topn = 3)

Out[196]: [('translation', 0.6564205884933472),
            ('finch', 0.5229377746582031),
            ('techniques', 0.49845004081726074)]

In [193]: aiW2V.most_similar(positive = ['company','years'], negative = ['companies'], topn = 3)

Out[193]: [('decades', 0.6332410573959351),
            ('months', 0.6087016463279724),
            ('decade', 0.589408278465271)]

In [194]: aiW2V2.most_similar(positive = ['robot','physical'], negative = ['algorithm'], topn = 3)

Out[194]: [('robots', 0.6743583083152771),
            ('mankind', 0.6014483571052551),
            ('singularity', 0.5984086394309998)]
```

```
In [74]: aiD2V.docvecs.most_similar([aiD2V['artificial'] ], topn=5 )
```

```
Out[74]: [('Intelligence community rolls out guidelines for ethical use of artificial intelligence',  
          0.3960205316543579),  
          ('China bids to become AI leader by 2030', 0.3951415419578552),  
          ('Take part in the first online AI study of human intelligence',  
          0.37886735796928406),  
          ('The Paradox of Artificial Intelligence', 0.36949050426483154),  
          ('Future happenings', 0.3667345345020294)]
```

```
In [41]: aiD2V.docvecs.most_similar([aiD2V['robot'] ], topn=5 )
```

```
Out[41]: [('robot', 0.5433241128921509),  
          ('The Complete History And Future <strong>of</strong> Robots | WIRED',  
          0.38944414258003235),  
          ('15 Small Robots That Will Invade Your Home Sooner Than You Think',  
          0.3852573037147522),  
          ('How fearful should we be about the rise of the robots?',  
          0.36742928624153137),  
          ('Tokyo phone shop replaces staff with a team of Pepper the ...',  
          0.36168625950813293)]
```

```
In [51]: aiD2V.docvecs.most_similar([aiD2V['bias'] ], topn=5 )
```

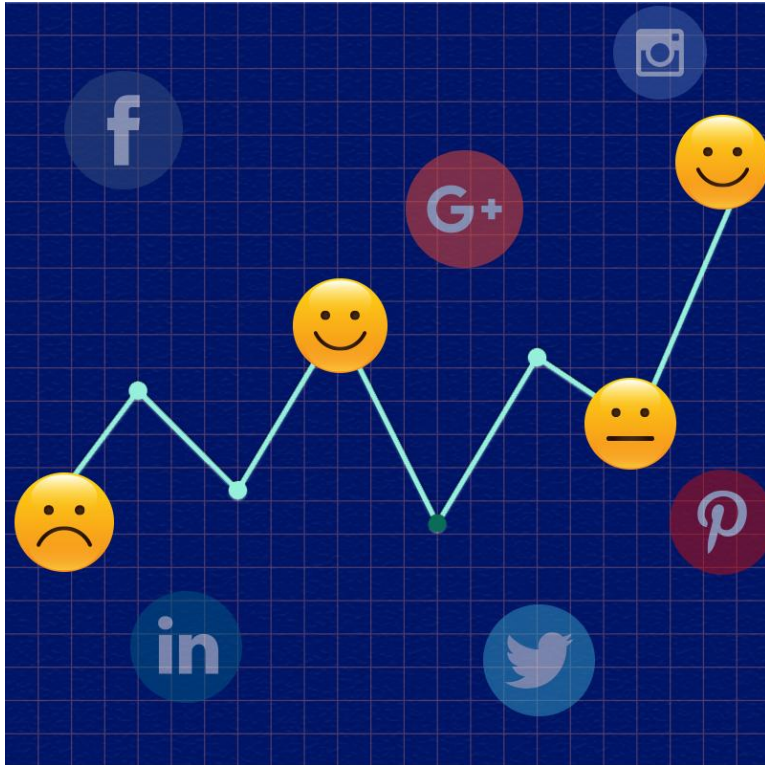
```
Out[51]: [('bias', 0.5471852421760559),  
          ('Why Mitigating AI Biases Is The Need of The Hour?', 0.4158788025379181),  
          ('fairness', 0.374753475189209),  
          ('The racist, fascist, xenophobic, misogynistic, intelligent machine',  
          0.37429606914520264),  
          ('The Real Reason Tech Struggles With Algorithmic Bias | WIRED',  
          0.33665013313293457)]
```

Can BERT learn **time** differences?



- Hugging Face
BertForSequenceClassification
- All 2015 versus all 2017
articles
- **68.6% accuracy**

BERT sentiment analysis



deep learning
machine learning
nvidia
google

artificial intelligence
algorithmic bias

GPT-2 Text Generation

Prompt	Pre-trained GPT-2	Fine-tuned GPT-2
My favorite activity is	to play with your friends. I love to play with my friends.	to watch a video of a video game and then play it back to the computer.
The solution to the world's problems is	to create a world where people are free to choose their own path.	to create a new kind of economy that works for everyone.

GPT-3 Text Generation

Prompt	Pre-trained GPT-3
The future of artificial intelligence is	in question because some people say it is unpredictable and others say it is predictable. This is because right now some things are predictable and some things are unpredictable.

**PRE-SOFTWARE:
SPECIAL-PURPOSE
COMPUTER**



**SOFTWARE 1.0:
DESIGN
THE ALGORITHM**



**SOFTWARE 2.0:
DESIGN
THE DATASET**



**SOFTWARE 3.0:
DESIGN
THE PROMPT**



Grounded Hypotheses

H1: AI milestones change the constitutions, frequencies, and relationships of frames.

H2: The frames used by AI stakeholders vary based on how closely they are involved in AI.

H3: Some frames are more likely to be discussed in the same document than others.

Future Research

1. Explicating the frames (e.g. Technofix)
2. Better topic models (e.g. 'stm' in R)
3. Fancy contextual embeddings (e.g. discourse atoms)
4. Other corpuses (e.g. social critique, ProQuest)